

RESI-xxx-SIO RESI-xxx-ETH

Our series of intelligent IO modules based on MODBUS protocol and ASCII text protocol for building automation and industrial automation.

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1 Our portfolio

We offer the following IO products:

1.1 ULTRA SLIM serial IO modules

Our ultra slim IO modules are extreme small modules and offer various IOs, always in combination with a RS232 and RS485 interface.

The dimension of those IO modules is very slim:

Only 17.5x90x58mm (WxHxD) in size

Those IO modules offer the following protocols:

- a MODBUS/RTU slave protocol
- a simple ASCII text protocol

The modules support the following baud rates:

- from 300bd up to 256000bd
- none, even and odd parity
- one or two stop bits.

All our modules are designed for use with 12 to 48Vdc power supplies, so they offer a broad range of applications. The serial interface is always galvanically insulated from the IOs on the module. The modules are designed for mounting on a DIN EN50022 rail.

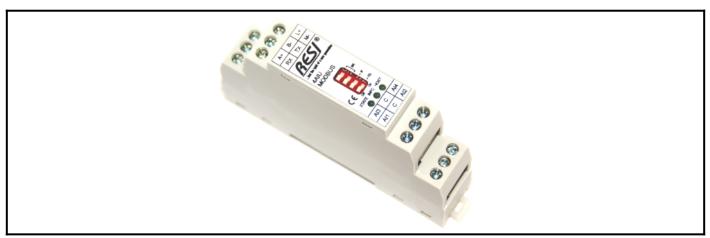


Figure: Sample of an ultra slim IO module with serial interface



1.2 ULTRA SLIM Ethernet IO modules

Our ultra slim IO modules are extreme small modules and offer various IOs, always in combination with an Ethernet interface.

The dimension of those IO modules is very slim:

■ Only 35.8x90x58mm (WxHxD) in size

Those IO modules offer various protocols:

- MODBUS/TCP server protocol
- MODBUS/RTU slave protocol via Ethernet
- simple ASCII text protocol via socket
- The Ethernet interface offers
- RJ45 interface mit 10MBit/100MBit
- support of AUTO MDIX

All our modules are designed for use with 12 to 48Vdc power supplies, so they offer a broad range of applications. The serial interface is always galvanically insulated from the IOs on the module. The modules are designed for mounting on a DIN EN50022 rail.



Figure: Sample of an ultra slim IO module with Ethernet interface



1.3 BIGIO serial IO modules

Our BIGIO modules are extreme compact modules with many IOs, always in combination with a serial RS485 interface. We offer two different housings depending on the amount of IOs implemented in the IO module. The dimension of the XT8 IO modules is:

- 142,3x110x62mm (WxHxD) in size
- The dimension of the XT12 IO modules is:
- 213x110x62mm (WxHxD) in size

Those IO modules offer various protocols:

- MODBUS/TCP server protocol
- MODBUS/RTU slave protocol via Ethernet
- simple ASCII text protocol via socket
- The Ethernet interface offers
- RJ45 interface mit 10MBit/100MBit
- support of AUTO MDIX

All our modules are designed for use with 12 to 48Vdc power supplies, so they offer a broad range of applications. The serial interface is always galvanically insulated from the IOs on the module. The modules are designed for mounting on a DIN EN50022 rail. but the modules offer also a wall mounting option.

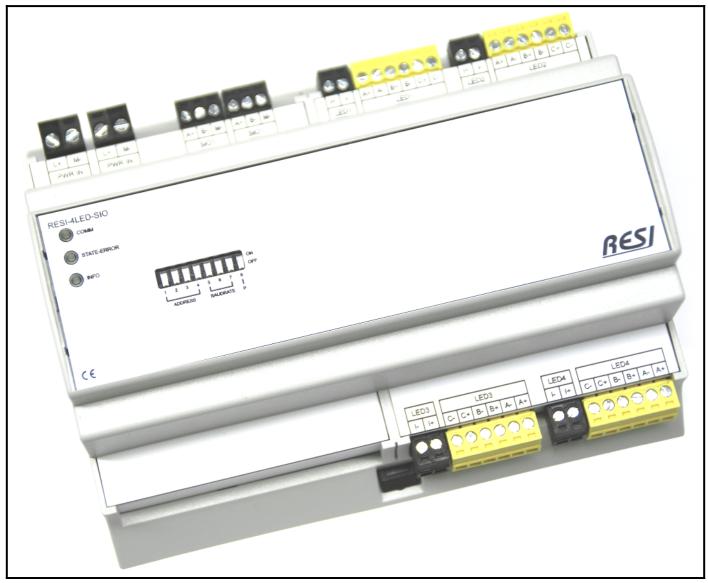


Figure: Sample of a XT8 IO module with serial interface



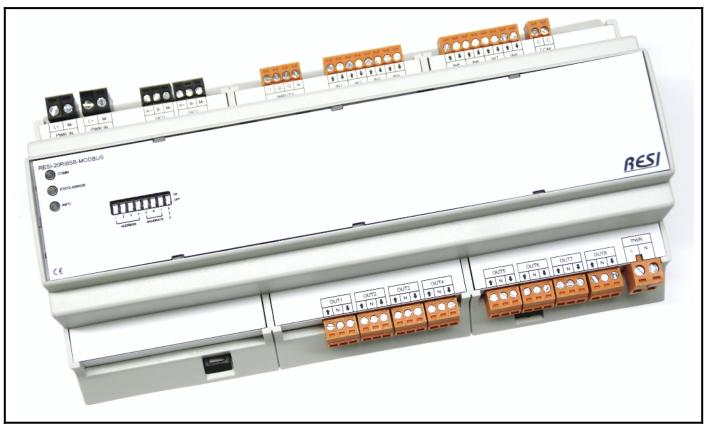


Figure: Sample of a XT12 IO module with serial interface



2 Declaration of conformity

2.1 CE

All products have passed the CE tests for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables.

2.2 Safety instructions



Danger to life through electrical current!

Only skilled personal trained in electro-engineering should perform the described steps in the following chapters. Please observe the country specific rules and standards. Do not perform any electrical work while the device is connected to power.

Pay attention to the following rules:

- 1. Disconnect the system from power
- 2. Secure the system against automatic power on
- 3. Check that the system is de-energized
- 4. Cover other energized parts of the system

IMPORTANT HINT: Before you start with the installation and the initial setup of the device, you have to read this document and the attached installation guide and the actual manual for the device very carefully. You have to follow all the herein given information very accurate!

- □ Only authorized and qualified personnel are allowed to install and setup the device!
- □ The connection of the device must be done in de-energized state!
- Do not perform any electrical work while the device is connected to power!
- Disable and secure the system against any automatic restart or power on procedure!
- □ The device must be operated with the defined voltage level!
- Supply voltage jitters must not exceed the technical specifications and tolerances given in the technical manuals for the product. If you do not obey this issue, the proper performance of the device cannot be guaranteed. This can lead to fail functions of the device and in worst case to a complete breakdown of the device!
- □ You have to obey the current EMC regulations for wiring!
- □ All signal, control and supply voltage cables must be wired in a way, that no inductive or capacitive interference or any other severe electrical noise disturbance may interfere with the device. Wrong wiring can lead to a malfunction of the device!
- □ For signal or sensor cables you have to use shielded cables, to avoid damages through induction!
- □ You have to obey and to apply the current safety regulations given by the ÖVE, VDE, the countries, their control authorities, the TÜV or the local energy supply company!
- Obey country-specific laws and standards!
- □ The device must be used for the intended purpose of the manufacturer!
- D No warranties or liabilities will be accepted for defects and damages resulting from improper or incorrect usage of the device!
- Subsequent damages, which results from faults of this device, are excluded from warranty and liability!
- Only the technical data, wiring diagrams and operation instructions, which are part to the product shipment are valid!
- The information on our homepage, in our data sheets, in our manuals, in our catalogs or published by our partners can deviate from the product documentation and is not necessarily always actual, due to constant improvement of our products for technical progress!
- □ In case of modification of our devices made by the user, all warranty and liability claims are lost!
- The installation has to fulfil the technical conditions and specifications (e.g. operating temperatures, power supply, ...) given in the devices documentation!
- Operating our device close to equipment, which do not comply with EMC directives, can influence the functionality of our device, leading to malfunction or in worst case to a breakdown of our device!
- Our devices must not be used for monitoring applications, which solely serve the purpose of protecting persons against hazards or injury, or as an emergency stop switch for systems or machinery, or for any other similar safety-relevant purposes!
- Dimensions of the enclosures or enclosures accessories may show slight tolerances on the specifications provided in these instructions!
- □ Modifications of this documentation is not allowed!
- In case of a complaint, only complete devices returned in original packing will be accepted!



3 Our Portfolio

Here you find a list of all available IO modules:

3.1 Digital IO modules

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-2RI-SIO	2xdigital inputs for 12-250Vac/dc signals	ULTRA SLIM 17.5mm
RESI-2RI-ETH	2xdigital inputs for 12-250Vac/dc signals	ULTRA SLIM 35.8mm
RESI-4DI-SIO	4xdigital inputs for 12-48Vdc signals	ULTRA SLIM 17.5mm
RESI-4DI-ETH	4xdigital inputs for 12-48Vdc signals	ULTRA SLIM 35.8mm
RESI-14RI-SIO	14xdigital inputs for 12-250Vac/dc signals	BIGIO XT8 142.3mm
RESI-48RI-SIO	48xdigital inputs for 12-250Vac/dc signals	BIGIO XT12 213mm
RESI-32DI-SIO	32xdigital inputs for 12-48Vdc signals	BIGIO XT8 142.3mm
RESI-64DI-SIO	64xdigital inputs for 12-48Vdc signals	BIGIO XT12 213mm
RESI-1RO-SIO	1xrelay output with max. 230Vac,30Vdc, 8A and NO+NC contacts	ULTRA SLIM 17.5mm
RESI-1RO-ETH	1xrelay output with max. 230Vac,30Vdc, 8A and NO+NC contacts	ULTRA SLIM 35.8mm
RESI-2RO-SIO	2xrelay output with max. 230Vac,30Vdc, 8A and NO contacts	ULTRA SLIM 17.5mm
RESI-2RO-ETH	2xrelay output with max. 230Vac,30Vdc, 8A and NO contacts	ULTRA SLIM 35.8mm
RESI-2SSR-1A-SIO	2xsolid state relay outputs with max. 250Vac, 250Vdc, 1A and NO contacts	ULTRA SLIM 17.5mm
RESI-2SSR-1A-ETH	2xsolid state relay outputs with max. 250Vac, 250Vdc, 1A and NO contacts	ULTRA SLIM 35.8mm
RESI-2SSR-6A-SIO	2xsolid state relay outputs with max. 60Vac, 60Vdc, 6A and NO contacts	ULTRA SLIM 17.5mm
RESI-2SSR-6A-ETH	2xsolid state relay outputs with max. 60Vac, 60Vdc, 6A and NO contacts	ULTRA SLIM 35.8mm
RESI-4DO-SIO	4xdigital outputs with max. 2-32Vdc, 300mA	ULTRA SLIM 17.5mm
RESI-4DO-ETH	4xdigital outputs with max. 2-32Vdc, 300mA	ULTRA SLIM 35.8mm
RESI-8CO-SIO	8xrelay output with max. 230Vac,30Vdc, 8A and NO+NC contacts	BIGIO XT8 142.3mm
RESI-8COBI-SIO	8xbistable relay output with max. 230Vac,30Vdc, 8A and NO+NC contacts	BIGIO XT8 142.3mm
RESI-10SSR-1A-SIO	10xsolid state relay outputs with max. 250Vac, 250Vdc, 1A and NO contacts	BIGIO XT8 142.3mm
RESI-10SSR-6A-SIO	10xsolid state relay outputs with max. 60Vac, 60Vdc, 6A and NO contacts	BIGIO XT8 142.3mm
RESI-30DO-SIO	30xdigital outputs with max. 2-32Vdc, 300mA	BIGIO XT8 142.3mm
RESI-60DO-SIO	60xdigital outputs with max. 2-32Vdc, 300mA	BIGIO XT12 213mm



PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-S16DI8PO-SIO	16xdigital inputs for 12-48Vdc signals 8xbistable power relais max. 250Vac, 16A, 200µF	BIGIO XT8 142.3mm
RESI-S8PO-SIO	8xbistable power relais max. 250Vac, 16A, 200µF	BIGIO XT8 142.3mm
RESI-16RI8PO-SIO	16xdigital inputs for 10-250Vac/dc signals 8xbistable power relais max. 250Vac, 16A, 200µF	BIGIO XT12 213mm
RESI-8PO-SIO	8xbistable power relais max. 250Vac, 16A, 200µF	BIGIO XT12 213mm
RESI-10RI4SB-SIO	10xdigital inputs for 10-250Vac/dc signals 8xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT8 142.3mm
RESI-4SB-SIO	8xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT8 142.3mm
RESI-20RI8SB-SIO	20xdigital inputs for 10-250Vac/dc signals 16xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT12 213mm
RESI-8SB-SIO	16xrelais max. 250Vac, 6A, AgSNO₂ contacts	BIGIO XT12 213mm
RESI-10RI8RO-SIO	10xdigital inputs for 10-250Vac/dc signals 8xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT8 142.3mm
RESI-8RO-SIO	8xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT8 142.3mm
RESI-20RI16RO-SIO	20xdigital inputs for 10-250Vac/dc signals 16xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT12 213mm
RESI-16RO-SIO	16xrelais max. 250Vac, 6A, AgSNO ₂ contacts	BIGIO XT12 213mm



3.2 Analog IO modules

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-4AIU-SIO	4xanalog inputs for -10+10Vdc signals, 16 bit, ±0.1%	ULTRA SLIM 17.5mm
RESI-4AIU-ETH	4xanalog inputs for -10+10Vdc signals, 16 bit, ±0.1%	ULTRA SLIM 35.8mm
RESI-12AIU-SIO	12xanalog inputs for -10+10Vdc signals, 16 bit, ±0.1%	BIGIO XT8 142.3mm
RESI-4AOU-SIO	4xanalog outputs for -10+10Vdc signals, 16 bit, ±0.1%	ULTRA SLIM 17.5mm
RESI-4AOU-ETH	4xanalog outputs for -10+10Vdc signals, 16 bit, ±0.1%	ULTRA SLIM 35.8mm
RESI-12AOU-SIO	12xanalog outputs for -10+10Vdc signals, 16 bit, ±0.1%	BIGIO XT8 142.3mm
RESI-2AIU2AOU-SIO	2xanalog inputs for 0+10Vdc signals, 12 bit, ±0.5% 2xanalog outputs for 0+10Vdc signals, 12 bit, ±0.5%	ULTRA SLIM 17.5mm
RESI-2AIU2AOU-ETH	2xanalog inputs for 0+10Vdc signals, 12 bit, ±0.5% 2xanalog outputs for 0+10Vdc signals, 12 bit, ±0.5%	ULTRA SLIM 35.8mm



3.3 Temperature IO modules

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-2RTD-SIO	2xinputs for RTD temperature sensors (PT100, PT1000, NI1000, NI120,) ±0.1% 2-wire, 3-wire and 4 wire connection	ULTRA SLIM 17.5mm
RESI-2RTD-ETH	2xinputs for RTD temperature sensors (PT100, PT1000, NI1000, NI120,) ±0.1% 2-wire, 3-wire and 4 wire connection	ULTRA SLIM 35.8mm
RESI-8RTD-SIO	8xinputs for RTD temperature sensors (PT100, PT1000, NI1000, NI120,) ±0.1% 2-wire, 3-wire and 4 wire connection	BIGIO XT8 142.3mm
RESI-8RTD2-SIO	8xinputs for RTD temperature sensors (PT100, PT1000, NI1000, NI120,) ±0.1% 2-wire connection	BIGIO XT8 142.3mm



3.4 IO modules for light systems

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-1LED-SIO	1x3 PWM outputs for LED stripes <60Vdc, <5A per PWM channel	ULTRA SLIM 17.5mm
RESI-1LED-ETH	1x3 PWM outputs for LED stripes <60Vdc, <5A per PWM channel	ULTRA SLIM 35.8mm
RESI-4LED-SIO	4x3 PWM outputs for LED stripes <60Vdc, <5A per PWM channel	BIGIO XT8 142.3mm
RESI-DMX-SIO	1xDMX512 master interface for one DMX universe	ULTRA SLIM 17.5mm
RESI-DMX-ETH	1xDMX512 master interface for one DMX universe	ULTRA SLIM 35.8mm
RESI-DALI-SIO	1xDALI master interface for 64 DALI ballasts	ULTRA SLIM 17.5mm
RESI-DALI-ETH	1xDALI master interface for 64 DALI ballasts	ULTRA SLIM 35.8mm



3.5 Special IO modules

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-1S0-SIO	1xS0 impulse input for smart meter with S0 interface	ULTRA SLIM 17.5mm
RESI-1S0-ETH	1xS0 impulse input for smart meter with S0 interface	ULTRA SLIM 35.8mm
RESI-2S0-SIO	2xS0 impulse input for smart meter with S0 interface	ULTRA SLIM 17.5mm
RESI-2S0-ETH	2xS0 impulse input for smart meter with S0 interface	ULTRA SLIM 35.8mm
RESI-1EGYDCS-SIO	1xDC metering with external shunt, DC voltage: 0100Vdc, max. 255A shunt	ULTRA SLIM 17.5mm
RESI-1EGYDCS-ETH	1xDC metering with external shunt, DC voltage: 0100Vdc, max. 255A shunt	ULTRA SLIM 35.8mm
RESI-1EGYDC-SIO	1xDC metering with external hall sensor, DC voltage: 0100Vdc, max. 80A	ULTRA SLIM 17.5mm
RESI-1EGYDC-ETH	1xDC metering with external hall sensor, DC voltage: 0100Vdc, max. 80A	ULTRA SLIM 35.8mm



3.6 MBUS IO modules

PRODUCT	DESCRIPTION	HOUSING TYPE
RESI-MBUS2-SIO	MBUS master to read data from 2 smart meter with MBUS interface	ULTRA SLIM 17.5mm
RESI-MBUS8SIO	MBUS master to read data from 8 smart meter with MBUS interface	ULTRA SLIM 17.5mm
RESI-MBUS24-SIO	MBUS master to read data from 24 smart meter with MBUS interface	ULTRA SLIM 17.5mm
RESI-MBUS48-SIO	MBUS master to read data from 48 smart meter with MBUS interface	ULTRA SLIM 17.5mm
RESI-MBUS64-SIO	MBUS master to read data from 64 smart meter with MBUS interface	ULTRA SLIM 17.5mm
RESI-MBUS2-ETH	MBUS master to read data from 2 smart meter with MBUS interface	ULTRA SLIM 35.8mm
RESI-MBUS8-ETH	MBUS master to read data from 8 smart meter with MBUS interface	ULTRA SLIM 35.8mm
RESI-MBUS24-ETH	MBUS master to read data from 24 smart meter with MBUS interface	ULTRA SLIM 35.8mm
RESI-MBUS48-ETH	MBUS master to read data from 48 smart meter with MBUS interface	ULTRA SLIM 35.8mm
RESI-MBUS64-ETH	MBUS master to read data from 64 smart meter with MBUS interface	ULTRA SLIM 35.8mm

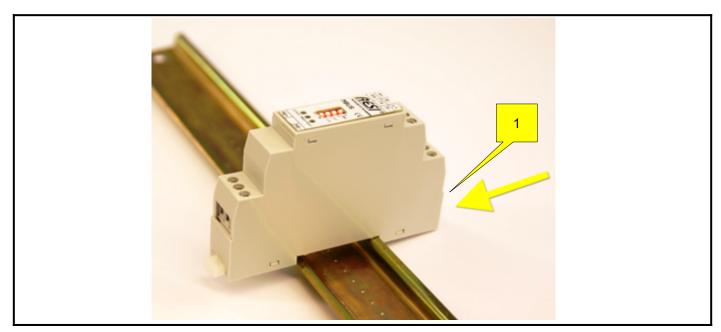


4 Mounting

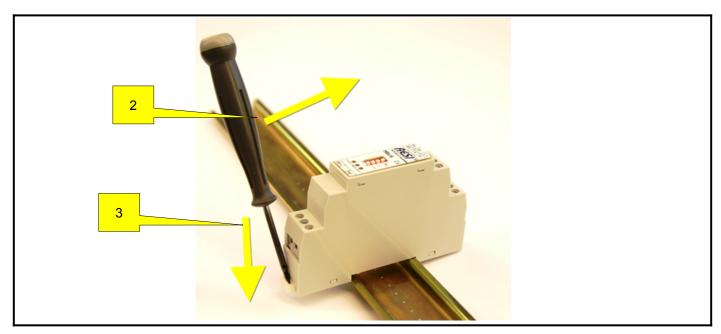
Here you will find the different mounting options for our modules

4.1 Mounting for ULTRA SLIM IOs

Our IO modules are designed for mounting on a 35mm DIN-EN50022 rail. At first, put the modules with the top side on the DIN rail (1).

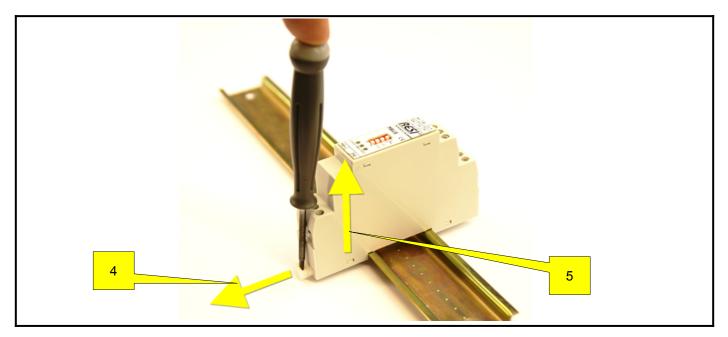


Then open the clamp lever on the bottom side with a screw driver (2) and press the device on the DIN rail (3). Release the clamp lever. The module is now placed correctly on the DIN rail.





To dismount the module from the DIN rail first open the clamp lever with a screwdriver on the bottom side (4). Hold the clamp lever opened while you lift the module from the DIN rail (5). Then remove the module from the bar with while pulling it on the top side.



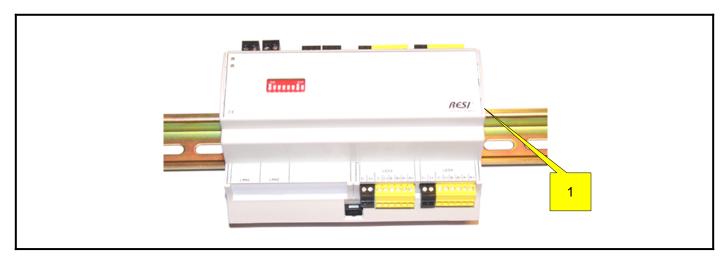


4.2 Mounting for BIG IOs XT8 or XT12

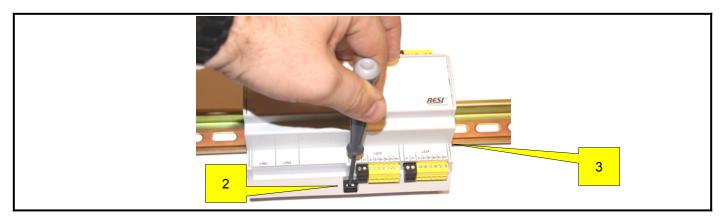
Our BIG IO modules are designed for mounting onto a 35mm DIN-EN50022 rail or for wall mounting. Please not, that in the following mounting description we use only symbolic photos of our IO modules.

4.2.1 Mounting on a DIN EN50022 rail

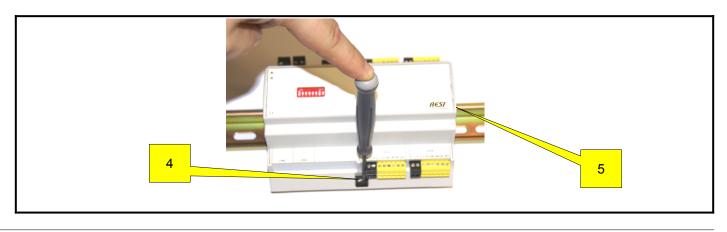
First snap in the top part of the module into the DIN rail (1). The bottom part of the module is not snapped into the DIN rail at this moment.



Then open the black hook with a screw driver (2). Now press the module with the opened hook onto the DIN rail until both sides of the module snap into the DIN rail (3). Release the screw driver now. The hook snaps into the DIN rail and the module is now mounted correctly onto the DIN rail.

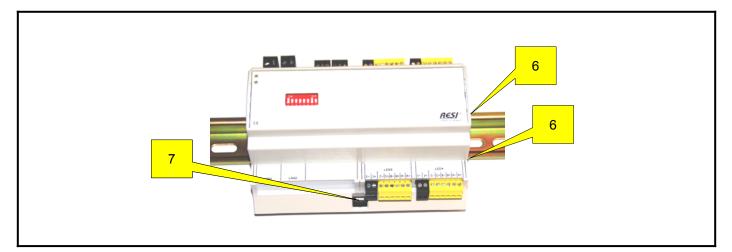


To remove the module from the DIN rail, you must open the hook with a screwdriver first. (4). Afterwards tilt the bottom side of the module upwards with the open hook (5). Now remove the module slightly from the DIN rail with the top side, to completely hang out the module from the DIN rail.





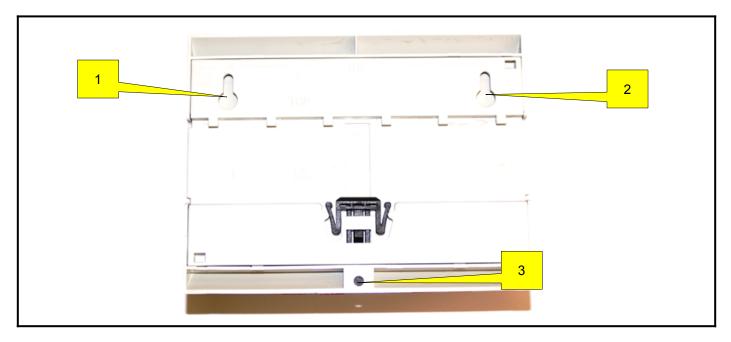
The module is correctly mounted, if the module has snapped into the DIN rail on both sides of the housing (6) and if the hook has snapped in too (7).



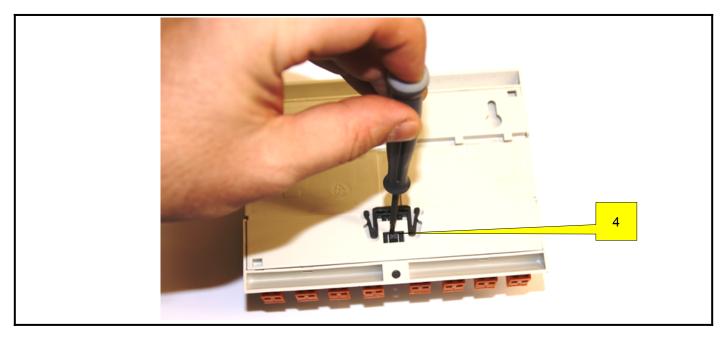


4.2.2 Mounting onto a wall

Our modules can also be mounted onto a wall. Turn over the module as shown in the picture below:

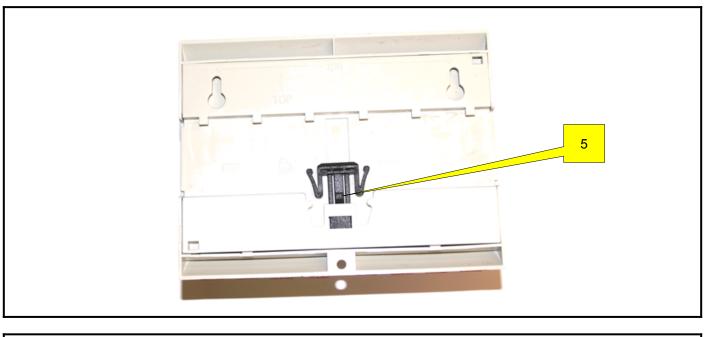


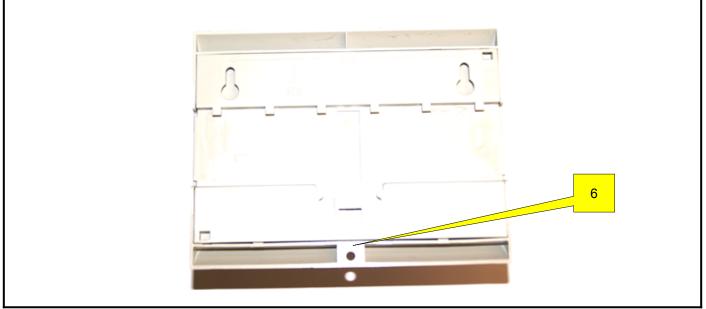
You will notice, that there are two holes for wall hooks or screws on the top side of the housing. (1) and (2). On the bottom side you will notice a small hole for a screw to fix the housing on the wall from the front (3). But first we have to remove the hook, which blocks the screw hole in the housing.





Press carefully the screwdriver onto the hook to open the lock (4) and pull back the hook to the inner side of the housing bottom to remove the hook. If the hook is not snapped into the housing, you can remove the hook by hand (5) and the screw hole for fixing the housing with a screen from the front side of the housing (6).







Now fix two wall hooks or screws into the wall. Use a center to center distance of 108mm between those two screws or hooks. The screw head must be bigger than 4mm but also smaller than 8mm to fix the housing onto the wall like a picture frame. If the housing in mounted onto the wall, you can fix the housing with a secure screw through the hole in the bottom housing from the front. But your screw must be smaller than 4mm to fit into this hole and the screw head must be bigger than 4mm to press the housing onto the wall.

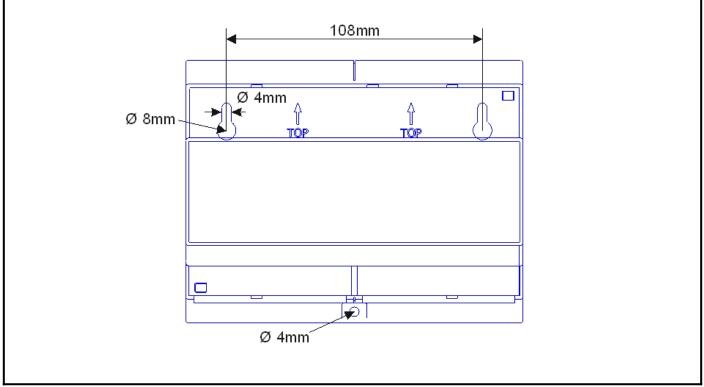


Illustration: Bottom view of the module with holes for XT8 wall mounting



5 General technical data

In this section you will find all technical data which is common to all IO modules. In the specific sections of the individual IO modules you will find only the differences and extensions to this standard description.

5.1 Basic technical data

Power supply	
Supply voltage	12-48 V = +/- 10%
Voltage LED indicator	Yes
Power consumption	see individual technical data for specific IO module
Serial interface	
(only for serial ULTRA SLIM IOs and BIG	IOs)
Protocols	MODBUS/RTU slave or ASCII text protocol
Туре	RS232 or RS485 for ULTRA SLIM IOs
	RS485 for BIG IOs
Baud rate	300 to 256000bd
Data bits	8 bits
Parity	none, even or odd
Stop bits	1 or 2 bits
LED indicator	Yes
Ethernet interface	
(only for Ethernet ULTRA SLIM IOs)	
Protocols	MODBUS/TCP Server
	ASCII Text socket
	MODBUS/RTU over Ethernet
Туре	Ethernet
Cable connection	via RJ 45 socket
LED indicator	Yes
General	
Storage temperature	-2085 °C
Operating temperature	055 °C
Humidity	2590% r.H. non-condensing
Protection class	IP20 (EN 60529)
Dimensions LxWxH	see section Dimension
Weight	see individual technical data for specific IO module
Installation	on DIN EN50022 rail for ULTRA SLIM IOs
	on DIN EN50022 rail and on wall for BIG IOs
Approvals	
CE conformity	Yes



5.2 Serial ULTRA SLIM IOs: basic terminals

The serial ULTRA SLIM IOs come in a housing with integrated clamps. All IO modules offer the following terminals:

L+, M-	Power supply:		
	L +:	12-48 V =	
	M-:	mass	
A, B, M-	RS485 ASCII or MODE	BUS/RTU interface	
	A +:	RS485 DATA + signal	
	В-:	RS485 DATA signal	
	M-:	RS485 ground signal	
TX, RX, M-	RS232 ASCII or MODE	BUS/RTU interface	
	TX +:	RS232 transmit signal	
	RX-:	RS232 receive Signal	
	M-:	RS232 ground signal	
Terminal type USLIM	Cable cross section:	max. 2.5 mm², max. 14AWG	
	Screw:	M3	
	Tightening torque:	max. 0.5Nm, max. 4.5 Lb-in	

5.3 Ethernet ULTRA SLIM IOs: basic terminals

The Ethernet ULTRA SLIM IOs come in a housing with integrated clamps. All IO modules offer the following terminals:

L+, M-	Power supply:		
	L +:	12-48 V =	
	M-:	mass	
ETHERNET	RJ45 connector		
	Ethernet connection	10M/100Mbit adaptive	
	supports AUTO–MDIX		
Terminal type USLIM	Cable cross section:	max. 2.5 mm², max. 14AWG	
	Screw:	M3	
	Tightening torque:	max. 0.5Nm, max. 4.5 Lb-in	



5.4 Serial BIG IOs: basic terminals

The serial BIG IOs come in a housing with removable clamps. All IO modules offer the following terminals:

L+, M-	Power supply via two separated plug-in 2-pin terminal blocks. For daisy chain IN and OUT power supply of many modules		
	Pin 1:	L+: 12-48 V=	
	Pin 2:	M-: Ground	
	Terminal type:	RM5	
SIO1	RS485 ASCII or MODE	BUS/RTU serial interface IN	
	Pin 1:	A+: RS485 DATA+ signal	
	Pin 2:	B-: RS485 DATA- signal	
-	Pin 3:	GND: RS485 ground signal	
	Terminal type:	RM3.5	
SIO2	RS485 ASCII or MODBUS/RTU serial interface OUT		
	Pin 1:	A+: RS485 DATA+ signal	
	Pin 2:	B-: RS485 DATA- signal	
	Pin 3:	GND: RS485 ground signal	
	Terminal type:	RM3.5	
Terminal type RM5	Cable cross section:	max. 2.5 mm², max. 14AWG	
	Screw:	M3	
	Tightening torque:	max. 0.5Nm, max. 4.43 Lb-in	
Terminal type RM3.5	Cable cross section:	max. 1.5 mm², max. 16AWG	
	Screw:	M2	
	Tightening torque:	max. 0.2Nm, max. 1.77 Lb-in	



5.5 Ethernet BIG IOs: basic terminals

The serial BIG IOs come in a housing with removable clamps. All IO modules offer the following terminals:

L+, M-	Power supply via two separated plug-in 2-pin terminal blocks. For daisy chain IN and OUT power supply of many modules		
	Pin 1:	L+: 12-48 V=	
	Pin 2:	M-: Ground	
	Terminal type:	RM5	
ETH	Ethernet interface		
	RJ45		
Terminal type RM5	Cable cross section:	max. 2.5 mm², max. 14AWG	
	Screw:	M3	
	Tightening torque:	max. 0.5Nm, max. 4.43 Lb-in	



6 Power supply

All of our IO modules support 12-48Vdc external power supply (±10%). The power cables should be selected according to the length of the power lines and the number of modules connected. When implementing a network with long cables, the use of thicker wire is more suitable due to the limitation of DC voltage drop. Furthermore, long wires can also cause interference with communication wires. All modules use onboard switching regulators to sustain efficiency over the 12..48Vdc input range. So the actual drawn current can be assumed to be inversely proportional to the DC voltage.

6.1 Power supply for serial ULTRA SLIM IO modules

The following drawings show the correct power supply for all of our serial SLIMIO products:

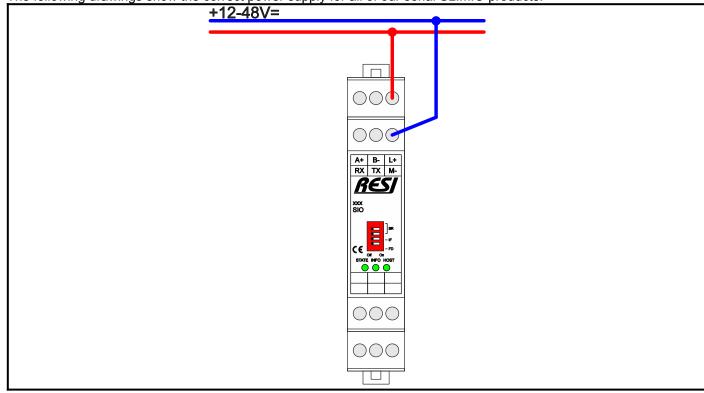


Figure: Power supply for our serial ULTRA SLIM IO modules



Power supply for Ethernet ULTRA SLIM IO modules 6.2

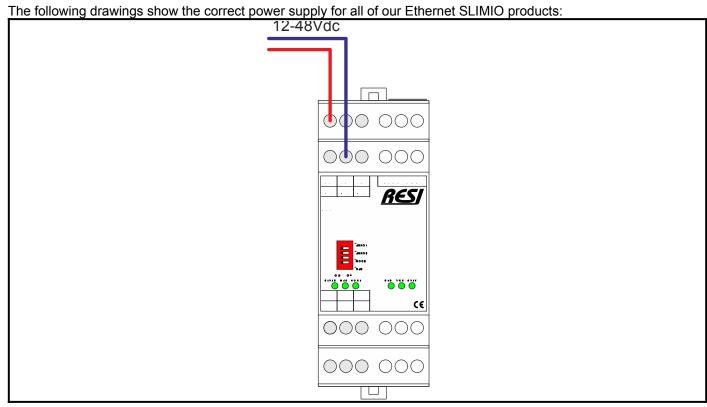


Figure: Power supply for our Ethernet ULTRA SLIM IO modules



6.3 Power supply for BIGIO XT8 modules

The following drawings show the correct power supply for all of our BIGIO XT8 products:

Figure: Power supply for our BIGIO XT8 modules



6.4 **Power supply for BIGIO XT12 modules**

The following drawings show the correct power supply for all of our BIGIO XT12 products:

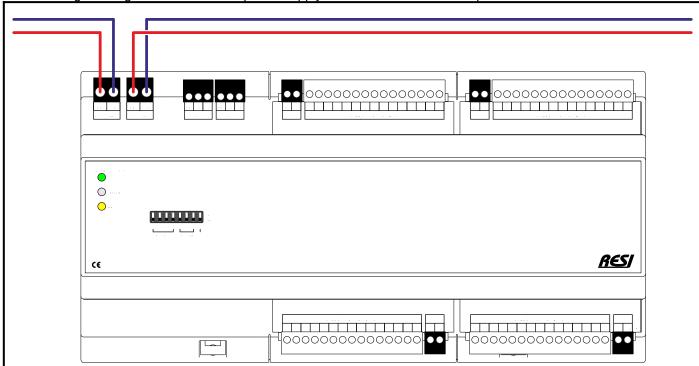


Figure: Power supply for our BIGIO XT12 modules



7 Serial connection

Our serial ULTRASLIM IO modules offer a RS232 or RS485 interface. Our serial BIGIO modules offer only a RS485 interface. The following drawings show the correct connection of the serial bus.

7.1 Serial connection for ULTRA SLIM IO modules

The following drawings show the correct serial connection of the RS232 or the RS485 for all of our serial SLIMIO products:

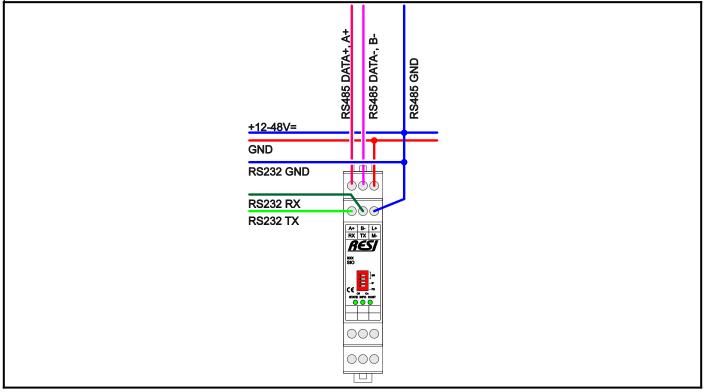


Figure: Serial connection for RS232 or RS485 for our serial ULTRA SLIM IO modules



7.2 Serial connection for BIGIO XT8 modules

The following drawings show the correct serial connection of the RS485 for all of our serial BIGIO products:

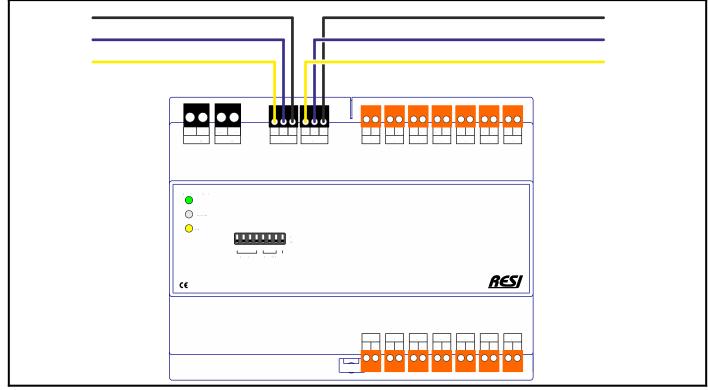


Figure: Serial connection for RS485 for our serial BIG IO modules



7.3 Serial connection for BIGIO XT12 modules

The following drawings show the correct serial connection of the RS485 for all of our serial BIGIO products:

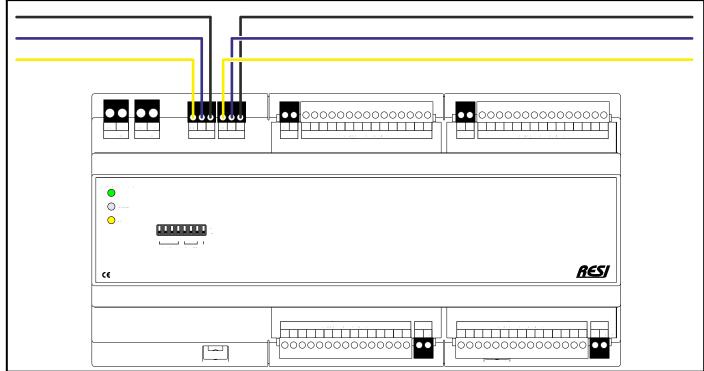


Figure: Serial connection for RS485 for our serial BIG IO modules



7.4 RESI-xxx-SIO SERIAL PROTOCOL

As mentioned our modules support either MODBUS/RTU or a simple ASCII text protocol.

7.4.1 MODBUS/RTU protocol

All of our serial IO modules communicate with a host system with the MODBUS/RTU slave protocol (RS232 or RS485 variants) or with the MODBUS/TCP server protocol (Ethernet version).

For communication via ASCII texts, ASCII messages with a special start character # (0x23, 35dec) and special end characters (0x0d, 13dec or CARRIAGE RETURN) are sent from the host to the module. The module also sends its responses with this special start and end character. See the ASCII command description below. In ASCII mode you can communicate with or without a bus number.

The following MODBUS functions are available for communication via MODBUS/RTU or MODBUS/TCP:

READ COIL STATUS (function code: 1) READ INPUT STATUS (function code: 2) READ HOLDING REGISTER (function code: 3) READ INPUT REGISTER (function code: 4) FORCE SINGLE COIL (function code: 5) PRESET SINGLE REGISTER (function code: 6) FORCE MULTIPLE COILS (function code: 15) PRESET MULTIPLE REGISTERS (function code: 16)

Note:

The functions READ HOLDING REGISTER and PRESET MULTIPLE REGISTERS are limited to max. 125 registers limited per request! The functions READ INPUT STATUS, READ COIL STATUS and FORCE MULTIPLE COILS are limited to 2000 coils or inputs (bits) per data frame.



7.4.1.1 HOWTO map values to MODBUS registers

MODBUS is an international standard for communication between host systems like PLCs, DDCs or Industrial PCs and peripheral components or sensors.

More details about the MODBUS standard and the MODBUS protocol can be found here: <u>http://en.wikipedia.org/wiki/Modbus</u> <u>http://www.modbus.org/</u>

You can find a documentation about this in the internet called "PI_MBUS_300.pdf", which describes the MODBUS protocol pretty good.

There are three different MODBUS protocol versions available: **MODBUS/TCP**: Used for communication with TCP/IP systems **MODBUS/RTU**: A binary version of the MODBUS protocol **MODBUS/ASCII**: An ASCII text based version of the protocol

To communicate, our RESI-xxx-SIO converters have either a RS232 interface to communicate 1 to 1, which means one MODBUS/RTU master (your host system) can talk to exact one MODBUS/RTU slave, or a RS485 to offer a one to many communication. Here one MODBUS/RTU master can communicate with a maximum of 255 MODBUS/RTU slaves. In older host systems the limit is 32 slaves. This depends on the capabilities of the RS485 driver IC in the host system. Our converters are able to use 256 communication partners on a RS485 line.

Our RESI-xxx-ETH converters can communicate with MODBUS/TCP protocol. A MODBUS/TCP system consists out of one TCP server which is in fact our gateway and at least one to n MODBUS/TCP clients. This will be your host. Our converters can connect only to one TCP client at a time.

To communicate the converters use an Ethernet interface.

MODBUS unit:

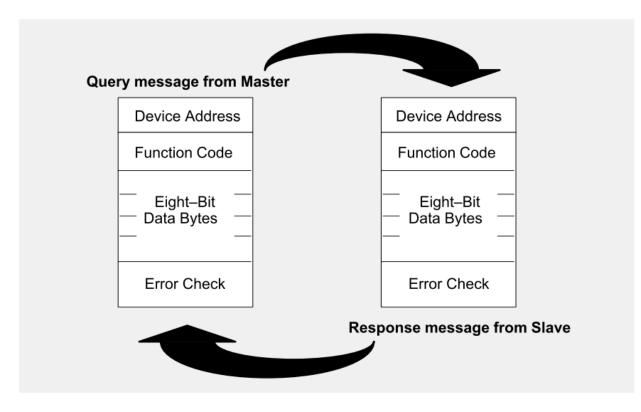
The MODBUS protocol demands a unique address of a MODBUS slave to address this special slave. This address is called MODBUS unit. The range of this address is from 0 to 255. Usually 0 is not used in applications. We use 0 for broadcast functions.



7.4.1.2 MODBUS query response cycle

MODBUS is a master slave protocol. This means, the master (your host system) has to send a protocol to a specific MODBUS slave (one of our converters), then this specific slave answers to the master, and then the master asks the next slave. The address of the slave is the so-called device address or unit address, which we mentioned before. See the below graphic, how a basic MODBUS request and response cycle looks like.

The Query–Response Cycle





7.4.1.3 MODBUS/RTU telegram structure

A MODBUS/RTU protocol frame consists out of the following fields:

- START: There is no specific start character, so a pause of four character timings depending on the baud rate of your communication must be established. This means at least for four characters, that there must be no communication on the serial line!
- ADDRESS: This is the unit address of the slave, the master wants to talk to. It's a number between 0 and 255.
- FUNCTION: This defines the type of data communication, the master wants to handle with the slave. Refer to the next pages for a detailed description of the functions.
- DATA: This is a block of individual data bytes.
- CRC CHECK: This is the checksum, to let the master and slave check, if the received protocol is correct and without communication errors.
- END: Same as the start condition. Again there must not be communicated for at least 4 character times on the serial line.

IMPORTANT HINT: If there is more than one MODBUS slave on a serial line, the pausing of the START and END sequence are essential to re synchronize the slaves in case of data loss. If the host doesn't keep this gaps, communication with the slaves can be corrupted or impossible!

START	ADDRESS	FUNCTION	DATA	CRC CHECK	END
T1-T2-T3-T4	8 BITS	8 BITS	n x 8 BITS	16 BITS	T1–T2–T3–T4



7.4.1.4 MODBUS commands

The MODBUS standard defines many available commands . But not all systems handle the complete spectrum of telegrams. Our converter handles only all telegrams necessary for using holding and INPUT registers.

We support

03 READ HOLDING REGISTER 04 READ INPUT REGISTER 06 PRESET SINGLE REGISTER 16 PRESET MULTIPLE REGISTER

IMPORTANT HINT: All other protocols are ignored by our converters.

So what are HOLDING REGISTERs ?

According to the MODBUS standard, a MODBUS/RTU slave can hold up to 65535 HOLDING registers. Each holding register is a 16 bit register, capable for integer values between 0 and 65535 or in hexadecimal from 0x0000 to 0xFFFF. A MODBUS/RTU master system can read and write the contents of those registers.

IMPORTANT HINT:

A MODBUS/RTU master can read and write into this registers with a 16 bit index, called the

starting address. The problem is the definition of the starting address. A 16 bit value can store the values from 0 to 65535. But according the MODBUS standard the registers are numbered from 1 to 65536. So, if the MODBUS standard talks about register 1, an index of 0 must be used as start address in the telegram. You have to check carefully, how this index is interpreted by the manufacturers' documentation.

Code Name

- 01 Read Coil Status
- 02 Read Input Status
- 03 Read Holding Registers
- 04 Read Input Registers
- 05 Force Single Coil
- 06 Preset Single Register
- 07 Read Exception Status
- 08 Diagnostics
- 09 Program 484
- 10 Poll 484
- 11 Fetch Comm. Event Ctr.
- 12 Fetch Comm. Event Log
- 13 Program Controller
- 14 Poll Controller
- 15 Force Multiple Coils
- 16 Preset Multiple Registers
- 17 Report Slave ID
- 18 Program 884/M84
- 19 Reset Comm. Link
- 20 Read General Reference
- 21 Write General Reference

Whenever you get a description of registers for a MODBUS device, the first question to solve is: How is the enumeration of the registers done?! Does the author use base=0, then he talks about the real start index of the telegram. Does the author mean base=1, conforming to naming conventions of the MODBUS consortium, then you have to subtract 1 before using this address in your telegrams.



IMPORTANT HINT:

If we display a holding register address like 4x00009 in our tool, we assume base=1 conforming to the standard. So your host system has to send the start index 00008 decimal to read out the correct register.

Start Index (Base=0)	MODBUS Register (Base=1)	Description
0	1	The first holding register
1	2	The second holding register
2	3	The third holding register
65534	65535	The penultimate holding register
65535	65536	The last holding register

7.4.1.5 MODBUS 16 bit holding register structure

Here we give a brief introduction, how to build the contents of a MODBUS holding register, and how a hexadecimal writing of a 16 bit register looks like. We assume, that the user is familiar to hexadecimal and binary number systems and also how a computer stores data into its internal memory.

For more details consult the internet: http://en.wikipedia.org/wiki/Hexadecimal http://en.wikipedia.org/wiki/Binary_number

Usually a hexadecimal digit describes 4 bits. So we can group the 16 bits into 4 hexadecimal digits named H3,H2,H1,H0. This means eg. the hexadecimal number 0xABCD stands for H3=A, H2=B, H1=C, H0=D.

	16 Bit HOLDING Register														
MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	H3 H2 H1 H0														

0xA=1010 binary, 10 dec, 0xB=1011,11 dec, 0xC=1100,12 dec and 0xD=1101, 13 dec. So the resulting binary number is 1010101111001101b or 43981 decimal.



See this graphical explanation, how the number is stored:

MSB				-											LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0	1	0	1	0	1	1	1	1	0	0	1	1	0	1
A B				([)						

7.4.1.6 MODBUS big vs. least significant byte order

Now the first problem for a host system arises:

If we take the 16 bit number 0xABCD, we have to use 2 bytes to store this value internally. There are two concurrent versions of how to store this value in the RAM:

INTEL byte order, Little endian systems store the least significant byte first. So a memory map for 0xABCD look like:

Memory address 0	CD
Memory address 1	AB

MOTOROLA byte order, Big endian systems store the most significant byte first. So a memory map for 0xABCD look like:

Memory address 0	
Memory address 1	

AB	
CD	

Consult the internet for more details about this storage system.

http://en.wikipedia.org/wiki/Endianness

MODBUS storing large data into 16 bit registers 7.4.1.7

After years, the market found out, that the capabilities of storing only 16 bit numbers into one holding register is not enough for many applications. The most common solution to store more than 16 bit values into holding registers is to use more than one register to hold the value. For storing e.g. a 32 bit value, we use two consecutive 16 bit holding registers, for storing a 32 bit float value we also use also two consecutive 16 bit registers!

We want to store the 32 bit integer value 0x12345678 into two consecutive holding registers starting at 4x00020. The memory map of the holding registers look like:

		16 bit value
Start Index 19	Holding Register 4x00020	0x1234
Start Index 20	Holding Register 4x00021	0x5678

But again, we can also store the reverse word order into two consecutive registers. Then the result looks like this:

		16 bit value
Start Index 19	Holding Register 4x00020	0x5678
Start Index 20	Holding Register 4x00021	0x1234

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So none of the above mentioned orders is better than the other. It depends only on the programmer, how the 32 bit value is treated.

Be aware, that both systems (host and converter) have to treat the 32 bit value in the same way. Otherwise you will read out wrong data! We will discuss this issue later in combination with 32 bit float numbers.

Our converter uses the second described way to store 32 bit values. We follow the little endian strategy of INTEL systems and store 0x5678 into the first HOLDING register, and then we store 0x1234 in the consecutive register.

7.4.1.8 MODBUS datatypes in our converters

Our converter supports the following data types for storing values into MODBUS registers.

- **16 bit signed binary**: This is an integer number between -32767..0..+32768 or 0x0000 to 0xFFFF hex. This number needs exactly one HOLDING register.
- **32 bit singed binary**: This is an integer number between -2,147,483,647..0..+2,147,483,648 or 0x00000000 to 0xFFFFFFF hex. This number needs two consecutive holding registers. We store the least significant word first. The serial number 2544082 is in hex 0x26D1D2. This leads to the following HOLDING register layout:

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		16 bit value
Start Index 0	Holding Register 4x00001	0xD1D2 or 53714 dec
Start Index 1	Holding Register 4x00002	0x0026 or 38 dec

32 bit IEEE floating point: This is a float number using 32 bit. As before, this float needs two consecutive holding registers. We store the least significant word first. The energy value of 6632480,00 is defined in 32 bit hex with 0x4ACA6840. This leads to the following HOLDING register layout. For more details search in the internet or consult http://en.wikipedia.org/wiki/IEEE_floating_point or try out some float values and their hexadecimal representation under http://www.h-schmidt.net/FloatConverter/IEEE754.html

						16 bit value	
Start Index 0			Holding Register 4x00001		0x6840		
Star	rt Index :	1	Holding Register 4	4x00002		0x4ACA	
	Sign	Expone	ent		Mantissa		
Value:	+1	2 ²²			1.581306457519	5312	
Encoded as:	0	149			4876352		
Binary:							
		Decima	al Representation	6632480.0			
	Binary Representation 01001010			0100101011001010	00110100001000000		
		Hexade	ecimal Representation	0x4aca6840			
		After ca	asting to double precision	6632480.0			



32 bit IEEE floating point inverse: This is a float number using 32 bit. Again this float needs two consecutive holding registers. We store the least significant word first. The energy value of 6632480,00 is in 32 bit hex 0x4ACA6840. This means the following HOLDING register layout. For more details search in the internet or consult http://en.wikipedia.org/wiki/IEEE_floating_point or try out some float values and their hexadecimal representation under http://www.h-schmidt.net/FloatConverter/IEEE754.html

							16 bit value	
Start Index 0			Holding Register 4x00001				0x4ACA	
Start Index		1 Holding		Holding Register 4x00002		0x6840		
	Sign	Expo	nent			Mantissa		
Value:	+1	2 ²	2			1.581306457519	5312	
Encoded as:	0	14	9			4876352		
Binary:				✓ 🗆				
		Decir	nal Representatio	n	6632480.0			
		Binar	y Representation		010010101100101	00110100001000000		
		Неха	adecimal Representation 0x4aca6840					
		After	casting to double	precision	6632480.0			

IMPORTANT HINT:

32 bit floats are very tricky! Eg. The value 3,5351799 is represented internally as 0x40624063. But the reverse word order (if the host reads out the wrong register indexes or the host corrupts the word order) 0x40634062 leads to the float number 3,5508046. So this error in your software is very hard to find! Be very cautious, which register indexes you read and how the word order of the two registers are interpreted.

32 bit date&time: This is a compressed format using 32 bit. Again the least significant word is stored into the first register. The structure of the 32 bits are:

Bits 07:	minute
Bits 815:	hour
Bits 1620:	day
Bits 2124:	month
Bits 2531:	year
The current	date & time "07.04

The current date & time "07.04.00 01:13" is represented hexadecimal with 0x0087010d (8847628dec) and stored as followed:

		16 bit value
Start Index 0	Holding Register 4x00001	0x010D
Start Index 1	Holding Register 4x00002	0x0087



7.4.1.9 MODBUS datatype storage and common pitfalls

In general MODBUS uses 16 bit wide registers. So if you use only datatypes, which needs also only one register, the mapping is easy. But as soon as you use datatypes, e.g. UINT32, which need two or more MODBUS registers, you can map the values in different ways.

We do a simple sample. We want to store the 32 bit unsigned integer value in hexadecimal 0x12345678 in MODBUS holding registers starting with index 4x00010. The mapping can be done in two different ways:

MODBUS Register	Storage of UINT32 datatype
4x00010	The high word of the 32 bit value 0x12345678 is stored in the first 16 bit wide MODBUS register.
1:9	This means the value 0x1234 is stored here.
4x00011	The low word of the 32 bit value 0x12345678 is stored in the second 16 bit wide MODBUS
l:10	register. This means the value 0x5678 is stored here.

But it is only one possibility, that we store the high word in the first MODBUS register. With the same right, we can define to store the low word in the first register, and the high word in the second.

|--|

MODBUS Storage of UINT32R datatype	
Register	
4x00010	The low word of the 32 bit value 0x12345678 is stored in the first 16 bit wide MODBUS register.
I:9	This means the value 0x5678 is stored here.
4x00011	The high word of the 32 bit value 0x12345678 is stored in the second 16 bit wide MODBUS
I:10	register. This means the value 0x1234 is stored here.

More complicated is the storage of a FLOAT32 value into two consecutive holding registers. We use a standard room temperature e.g. 23,45 °C as a value, we want to store it into two registers.

First we have to translate this value into a valid IEE754 float value. Therefore we use a perfect site in the internet (<u>http://www.h-schmidt.net/FloatConverter/IEEE754.html</u>):

	Sign	Exponent	Mantissa
Value:	+1	24	1.4656250476837158
Encoded as:	0	131	3905946
Binary:			$\lor ~ \lor ~$
		Decimal Representation	23.45
		Binary Representation	01000001101110111001100110011010
		Hexadecimal Representation	0x41bb999a
		After casting to double precisior	23.450000762939453

We enter the value 23.45 and we get a 32 bit hexadecimal representation of the float value. It is the number 0x41BB999A. Now we store this value in the same way, we have stored the UINT32 value into two registers:

MODBUS Register	Storage of FLOAT32 datatype
4x00010 I:9	The high word of the 32 bit float value 0x41BB999A is stored in the first 16 bit wide MODBUS register. This means the value 0x41BB is stored here.
4x00011 I:10	The low word of the 32 bit float value 0x41BB999A is stored in the second 16 bit wide MODBUS register. This means the value 0x999A is stored here.

But we can also use the reverse notation:

Storage of FLOAT32R datatype
The low word of the 32 bit float value 0x41BB999A is stored in the first 16 bit wide MODBUS
register. This means the value 0x999A is stored here.
The high word of the 32 bit float value 0x41BB999A is stored in the second 16 bit wide MODBUS
register. This means the value 0x41BB is stored here.
_



Now we show a common pitfall in writing and reading more than one MODBUS register and rebuilding a value. We use a different float value. In hexadecimal it is 0x41BC41BB. Again we use the online converter:

Sign +1 0	Exponent 2 ⁴ 131			271
	Decimal Representation		23.532095	
	Binary Representation		01000001101111000100000110111011	
	Hexadecimal Representat	ion	0x41bc41bb	
	After casting to double pre	ecision	23.532094955444336	
	+1	+1 2 ⁴ 0 131 • • • • • • • • • • • • • • • • • • •	+1 2 ⁴ 0 131 • • • • • • • • • • • • • • • • • • •	+1 2 ⁴ 1.470755934715 0 131 3948987 V Decimal Representation 23.532095 Binary Representation 0100000110111001

You notice, the float value is 23.532095.

Now we store it with HIGH word first into two registers:

MODBUS Register	Storage of FLOAT32 datatype
4x00010 I:9	The high word of the 32 bit float value 0x41BC41BB is stored in the first 16 bit wide MODBUS register. This means the value 0x41BC is stored here.
HIGH WORD	
4x00011 I:10	The low word of the 32 bit float value 0x41BC41BB is stored in the second 16 bit wide MODBUS register. This means the value 0x41BB is stored here.
LOW WORD	

But now we make a very big mistake, we read the two registers and restore the hexadecimal value in our host software in the reverse word order. First low word, then high word. The result is the 32 bit value 0x41BB41BC instead the correct value 0x41BC41BB. Then we convert this into an IEE754 float value.

	Sign	Exponent	Mantissa
Value:	+1	24	1.4629435539245605
Encoded as:	0	131	3883452
Binary:			$\checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \land \checkmark \land \land \land \land \land \land \land \land \land$
		Decimal Representation	23.407097
		Binary Representation	01000001101110110100000110111100
		Hexadecimal Representation	0x41bb41bc
		After casting to double precision	23.40709686279297

The result is 23.407097. This is not far away from the original number of 23.532095! So this massive software error can be undiscovered for a long time. Only if the reverse float value generates numbers which are physically not possible for the measured signal, this error is discovered!



7.4.1.10 MODBUS data type table

The following table shows, how more complex data types are stored in successive 16 bit holding or input registers within the MODBUS registers:

MODBUS DATATYPE	SIZE	WORD ORDER	DESCRIPTION
UINT16	16 bits 1 register	none	Defines a 16 bit unsigned integer value in the range of 0 to 65535 or 0x0000 to 0xFFFF
SINT16	16 bits 1 register	none	Defines a 16 bit signed integer value in the range of -32768 to +32767 or 0x8000 to 0x7FFF
UINT32	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit unsigned integer value in the range of 0 to 4.294.967.295 or 0x00000000 to 0xFFFFFFFF
SINT32	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit signed integer value in the range of -2.147.483.648 to +2.147.483.647or 0x80000000 to 0x7FFFFFF
UINT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit unsigned integer value in the range of 0 to 4.294.967.295 or 0x00000000 to 0xFFFFFFFF with reverse word order
SINT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit signed integer value in the range of -2.147.483.648 to +2.147.483.647or 0x80000000 to 0x7FFFFFF with reverse word order
FLOAT32	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit float value in the range of $\pm 1.4 \cdot 10^{-45}$ to $\pm 3.403 \cdot 10^{38}$. A mantissa of 23 bits and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma.
FLOAT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit float value in the range of $\pm 1.4 \cdot 10^{-45}$ to $\pm 3.403 \cdot 10^{38}$. A mantissa of 23 bits and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma. The two 16 bit words are stored in reverse order.
DOUBLE64	64 bits 4 register	0:Highest Word 1:Higher Word 2:Lower Word 3:Lowest Word	Defines a 64 bit float value in the range of $\pm 4.24 \cdot 10^{-324}$ to $\pm 1,798 \cdot 10^{308}$. A mantissa of 52 bits and an exponent of 11 bits are used. The value can store 15 to 16 digits after the comma.
DOUBLE64R	64 bits 4 register	0:Lowest Word 1:Lower Word 2:Higher Word 3:Highest Word	Defines a 64 bit float value in the range of $\pm 4.24 \cdot 10^{-324}$ to $\pm 1,798 \cdot 10^{308}$. A mantissa of 52 bits and an exponent of 11 bits are used. The value can store 15 to 16 digits after the comma. The four 16 bit words are stored in reverse order.



7.4.1.11 MODBUS table

COILS (1x) & INPUTS (2x)

The module holds internally a list of 1 bit coil and input register. Those registers can be read by the host with the function READ COIL STATUS (function code: 1). If the register can also be modified by the host, the host can use the functions FORCE SINGLE COIL (function code: 5) and FORCE MULTIPLE COILS (function code: 15).

In addition the SAME registers are also readable over the function READ INPUT STATUS (function code: 2). This is for host systems, which do not support all MODBUS/RTU functions properly.

The MODBUS convention defines 65535 possible coils with the notation 1x00001 to 1x65536. Inputs are usually noted with 2x00001 to 2x65536. Please refer the software MODBUS POLL as a sample for this notation. Internally in the MODBUS/RTU frames an index notation is used, which starts with 0 and ends with 65535. So we decided to note in the following document a register with: 1x00100 for the coil 100, 2x00100 as a hint, that you can read this register also as the input 100, and in addition also the real index of the protocol index 99 with the notation I:99.

HOLDING REGISTER (3x) & INPUT REGISTER (4x)

The module holds internally a list of 16 bit wide holding register. Those registers can be read by the host with the function READ HOLDING REGISTER (function code: 3). If the register can also be modified by the host, the host can use the functions PRESET SINGLE REGISTER (function code: 6) and PRESET MULTIPLE REGISTERS (function code: 16).

In addition the SAME holding registers are also readable over the function READ INPUT REGISTER (function code: 4). This is for host systems, which do not support all MODBUS/RTU functions properly.

The MODBUS convention defines 65535 possible holding register with the notation 4x00001 to 4x65536. Input register are usually noted with 3x00001 to 3x65536. Please refer the software MODBUS POLL as a sample for this notation. Internally in the MODBUS/RTU frames an index notation is used, which starts with 0 and ends with 65535. So we decided to note in the following document a register with: 4x00100 for the holding register 100, 3x00100 as a hint, that you can read this register also as the input register 100, and in addition also the real index of the protocol index 99 with the notation I:99.



SOFTWARE RESET					
RESET	1x06001 2x06001 I:6000	0,0x00 B:00	N/A:NO CHANGE	BIT R/W	NO
Performs a software reset, whenever 1 is wr	itten to this register. If the h	ost writes to this register 1, the module executes a soft res	et (reboot).		
RESET	3x06001 4x06001 1:6000	0,0×0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
Performs a software reset, whenever 1 is wr	itten to this register. If the h	ost writes to this register 1, the module executes a soft res	et (reboot).		
CONVERTER STATUS					
CONVERTER STATUS	3x06002 4x06002 1:6001	0,0x0000 B:00 00		UINT16 R/O	
Current status of the converter		1		i	
DIP SWITCH					
DIP SWITCH	3x10010 4x10010 1:10009	65,0x0041 B:00 41		UINT16 R/O	
Returns the current setting of the Dip switche For ULTRA SLIM IOS: Dir Dur Switch 1 (=0.0FF, =1.0N) Bit 0: DIP Switch 2 (=0.0FF, =1.0N) Bit 2: DIP Switch 3 (=0.0FF, =1.0N) Bit 2: DIP Switch 4 (=0.0FF, =1.0N) Bit 3: DIP Switch 4 (=0.0FF, =1.0N) Bit 0: DIP Switch 4 (=0.0FF, =1.0N) Bit 1: DIP Switch 1 (=0.0FF, =1.0N) Bit 2: DIP Switch 4 (=0.0FF, =1.0N) Bit 3: DIP Switch 1 (=0.0FF, =1.0N) Bit 3: DIP Switch 4 (=0.0FF, =1.0N) Bit 4: DIP Switch 5 (=0.0FF, =1.0N) Bit 5: DIP Switch 6 (=0.0FF, =1.0N) Bit 5: DIP Switch 8 (=0.0FF, =1.0N) Bit 7: DIP Switch 8 (=0.0FF, =1.0N)					
PRODUCT DATA					
HW_GROUP	3x65201 4x65201 I:65200	4096,0x1000 B:10 00		UINT16 R/O	
This is the group of hardware of the current	product				
SW_GROUP	3x65202 4x65202 I:65201	37,0x0025 B:00 25		UINT16 R/O	
This is the group of software of the current p	roduct				
SW_VERSION	3x65203 4x65203 I:65202	4352,0x1100 B:11 00		UINT16 R/O	
		SW VERSION:1.1.0			
This is the current software version of the firr					
SW_AUTHOR	3x65204 4x65204 I:65203	18771,0x4953 B:49 53		UINT16 R/O	
This is the current software author of the firm	Iware				



MODBUS SETTINGS						
UNIT_ID	3x65222 4x65222 I:65221	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO
		UNIT ID:1	•			
f the host reads this register, the c If the host write a new value into the The host can execute a reboot in NOTE:DIP switch 4 must set to OF	urrent programmed unit ID is returned his register, the new value will be stored writing to the register RESET SYSTEM FF to activate this unit ID, otherwise the	All values above unit ID 255 define also the unit ID 2 in the FLASH as the new unit ID. The new unit ID is unit ID is 255.	255. s activated after a po	wer off/power on cycle or a software reboot of the mod	ule.	
HINT:This settings will be activ	/e after you repower or reset your d	evice !!				
BAUD_RATE	3x65223 4x65223 I:65222	57600,0x0000E100 B:00 00 E1 00	38400	38400	UINT32 R/W	NO
		57600Bd		ENTER BAUD RATE		
	d rate in the FLASH IO: This baudrate is only used, if DIP s audrate is only used, if DIP switch mod	vitch mode DIP1=ON+DIP2=ON (BR) (default is 576 e DIP7=ON (PARAMETER) (default is 57600bd)	00bd)		·	
Valid baud rates are: 300bd, 600bd, 900bd, 1200bd, 24 9600bd, 19200bd, 38400bd, 5760 230400bd, 250000bd, 256000bd						
HINT:This settings will be activ	/e after you repower or reset your d	evice !!				
PARITY	3x65225 4x65225 1:65224	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
		NO PARITY		SELECT PARITY		
If the register is read out, the curry Writing a value to this register will Parity values are 0: no parity 1: even parity 2: odd parity	ently set parity of the serial interface is n change the new parity in FLASH. This v	eturned. vill only take effect after a restart of the module. This	can be triggered by	writing to the RESET SYSTEM register.		1
STOP BITS	3x65226 4x65226 I:65225	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO
		ONE STOPBIT	·	SELECT STOPBITS		
f the register is read out, the curre Writing a value to this register will Values for stop bits are 1: one stop bit	ently set number of stop bits of the seria change the new number of stop bits in	l interface is returned. the FLASH. This will only take effect after a restart of	f the module. This ca	n be triggered by writing to the RESET SYSTEM regist	er.	
2: two stop bits						



7.4.2 ASCII protocol

All of our IO modules communicate with very simple ASCII commands. The following special characters are used in this description:

stands for the hash sign ASCII character 35dec or 0x23

- : stands for the **colon** ASCII characters 58dec or 0x3A
- = stands for the equal sign with the ASCII code 61ec or 0x3D
- stands for the minus sign with the ASCII code 45dec or 0x2D
- , stands for the **comma** with the ASCII code 44dec or 0x2C

<CR> or $_{CR}$ stands for the **CARRIAGE RETURN** ASCII character 13dec or 0x0D. This is shown as CR in the following. **<SP>** or \Box stands for **SPACE**. This is the space in ASCII code 32dec or 0x20. The space is shown as , hereinafter.

In the following **<ADR>** is used for the **bus address**. This can be transmitted in decimal or hexadecimal and is separated from the following command with a comma (ASCII characters 44dec or 0x2C). Hexadecimal numbers always start with 0x. Only the ASCII characters '0' - '9' 48dec to 57dec, 0x30-0x39 and 'A' to 'F', 65dec to 70dec, 0x41-0x46 may be used. Each module always responds to broadcast address 0 and its own bus address. An external DIP switch can be used to quickly switch between the fixed bus address 255 and the programmed bus address. See the DIP switch description.

7.4.2.1 COMMUNICATION SEQUENCE

In principle, the IO module does not send any characters by itself. Communication always starts from the host. If only one IO module is used on a bus line (e.g. with RS232 interface), there is no need for a bus address in the protocol. In RS485 mode, however, several modules can be connected on an RS485 line. Then a bus address is absolutely necessary for communication.

The command structure looks like this:

The host sends a command or a command with parameters without a bus address: #<command><CR> or #<command>:<parameter><CR>

The module responds when it feels addressed with the telegram: #<respond><CR>

The host sends the following to the module with the bus address: #<ADR>,<command><CR> or #<ADR>,<command>:<parameter><CR>

The module then replies with: #<ADR>,<reply><CR>

The bus address is in the range from 1dec to 255dec or 0x00 to 0xFF hexadecimal. The setting is made using our free configuration software MODBUSConfigurator or our free LIBRE OFFICE® based configurator.

There are two spellings for each command. A long version and a short version, so that you have to send less. For example, you can query the software version with the VERSION command or with the VER command.



7.4.2.2 Example: Query VERSION

This command provides the current type of the module.

Long host version: #VERSION<CR> or #<ADR>,VERSION<CR>

Short host version: #VER<CR> or #<ADR>,VER<CR>

Reply: #VERSION:<HIGH>.<MED>.<LOW><CR> or #<ADR>,VERSION:<HIGH>,<MED>,<LOW><CR>

<HIGH>.<MED>.<LOW> represents the current software version, e.g. 3.0.0

Examples: #VERSION_{CR} #VERSION:3.0.0_{CR}

With broadcast address in decimal and long version: #0,VERSION_{CR} #0,VERSION:3.0.0_{CR}

With broadcast address in hexadecimal and short version: #0x00,VER_{CR} #0x00,VERSION:3.0.0_{CR}

With bus address 255 in decimal #255,VER_{CR} #255,VERSION:3.0.0_{CR}

With bus address 255 in hexadecimal #0xFF,VERSION_{CR} #0xFF,VERSION:3.0.0_{CR}

With bus address 43 in decimal #43,VER_{CR} #43,VERSION:3.0.0_{CR}

With bus address 43 in hexadecimal #0x2B,VER_{CR} #0x2B,VERSION:3.0.0_{CR}



7.4.2.3 Example: Query module TYPE

This command provides the current type of the module.

Long host version: #TYPE<CR> or #<ADR>,TYPE<CR>

Host short version: #TYP<CR> or #<ADR>,TYP<CR>

Respond: #TYPE:<TYP><CR> or #<ADR>,TYPE:<TYP><CR>

<TYP> represents the current type of the module. A RESI-2RI-SIO is shown as an example

Examples: #TYPEcr #TYPE:RESI-2RI-SIOcr

#255,TYP_{CR} #255,TYPE:RESI-2RI-SIO_{CR}

7.4.2.4 Table of all ASCII commands

In this list you will find all possible ASCII commands. Only the version including the bus address is listed here. It has already been explained that this can also be omitted. If an argument has the addition dec, it is returned as a decimal number. If an argument has the addition hex, a hexadecimal number is returned. Many commands return both the decimal and the hexadecimal representation. The host can thus choose which number conversion he would like to carry out.

Please refer to the description of individual products for more details about the available ASCII commands.



SCII
3011
SCII
SCII
SUI
SCII
SCII
SCII



MODBUS INTERFACE				
SET MODBUS ADDRESS	ASCII	#SET MODBUS ADDRESS: <unitid><cr></cr></unitid>	ASCII	NO
	WRITE	#SETMBADR: <unitid><cr></cr></unitid>		
	COMMAND	Result:		
		#OK <cr></cr>		
	UNITID	1		
	тх	#SET MODBUS ADDRESS:1 <cr></cr>		
	RX	N/A		
	100			
edefines the unit ID of the module. This	change will affect the MOF	BUS/RTU communication immediately. As a Unit IO you can use the values 0dec to 255dec.		
cuclines are unit ib of the module. This	Change will allest the MOL	boom to communication infiniteliately. As a onit to you can use the values ouce to 2550cc.		
INT: The new settings are activated after	er a system reboot or powe	off on cycle!		
ET MODBUS BAUDRATE	ASCII	#SET MODBUS BAUDRATE: <baud><cr></cr></baud>	ASCII	NO
	WRITE	#SETMBBAUD: <baud><cr></cr></baud>		
	COMMAND	Result:		
		#OK <cr></cr>		
	BAUD	57600:57600BD		
		#SET MODBUS BAUDRATE:57600 <cr></cr>		
	TX			
	RX	N/A		
ts a new baud rate in the FLASH				
or ULTRA SLIM IOs RESI-xxx-SIO: Thi	s baudrate is only used, if D	IP switch mode DIP1=ON+DIP2=ON (BR) (default is 57600bd)		
or BIG IOs RESI-xxx-SIO: This baudrat	e is only used, if DIP switch	IP switch mode DIP1=ON+DIP2=ON (BR) (default is 57600bd) mode DIP7=ON (PARAMETER) (default is 57600bd)		
ne ionowing baugrates are allowed:	4900bd			
he following baudrates are allowed: 00bd, 600bd, 900bd, 1200bd, 2400bd, 600bd, 19200bd, 38400bd, 57600bd, 1	400000, 15200bd 128000bd			
30400bd, 250000bd, 256000bd	1020000, 12000000			
INT: The new setup parameters will be	active after a restart of the	module.		
ET MODBUS PARITY	ASCII	#SET MODBUS PARITY: <parity><cr></cr></parity>	ASCII	NO
	WRITE	#SETMBPAR: <parity><cr></cr></parity>	7,60011	
	COMMAND	Result:		
	CONINIAND			
		#OK <cr></cr>		
	PARITY	#OK <cr> NONE:NO PARITY</cr>		
		#OK <cr></cr>		
	PARITY	#OK <cr> NONE:NO PARITY</cr>		
	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
Sets a new parity for the serial interface.	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
/BParity:	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
IBParity:	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
IBParity: IONE: no parity IVEN: even parity	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
IBParity: IONE: no parity IVEN: even parity	PARITY TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr></cr></cr>		
IBParity: IONE: no parity VEN: even parity DD: odd parity	PARITY TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A</cr></cr>		
Sets a new parity for the serial interface. /BParity. /CNE: no parity V2FN: even parity V2D: odd parity /INT: The new setup parameters will be	PARITY TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A N/A module.</cr></cr>		
IBParity: ' IONE: no parity VEN: even parity DDD: odd parity IINT: The new setup parameters will be	PARITY TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A</cr></cr>	ASCII	NO
IBParity: ' IONE: no parity VEN: even parity DDD: odd parity IINT: The new setup parameters will be	PARITY TX RX active after a restart of the	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A M/A Module. #SET MODBUS STOP:<stopbit><cr></cr></stopbit></cr></cr>	ASCII	NO
IBParity: ONE: no parity VEN: even parity DD: odd parity INT: The new setup parameters will be	PARITY TX RX active after a restart of the ASCII WRITE	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SET MODBUS STOP:<stopbit><cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity. IONE: no parity VEN: even parity VDD: odd parity IINT: The new setup parameters will be	PARITY TX RX active after a restart of the ASCII	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SET MODBUS STOP:<stopbit><cr> Result:</cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity. IONE: no parity VEN: even parity VDD: odd parity IINT: The new setup parameters will be	ARITY TX RX active after a restart of the ASCII WRITE COMMAND	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: ONE: no parity VEN: even parity DD: odd parity INT: The new setup parameters will be	PARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT</cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: ONE: no parity VEN: even parity DD: odd parity INT: The new setup parameters will be	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity. IONE: no parity VEN: even parity VDD: odd parity IINT: The new setup parameters will be	PARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT</cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: JONE: no parity VEN: even parity JDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IMParity: JONE: no parity VEN: even parity DD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: IONE: no parity VEN: even parity IDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: ' ONE: no parity VEN: even parity VED: odd parity IINT: The new setup parameters will be SET MODBUS STOPS ET MODBUS STOPS	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: ' ONE: no parity VEN: even parity VED: odd parity IINT: The new setup parameters will be SET MODBUS STOPS ET MODBUS STOPS	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: IGNE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: A setup parameters will be SET MODBUS STOPS EXAMPLE: A setup parameters will be INT: one stop bits for the setup WO: two stop bits	ARITY TX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A</cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	NO
IBParity: '.' ONE: no parity VEN: even parity UDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS EXTENDED HIGHT STOPS HISTOPS HISTOPS NE: one stop bits WO: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module.</cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: '.' ONE: no parity VEN: even parity UDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS EXTENDED HIGHT STOPS HISTOPS HISTOPS NE: one stop bits WO: two stop bits IINT: The new setup parameters will be	ARITY TX RX active after a restart of the ASCI STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A</cr></cr></cr></stopbit></cr></stopbit></cr></cr>	ASCII	
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module.</cr></cr></cr></stopbit></cr></stopbit></cr></cr>		NO
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ARITY TX RX active after a restart of the ASCI STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A nodule. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> NVA module. #SET MODBUS STOP:ONE<cr> N/A ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr></cr></stopbit></parity></baud></unitid></cr></cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ACIU WRITE ASCII WRITE COMMAND STOPBIT TX RX rial interface.	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A nodule. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT ONE:STOPBIT SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> Result: #COMPARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MED PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MED PARAMS:<unitid>,<baud>,<parity>,<stopbit></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: '.' ONE: no parity VEN: even parity UDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS EXTENDED HESTOPS IBStops NE: one stop bit WO: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX rial interface. active after a restart of the ASCII WRITE COMMAND	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SETMDPARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SETMDPARAMAS:<unitid>,<baud>,<parity>,<stopbit></stopbit></parity>,<stopbit></stopbit></baud></unitid></cr></stopbit></parity>,<stopbit></stopbit></baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,<stopbit></stopbit></baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity>,</baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX ACTI RX ACTI RX ACTI RX COMMAND STOPBIT TX RX rial interface. ACTI WRITE COMMAND ACTI RX I I I I I I I I I I I I I I I I I I	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A nodule. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>.<baud>.<parity>.<stopbit><cr> #SET MODBUS PARAMS:<unitid>.<baud>.<parity>.<stopbit><cr> Result: #OK<cr> 1</cr></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: '.' ONE: no parity VEN: even parity UDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS EXTENDED HESTOPS IBStops NE: one stop bit WO: two stop bits IINT: The new setup parameters will be	ACIU WRITE COMMAND STOPBIT TX ASCII WRITE COMMAND STOPBIT TX RX rial interface. ASCII WRITE COMMAND UNITID BAUD	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A module. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A Module. #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX ACTI RX ACTI RX ACTI RX COMMAND STOPBIT TX RX rial interface. ACTI WRITE COMMAND ACTI RX I I I I I I I I I I I I I I I I I I	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A nodule. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>.<baud>.<parity>.<stopbit><cr> #SET MODBUS PARAMS:<unitid>.<baud>.<parity>.<stopbit><cr> Result: #OK<cr> 1</cr></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
/IBParity: IONE: no parity VEN: even parity DDD: odd parity IINT: The new setup parameters will be	ACIU WRITE COMMAND STOPBIT TX ASCII WRITE COMMAND STOPBIT TX RX rial interface. ASCII WRITE COMMAND UNITID BAUD	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> NA </cr></cr>		
IBParity: '.' ONE: no parity VEN: even parity UDD: odd parity IINT: The new setup parameters will be SET MODBUS STOPS EXTENDED HESTOPS IBStops NE: one stop bit WO: two stop bits IINT: The new setup parameters will be	ARITY TX RX RX active after a restart of the ASCII WRITE COMMAND STOPBIT TX RX rial interface. active after a restart of the ASCII WRITE COMMAND UNITID BAUD PARITY STOPBIT	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> N/A nodule. #SET MODBUS STOP:<stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr> ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A ONE:ONE STOPBIT #SET MODBUS STOP:ONE<cr> N/A module. #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #SET MODBUS PARAMS:<unitid>,<baud>,<parity>,<stopbit><cr> #OK<cr> 1 57600:57600BD NONE:NO PARITY ONE:ONE STOPBIT</cr></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></stopbit></parity></baud></unitid></cr></cr></cr></cr></stopbit></cr></stopbit></cr></cr>		
IBParity: (IONE: no parity VEN: even parity VEN: even parity IINT: The new setup parameters will be SET MODBUS STOPS EXAMPLE: INT: The new amount of stop bits for the set IBStops WD: two stop bits IINT: The new setup parameters will be	ARITY TX TX RX ACII WRITE COMMAND STOPBIT TX RX rial interface. ACII WRITE COMMAND ASCII WRITE COMMAND	#OK <cr> NONE:NO PARITY #SET MODBUS PARITY:NONE<cr> NA </cr></cr>		



GET MODBUS ADDRESS ASC REA COM TX RX	AD	#GET MODBUS ADDRESS <cr> #GMBADR<cr> Result:</cr></cr>	ASCII	
СОМ		Result:		
ТХ	MMAND			
		#GMBADR: <mbunitdec>,<mbflashdec>,<mbunithex>,<mbflashhex><cr></cr></mbflashhex></mbunithex></mbflashdec></mbunitdec>		
RX		#GET MODBUS ADDRESS <cr></cr>		
		#1,GMBADR:1,1,0x1 <cr></cr>		
		Current MODBUS unit ID for DIP4=OFF:1,1,0x1,0x1		
Shows the current used MODBUS/RTU or ASCII unit MODBUS/RTU unit or ASCII address for communicat	it address and shows ationMBFLASHDecM	also the stored unit address in the FLASH memory, which is only used if the DIP switch for the bus address is set to 0.MBUnitDec/ME BFLASHHexThe internal stored MODBUS/RTU unit address or ASCII address from the FLASH memory, if the DIP switch DIP3 is O	BUnitHexThe currei FF.	nt used
GET MODBUS BAUDRATE ASC		#GET MODBUS BAUDRATE <cr></cr>	ASCII	
REA		#GMBBAUD <cr></cr>		
СОМ		Result:		
		#GMBBAUD: <baudrate><cr></cr></baudrate>		
тх		#GET MODBUS BAUDRATE <cr></cr>		
RX		#1,GMBBAUD:57600 <cr></cr>		
		Current baudrate for DIP1+2=ON:57600		
This Sure current complete vacance in the tensor For ULTRA SLIM IOS RESI-xxx SIO: This baudrate is For BIG IOS RESI-xxx.SIO: This baudrate is only used The following baudrates are allowed: 300bd, 600bd, 900bd, 1200bd, 2400bd, 4800bd, 9600bd, 19200bd, 3840bd, 57600bd, 115200bd, 126 230400bd, 250000bd, 256000bd		itch mode DIP1=ON+DIP2=ON (BR) (default is 57600bd) DIP7=ON (PARAMETER) (default is 57600bd)		
GET MODBUS PARITY	CII		ASCII	
REA		#GET MODBUS PARITY <cr> #GMBPAR<cr></cr></cr>	ASCII	
		Result:		
001		#GMBPAR: <mbparity><cr></cr></mbparity>		
тх		#GET MODBUS PARITY <cr></cr>		
RX		#J.GMBPAR:NONE <cr></cr>		
RA				
Shows the current configured parity of the serial interfa		Current parity:NONE		
MBParity NONE: no parity EVEN: even parity ODD: odd parity				
GET MODBUS STOP	CII	#GET MODBUS STOP <cr></cr>	ASCII	
REA	AD	#GMBSTOP <cr></cr>		
COM		Result:		
		#GMBSTOP: <mbstop><cr></cr></mbstop>		
тх		#GET MODBUS STOP <cr></cr>		
RX		#1.GMBSTOP:ONE <cr></cr>		
		Current stopbit(s):ONE		
Shows the current configured parity of the serial interf. MBParity NONE: no parity EVEN: even parity ODD: odd parity				
GET MODBUS PARAMS ASC		#GET MODBUS PARAMS <cr></cr>	ASCII	
REA		#GMBPARAMS <cr></cr>		
СОМ		Result:		
		#GMBPARAMS: <mbunitdec>,<mbflashdec>,<mbunithex>,<mbflashhex>, <mbbaudratedec>,<mbbaudratehex>,<mbparity>,<mbstops><cr></cr></mbstops></mbparity></mbbaudratehex></mbbaudratedec></mbflashhex></mbunithex></mbflashdec></mbunitdec>		
		#GET MODBUS PARAMS <cr></cr>		
ту		#JGMBPARAMS:1,0x1,1,0x1,57600,0xE100,NONE,ONE <cr></cr>		
TX				
TX RX				
		Current MODBUS unit ID used:1		
		Current MODBUS unit ID used:1 Current MODBUS unit ID in FLASH:1		
		Current MODBUS unit ID used:1 Current MODBUS unit ID in FLASH:1 Current baudrate in FLASH:57600		
		Current MODBUS unit ID used:1 Current MODBUS unit ID in FLASH:1		



SYSTEM COMMANDS				
RESET	ASCII	#RESET <cr></cr>	ASCII	NO
	WRITE	#RST <cr></cr>		
	COMMAND	Result:		
		#OK <cr></cr>		
	тх	#RESET <cr></cr>		
	RX	N/A		
Executes a software reset (Reboot) of the module.			-
FACTORY RESET	ASCII	#FACTORY RESET <cr></cr>	ASCII	NO
	WRITE	#FRST <cr></cr>		
	COMMAND	Result:		
		#OK <cr></cr>		
	тх	#FACTORY RESET <cr></cr>		
	RX	N/A		



7.5 RESI-xxx-SIO SERIAL PARAMETERS

Normally you select the serial parameters via DIP switch for fast use of the modules. But in special cases you will need a different setup for the serial interface. Please find all information here, how you can change the serial setup via MODBUS/RTU or ASCII commands.

HINT: This commands are only valid for the ULTRA SLIM IOs with serial RS232 or RS485 interface and for the BIG IOs with RS485 interface.

7.5.1 ULTRA SLIM IOs: Howto change the UnitID of the IO module

When DIP switch #4:FD is set to ON, the module always communicates with the Unit ID 255. When you switch this DIP switch to OFF, the module will use the internal Unit ID from the FLASH memory.

You can set this Unit ID either with this MODBUS register:

UNIT_ID	3x65222 4x65222 I:65221	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO	
		UNIT ID:1					
f the host reads this register, the current programmed unit ID is returned. All values above unit ID 255 define also the unit ID 255. If the host write a new value into this register, the new value will be stored in the FLASH as the new unit ID. The new unit ID is activated after a power off/power on cycle or a software reboot of the module. The host can execute a reboot in writing to the register RESET SYSTEM. NOTE:DIP switch 4 must set to OFF to activate this unit ID, otherwise the unit ID is 255.							

or you use this ASCII command:

SET MODBUS ADDRESS	ASCII WRITE	#SET MODBUS ADDRESS: <unitid><cr> #SETMBADR:<unitid><cr></cr></unitid></cr></unitid>	ASCII	NO	
	COMMAND	Result:			
		#OK <cr></cr>			
	UNITID	1			
	тх	#SET MODBUS ADDRESS:1 <cr></cr>			
	RX	N/A			
Redefines the unit ID of the module. This change will affect the MODBUS/RTU communication immediately. As a Unit IO you can use the values Odec to 255dec.					
HINT: The new settings are activated after a system reboot or power off on cycle!					

After you changed the Unit ID you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET							
RESET	1x06001 2x06001 I:6000	0,0x00 B:00		N/A:NO CHANGE	BIT R/W	NO	
Performs a software reset, wh	nenever 1 is written to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).	•			
RESET	3x06001 4x06001 I:6000	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO	
Performs a software reset, whenever 1 is written to this register. If the host writes to this register 1, the module executes a soft reset (reboot).							

Or you use the ASCII command:

SYSTEM COMMANDS						
RESET	ASCII	#RESET <cr></cr>	ASCII	NO		
	WRITE	#RST <cr></cr>				
	COMMAND	Result:				
		#OK <cr></cr>				
	тх	#RESET <cr></cr>				
	RX	N/A				
Executes a software reset (Reboot) of the module.						

Remember, only if the DIP Switch #4 FD=OFF, you can use your new UnitID. Otherwise the module communicates with UnitID 255.



7.5.2 ULTRA SLIM IOs: Howto change the parity+stopbits of the IO module

Usually the IO module communicates with no parity and one stopbit. But you can change this behaviour: You can set the parity and the stop bits with this MODBUS register:

PARITY	3x65225 4x65225 I:65224	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
		NO PARITY		SELECT PARITY		
If the register is read out, the currently set parity of the serial interface is returned. Writing a value to this register will change the new parity in FLASH. This will only take effect after a restart of the module. This can be triggered by writing to the RESET SYSTEM register. Parity values are 0: no parity 1: even parity 2: odd parity						
STOP BITS	3x65226 4x65226 I:65225	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO
		TWO STOPBITS		SELECT STOPBITS		
f the register is read out, the currently set number of stop bits of the serial interface is returned. Writing a value to this register will change the new number of stop bits in the FLASH. This will only take effect after a restart of the module. This can be triggered by writing to the RESET SYSTEM register.						
Values for stop bits are 1: one stop bit 2: two stop bits						

or you use this ASCII command:

SET MODBUS PARITY	ASCII WRITE COMMAND	#SET MODBUS PARITY: <parity><cr> #SETMBPAR:<parity><cr> Result: #OK<cr></cr></cr></parity></cr></parity>	ASCII	NO
	PARITY	NONE:NO PARITY		
	тх	#SET MODBUS PARITY:NONE <cr></cr>		
	RX	N/A		
Sets a new parity for the serial interface. MBParity: NONE: no parity EVEN: even parity ODD: odd parity HINT: The new setup parameters will be active	after a restart of the mo	dule.		
SET MODBUS STOPS	ASCII WRITE COMMAND	#SET MODBUS STOP: <stopbit><cr> #SETMBSTOP:<stopbit><cr> Result: #OK<cr></cr></cr></stopbit></cr></stopbit>	ASCII	NO
	STOPBIT	ONE:ONE STOPBIT		
	тх	#SET MODBUS STOP:ONE <cr></cr>		
	RX	N/A		
Sets a new amount of stop bits for the serial in MBStops ONE: one stop bit TWO: two stop bits HINT: The new setup parameters will be active		dule.		

After you changed the two settings you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET						
RESET	1x06001	0,0x00		N/A:NO CHANGE	BIT	NO
	2x06001	B:00			R/W	
	1:6000					
Performs a software reset, whenever 1 is writte	en to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			
RESET	3x06001	0,0x0000		N/A:NO CHANGE	UINT16	NO
	4x06001	B:00 00			R/W	
	1:6000					
Performs a software reset, whenever 1 is write	en to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			

Or you use the ASCII command:

SYSTEM COMMANDS	SYSTEM COMMANDS						
RESET		#RESET <cr></cr>	ASCII	NO			
		#RST <cr></cr>					
	COMMAND	Result:					
		#OK <cr></cr>					
	тх	#RESET <cr></cr>					
	RX	N/A					
Executes a software reset (Reboot) of the mod	lule.						

Remember, now the Module uses ALWAYS the new parity and stop bit setting in all communication modes!



7.5.3 ULTRA SLIM IOs: Howto change the baud rate of the IO module

Usually the IO module communicates with baud rates selected by the two DIP switches #1+#2. This will be:

#1	#2	
OFF	OFF	9600 baud
ON	OFF	19200 baud
OFF	ON	38400 baud
ON	ON	57600 baud or the new defined BAUDRATE from FLASH

But you can change the baud rate used with DIP switch setting ON,ON: You can set the baud rate with this MODBUS register:

BAUD_RATE	3x65223 4x65223 I:65222	57600,0x0000E100 B:00 00 E1 00	38400	38400	UINT32 R/W	NO
		57600Bd		ENTER BAUD RATE		
	FLASH drate is only used, if DIP sv lly used, if DIP switch mod	witch mode DIP1=ON+DIP2=ON (BR) (default is 57600b e DIP7=ON (PARAMETER) (default is 57600bd)	d)			
Valid baud rates are: 300bd, 600bd, 900bd, 1200bd, 2400bd, 4800b 9600bd, 19200bd, 38400bd, 57600bd, 115200 230400bd, 250000bd, 256000bd	d, bd, 128000bd					

or you use this ASCII command:

SET MODBUS BAUDRATE	WRITE COMMAND	#SET MODBUS BAUDRATE: <baud><cr> #SETMBBAUD:<baud><cr> Result: #OK<cr></cr></cr></baud></cr></baud>	ASCII	NO
	BAUD	57600:57600BD		
	тх	#SET MODBUS BAUDRATE:57600 <cr></cr>		
	RX	N/A		
Sets a new baud rate in the FLASH For ULTRA SLIM IOS RESI-xxx-SIO: This baut For BIG IOS RESI-xxx-SIO: This baudrate is on The following baudrates are allowed: 300bd, 600bd, 900bd, 1200bd, 2400bd, 4800b 9600bd, 13200bd, 38400bd, 57600bd, 115200 230400bd, 250000bd, 256000bd	d,	vitch mode DIP1=ON+DIP2=ON (BR) (default is 57600bd) e DIP7=ON (PARAMETER) (default is 57600bd)		
HINT: The new setup parameters will be active	after a restart of the mode	lle.		

After you changed the two settings you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET						
RESET	1x06001 2x06001 I:6000	0,0x00 B:00		N/A:NO CHANGE	BIT R/W	NO
Performs a software reset, whenever 1 is writt	en to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).	•		
RESET	3x06001 4x06001 I:6000	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Performs a software reset, whenever 1 is writt	en to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			

Or you use the ASCII command:

SYSTEM COMMANDS						
RESET	ASCII WRITE COMMAND	#RESET <cr> #RST<cr> Result:</cr></cr>	ASCII	NO		
	COMMAND	#OK <cr></cr>				
	тх	#RESET <cr></cr>				
	RX	N/A				
Executes a software reset (Re	eboot) of the module.	·				

Remember, now the Module uses ALWAYS the new baud rate, if you set the two DIP switches #1+#2 to ON,ON!



7.5.4 BIG IOs: Howto change the UnitID of the IO module

When DIP switches #1-#4:ADDRESS are all set to OFF, the module always communicates with the Unit ID from the FLASH. Otherwise the module uses the UnitIDs 1..15.

You can set this Unit ID either with this MODBUS register:

UNIT_ID	3x65222 4x65222 I:65221	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO
		UNIT ID:1				
the host reads this register, the current programmed unit ID is returned. All values above unit ID 255 define also the unit ID 255. If the host write a new value into this register, the new value will be stored in the FLASH as the new unit ID. The new unit ID is activated after a power off/power on cycle or a software reboot of the module. The host can execute a reboot in writing to the register RESET SYSTEM. NOTE:DIP switch 4 must set to OFF to activate this unit ID, otherwise the unit ID is 255.						

or you use this ASCII command:

SET MODBUS ADDRESS	ASCII WRITE COMMAND	#SET MODBUS ADDRESS: <unitid><cr> #SETMBADR:<unitid><cr> Result:</cr></unitid></cr></unitid>	ASCII	NO		
	COMMAND	#OK <cr></cr>				
	UNITID	1				
	тх	#SET MODBUS ADDRESS:1 <cr></cr>				
	RX	N/A				
Redefines the unit ID of the module. This	change will affect the MODB	US/RTU communication immediately. As a Unit IO you can use the values 0dec to 255dec.				
HINT: The new settings are activated after	NT: The new settings are activated after a system reboot or power off on cycle!					

After you changed the Unit ID you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET						
RESET	1x06001	0,0x00		N/A:NO CHANGE	BIT	NO
	2x06001	B:00			R/W	
	1:6000					
Performs a software reset, wh	enever 1 is written to this register. If the ho	st writes to this register 1, the module executes a soft re	eset (reboot).			
RESET	3x06001	0,0x0000		N/A:NO CHANGE	UINT16	NO
	4x06001	B:00 00			R/W	
	1:6000					
Performs a software reset, wh	Performs a software reset, whenever 1 is written to this register. If the host writes to this register 1, the module executes a soft reset (reboot).					

Or you use the ASCII command:

SYSTEM COMMANDS						
RESET	ASCII	#RESET <cr></cr>	ASCII	NO		
	WRITE	#RST <cr></cr>				
	COMMAND	Result:				
		#OK <cr></cr>				
	тх	#RESET <cr></cr>				
	RX	N/A				
Executes a software reset (Reboot) of the n	nodule.			-		

Remember, only if the DIP Switches #1-#4:ADDRESS are all OFF, you can use your new UnitID. Otherwise the module communicates with the selected UnitID.



7.5.5 BIG IOs: Howto change the parity+stopbits of the IO module

Usually the IO module communicates with no parity and one stopbit. What kind of parity and stop bit setting the IO module is using, is defined by DIP switch #8: PARAMETER.

If this DIP switch is set to OFF, the IO module ALWAYS uses no parity and one stopbit!

If this DIP switch is set to ON, the IO module will use the settings from the FLASH memory!

You can set the parity and the stop bits with this MODBUS register:

PARITY	3x65225 4x65225 I:65224	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		NO PARITY	SELECT PARITY		
Writing a value to this register will chang Parity values are 0: no parity 1: even parity 2: odd parity	ser parity of the serial interface is r ge the new parity in FLASH. This v	eturned. vill only take effect after a restart of the module. This can be	riggered by writing to the RESET SYSTEM register.		
STOP BITS	3x65226 4x65226 I:65225	1,0x0001 B:00 01	N/A:NO CHANGE	UINT16 R/W	NO
		TWO STOPBITS	SELECT STOPBITS		
f the register is read out, the currently s Writing a value to this register will chang Values for stop bits are 1: one stop bit 2: two stop bits	et number of stop bits of the serial ge the new number of stop bits in t	interface is returned. he FLASH. This will only take effect after a restart of the mor	ule. This can be triggered by writing to the RESET SYST	EM register.	·

or you use this ASCII command:

SET MODBUS PARITY	ASCII	#SET MODBUS PARITY: <parity><cr></cr></parity>	ASCII	NO
	WRITE	#SETMBPAR: <parity><cr></cr></parity>		
	COMMAND	Result:		
		#OK <cr></cr>		
	PARITY	NONE:NO PARITY		
	тх	#SET MODBUS PARITY:NONE <cr></cr>		
	RX	N/A		
Sets a new parity for the serial interface MBParity: NONE: no parity EVEN: even parity ODD: odd parity				
HINT: The new setup parameters will be	e active after a restart of the	module.		
SET MODBUS STOPS	ASCII	#SET MODBUS STOP: <stopbit><cr></cr></stopbit>	ASCII	NO
	WRITE	#SETMBSTOP: <stopbit><cr></cr></stopbit>		
	COMMAND	Result:		
		#OK <cr></cr>		
	STOPBIT	ONE:ONE STOPBIT		
	тх	#SET MODBUS STOP:ONE <cr></cr>		
	RX	N/A		
Sets a new amount of stop bits for the s MBStops ONE: one stop bit TWO: two stop bits	erial interface.			•
HINT: The new setup parameters will be	active after a restart of the	module		

After you changed the two settings you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET						
RESET	1x06001 2x06001 I:6000	0,0x00 B:00		N/A:NO CHANGE	BIT R/W	NO
Performs a software reset, wh	nenever 1 is written to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			
RESET	3x06001 4x06001 I:6000	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Performs a software reset, wh	nenever 1 is written to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			

Or you use the ASCII command:

SYSTEM COMMANDS						
RESET	ASCII	#RESET <cr></cr>	ASCII	NO		
	WRITE	#RST <cr></cr>				
	COMMAND	Result:				
		#OK <cr></cr>				
	тх	#RESET <cr></cr>				
	RX	N/A				
Executes a software reset (Ref	boot) of the module.					

Remember, now the Module uses the new parity and stop bit setting only, if DIP switch #8=ON!



7.5.6 BIG IOs: Howto change the baud rate of the IO module

Usually the IO module communicates with baud rates selected by the three DIP switches #5+#6+#7. This will be: DIP #7:BR2 DIP #6:BR1 DIP #5:BR0 MODBUS/RTU or ASCII baud rate

OFF	OFF	OFF	4800bd
OFF	OFF	ON	9600bd
OFF	ON	OFF	19200bd
OFF	ON	ON	38400bd
ON	OFF	OFF	57600bd
ON	OFF	ON	115200bd
ON	ON	OFF	230400bd
ON	ON	ON	256000bd

This baud rates and the parity NONE and ONE stop bit are used, if the DIP switch #8 is set to OFF. But you can change the baud rate used with DIP switch #8 PARAMETER setting to ON. Remember, that you will also use the configured parity and stop bits from the FLASH memory!

You can set the baud rate with this MODBUS register:

BAUD_RATE	3x65223 4x65223 I:65222	57600,0x0000E100 B:00 00 E1 00	38400	38400	UINT32 R/W	NO	
57600Bd				ENTER BAUD RATE			
Image:							

or you use this ASCII command:

SET MODBUS BAUDRATE	WRITE #SETMBBAUD: <baud><cr> COMMAND Result: #OK<cr></cr></cr></baud>			
	BAUD	57600:57600BD		
	тх	#SET MODBUS BAUDRATE:57600 <cr></cr>		
	RX	N/A		
Sets a new baud rate in the FLASH For ULTRA SLMI los RES1-xxx-SIO: This baur For BIG IOS RES1-xxx-SIO: This baudrate is on The following baudrates are allowed: 300bd, 600bd, 900bd, 1200bd, 2400bd, 4800b 9600bd, 19200bd, 38400bd, 57600bd, 115200 230400bd, 250000bd, 256000bd	d.	switch mode DIP1=ON+DIP2=ON (BR) (default is 57600bd) de DIP7=ON (PARAMETER) (default is 57600bd)		
HINT: The new setup parameters will be active	after a restart of the mo	dule.		

After you changed the two settings you have to restart the module to make the changes effective. You can also use the MODBUS register for resetting the module:

SOFTWARE RESET						
RESET	1x06001 2x06001 I:6000	0,0x00 B:00		N/A:NO CHANGE	BIT R/W	NO
Performs a software reset, wh	nenever 1 is written to this register. If the ho	st writes to this register 1, the module executes a soft re	set (reboot).			
RESET	3x06001 4x06001 I:6000	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Performs a software reset, whenever 1 is written to this register. If the host writes to this register 1, the module executes a soft reset (reboot).						

Or you use the ASCII command:

SYSTEM COMMANDS					
RESET	ASCII	#RESET <cr></cr>	ASCII	NO	
	WRITE	#RST <cr></cr>			
	COMMAND	Result:			
		#OK <cr></cr>			
	тх	#RESET <cr></cr>			
	RX	N/A			
Executes a software reset (Reboot) of the module.					

Remember, now the Module uses ALWAYS the new baud rate, the parity and the stop bits, if you set the DIP switch #8 to ON! If you set the DIP switch #8 to OFF, you will use the baud rate defined by DIP switch #5-#7 and the parity is always NONE and the stop bit is always ONE.



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7.6 **RESI's MODBUS Configurator**

Almost all of our products can be used together with our MODBUSConfigurator software tool. You can configure and test the modules.

7.6.1 HOWTO manually establish a serial connection to the module

Open our MODBUSConfigurator tool, you will see the following screen:

Now you can manually add an IO module form the menu:

- near s mobilition com	guator entranzio - formanient						
Project manager		Project setting	s				
D 😂 🖬 🗐 🞑	MBUS modules >	Project name:	New Proje	d			
	DALI modules >	Scan serial po					
	DMX modules >	Scan serial po	rts for devi	H112			
	KNX modules >	Chaase ports:		Advanced options			
	ENOCEAN modules	M COM1		Choose baudrates:			
	Sim IO modules >	COM2		I 9600 I	1 4800	Choose parity:	Choose
	Big IO modules +	RESE-4LED-STO			115200	NONE	@ 1 ST
	Ligito modules	RESI-14RI-SIO			230400	C EVEN	C 2 ST
		RESI-32DI-SID		₹ 57600 ×	256000	C ODD	0.501
		RESI-48RI-SIO					
		RESI-64DI-SIO		Scon for SLIMIOs	(17.5mm)	Fast Scan (Only 255)	
		RESI-8CO-SID		Scan for BIG IOs	(1.42mm)	Full Scan (Range 1-255)	1
		RESI-30DO-SIO		Scall for big los	(i 45mm)	Full Scan (Hange H200)	
		REST-SETD-SIO		In this dialog page :		ch far cannected RESI ca	o cartoro o
		RESI-SLIDDIRO-SIO				evailable cam parts in the	
		RESI-SERDINO-30		ports" updates the l	ist of evailabl	e com ports. Use this func	tion, if you
		NE34-56RO-340				n "Fast Scan" reduces the S unit address of your sma	
		REST-4LED-ASCII				vailable MODBUS units in	
		RESI-16DIBRO-ASCI	l .			d lines. If you know your bi	
		RESI-14RI-ASCII				eed up the search proces parity in your converter, you	
		RESI-32DI-ASCII				nually by entering a start a	
		RESI-8CO-ASCII				"Project manager". Il you	
		RESI-SRTD-ASCIL				or the slim IOs and gatewa les. Be aware, that some l	
		RESI-16DISRO-SIO (e	(blo			erial interface of the PC ca	
		COM28 COM29 COM30 COM31	v				



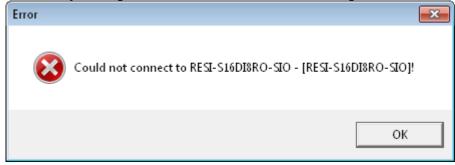
You will get the following screen. Now you have to define the serial settings to establish a connection:

Project manager	Cocal COM port settings				
L ← H 5		evice COMM - Stephile I stophile arty: NONE -	t • Ps/ddiress:		
	Epweised config III Test connect	sion 🛃 T⊵s:			
	DES S16D 8DO SIC	16D 6RO to 90	OF USAFITU mind als with 12 Dis 12-46 Mitching 8DOs 250 Mitching	TEA, STOLE	
	Solvereversion: 9992				
	State:	7399			
	FPAM/MCDBLSUF# Ony wat a DP twitchts Set _ YYY west Des Descale				
	Devet Counters: Setteday outputs: E	noble Logic Disoble Logic Clear of logic C	priigaw Logi a	501 ×	
	Degister Vo	due	Connect		
		9979,7	Conset status of DII (0+OFF, 1+ON)		
		3777.7	Current status of DI2 (0-OFF, 1-ON)		
		9377,7	Current status at DI3 (8-OFT; 1-ON)		
		2929,2	Consent stotus of DH (0+OFF, 1+ON)		
		3373.7	Current status of DIS (0-OFF, 1-ON)		
	0500006 05	9999.7	Current status at DIS (U-OFT, 1-ON)		

Test the connection by pressing the button "Test connection". If you have successfully established the connection, you will see the following picture:

Project manager	Local COM port settin	nas		
	Modbus unit	 Device: COM4 	▼ Stopbis stopbt ▼ IP-Address:	
🗅 📽 🗑 🍯 🗳 🗳 🛸 📾 🚳 🔗 🤮				
🛪 🚰 New Project	Boudrate: 57600	 Parity: NONE 	- Port	
E RESI-S16018R0-S10 - [RESI-S1608R0-S10]	Device specific			
		Test connection 💦 Test		
		Test contaction Ed Lest		
	RESHS16DIBRO-SIO		16DIBRO to MODBUS/RTU module with 16 DIs12-48/so and 8ROs 250/4a, 16A, 200µF	
	Software version:	1.1.0		
	State:	no error		
	FRAM MODBUS Unit		HELP	
	1000 1	ly valid if DP switch is t to 0 on 10 module	HELP	
	Set ??? 58			
	Board Countour, Sotrole	wormite Easthallagia Disable	e Logis Clearelliogic Configure Logis ROT +	
	Register	Value	Comment	
	0x00001 0x00002	Bx????;? 0x????;?	Current status of DI1 (0-OFE, 1-ON)	
	0x00002 0x00003	0x7777,7 0x7???.?	Current status of DI2 (0-OFF, 1-ON) Current status of DI3 (0-OFF, 1-ON)	
	0x00003	Bx7272,2	Current status of DI (0-OFF, 1-ON)	
	0x00005	0x7777.7	Current status of DIS (0-OFF, 1-ON)	
	0x00006	0x7777.7	Current status of DI6 (0-OFF, 1-ON)	
	0x88887	Bx????.?	Current status of DIZ (0-OFF, 1-ON)	
	0x00008	0x7777,7	Current status of DIB (0-OFF, 1-ON)	
	0x00009 0x00010	0x?????? 0x????????????????????????????	Current status of D18 (0-0FF, 1-0N) Current status of D18 (0-0FF, 1-0N)	
	0x00011	0x7777.7	Current status of D111 (0-OFF, 1-ON)	
	0x00012	0x7777.7	Current status of DTT (0-OFF, 1-ON)	
	0x00013	Bx7272,2	Current stotus of DI13 (0–OFF, 1–ON)	
	0x00014	0x7777,7	Current status of D114 (0-OFF, 1-ON)	
	0x00015	0x????.?	Current status of DI15 (0-OFF, 1-ON)	
	0x00016	Bx????,?	Current status of DI16 (0-OFF, 1-ON)	
	0x00017	0x????.?	Current status of FO01 (0-OFF, 1-ON)	
	0x00018	Bx7777,7	Current status of ROI2 (0-OFF, 1-ON)	
	0x00019	0x7777.7	Current status of PO00 (0-OFF, 1-ON)	
	0x00020	0x????.?	Current status of R004 (0-OFF, 1-ON)	
	0x80821	Bx7272,2	Current status of BO05 (0-OFF, 1-ON)	
	0x00022	0x7777,7	Current status of RO06 (0-OFF, 1-ON)	
	0x00023	0x????.?	Current status of R007 (0-OFF, 1-ON)	
	0x80824	Bx7272,2	Current stetus of RO08 (0=OFF, 1=ON)	
	4x00001	0x????.?	Counter for rising edges on DI1	
	4x00002	Bx7272.2	Counter for folling edges on D1	
	4x00003	0x7777,7	Counter for rising edges on DI2	
	4x00004	0x????.?	Counter for folling edges on DI2	
	4x88885	Bx7272,2	Counter for rising edges on DI3	
	4x00006	0x7777,7	Counter for falling edges on DI3	
	4x00007 4x00008	0x?????? 0x????????????????????????????	Counter for rising edges on DI4 Counter for folling edges on DI4	
	4x00009	0x7777,7	Counter for rising edges on DIS	
	4x00010	0x7777.7	Counter for holing edges on DIS	
	4x00011	Bx7272,2	Counter for rising edges on DI6	
	4x00012	0x7777,7	Counter for falling edges on DI6	
	4x00013	0x????.?	Counter for rising edges on D17	
	4x00014	Bx????,?	Counter for falling edges on DI7	
	4x00015 4y00016	0x????,?	Counter for rising edges on DI8 Counter for followed edges on DI8	
Drint moviest second				

Otherwise you will get after a few seconds an error message like this:





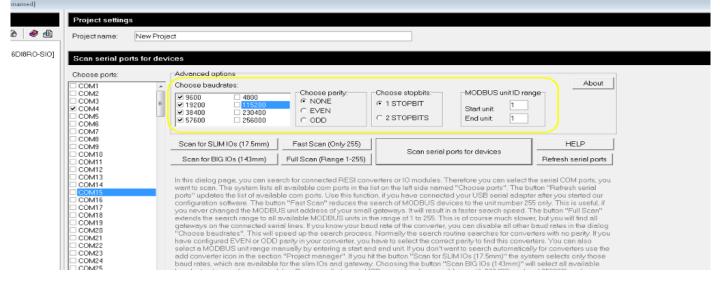
- 61 **- X**-

7.6.2 HOWTO search for serial modules

Open our MODBUSConfigurator tool, you will see the following screen:

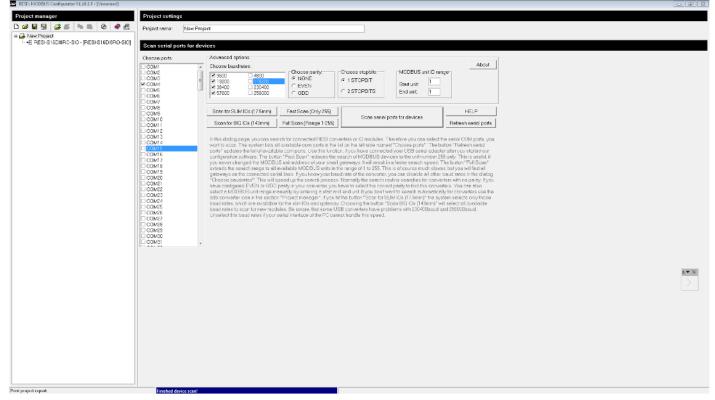
Project manager Project settings						
- Wew Project New P	Projed name: Nave Projed					
	cen serial parts for devices					
Choose ports:	Advanced sprions					
C0M2	Choose bandmises Choose parity: Choose stappiles About # 3900 # 1800 # NNE # 1STCPBIT Standard Standard # 3900 # 13000 # 1STCPBIT Choose stappiles MCOBUS unit Direnge Standard # 3900 # 25000 # 1STCPBITS End unit 1 End unit 255 End unit 255					
D COM8	Scenter SUM IDs (175mm) Fast Scan (Dity 255) Scan satio (onts for dav(res HELP					
	Scontor BIG [R43mm] Full Scon (Ronge 1-255) Patresh send pois					
Image: Control of Con	In this dolog poge, you can search for connected FIESI converters on CI modules. Therefore you can select the serie I COM polits, you worth 5 scitts. The system lists of a built is in the lists in marked "Aboves point" The builton "Relief and the construction of the politic construction of the politic construction. ISS series dollare of the source of the construction of the construct					

Select the correct serial interfaces, the correct baud rates, parity and stop bits for an automatic search for IO modules. Very important is the correct range of UnitID for this search:





Then click on the button "Scan serial ports for devices" to start the automatic search. This can last for minutes, if you have selected many interfaces, many baud rates and especially a big range of UnitIDs for the search.



Now select the module from the project tree and activate the test mode, you will see all actual values of your module on the screen:

3 😹 🚅 📭 🛋 🙆 🛷 🛃	Modbus unit 1		Stophits 1 stophit • IP-Address:					
New Project	Boudrate: 57600	Parity: NONE	Port:					
	Device specific							
		B. Devine contract and the second sec						
		PESI/S16DI310-SIO 16018PC to MODBUS/RTU module with 15 DIs 12-48/soc and 8POs 250/vec, 16A, 200) F						
	Software version: 1.1.0							
	State: no errar							
	FRAM MODBUS Unit.	FRAM MODEUS Unitony water DP average in HELP						
	Set 1 set							
	Board Countorn, Sotrola	Raset Curiters Setrelay outputs Enable Logic Disorbillogic Configure Logic (
	Register 0x00001	Value	Comment					
	0x00002	0x0000,0 0x0000.0	Current status of DI1 (0-OFF, 1-ON) Current status of DI2 (0-OFF, 1-ON)					
	0x00002	0x0000.0	Current status of DI3 (0-0FF, 1-0N) Current status of DI3 (0-0FF, 1-0N)					
	0x00004	0x8080.0	Current status of DI4 (0-OFF, 1-ON)					
	0x00005	0x0000,0	Current status of DIS (0-OFF, 1-ON)					
	0x00006	0x0000.0	Current status of DIS (0-OFF, 1-ON)					
	0x00007	0x0000,0	Current status of DI2 (0-OFE, 1-ON)					
	0x00008 0x00009	0x0000,0 0x0000,0	Current status of DI8 (0-OFF, 1-ON) Current status of DI9 (0-OFF, 1-ON)					
	0x00010	0x0000.0	Current status of D10 (0-OFF, 1-ON)					
	0x00011	0x0000.0	Current status of DI11 (0-OFF, 1-ON)					
	0x00012	0x0000.0	Current status of DI12 (0-OFF, 1-ON)					
	0x00013	0x0000,0	Current status of DI13 (0=OFF, 1=ON)					
	0x00014 0x00015	0x0000,0 0x0000.0	Current status of DI14 (0-OFF, 1-ON)					
	0x00015	0x0000.0	Current status of DI15 (0-OFF, 1-ON) Current status of DI16 (0-OFF, 1-ON)					
	0400018	axaaaca	Current atoms of Diffe (u-OFF) (1-OFF)					
	0x00017	0x0001,1	Current status of ROB1 (0-OFF, 1-ON)					
	0x00018	0×0000,0	Current status of BO02 (0-OFF, 1-ON)					
	0x00019	0x0000,0	Current status of R003 (0-OFF, 1-ON)					
	0x00020 0x00021	0x0000.0 0x0000.0	Current status of FROUX (U=OFF, 1=ON)					
	0x00021	0x0000.0	Current status of ROBS (0-OFF, 1-ON) Current status of ROB6 (0-OFF, 1-ON)					
	0x00022	0x0000.0	Current status of HOD7 (IPOFF, 1=ON)					
	0x00024	0x0001,1	Current stehus of ROB8 (I-OFF, 1-ON)					
	4x00001	0x0000.0	Counter for rising edges on DI1					
	4x80882	0x0000,0	Counter for falling edges on DI1					
	4x00003 4x00004	0x0000,0 0x0000.0	Counter for rising edges on DI2 Counter for folling edges on DI2					
	4x00005	0x0000,0	Counter for rising edges on D/3					
	4x00006	0x0000.0	Counter for failing edges on DI3					
	4x00007	0×0000.0	Counter for rising edges on DI4					
	4x88888	0x8080,0	Counter for falling edges on DI4					
	4x00009	0×0000,0	Counter for rising edges on DIS					
	4x00010 4x00011	0x0000.0	Counter for tolling edges on DIS					
	4x00012	0x0000,0 0x0000.0	Counter for rising edges on DI6 Counter for falling edges on DI6					
	4x00012	0x0000.0	Counter for realing edges on DI7					
	4x00014	0x0000,0	Counter for failing edges on DI7					
	4x00015	0×0000.0	Counter for rising edges on DI8					

You can also use now commands from the command bar to control the connected IO module.



8 Ethernet connection

Our Ethernet ULTRA SLIM IO or Ethernet BIG IO modules offer an Ethernet interface.

8.1 Ethernet connection for ULTRA SLIM IO modules

The following drawings show the correct Ethernet connection for all of our SLIMIO products:

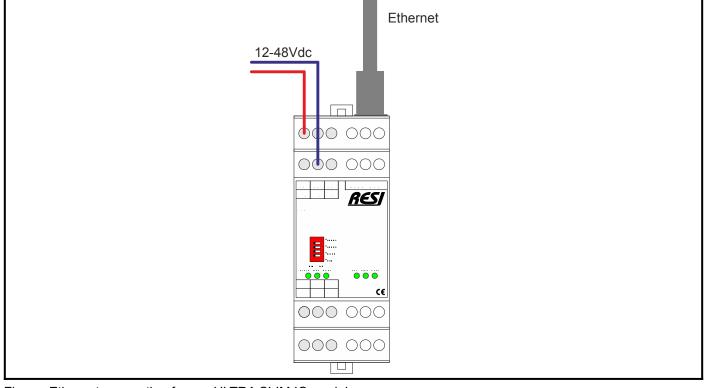


Figure: Ethernet connection for our ULTRA SLIM IO modules



8.2 Ethernet connection for BIG IO modules

The following drawings show the correct Ethernet connection for all of our BIGIO products:

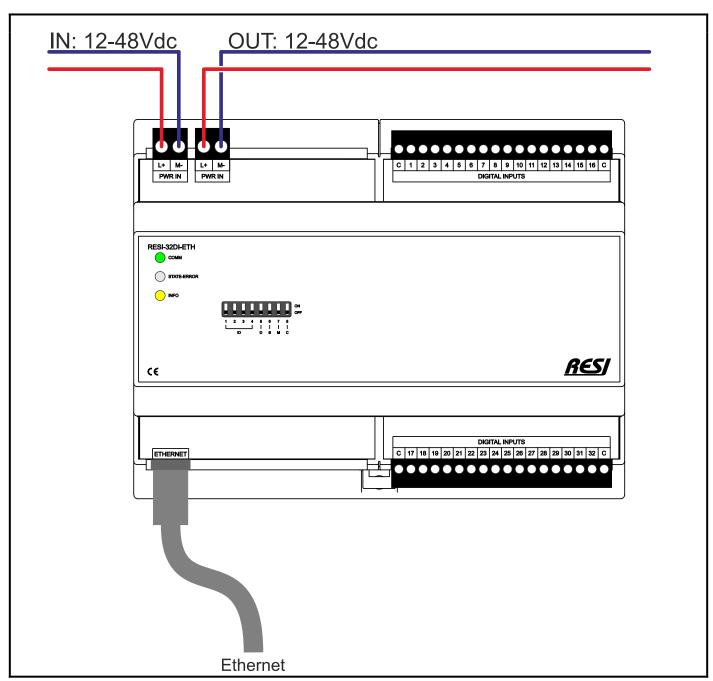


Figure: Ethernet connection for our BIG IO modules



8.3 **RESI-XXX-ETH OPERATING MODES**

The gateway basically supports two different operating modes:

TRANSPARENT MODE: Bidirectional, transparent gateway between Ethernet socket data and IO module. All data arriving at the Ethernet socket are processed directly by the IO module. All data from the IO module is forwarded directly to the Ethernet socket. This mode is required for the ASCII protocol.

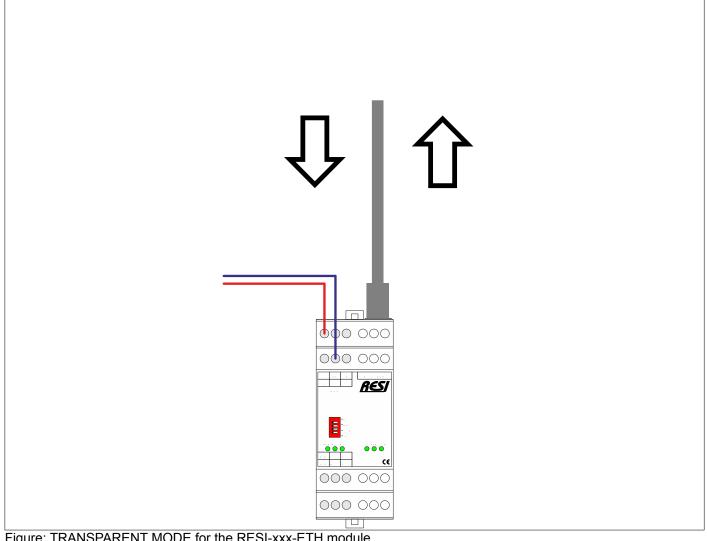


Figure: TRANSPARENT MODE for the RESI-xxx-ETH module



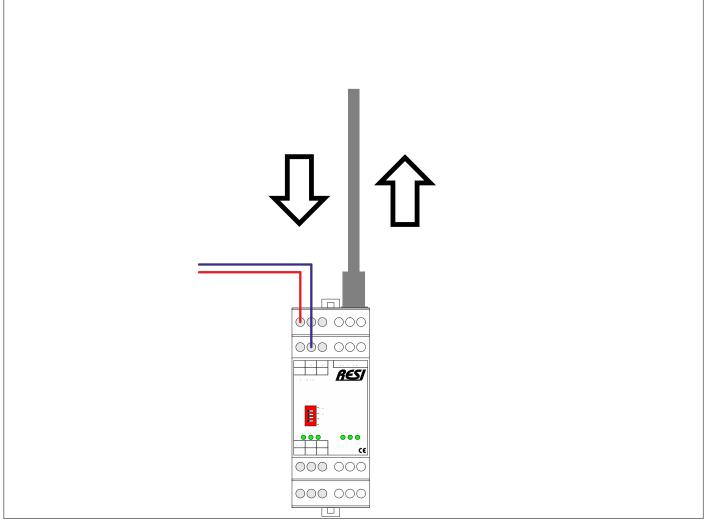


Figure: MODBUS/RTU via ETHERNET MODE for the RESI-xxx-ETH module



 MODBUS/TCP server: The module is a MODBUS/TCP server. A host with MODBUS/TCP master protocol can communicate directly with the IO module connected via Ethernet.

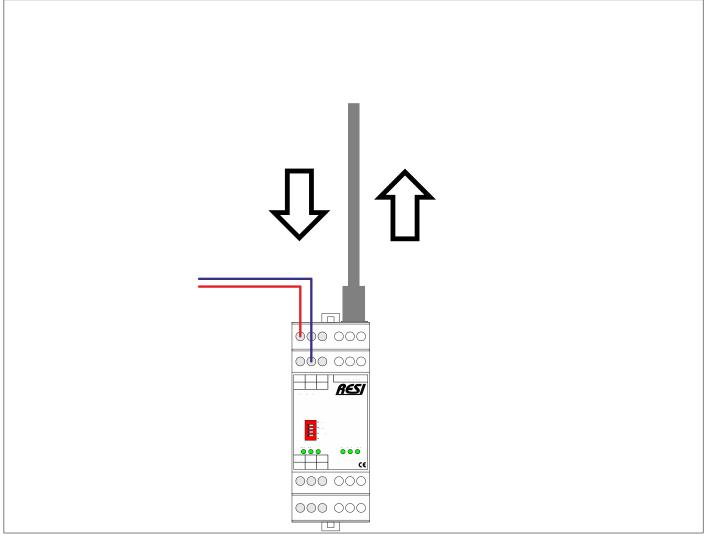


Figure: MODBUS/TCP SERVER MODE for the RESI-xxx-ETH gateway



8.4 **RESI-xxx-ETH WEB CONFIGURATION**

All of our RESI-xxx-ETH gateways have an integrated web server that configures basic access to the Ethernet interface and reads out MODBUS/TCP. To do this, open an Internet Explorer and enter the configured IP address of the selected gateway.

HINT: Please check the individual section of each IO module for the standard IP settings of our specific module. The default user name is RESI and the default password is RESI.

You should see the following page:

ass RESI-2RTD-E	eth X	+				×
← → ⊂ ŵ	③ 19	2.168.0.50	⊘ ☆	Q Suchen	III\ 🗊	≡
	V3014			Visit RESI webpage		
	RE	RESI-2RTD-ETH RESI-2RTD-ETH				
	Current Status	Current settings		help		
	Local IP Config	Module Name: RESI-2RTD-ETH		• Run time:		
	TTL1	Firmware Revision: 3014		run time means the minutes		
	Misc Config	Current IP Address: 192.168.0.50		since latest reboot		
	Reboot	MAC Address: d8-b0-4c-d6-81-27		• TX/RX Count:		
		Run Time: Oday: Ohour: 3min:41		TX/RX count give us a calculation		
		TX Count(ETH) : 0 bytes		of the total byte we have been		
		RX Count(ETH) : 0 bytes		received or send.		
		Conn Status(ETH)A: LISTEN				
		Conn Status(ETH)B: IDLE				
	Copyright © 2009	- 2019 · by RESI Informatik & Automation GmbH and DI HC S	IGL,MSc	website: <u>www.RESI.cc</u>		



8.4.1 How to set up the IP address

Select the "Local IP Config" page. Use the following mask to edit the IP settings:

RESI-2RTD-ETH	× +			
← → ♂ ŵ	③ 192.168.0.50	 ····································	2 , Suchen	II\ ⊡ ≡
V3014			<u>Visit RESI webpage</u>	
		I-2RTD-ETH I-2RTD-ETH		
Current Sta	otus	Current settings	help	
Local IP Con TTL1 Misc Config Reboot	Static IP: 192 for RES Submask: 255 for RES Gateway: 192 for RES	IP ▼ SI-2RTD-ETH select DHCP for automatic IP adressing TIC for manual configuration of the IP settings 168 0 • 50 SI-2RTD-ETH enter your desired module IP adress here · 255 • 255 • 0 SI-2RTD-ETH enter your desired Subnet mask here · 168 • 0 • 1 SI-2RTD-ETH enter your desired gateway IP address here · 168 • 0 • 1 SI-2RTD-ETH enter your desired gateway IP address here · 168 • 0 • 1 SI-2RTD-ETH enter your desired DNS server IP address here	 IP type: StaticIP or DHCP StaticIP Module's static ip Submask usually 255.255.255.0 Gateway Usually router's ip address 	
		Save Cancel		

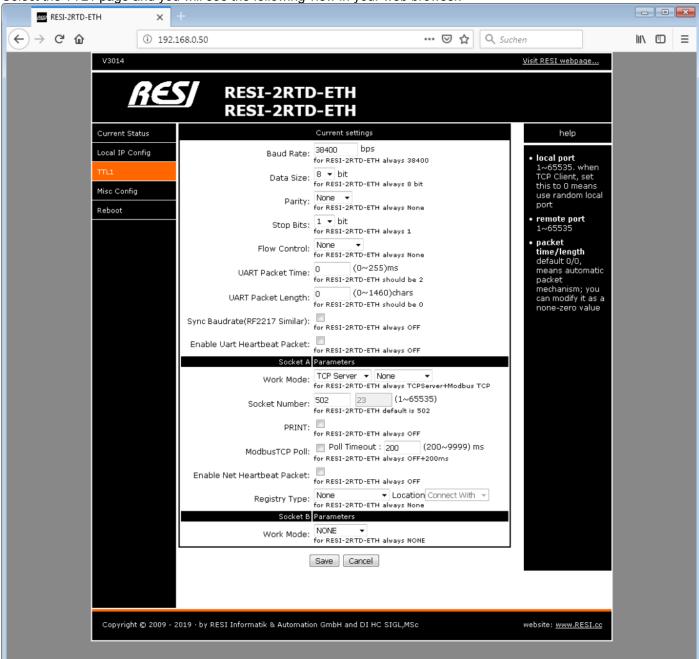
- IP type: Selection between STATIC IP for a static IP address or DHCP mode for an automatic assignment of the IP address.
- Static IP: Choose your desired IP address in IPv4 format
- Submask: Select your desired subnet mask in IPv4 format
- Gateway: Select your desired gateway IP address in IPv4 format
- DNS server: Select your desired DNS server IP address in IPv4 format

Click SAVE to save your data. But don't forget to restart the device for the new IP settings to take effect. If you have problems, set the CFG DIP switch to ON and restart the device. Wait for more than 30 seconds. The gateway resets to the factory settings with the IP standard settings defined above. Don't forget to set the CFG DIP switch back to OFF afterwards.



8.4.2 How to change the socket number

Select the TTL1 page and you will see the following view in your web browser.



NOTE: Do not change the TTL communication parameters (e.g. baud rate, ...). You can lose the connection to the gateway!

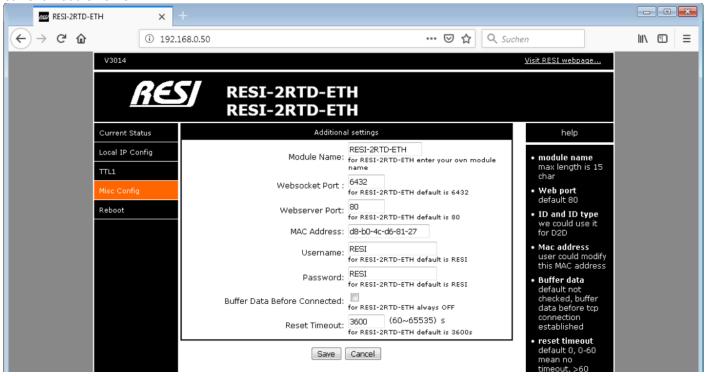
- Work mode: Here you can select TCP Server/none if you want to communicate in transparent mode. All incoming data on the socket are forwarded directly to the IO module. If you want to use the internal MODBUS / TCP to MODBUS/RTU converter, you have to select TCP Server/ModbusTCP. If you select TCP-Server/none, you can also communicate with the MODBUS/RTU protocol over Ethernet or use the ASCII protocol.
- Socket number: Here you can select the desired socket number that you want to use for the Ethernet connection. The default value for our converters is 1024, for MODBUS/TCP 502.

Please leave the rest of the parameters unchanged. They are only suitable for experts!



8.4.3 How to change username and password

If you select the Misc config page, you will see the currently configured user name and password. You will also see the current module name.



- Module name: Here you can enter a new module name. It is used for better identification if you have more than one gateway in your network.
- Username: Here you can enter a new user name for accessing the web configuration.
- Password: Here you can enter a new password for accessing the web configuration.

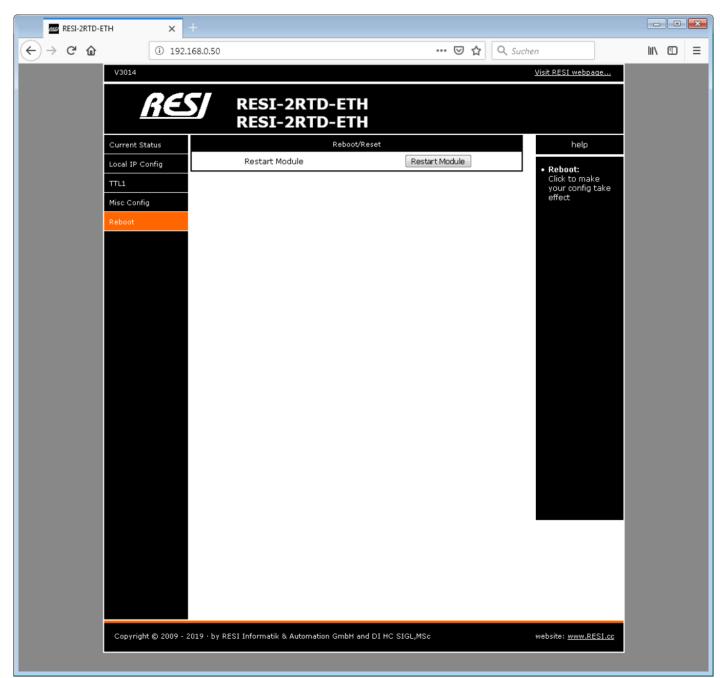
Don't forget to save the new settings with the SAVE button!

Please leave the rest of the parameters unchanged. These are only for experts!



8.4.4 How to restart the gateway via Ethernet

First select the Reboot page. Then select the Restart Module button to restart the software.





8.4.5 How to select the MODBUS / TCP server mode

A gateway can be switched to one of the following states very quickly:

- 1. Activate DIP switch 4: CFG
- 2. Wait for about 30 seconds. The gateway LEDs flash very quickly
- 3. Deactivate all DIP switches

Now you have reset the factory settings to the IP standard settings and selected the MODBUS/TCP server mode. To test your MODBUS/TCP server functionality, use the MODBUS Poll software shown here:

Connection Setup	X
Connection	ОК
Modbus TCP/IP	
Serial Settings	Cancel
Silicon Labs CP210x USB to UART Bridge (COM4)	Mode
9600 Baud -	⊚ RTU
8 Data bits 👻	Response Timeout
None Parity -	1000 [ms]
1 Stop Bit -	Delay Between Polls 100 [ms]
Remote Modbus Server	
IP Address or Node Name	
192.168.0.50	•
Server Port Connect Timeout	IPv4
502 3000 [ms]	© IP√6



Now select the area of the MODBUS-Holding register you want to display. Select the function Setup/Read-Write Definition .. and configure the following parameters. After you click OK, the updated values are displayed.

월 Modbus Poll - Mbpoll 1	23
File Edit Connection Setup Functions Display View Window Help	
□ 🚔 🖬 🎒 🗙 🗂 呉 直 几 05 06 15 16 17 22 23 TC 🗵 🦹 🧏	
Mbpoll1 Read/Write Definition	
Tx = 106: Err = 22: ID = 255: F = 03: Slave ID: 255 OK	
Alias 4x0000 1 -9990 Function: 03 Read Holding Registers (4x) Cancel	
2 -9990 3 -9990 Address: 1 Protocol address. E.g. 40011 -> 10	
4 -9990 5 -9990 Quantity: 10	
6 -9990 Scan Rate: 1000 [ms] Apply 7 203 Disable Image: Scan Rate:	
Image: state	
10 0 Disable on error Read/Write Once	
View Rows 10	
☐ Hide Alias Columns	
Address in Cell Enron/Daniel Mode	
For Help, press F1.	



8.4.6 How to select the TRANSPARENT or MODBUS/RTU via ETHERNET mode

A gateway can be switched to one of the following states very quickly:

- 1. Activate DIP switch 4: CFG
- 2. Wait for about 30 seconds. The gateway LEDs flash very quickly
- 3. Deactivate all DIP switches

Now you have reset the factory settings to the IP standard settings and selected the MODBUS/TCP server mode. Now open the Web configuration with your browser and navigate to the page shown below:

RESI-2RTD-ETH	× +			
← → ♂ ŵ	③ 192.168.0.50	··· 🗵 🗘	Suchen	III\ ⊡ ≡
V3014			Visit RESI webpage	
	RESI-2RTI RESI-2RTI			
Current	t Status	Current settings	help	
	P Config Baud Rate:	for RESI-2RTD-ETH always 38400	• local port 1~65535. when	
	Data Size:		TCP Client, set this to 0 means	
Reboot	Parity:	None for RESI-2RTD-ETH always None	use random local port	
	Stop Bits:	Tor REDI ZRTD ETH always 1	remote port 1~65535	
	Flow Control:		 packet time/length default 0/0, 	
	UART Packet Time:	for RESI-2RTD-ETH should be 2	means automatic packet mechanism; you	
	UART Packet Length:	0 (0~1460)chars for RESI-2RTD-ETH should be 0	can modify it as a none-zero value	
	Sync Baudrate(RF2217 Similar):	for RESI-2RTD-ETH always OFF		
	Enable Vart Heartbeat Packet:	TOP RESI-2RTD-ETH always OFF	_	
		Paramaters TCP Server ModbusTCP for RESI-2RTD-ETH always TCPServer+Modbus TCP		
	Socket Number:	502 23 (1~65535) for RESI-2RTD-ETH default is 502		
	PRINT:	for RESI-2RTD-ETH always OFF		
	ModbusTCP Poll:	Poll Timeout : 200 (200~9999) ms for RESI-2RTD-ETH always OFF+200ms		
	Enable Net Heartbeat Packet:	TOP RESI-2RTD-ETH always OFF		
	Registry Type:	Tor REST 2RTD ETTT always Horie		
	Work Mode:	Parameters NONE for RESI-2RTD-ETH always NONE		
		Save Cancel		
Соруг	right © 2009 - 2019 · by RESI Informatik & Automatic	on GmbH and DI HC SIGL,MSc	website: <u>www.RESI.cc</u>	

Now change the **Work Mode** from **MODBUS/TCP** to **None** and adapt the socket number to your needs. (e.g. 1024). Click SAVE and restart the module with the RESTART button. Now the module works in TRANSPARENT mode.



Now open the MODBUS Poll software to test the MODBUS/RTU via the Ethernet mode:

nnection Setup		[
		ОК
Modbus RTU/ASCII Ov	ver TCP/IP ▼	Cancel
Serial Settings		
Silicon Labs CP210x US	SB to UART Bridge (COM4) 🚽	Mode
9600 Baud 👻		I RTU 🔿 ASCII
8 Data bits 👻		Response Timeout
None Parity 👻		Delay Between Polls
1 Stop Bit 🔹	Advanced	100 [ms]
Remote Modbus Server		
IP Address or Node Na	me	
192.168.0.50		•
Server Port	Connect Timeout	IPv4
1024	3000 [ms]	© IP∨6

After you have established a connection, set the MODBUS read parameters to your needs. Select the function Setup / Read-Write Definition .. and configure the following parameters. If successful, the following values should be displayed:

🖬 Modbus Poll - Mbpoll 1 📃 🔲 🖾				
File Edit Connection Setup Functions	Display View Window Help			
🔁 🖻 🖶 🎒 🗙 🛅 🗒 🚊 💷 05	15 06 15 16 17 22 23 TC 🖂 💡 💦			
Mbpoll1	Read/Write Definition			
Tx = 303: Err = 47: ID = 255: F = 03: S	S Slave ID: 255 OK			
Alias 4x0000	Function: 03 Read Holding Registers (4x) Cancel			
2 -9990 3 -9990	Address: 1 Protocol address. E.g. 40011 -> 10			
4 -9990 5 -9990	Quantity: 10			
6 -9990 7 203	Scan Rate: 1000 [ms] Apply			
8 203	Disable Read/Write Disabled			
10 0	Disable on error Read/Write Once			
	View Rows 10 20 50 100 Fit to Quantity 			
	☐ Hide Alias Columns			
	Address in Cell Enron/Daniel Mode			
For Help, press F1.	[192.168.0.50]: 1024			



To test the ASCII protocol, use the freeware tool putty to establish a socket connection to the module. Configure your IP settings as follows:

🕵 PuTTY Configuration		X
Category:		
🖃 Session	Basic options for your PuTTY se	ssion
Logging	Specify the destination you want to conne	ct to
i ⊡ - Terminal I - Keyboard	Host Name (or IP address)	Port
Bell	192.168.0.50	1024
Features	Connection type:	H 🔘 Serial
Appearance Behaviour Translation Selection	Load, save or delete a stored session Saved Sessions	
Colours Connection Data Proxy Celnet Rlogin CSH	Default Settings 1EGYDC_RS485 1RS485_ETH DAU TESTER KNX TESTER POWER SUPPLY PRIVA	Load Save Delete
In Serial	Close window on exit: Always Never Only on c	lean exit
About	Open	Cancel

Then we have to change the behavior of the PUTTY terminal emulation. Click Terminal in the tree on the left and change the settings to the parameters shown below:

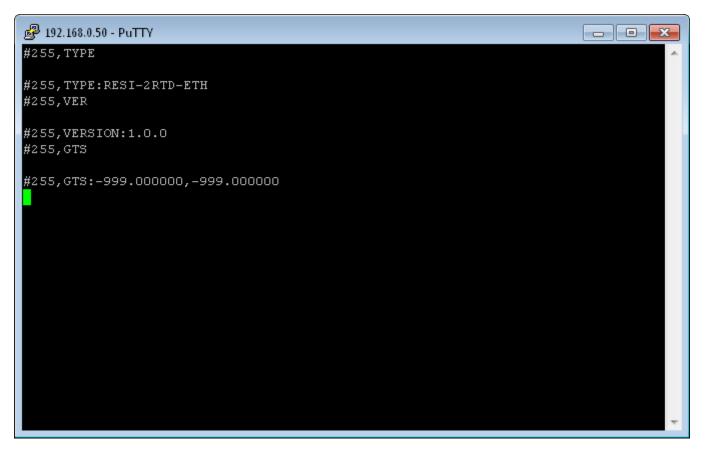
🕵 PuTTY Configuration	E Contraction of the second se
Category:	
 Session Logging Terminal Keyboard Bell Features Window 	Options controlling the terminal emulation Set various terminal options Auto wrap mode initially on DEC Origin Mode initially on Implicit CR in every LF Implicit LF in every CR
Appearance Behaviour Translation Selection Colours	 Use background colour to erase screen Enable blinking text Answerback to ^E: PuTTY
⊡ Connection Data Proxy Telnet Rlogin ⊕ SSH	Line discipline options Local echo:
Serial	Remote-controlled printing Printer to send ANSI printer output to: None (printing disabled)
About	Open Cancel



Click Open to establish a socket connection to the module. Enter the first command #TYPE <CR>. The IO module responds with the current module type.

₽ 192.168.0.50 - PuTTY	
#TYPE	<u>^</u>
#TYPE:RESI-2RTD-ETH #VER	
#VERSION:1.0.0 #GTS	
#GTS:-999.000000,-999.000000	
	Ŧ

You can also use the UnitID of the IO module in this protocol:



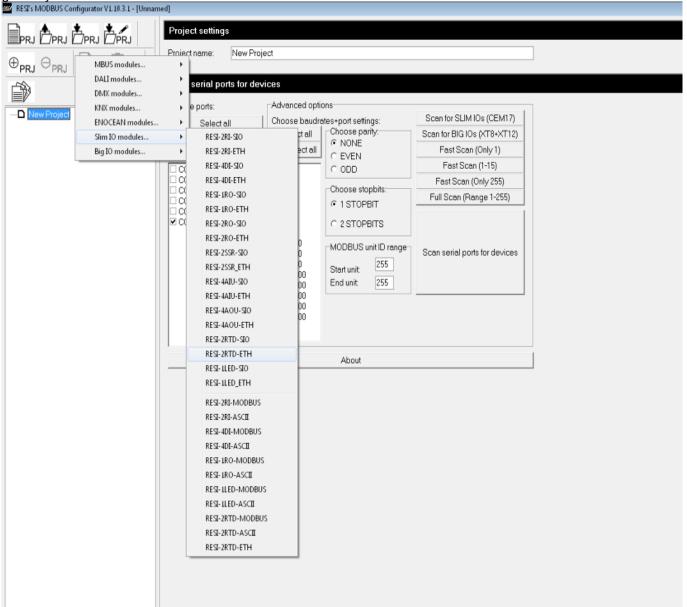


8.5 **HOWTO** connect to an Ethernet gateway

Follow these steps for communicating with an Ethernet gateway.

8.5.1 Example: Add RESI-2RTD-ETH to project tree

First, start the MODBUSConfigurator software. Click on the project tree title "New Project" and add a desired Ethernet gateway.





In our case we take a RESI-2RTD-ETH gateway. Your screen should look like this:

	Local COM port settin		
🗐 Prj 🗗 Prj 🏝 Prj	Modbus unit 255	Device. ME/TCP Sugbits 1 stopbit IP-Address.	
	Baudrate: 19200	Parity: NONE Port	
	Device specific		
Ê		-OD- Test connection , C, Test	
	Download config	Test Connection Test	
L-D RESERTD-ETH-[RES-2RTD-E]	RESH2RTD-ETH	2RTD to MCDBUS/TCP Ethernet module for 2 PT or N temperature sensors	
		777	
	State	1117	
	Bead config Write config	Paget converter	
	MODBUS		
		Baudrate: 57600 V Parity: NOVE V Stopbils: 1 stopbil V	
	Channel 1 Sensor	Current: Visendard: VUnit: V Offset (*) 0.00000 Interval (s): 10	
		Contener Standard, Sone Standard, Orser(5) Control methan(5) (10	
	-Channel 2 Sensor	Current: Stondard: Val: Ofset [C] 0.00000 interval [s]:	
	Janeer	Toward Toward Toward Constrations managed in	
	Register	Volue Comment	
		TEMPERATURES as SINT16 (value*10)	
	4x00001	bx????,? CH1:volid tempsroture (volus*10)	
	4x00002 4x00003	0x777.7 CH2vald temperature (value*10)	
	4x00003 4x00004	0x????,? CH1:real temperature (value*10) 0x????,? CH2:real temperature (value*10)	=
	4x00005	0x11111 CTTEAR Impediate (value*10) 0x1212,7	
	4x00006	Ibx????,? CH2:average temperature (volue*10)	
	4x00007	0x?????? CH1:status as hex	
	4x00007:0	0x????,? CH1:status bit 0:-1 value is valid,-0 value is invalid	
	4x00007:1 4x00007:2	0x????? CH1:status bit 1:=1 ADC OUT OF RANGE,ADC obsolute input voltage is bey 0x????? CH1:status bit 2:=1 SENSOR UNDER RANGE.T	
	4x00007:3	b(117) CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplimit, or sensor is D(2777), CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplimit, or sensor is on D(2777), CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplimit, or sensor is on D(2777), CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplimit, or sensor is on D(2777), CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplimit, or sensor is on D(2777), CH13table bit 3-1 SENSOR OVER RANGE, Tolive emplification (CH13table bit 3-1 SENSOR OVER RANGE).	
	4x00007;4	0x1117.7 CHI status bit 4.don't care	•
	4x00007:5	0x?????? CI II:status bit 5:don't care	
	4x00007:6	0x?????? CH1:status bit 5:-1 ADC OUT OF PANGE, bad ADC reading (could be large	
	4x00007:7	0x????,? CH1:status bit 7:=1 SENSOR HARD FAULT, sensor is open or shortened, R	TD or RSENSE error,=0 sensor is ok
	4×00008	Ibx????,? CH2:status as hex	
	4x00008.0	0x????? CH2.states bit 01 value is valid0 value is invalid	
	4x00008:1	0x????,? CH2:status bit 1:=1 ADC OUT OF RANGE,ADC absolute input voltage is bey	
	4x00008:2 4x00008:3	0x????.? CH2:status bit 2:-1 SENSOR UNDER RANGE_T <towtemp is<br="" limit="0" sensor="">0x????.? CH2:status bit 3:-1 SENSOR OVER RANGE_Tinit=0 sensor is of the sensor</towtemp>	
	4x00008:4	INTERPORT CH2 status bit 3-1 SCHOOL OVER POWGE, I Kingh temp innic a sensor is a INTERPORT CORE	*
	4x00008.5	0x7777.7 CH2.status bit 5.don't care	
	4x0000036	0x1777,7 C12:status bit 6:=1 ADC OUT OF RANGE,bad ADC reading (could be large	external poise event) all sensor is pk
	4x00008;7	Dx?????? CH2:status bit 7:-1 SENSOR HARD FAULT, sensor is open or shortened, R	
		CONFIG REGISTERS	
	4x06021	0x????? CHI_CONFIG SENSOR TYPE.bits 3.0.sensor type.74.excitation current.11.	8 sensor standard
	4x06021:30	0x777,7 CI1:SENSOR TYPE-bits 3.0.15.0:PT100.1:PT1000.2:PT1000.aipha 0.00375	3:PT10.4:PT50.5:PT200.6:PT500.7:NI120.0:NI1000-DIN43760.9:R
	4x05021:74	DX????,? CH1 EXCITATION CURRENT bits 7, 415,0500µA,11mA,25µA,310µA,425µ	
	4x06021:118	0x????,? CH1:SENSOR STANDARD:bits 118:15.0:Europe.1:America.2:Japan.3:ITS-	90.4:DON'T CARE
	4x06021:1512	bx????,? CH1:SENSOR_UNIT:bits 1512:15.0:"Celsius ["C].1:"Fahrenheit["F].2:"Kelvin]	
	4x06022-23	0x????? CH1.zero adjust["C].SINT32.Offset*10000.word order.0xAABBCCDD -> 0xCC	DD 0xAABB
4 III +	*	"	•
Print project report			

8.5.2 Enter IP address & socket port

You will notice, that the software automatically suggest as a device "MB/TCP". Now you have to enter the via web configuration defined IP address and socket number for the communication via MODBUS/TCP protocol. We take the standard settings for RESI-2RTD-ETH: 192.168.0.50 as IP address and 502 as socket address.

- the street of						
	Local COM port settings					
PRJ L/PRJ L/PRJ	Modbus unit: 255 V Device: MB/TCP V Stopbits 1 stopbit V / IP-Address: 192.168.0.50					
	Baudrate: 19200 V Parity: NONE V Part: 502					
	Device specific					
	, ♦ , Download carring , ^{-d.p.} , Test connection , <mark>>>,</mark> Test					
- D New Project						
- D RESIZRTD-ETH- (RESIZRTD-ET	RESI-2RTD-ETH 2RTD to MODBUS/TCP Ethemet module for 2 PT or NI temperature sensors					
	Software version: ????					
	State: ????					
	31002. 1111					
	Bead config Write config Reset converter					
	MODBUS					
	Address: 255 💌 Baudrate: 57600 💌 Parity: NONE 💌 Stopbits: 1 stopbit					
	Channel 1					
	Sensor. Current: Standard: Unit: Offset ['C]: 0.00000 Interval [s]: 10					
	Channel 2					
	Sensor, Current, Standard: VUnit; V Offset [*C]: 0.00000 Interval [s]: 10					
	General Construction Constructi					
	Register Volue Comment					
	Common Commo					
	TEMPERATURES as SINT16 (value*10)					
	4x00001 0x????? CH1:valid temperature (value*10)					
	4x00002 0x????? CH2:valid temperature (value*10)					
	4x00003 0x????,? CH1:real temperature (value*10)					
	4800004 0x????? CH2:real temperature (value*10)					
	4x00005 0x???? CH1:xverage temperature (value*10) 4x00006 0x???? CH1:xverage temperature (value*10)					
	4x00007 0x????, CH1:status as hox 4x00007-0 0x2222 CH1:status hit 0x traduc is valid =0 value is invalid					
	Available 20 CH1-status bit It=1 value to value to invalue					

Click on the button "Test connection". The software should display after a short test: connection test successful.



8.5.3 Change MODBUS unit ID to your needs

Now you can change the MODBUS address to your needs. We use 1 as a Unit ID for MODBUS/TCP communication. Download the new configuration to the device in clicking onto "Download config".

	Local COM port settings	
	Modbus unit: 255 🛛 🗣 Device: MB/TCP 🔍 🤤	Stopbits 1 stopbit 👻 IP-Address: 192.168.0.5
	Baudrate: 19200 - Parity: NONE -	Port: 502
	Bevice specific	
New Project	Download config	t
RESI-2RTD-ETH - [RESI-2RTD-E	PESI2PTD-ETH	2RTD to MODBUS/TCP Ethernet module for 2 PT or N
	Software version: ????	
	State: ????]
	<u>R</u> ead config <u>W</u> rite config R <u>e</u> set converter	
	MODBUS	
	Address: 1 Baudrate: 57600 Parity:	NONE Stopbits: 1 stopbit
	-Chennol 1	
	Sensor: Current: Standard:	Unit: Offset
	-Channel 2	
	Sensor: Current: Standard:	▼Unit: ▼ Offset
	Register Value	Comment
		TEMPERATURE
	4x00001 0x????,? 4x00002 0x????,?	CH1:valid tempe
	4x00002 0x?????? 4x00003 0x??????	CH2:valid tempe CH1:real temper
1	4x00004 0x????,?	CH2:real temper

8.5.4 After Download config, change local COM port settings

The next step is to change the MODBUS Unit ID in the Local COM port settings to 1. Check the new settings with the function "Test connection".

🚟 REST's MODBUS Configurator V1.10.3.1 - [Unnam	ned]					
	Modbus unit:	ddress: 192.168.0.50				
	Bauarare: 19200 Parity: NONE Port	502				
New Project	Device specific Download config Test connection Test					
	RESI-2RTD-ETH 2RTD to MODBUS/TCP Etherne Software version: ???? State: ????	t module for 2 PT or NI ten				
	Bead config Write config Reset converter					
	MODBUS Address: 1 V Baudrate: 57600 V Parity: NONE V Stopbits: 1 stop	obit 👻				
	Channel 1 Sensor: Current Standard: Unit	Offset [*C]:				
	Channel 2 Sensor: Current Standard: Unit	Offset [*C]:				
	Register Value	Comment				
		TEMPERATURES a				



8.5.5 Read sensor configuration

Now we read out the current sensor configuration of the IO module. Click on Read config. Your display should look like this:

Local COM port settings	3				
Modbus unit: 1	✓ Device: MB/TCP ✓ S	Stopbits 1 stopbit	IP-Address:	192.168.0.50	
Baudrate: 19200	▼ Parity: NONE ▼		Port:	502	
Device specific					
👃 Download config / 🖉 Te	st connection 🙀 Test				
RESI-2RTD-ETH		2RTD to MODBUS/TCP m	odule for 2 PT	or NI temperature sensors	
Software version: 1.	0.0				
State:	no error]			
Read config Write config	R <u>e</u> set converter				
MODBUS					HELP
Address: 1	Parity: NONE 💌 Stopbits:	1 stopbit 💌			
Channel 1				0.4 1502 0 00000	
Sensor: PT100	▼Current: 500µA ▼ Standard:	Europe 🚽 Unit: *C	_	Offset [°C]: 0.00000	Interval [s]: 10
Channel 2				0//	
Sensor: PT100	▼Current: 500μA ▼Standard:	Europe 🔽 Unit: °C	_	Offset [°C]: 0.00000	Interval [s]: 10
Register	Value	Comment			
		TEMPERATURES (as SINT16 (v	alue*10)	

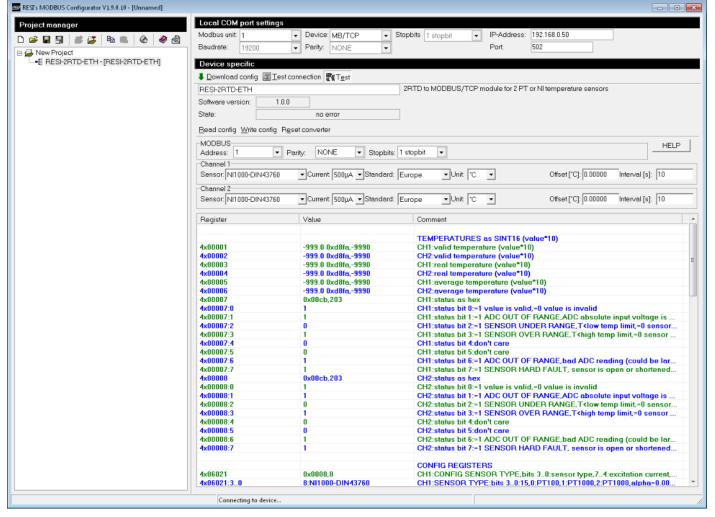


Now we can change the settings to our needs. For example we want to use NI1000 sensors:

	X
Local COM port settings	
Modbus unit: 1 V Device: MB/TCP V Stopbits 1 stopbit V IP-Address: 192.168.0.50	
Baudrate: 19200 V Parity: NONE V Port: 502	
Device specific	_
Download config 🖾 Test connection 💱 Test	
RESI-2RTD-ETH 2RTD to MODBUS/TCP module for 2 PT or NI temperature sensors	
Software version: 1.0.0	
State: no error	
Read confi Write config F iset converter	
	_
MODBUS HELP	
Address: 1 Parity: NONE Stopbits: 1 stopbit	
Channel 1	
Sensor: NI1000-DIN43760 ▼Current: 500µA ▼Standard: Europe ▼Unit: °C ▼ Offset [°C]: 0.00000 Interval [s]: 10	
-Channel 2	_
Sensor: N11000-DIN43760 ▼Current: 500µA ▼ Standard: Europe ▼Unit: *C ▼ Offset [*C]: 0.00000 Interval [s]: 10	
Register Value Comment	

8.5.6 Test the configuration

After a successful download we activate the test function. (Don't forget to select the correct Unit ID in the Local COM port settings. Otherwise you will get no connection). You should get the following result (We have not connected any sensors to the module, therefore we got for all values -999,0:





9 DIP switch settings

Our ULTRA SLIM IO module offer a 4 pin DIP switch for initial setup of the serial connection or the Ethernet connection. Our BIGIO modules offer an 8 pin DIP switch for initial setup.

9.1 DIP switch for serial ULTRA SLIM IOs

The following drawings show the DIP switches for all of our serial SLIMIO products:

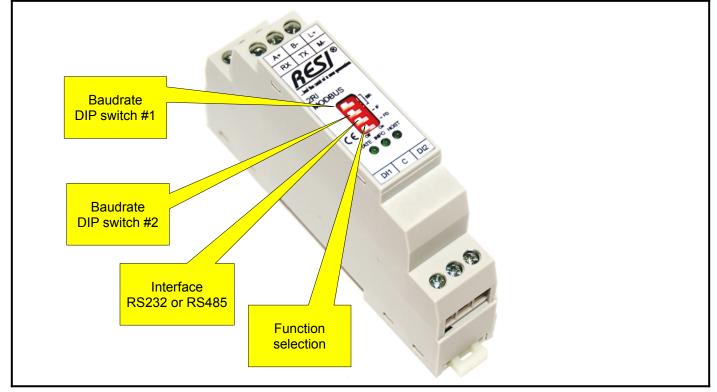


Figure: DIP switches for our serial ULTRA SLIM IO modules

Baud rate BR	Use DIP switch 1 + 2 to select the baud rate:			
	ON O	PFF: PFF: N:	9600Bd 19200Bd 38400Bd	
	ON O	N:	from FLASH (normally 57600Bd)	
	configuratio	on softv	t parity (NONE, EVEN, ODD) and the stop bits are set via the vare, not via the DIP switches! Likewise, the baud rate for sition BR=ON,ON is set via the configuration software.	
Interface IF	Selects the OFF=RS23 ON=RS485	32	al type of the serial interface for the ASCII or MODBUS/RTU protocol:	



Function selection FD	Selects a special function:
	OFF=The unit ID from the FLASH is used ON=Unit ID 255 is always used
NOTE	After changing the DIP switch, the device will be booted automatically So no voltage off/voltage one cycle is necessary. After restarting, all LEDs flash briefly to represent the restart sequence.



9.2 DIP switch for Ethernet ULTRA SLIM IOs

The following drawings show the DIP switches for all of our Ethernet SLIMIO products:

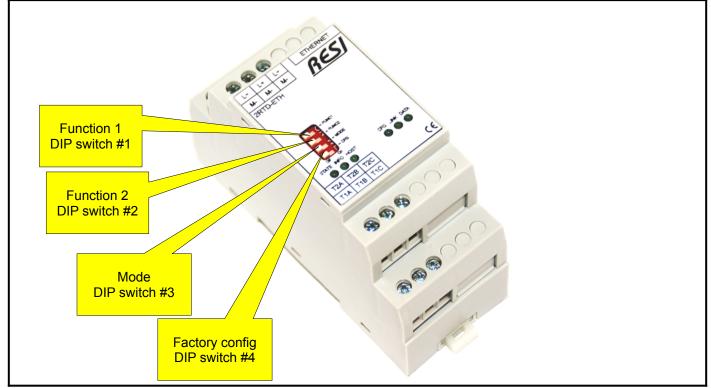


Figure: DIP switches for our Ethernet ULTRA SLIM IO modules

FUNC1 configuration	ON: When the module is restarted, the module changes to STATIC IP with the standard IP settings OFF: The current IP settings are used
FUNC2 configuration.	ON: When the module is restarted, the module changes to DHCP IP
<u><u></u></u>	OFF: The current IP settings are used
MODE	While resetting to factory settings (CFG=ON):
	OFF: Socket mode is set to MODBUS/TCP Socket ON: Socket mode is set to MODBUS/RTU or ASCII over Ethernet
	In normal operation:
	OFF: The configured UnitID is used ON: UnitID 255 is always used!
CFG	ON: When the module restarts, the module restores the factory settings. Wait for about 30 seconds until the STATE + CFG LEDs blink quickly. Then set all DIP switches to OFF. The module restarts automatically and is ready for use. OFF: Normal start of the module
NOTE	After changing a DIP switch, the module restarts immediately. After restarting, all LEDs are briefly switched on to visually indicate the restart of the device.



9.3 DIP switch for serial BIG IOs

The following drawings show the DIP switches for all of our serial BIGIO products:

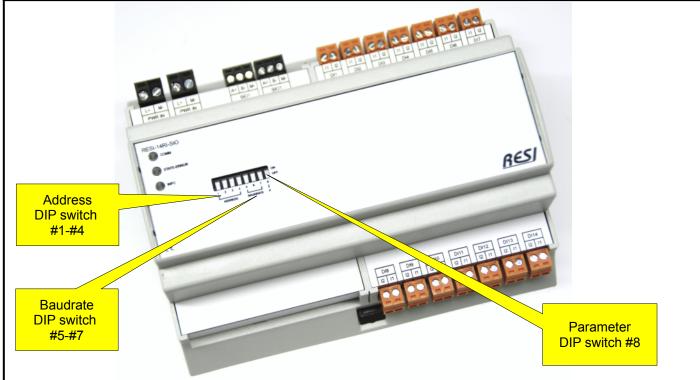


Figure: DIP switches for our serial BIG IO modules

The 8 pin DIP switch has the following mapping:

DIP SWITCH 1=ADR0 2=ADR1 3=ADR2 4=ADR3 5=BR0 6=BR1 7=BR2 8=PARAMETER



ADDRESS This four DIP switches ADR3-ADR0 create the MODBUS/RTU unit number or ASCI bus address in the range of 0 to 15. You can use the following settings:

ADR3 OFF	ADR2 OFF	ADR1 OFF	ADR0 OFF	MODBUS/RTU unit number or ASCII bus number Internal MODBUS/RTU unit number is used from the FLASH memory in the range of 0 to 255.
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

BAUD RATE Those three DIP switches BR2-BR0 define the MODBUS/RTU or ASCII baud rate for the communication:

BR2	BR1	BR0	MODBUS/RTU or ASCII baud rate
OFF	OFF	OFF	4800bd
OFF	OFF	ON	9600bd
OFF	ON	OFF	19200bd
OFF	ON	ON	38400bd
ON	OFF	OFF	57600bd
ON	OFF	ON	115200bd
ON	ON	OFF	230400bd
ON	ON	ON	256000bd

PARAMETER This DIP switch selects between the configuration via DIP switch or via FLASH parameter for the serial setup.

=0: The selected UnitID, baud rate from the DIP switch settings are used.

The parity is NONE and the one stop bit is used

=1: The selected UnitID from the DIP switches is used, but the serial parameters are taken from the FLASH parameters.

Baud rate can be selected between 300 to 256000 Baud.

Parity can be NONE, EVEN or ODD.

Stop bits can be ONE or TWO.

NOTE After changing the DIP switch, the device will be booted automatically So no voltage off/ voltage one cycle is necessary. After restarting, all LEDs flash briefly to represent the restart sequence.



9.4 DIP switch for Ethernet BIG IOs

The following drawings show the DIP switches for all of our serial BIGIO products:

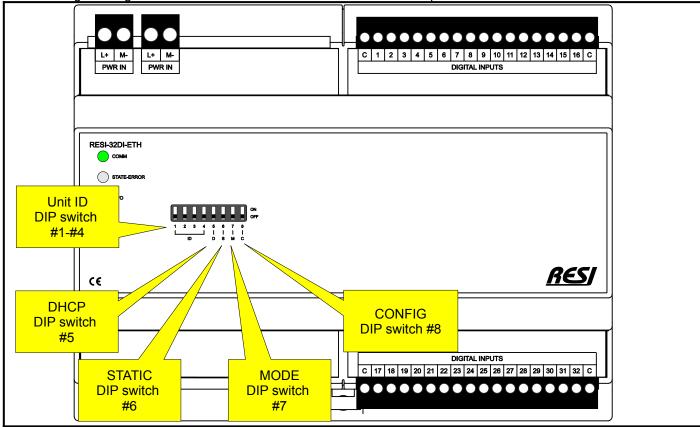


Figure: DIP switches for our serial BIG IO modules

The 8 pin DIP switch has the following mapping:

DIP SWITCH

1=ID0 2=ID1 3=ID2 4=ID3 5=D 6=S 7=M 8=C



This four DIP switches ID3-ID0 create the MODBUS unit number or ASCII bus address. You can use the following settings:

	use the following settings:						
1=ID0	ID3	ID2	ID1	ID0	MODBUS unit number or ASCII bus number		
2=ID1	OFF	OFF	OFF	OFF	255		
3=ID2	OFF	OFF	OFF	ON	1		
4=ID3	OFF	OFF	ON	OFF	2		
	OFF	OFF	ON	ON	3		
	OFF	ON	OFF	OFF	4		
	OFF	ON	OFF	ON	5		
	OFF	ON	ON	OFF	6		
	OFF	ON	ON	ON	7		
	ON	OFF	OFF	OFF	8		
	ON	OFF	OFF	ON	9		
	ON	OFF	ON	OFF	10		
	ON	OFF	ON	ON	11		
	ON	ON	OFF	OFF	12		
	ON ON	ON	OFF	ON OFF	13 14		
	ON	ON ON	ON ON	OFF	Internal MODBUS unit number is used from the		
	ON	ON	ON	ON	FLASH memory in the range of 0 to 255.		
DHCP	If this D	IP switch	is activate	d by boot up	, the internal IP configuration is changed to DHCP		
5=D		for Ether		<i>y</i> 1			
	Wait ur	ntil the ST	FATE LEC) flashes ve	ry fast in white. Then set all DIP switches to OFF and		
	restart t	he module	e (power o	of/on cycle)!			
STATIC					, the internal IP configuration is changed to STATIC		
6=S					address of the module.		
					ry fast in white. Then set all DIP switches to OFF and		
	iesiari i		e (power c	of/on cycle)!			
MODE	This DI	o switch is	s used too	ether with the	e DIP switch 8=C.		
7=M					ON) and DIP switch 8 C is set to 1 (ON) by boot up,		
					set of the module is done:		
					ress with the default IP address of the module, the		
					the default values and all module specific parameters		
	are set	to factory	default va	lues.			
	Wait un	til the STA	TE LED f	lashes very f	ast in white. Then set all DIP switches to OFF and		
				of/on cycle)!			
	=0: For	communi	cation MO	DBUS/TCP	protocol is used		
	=0: For	communi	cation MO	DBUS/TCP			
001510	=0: For =1: For	communio communio	cation MO cation MO	DBUS/TCP DBUS/RTU	protocol is used via Ethernet or ASCII protocol is used		
CONFIG	=0: For =1: For This DI	communie communie P switch a	cation MO cation MO ctivated th	DBUS/TCP DBUS/RTU	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module.		
CONFIG 8=C	=0: For =1: For This DII If this D	communie communie P switch a NP switch	cation MO cation MO ctivated th is set by	DBUS/TCP p DBUS/RTU ne complete l boot up in c	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs		
	=0: For =1: For This DII If this D a comp	communie communie Switch a DIP switch lete syster	cation MO cation MO ctivated th is set by m reset to	DBUS/TCP DBUS/RTU	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs		
	=0: For =1: For This DII If this D a comp STATIC	communie communie P switch a DIP switch lete syster IP mode	cation MO cation MO ctivated th is set by m reset to is used	DBUS/TCP p DBUS/RTU ne complete l boot up in c default value	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es.		
	=0: For =1: For This DII If this D a comp STATIC The def	communie communie P switch a DIP switch lete syster IP mode ault IP set	cation MO cation MO ctivated th is set by m reset to is used ttings of th	DBUS/TCP p DBUS/RTU ne complete l boot up in c default value ne module are	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es. e set		
	=0: For =1: For This DII If this D a comp STATIC The def The use	communic communic P switch a DIP switch lete system IP mode ault IP set crname an	cation MO cation MO ctivated th is set by m reset to is used ttings of th ad passwo	DBUS/TCP p DBUS/RTU ne complete l boot up in c default value ne module are rd for the we	brotocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es. e set b page is set to defalt values		
	=0: For =1: For This DII If this D a comp STATIC The def The use Depend	communie communie P switch a DIP switch lete syster IP mode ault IP set ault IP set ername ar ling on DII	cation MO cation MO ctivated th is set by m reset to is used ttings of th nd passwo P switch 7	DBUS/TCP p DBUS/RTU ne complete l boot up in c default value ne module are rd for the we	protocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es. e set		
	=0: For =1: For This DII If this D a comp STATIC The def The use Depend mode is	communie communie P switch a DIP switch lete system IP mode ault IP set ault IP set anname ar ling on DII activated	cation MO cation MO is set by m reset to is used ttings of th nd passwo P switch 7	DBUS/TCP p DBUS/RTU boot up in c default value me module are ord for the we c=M, MODBU	brotocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es. e set b page is set to defalt values IS/TCP or MODBUS/RTU via Ethernet or ASCII protocol		
	=0: For =1: For This DII If this D a comp STATIC The def The use Depend mode is Wait un	communic communic P switch a DIP switch lete system IP mode fault IP set fault IP s	cation MO cation MO is set by m reset to is used ttings of th nd passwo P switch 7 I ATE LED fi	DBUS/TCP p DBUS/RTU boot up in c default value me module are ord for the we c=M, MODBU	brotocol is used via Ethernet or ASCII protocol is used basic configuration of the module. combination with the DIP switch 7=M the module performs es. e set b page is set to defalt values		

ID



9.5 DIP switches for BIG IOs RESI-S16DI8PO-SIO,RESI-S8PO-SIO

The following drawings show the DIP switches for our serial BIGIO products RESI-S16DI8PO-SIO and RESI-S8PO-SIO:

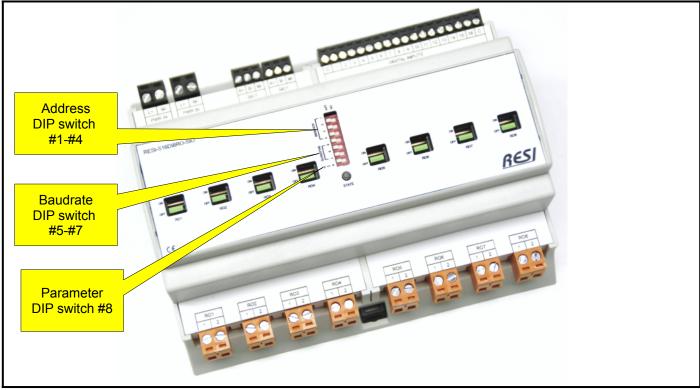


Figure: DIP switches for our BIG IO modules RESI-S16DI8PO-SIO, RESI-S8PO-SIO

The 8 pin DIP switch has the following mapping:

DIP SWITCH 1=ADR0 2=ADR1 3=ADR2 4=ADR3 5=BR0 6=BR1 7=BR2 8=PARAMETER



ADDRESS This four DIP switches ADR3-ADR0 create the MODBUS/RTU unit number or ASCII bus address in the range of 0 to 15. You can use the following settings:

ADR3 OFF	ADR2 OFF	ADR1 OFF	ADR0 OFF	MODBUS/RTU unit number or ASCII bus number Internal MODBUS/RTU unit number is used from the FLASH memory in the range of 0 to 255.
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

BAUD RATE Those three DIP switches BR2-BR0 define the MODBUS/RTU or ASCII baud rate for the communication:

BR2 OFF OFF	BR1 OFF OFF	BR0 OFF ON	MODBUS/RTU or ASCII baud rate 4800bd 9600bd
OFF	OFF	OFF	19200bd
OFF	ON	ON	38400bd
ON	OFF	OFF	57600bd
ON	OFF	ON	115200bd
ON	ON	OFF	230400bd
ON	ON	ON	256000bd

PARAMETER This DIP switch selects between the configuration via DIP switch or via FLASH parameter for the serial setup.

=0: The selected UnitID, baud rate from the DIP switch settings are used.

The parity is NONE and the one stop bit is used

=1: The selected UnitID from the DIP switches is used, but the serial parameters are taken from the FLASH parameters.

Baud rate can be selected between 300 to 256000 Baud.

Parity can be NONE, EVEN or ODD.

Stop bits can be ONE or TWO.

NOTE After changing the DIP switch, the device will be booted automatically So no voltage off/ voltage one cycle is necessary. After restarting, all LEDs flash briefly to represent the restart sequence.



10 LED indicators

Our serial ULTRA SLIM IO modules offer 3 LED indicators for status display, our Ethernet ULTRA SLIM IO modules offer 6 LED indicators for status display. Our BIGIO modules offer 4 LED indicators for status display.

10.1 LED indicators for serial ULTRA SLIM IOs

The following drawings show the LED indicators for all of our serial SLIMIO products:

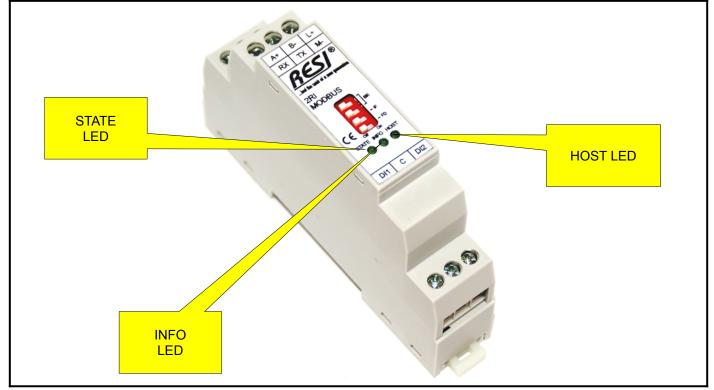


Figure: LED indicators for our serial ULTRA SLIM IO modules

- **STATE** State LED, flashes slowly (approx. 1s) if the module is OK. Flashes quickly when the module has an internal error
- **INFO** This LED shows more information about the local IOs. The functionality depends on the used IO module. Please refer to the detailed description for each IO module.
- **HOST** Shows whether serial data is currently being sent or received via the RS232 or RS485 interface



10.2 LED indicators for Ethernet ULTRA SLIM IOs

The following drawings show the LED indicators for all of our Ethernet SLIMIO products:



Figure: LED indicators for our Ethernet ULTRA SLIM IO modules

- **STATE** State LED, flashes slowly (approx. 1s) if the module is OK. Flashes quickly when the module has an internal error
- **INFO** This LED shows more information about the local IOs. The functionality depends on the used IO module. Please refer to the detailed description for each IO module.
- **HOST** Shows whether serial data is currently being sent or received via the internal serial interface to the Ethernet controller
- CFG Factory setting LED: In working mode, this LED flashes in the same rhythm as the STATE LED. If the DIP switch CFG is ON when restarting, the STATE LED is always on and the CFG LED flashes slowly. When this process is complete, both LEDs will flash very fast. Then the CFG LED must be set to OFF again!
- LINK This LED is on when the Ethernet interface is electrically connected correctly with the network
- DATA This LED shows the data flow on the Ethernet interface



10.3 LED indicators for serial BIG IOs

The following drawings show the LED indicators for all of our serial BIGIO products:

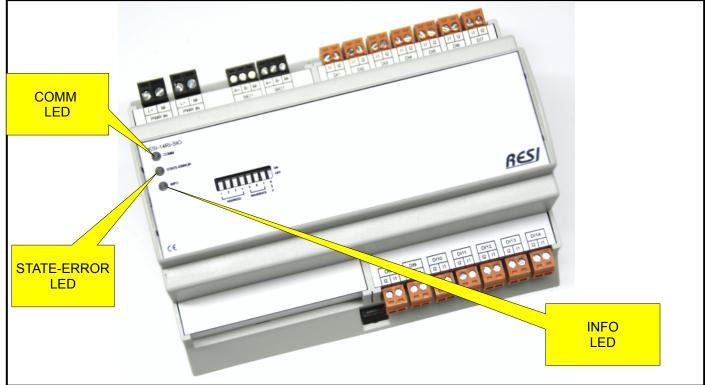


Figure: LED indicators for our serial BIG IO modules

- **COMM** Shows whether serial data is currently being sent or received via the RS485 interface
- **STATE-ERROR** State LED, flashes slowly (approx. 1s) in WHITE if the module is OK. Flashes quickly in RED when the module has an internal error
- **INFO** This LED shows more information about the local IOs. The functionality depends on the used IO module. Please refer to the detailed description for each IO module.



10.4 LED indicators for Ethernet BIG IOs

The following drawings show the LED indicators for all of our Ethernet BIGIO products:

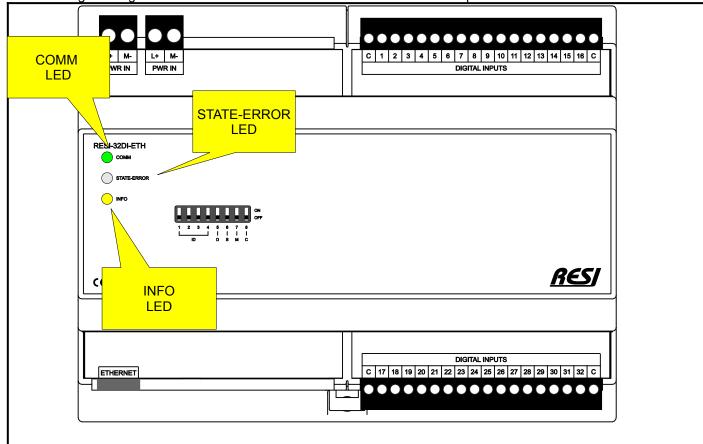


Figure: LED indicators for our serial BIG IO modules

- **COMM** Shows whether serial data is currently being sent or received via the Ethernet interface
- **STATE-ERROR** State LED, flashes slowly (approx. 1s) in WHITE if the module is OK. Flashes quickly in RED when the module has an internal error
- **INFO** This LED shows more information about the local IOs. The functionality depends on the used IO module. Please refer to the detailed description for each IO module.



10.5 LED indicators for BIG IOs RESI-S16DI8PO-SIO,RESI-S8PO-SIO

The following drawings show the LED indicators for our serial BIGIO products RESI-S16DI8PO-SIO and RESI-S8PO-SIO:

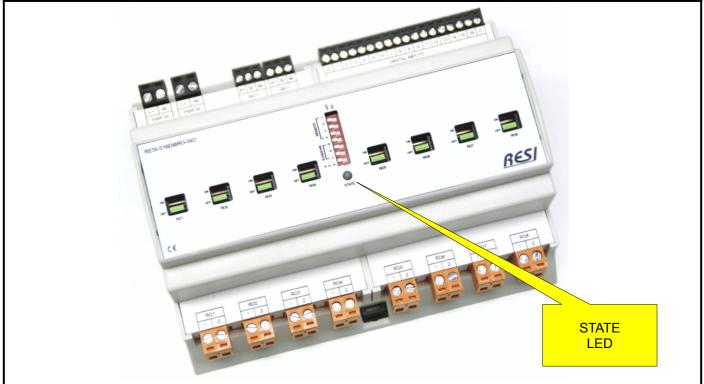


Figure: LED indicators for our BIG IO modules RESI-S16DI8PO-SIO, RESI-S8PO-SIO

STATE State LED, flashes slowly (approx. 1s) in WHITE if the module is OK. Flashes quickly in RED when serial data is currently being sent or received via the RS485 interface



11 DIMENSIONS

11.1 ULTRA SLIM IOS: RESI-xxx-SIO

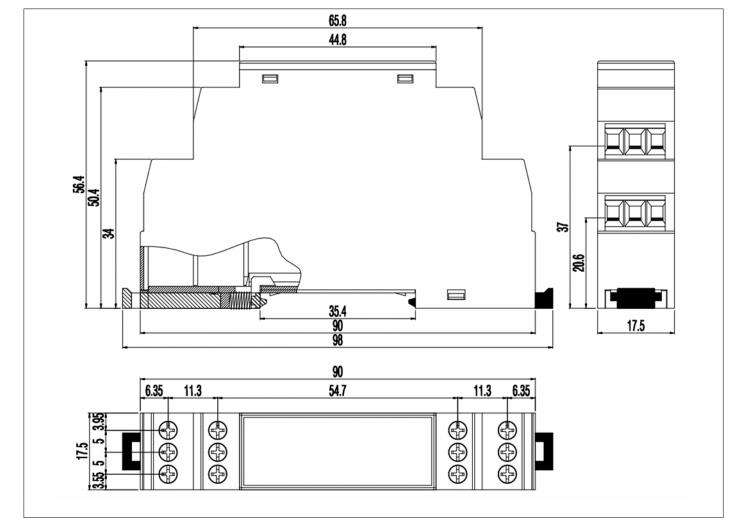


Figure: Dimensions of the housing for our serial ULTRA SLIM IO modules in mm

Dimensions

Housing illustration Color Material Protection class 17.5 x 90 x 58 gray RAL 7035 PA-UL 94 V0 IP20 based on DIN 40050 / EB 60529



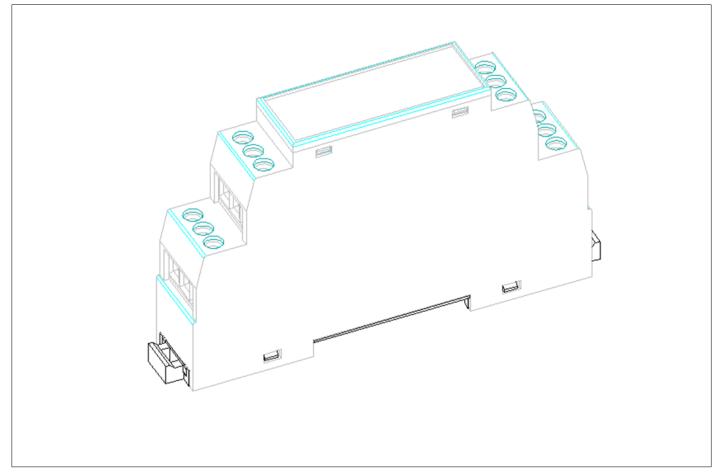


Figure: For our serial ULTRA SLIM IO modules: Housing illustration in 3D

11.2 ULTRA SLIM IOS: RESI-xxx-ETH

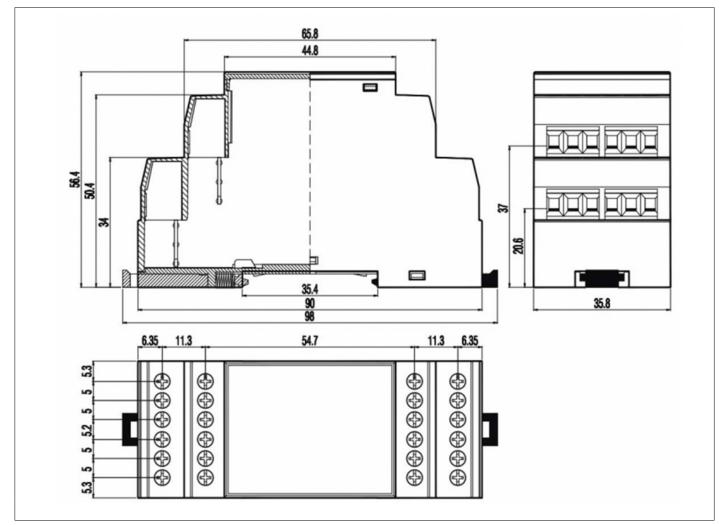


Figure: Dimensions of the housing for our Ethernet ULTRA SLIM IO modules in mm

Dimensions

Housing illustration Color Material Protection class 35.8 x 90 x 58 gray RAL 7035 PA-UL 94 V0 IP20 based on DIN 40050 / EB 60529



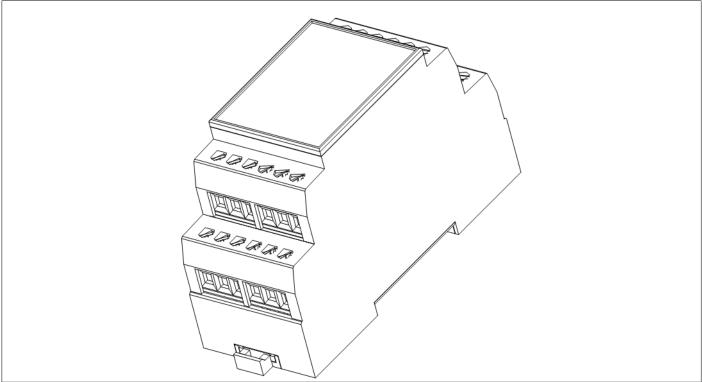


Figure: For our Ethernet ULTRA SLIM IO modules: Housing illustration in 3D



11.3 BIG IOS: RESI-XXX-SIO XT8

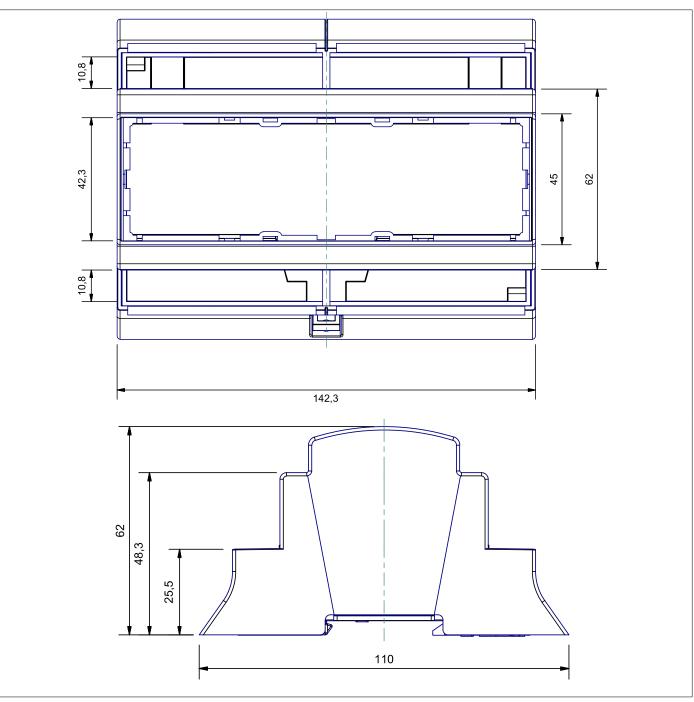


Figure: Dimensions of the housing for our serial BIG IOs XT8 modules in mm

Dimensions

Housing illustration Color Material Protection class 142.3 x 110 x 62 grey RAL 7035 Self-extinguishing Blend PC/ABS UL94-VO IP20 based on DIN 40050 / EB 60529

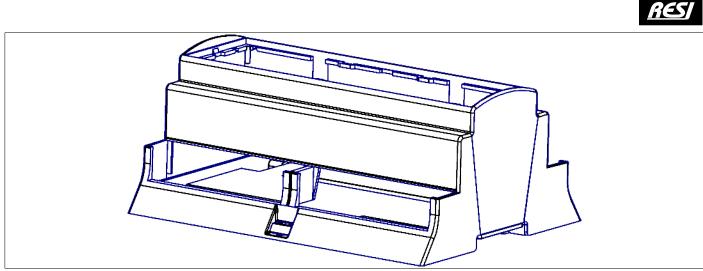


Figure: For our serial BIG IOs XT8 modules: Housing illustration in 3D



11.4 BIG IOS: RESI-XXX-SIO XT12

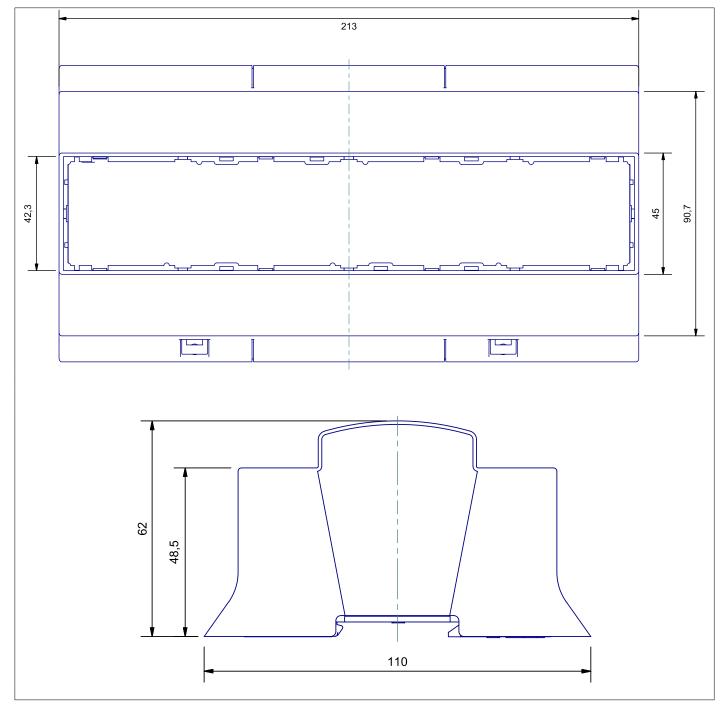


Figure: Dimensions of the housing for our serial BIG IOs XT12 modules in mm

Dimensions

Housing illustration Color Material Protection class 213 x 110 x 62 grey RAL 7035 Self-extinguishing Blend PC/ABS UL94-VO IP20 based on DIN 40050 / EB 60529

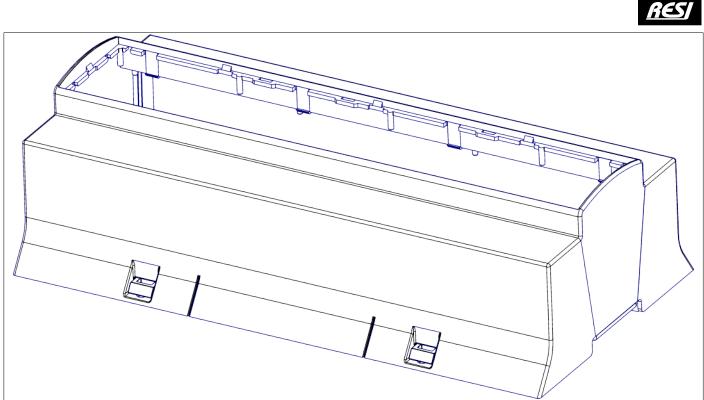


Figure: For our serial BIG IOs XT12 modules: Housing illustration in 3D



12 MODBUSConfigurator software

12.1 General information

We offer a free configuration & test tool named MODBUSConfigurator. This tool offers the possibility to configure and test almost all of our products. When you start the software you will see the following picture.

RESI's MODBUS Configurator V1.10.3.1 - [Unnam	ned]			 - • •
	Project settings Project name: New Project			
⊕ _{PRJ} ⊖ _{PRJ} ● PRJ ⊖ ● PRJ ● PRJ ● ● PRJ ● ● PRJ ● PRJ ● ● PRJ ● PRJ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	Select all Chor Deselect all Select all Refresh serial ports De COM1 66 COM4 99 COM6 22 COM8 44 9 0 COM6 22 COM8 44	00 Choose stopbits: 200	Scan for SLIM IOs (CEM17) Scan for BIG IOs (XT8+XT12) Fast Scan (Only 1) Fast Scan (1-15) Fast Scan (Only 255) Full Scan (Range 1-255) Scan serial ports for devices	
		About		
Print project report				h



12.2 Main menu icons

The main menu icons provide the purpose to start a new project or open an existing project or save the current project to a new project file. You can also add some new items to a gateway like meters or DALI lamps or you can add a new gateway to an existing project. of course you can delete and configure gateway from a project. You can copy and paste objects within the existing project and you can generate a project report for documentation.



First row:

- Create a new empty project
- Open an existing project
- Save current project
- Save current project with new name

Second row:

- Add a gateway, IO module or object to the project tree
- Delete selected item from the project tree
- Copy selected item into internal clipboard
- Paste internal clipboard to project tree

Third row:

Generate project report



12.3 Project settings

In this section you can define your special project name:

Project settings	
Project name:	New Project

12.4 Scan for serial devices

In this section you can configure an automatic search process to find all connected devices. Therefore you see on the left side the current available serial interfaces currently connected to your computer.

With the button select all you can select all of the available serial interfaces. With the button Select all you can select all serial interfaces for the automatic search process. The button Deselect all will deselect all serial interfaces for this automatic search. The button Refresh serial ports will scan again all connected serial interfaces of your computer and refresh the displayed list of serial interfaces.

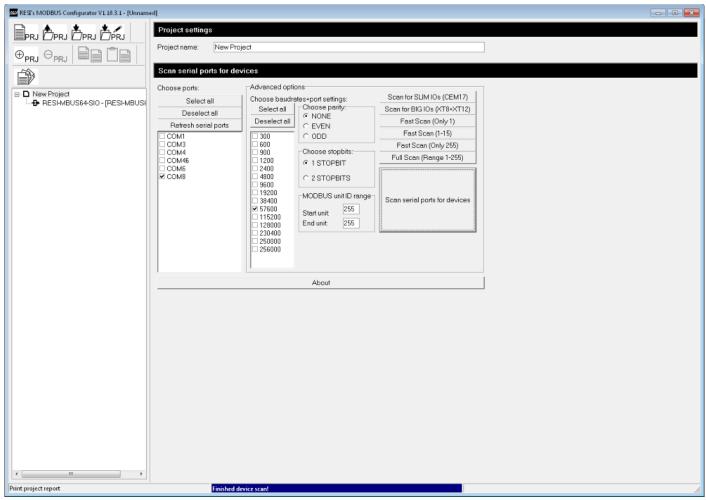
In the area on the right side you will find settings for baud rates, parity and stop bits. Also you can select the range of MODBUS unit IDs which are used for this automatic search process. The automatic search for connected serial devices starts by pressing the Scan serial ports for devices button. The remaining buttons offer a quick selection for certain scenarios. The About button opens a dialog with information about the program version.

Scan serial ports for devices

Choose ports:	-Advanced optic	ons	
Select all	Choose baudra	tes+port settings:	Scan for SLIM IOs (CEM17)
Deselect all	Selectall	Choose parity: • NONE	Scan for BIG IOs (XT8+XT12)
Refresh serial ports	Deselect all	O EVEN	Fast Scan (Only 1)
	300	CODD	Fast Scan (1-15)
COM3	600		Fast Scan (Only 255)
COM4 COM46	□ 900 □ 1200	Choose stopbits:	Full Scan (Range 1-255)
□ COM6 I COM8		© 2 STOPBITS MODBUS unit ID range Start unit: End unit: 255	Scan serial ports for devices
		About	



If your automatic scan was successful, the project tree will show the connected IO modules or gateways:





12.5 Configure and test a device

When you click in the project tree onto a device you can select a device. On the right side you will see all technical parameters to set up and test a specific device.

EST's MODBUS Configurator VL 10.3.1 - [Unnamed]	
Image: Properticipation of the setting	
Device specific	
Device specific ↓ Download config Test	
B-D New Project RESHMBUS64-SIO - [RESHMBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)	
Software version: 5.0.0	
State: no configuration Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter	
MODBUS MBUS	
Address: 255 V Parity: NONE V Start 1 Baudrate: 2400 V Baudrate: 57600 V Stanbits: 1 stopbit V End 251 Ouerytimeout 65535 Polltimeout: 65535	
MB Register MBUS datatype MB datatype Content MBUS index MB value HEX	Cur
	Þ
Print project report Finished device scan!	



12.5.1 Local COM port settings

In this section you will see the current configured serial or IP settings to communicate with the selected device. Also you can change the MODBUS unit ID which is used for the communication protocol.

Local COM	port settings									
Modbus unit:	255	• [Device:	COM8	👻 Sto	opbits	1 stopbit	-	IP-Address:]
Baudrate:	57600	▼ F	Parity:	NONE	•				Port:	

Select serial communication:

As long as you select a serial device COMx from the drop-down list Device you will use a serial interface to communicate with the connected module. Choose your desired parameters for baud rate, parity and stopbits.

Select Ethernet communication:

If you open the drop down list, you will notice two other options

- TCP/IP: Use serial communication via TCP/IP
- MB/TCP: use MODBUS/TCP protocol via TCP/IP

First, select one of the two options, then you can enter a IP address and a socket number for the communication via Ethernet.

Local COM	port setting:	5									
Modbus unit:	255	-	Device:	MB/TCP	•	Stopbits	1 stopbit	-	IP-Address:	192.168.0.240	
Baudrate:	57600	-	Parity:	TCP/IP					Port:	502	
			-	MB/TCP							
Device spe	cific			COM1							
				COM2	LΓ						
_ I ▼ _ Dowr	nload config	'-ad-'	Test cor	COM3	s	st					
	-			COM4	Ľ						
RESI-MBUSE	64-SIO			COM5		MBUS	to MODBUS,	/RTU c	onverter for 64	meters (1200 registers)	
				COM6	-					, <u> </u>	
Software vers	ion: 5.	0.0									

Check connection settings:

After you have defined your communication settings, you can test the communication by pressing the button test connection. If the connection is not successful established, an error dialog will pop up. If the communication is ok, the fields Software version and State will show more information about the device.

Local COM	port settings							
Modbus unit	255 [Device: 	COM8	✓ Stopbits	1 stopbit	-	IP-Address:	s: 192.168.0.240
Baudrate:	57600 [Parity: 	NONE	-			Port:	502
Device spec	cific							
	load config	<u>T</u> est co	nnection 🔼	T <u>e</u> st				
RESI-MBUS6	4-SIO			MBUS	S to MODBUS/	'RTU c	converter for 6	64 meters (1200 registers)
Software versi	ion: 5.0.0							
State:		no config	guration					



12.5.2 Device specific area

In this section you will find specific information about the connected device. In this sample we have connected a MBUS devices with one meter.

RJ DPRJ Hotos unit		Nice: COM8		IP-Address. Port:				
Eaucrate Eaucrate	57600 - Pe	NONE	•	Port				
Device spe	cific							
♦ Down	Ibad config Is	stconnection	C I Test					
RESHMBUSS	34-510		MBUS to MODEUS/RT	U converter for 64 meters (120	(registers)			
Sofware vers								
State:		na error						
Search M-Bu	s slaves Sgarch M-Bus	slaves via serial	Save CSV file. Epse configuration	Application Reset Activate L	EVEL converter De	activate LEVEL converter		
MODEUS			MBUS					
Address: 2	55 • Pority.	NONE .	Start 1 Boudrate	2400 💌				
Baudrate: 5	7600 · Stopbits	1 stopbit	End 251 Query timeout:	65535 Polltimeout:	65535			
		Transpon Is						
MB Register		MB detatype				MB value HEX		Metername
4x00001	INT32[4]		Volume:101-3 m ^e			MSW 0000,0000 LSW		Metar 2 [P:2]
4×00003	INT32[4]		Volume:10^-3 m ^e -Accumulation of ab			MSW.0000.00001.SW		Meter 2 [P:2]
4×00005	INT32[4]		On time hours		2	MSW/0000.1137/LSW		Meter 2 [P:2]
4x00007	INT16[2]		Volume flow:10^-3 m//h		3	MSW:0000.0000:LSW		Meter 2 [P:2]
4x00009	INT8[1]		External temperature:1010.10		4	MSW:41D8,00001LSW		Meter 2 [P:2]
4×00011	INT16[2]		Volume flow:10 ⁻³ m ⁹ /h		5	MSW:0000.00001LSW		Meter 2 [P:2]
4×00013	INT16[2]	FLOAT32	Volume flow:10 ⁺ -3 m ² /h		6	MSW.0000.0000.LSW	0.0000,0.00000000000000E+0	Meter 2 [P:2]
4x00015	NT8[1]	FLOAT32	External temperature:1010.10		7	MSW:41E8,0000:LSW	23.0000,2.300000000000E+1	Meter 2 [Pt2]
4x00017	INTE[1]	FLOAT32	External temperature:1010.10		8	MSW-41D8,00001LSW	27.0000,2.7000000000000E+1	Meter 2 [P:2]
4x00019	INT8[1]	FLOAT32	External temperature:1010 °C-Averag	e medio temperature	9	MSW:41C0.0000:LSW	24.0000.2.4000000000000E+1	Meter 2 [P:2]
4×00021	INT32[4]	DATE TIME 1	Time&Date data type F		10	MSW/248A/2D05LSW	13:05 D.M.Y.10:04:20 ST:0 M.0.0x248A2D0	Meter 2 (P.2)
4x00023	INT32[4]		Volume:101-3 mfU:0.T.0.S:11		11	MSW/0000.0000/LSW/		Meter 2 [P:2]
4x00025	INT16[2]	FLOAT32	Volume fore:101-3 m*/h[U:0,T:0,S:1]		12	MSW-0000.00001.SW	0.0000 0.000000000000000E+0	Meter 2 [P:2]
4x00027	INT16[2]		Volume fow:10^-3 m9/h(UILT:0.S:1)		13	MSW10000,00001.SW		Meter 2 [P:2]
4×00023	INT8[1]		External temperature:1010 °C/U 0.T:0	1511	14	MSW 4170.00001.SW		Meter 2 [P:2]
4x00031	INTRE1		External temperature:1010 °CIU.0.T:0		15	MSW-41C8.0000:LSW		Meter 2 [P:2]
4x000033	INTE[1]		External temperature:101010-Average			MSW:41E0.0000:LSW		Meter 2 [P:2]
4x00035	INT16[2]		Date data type G[UILT:0.S:1]			WORD:239E		Meter 2 [P-2]
4×00035	INT16[2]		Info code			WORD:0001		Meter 2 [P:2]
4×00037	INT48[6]		Config number		19	MSW.000000175464.88AE:LSW		Meter 2 [P.2]
4x00041	NT16[2]		Meter type			WORD:2203		Meter 2 [P:2]
4x00042	INT16[2]		Entraneous version		20	W0RD:0601		Meter 2 [P:2]
433342	TALLOIS	OINT IS	Firmwere version		1.1	0010.0001	1331,00001	Mean C P.C
4×03001	PES	UINT16	Converter state for meter		STATE	WORD:0003	3.0x0003 → Values are valid!"	Meter 2 (P.2)
4x09002	HEADER		Identification number of meter		ID ID	LSW/6229,MSW/2071		Meter 2 [P:2]
1.10001	1000	1.10.0700			10	1 10 11 00 74 00 00 1 00 1	E 1001000 0 00010000	
4×10001	HEADER		Identification number of meter		ID	MSW2071.62291LSW		Meter 2 [P:2]
4×10003	HEADER		Monulacturer of meter			MSW/004D.414BLSW		Meter 2 [P:2]
4×10005	HEADER.		Version of meter			WORD:001D		Meter 2 [P:2]
4x10006	HEADER		Medium of meter			WORD:0016		Meter 2 [P:2]
4x10007	HEADER		Access of mater		ACCESS	WORD:00ED		Meter 2 [P:2]
4×10008	HEADER		Status of meter		STATUS	W0RD:0000		Meter 2 [P:2]
	PESI	UINT16	Future value of meter		FUTURE	WORD:0000		Meter 2 [P:2]
4x10003 4x10010	PESI	UINT16	Communication state with meter		COMM STATE	WORD:0003	3.0x0003 -> Values are valid!	Motor 2 [P:2]

For all devices you have two options:

Download config

With this button you can download your new settings which you have selected in the device specific area into the connected module. After that you may have changed the basic configuration settings. So don't forget to change the Local COM port settings to establish communication to the module again.

Test

This button activates a cyclic test option, which will show values from the connected device. IN this case it will show the current meter values of the connected MBUS meter on your MBUS gateway.

levice specific	
Download config Test connection C Test	
ESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)	
oftware version: 5.0.0	
ate: no error	
earch M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter	
10DBUS .ddress: 255 ▼ Parity: NONE ▼ Start 1 Baudrate: 2400 ▼	
audrate: 57600 🔹 Stopbits: 1 stopbit 💌 End 251 Query timeout: 65535 Poll timeout: 65535	
B Register MBUS datatype MB datatype Content MBUS index MB value HEX	
.00001 INT32[4] FLOAT32 Volume:10^-3 m ^o 0 MSW.0000.0000.LSW	
00003 INT326/1 ELOAT32 Volume:10^3 m%Accumulation of abovelue only if nonative contribut MSW/0000.00004 SW	



Device specific commands:

You will also find a command area with buttons for device specific commands. In the case of our MBUS gateways you will find the functions:

- Search M-Bus slaves
- Search M-Bus svales via serial
- Save CSV file
- etc.

Please refer to the detailed documentation for each module, what the specific commands are for and how you can use them.

General device settings:

Below of the device specific command area is an area with general settings for the selected device. IN our sample case it will be:

- MODBUS address
- Baudrate
- Parity
- Stopbits
- Primary MBUS start ID
- Primary MBUS end ID
- etc.

This settings can be downloaded into the device with the button Download. Some of your modules can also upload this settings fro the device. Then they have an additional button in the device specific command area.

Value grid:

Under the specific device settings most of our module show a gird with more configuration possibilities or a grid with MODBUS registers. Again the configuration grid will be downloaded with the button Download int the device. The MODBUS values will be cyclic updated by activating the Test button.

For more details refer to the specific devices, what information the MODBUSConfigurator software will offer.



13 RESI-14RI-SIO

13.1 General information

This series of IO modules offer the following features:

- 14 digital inputs for 12-250Vac/dc signals
- Each digital input is galvanic insulated to all other digital inputs
- Each digital input is cabled via extra 2 pin removable terminal
- Galvanic insulated RS485 interface for communication with a host system

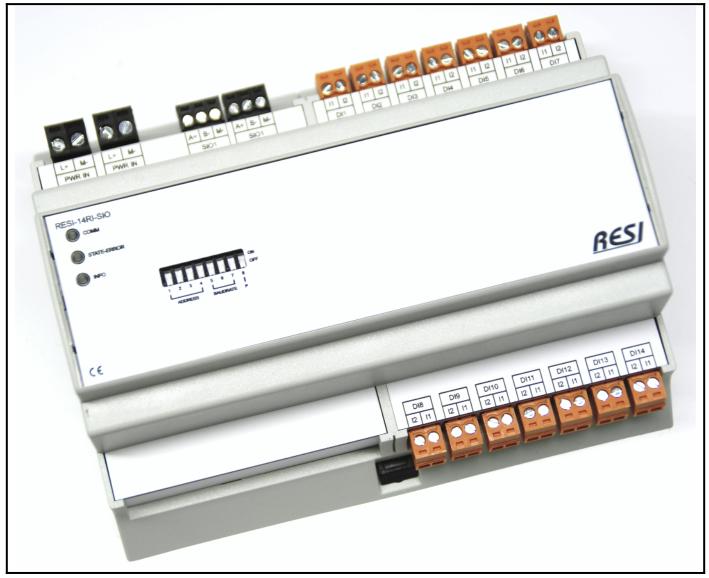


Figure: Our RESI-14RI-SIO module



13.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	<0.5W
Product housing	BIG IO XT8
Product weight	255g
Digital inputs	
Total amount of inputs	14
Sampling rate	Every 5ms
DC rating	
Input voltage range	12-250V= +/-10%
Input current	per channel
	approx. 0.85mA@12V=
	approx. 0.85mA@24V=
	approx. 0.85mA@32V=
	approx. 0.85mA@48V=
	approx. 0.85mA@250V=
Input power consumption	max. 0.3W/channel
Logic levels	0: <4.5V~
	1: >7.5V~
AC rating	
Input voltage range	12-250V= +/-10%
Input current	per channel
	approx. 0.85mA@12V~
	approx. 0.85mA@24V~
	approx. 0.85mA@48V~
	approx. 0.85mA@110V~
	approx. 0.85mA@230V~
	approx. 0.85mA@250V~
Input power consumption	max. 0.3W/channel
Logic levels	0: <4.5V~
	1: >7.5V~
Cable connection	Via 14 2-pin plug-in terminal block
Terminal type	RM3.5
Galvanic insulation	Yes, to each other digital input and to IO module
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one



13.3 Additional terminals & LED states

DIGITAL INPUTS	14 digital inputs for 12-250Vac/dc signals						
	Eight 2 pin plug-in terminal block						
	Terminal type:	RM3.5					
	l1:	Digital input +: AC/DC signal					
	12:	Digital input -: Ground or neutral wire					
	0=open or short cut						
		1=AC or DC voltage between 12 and 250V					
Pin layout	Pin 1:	l1					
	Pin 2:	12					
INFO	This LED is on, if at least one of the digital inputs is high (1).						
	This LED is off, if all digital inputs are low (0).						

13.4 Connection diagram

13.4.1 Cabling of the digital inputs with DC signals

In the below drawing you see the cabling of the 14 digital inputs of the module with DC signals.

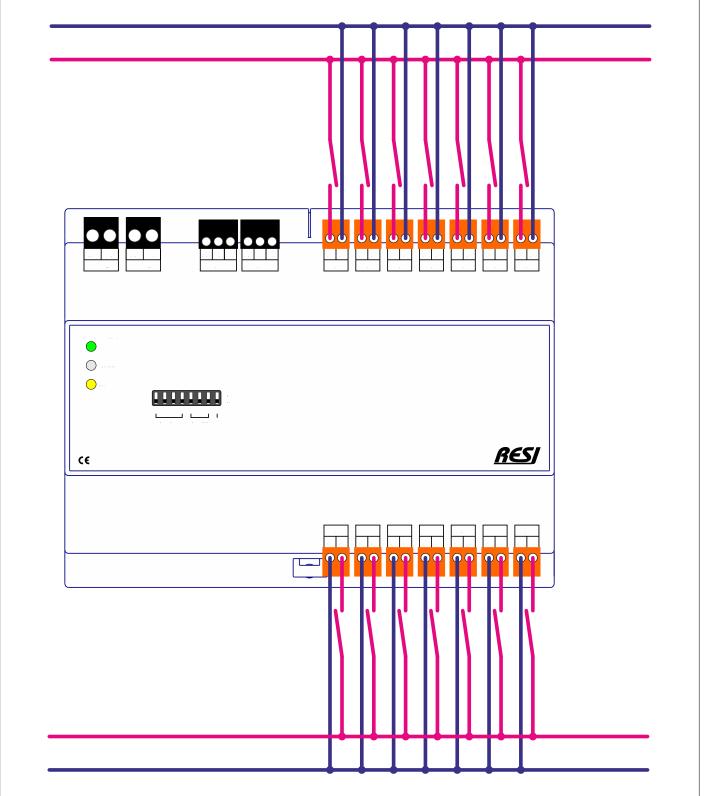


Figure: Cabling of the digital inputs of the IO module with DC signals

Don't forget, that you can use signals from different DC power supplies for each input, because all digital inputs are galvanically insulated to each other. Also you can mix AC and DC input signals on one module!





13.4.2 Cabling of the digital inputs with AC signals

In the below drawing you see the cabling of the 14 digital inputs of the module with AC signals.

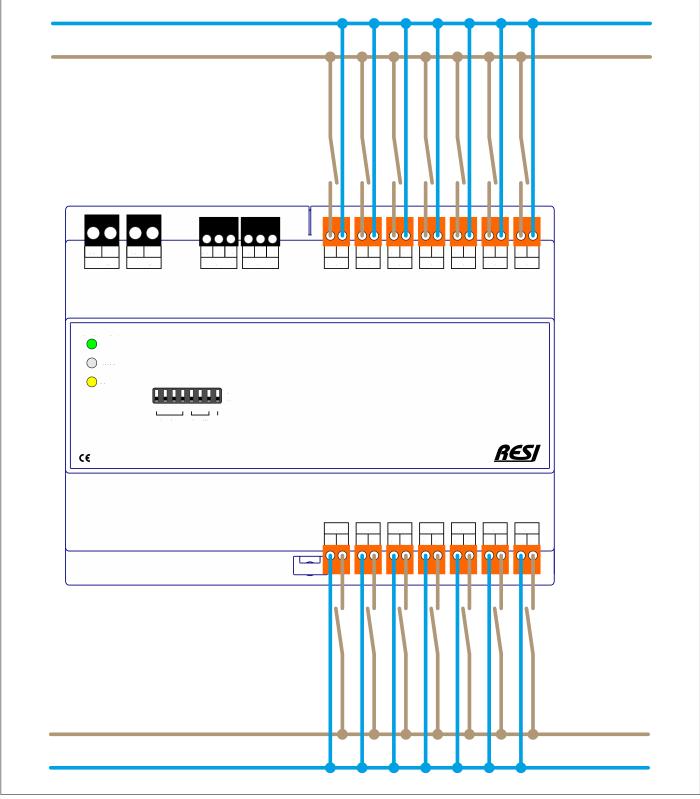


Figure: Cabling of the digital inputs of the IO module with AC signals

Don't forget, that you can use signals from different AC power supplies for each input, because all digital inputs are galvanically insulated to each other. Also you can mix AC and DC input signals on one module!



13.4.3 Mixed cabling of the digital inputs with AC and DC signals

In the below drawing you see the cabling of the 14 digital inputs of the module with AC and DC signals. For each digital input you can use a different power source:

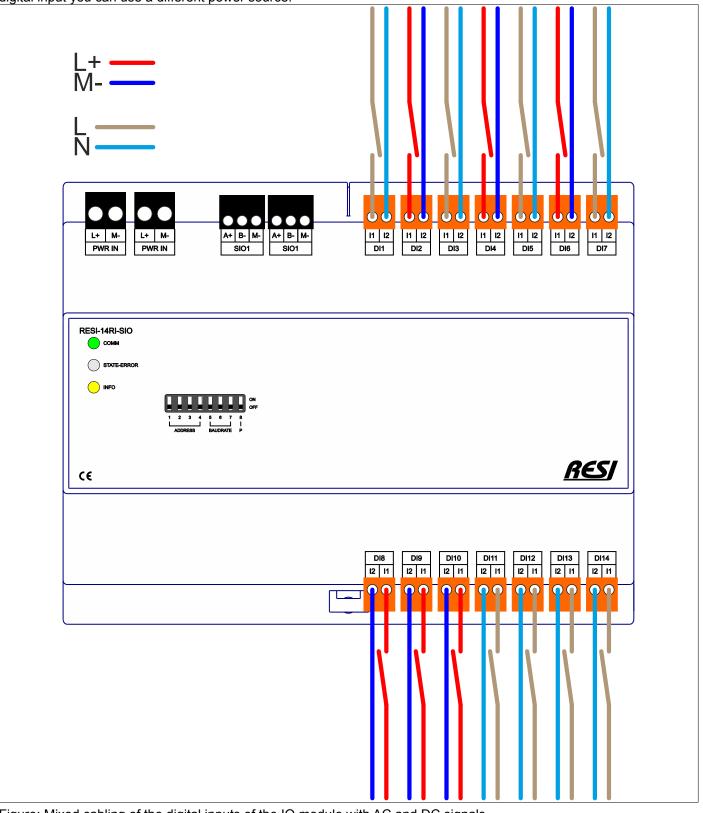


Figure: Mixed cabling of the digital inputs of the IO module with AC and DC signals



13.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-14RI-SIO-MODBUS+ASCII-ENxx.pdf

13.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-14RI-SIO-MODBUS+ASCII-ENxx.pdf



14 RESI-48RI-SIO

14.1 General information

This series of IO modules offer the following features:

- 48 digital inputs for 12-250Vac/dc signals
- Each digital input is galvanic insulated to all other digital inputs
- Each digital input is cabled via extra 2 pin removable terminal
- Galvanic insulated RS485 interface for communication with a host system

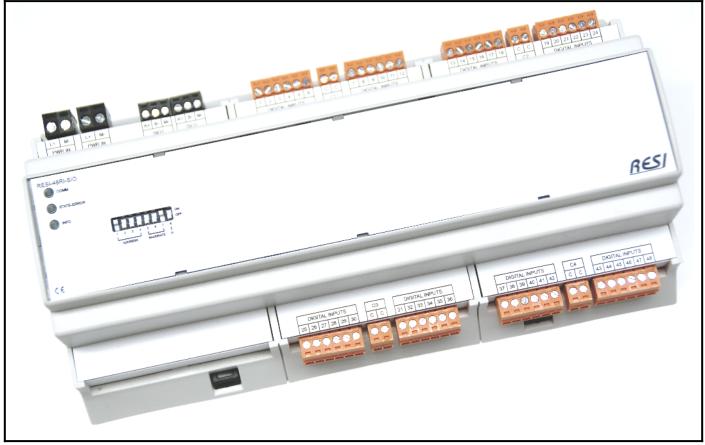


Figure: Our RESI-48RI-SIO module



14.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	<0.5W
Product housing	BIG IO XT12
Product weight	425g
Digital inputs	
Total amount of inputs	48, organized in four groups with 12 digital inputs each
	Each input group can have different AC/DC power source
Sampling rate	Every 5ms
DC rating	
Input voltage range	12-250V= +/-10%
Input current	per channel
	approx. 0.7mA@12V=
	approx. 0.7mA@24V=
	approx. 0.7mA@32V=
	approx. 0.7mA@48V=
	approx. 0.7mA@250V=
Input power consumption	max. 0.2W/channel
Logic levels	0: <4.5V=
	1: >7.5V=
AC rating	
Input voltage range	12-250V= +/-10%
Input current	per channel
	approx. 0.7mA@12V~
	approx. 0.7mA@24V~
	approx. 0.7mA@48V~
	approx. 0.7mA@110V~
	approx. 0.7mA@230V~
	approx. 0.7mA@250V~
Input power consumption	max. 0.2W/channel
Logic levels	0: <4.5V~
	1: >7.5V~
Cable connection	Via eight 6-pin plug-in terminal blocks and four 2-pin terminal blocks
Terminal type	RM3.5
Galvanic insulation	Yes, to each other digital input group and to IO module
Default serial settings	
Baud rate	via DIP switch
Parity	none
O (11(1))	



14.3 Additional terminals & LED states

DIGITAL INPUTS	48 digital inputs for 12-250Vac/dc signals				
	for each digital inpu	for each digital input group with 12 digital inputs:			
	Two 6 pin plug-in terminal blocks and one 2-pin plug-in terminal blocks				
	Terminal type:	RM3.5			
Digital input group #1					
Terminal block #1:	16:	Digital inputs #1 to #6			
		0=open or short cut			
		1=AC or DC voltage between 12 and 250V			
Pin layout	Pin 1:	1: Digital input #1			
	Pin 6:	6: Digital input #6			
Terminal block #2:	C1:C	Common signal for digital inputs #1 to #12			
Pin layout	Pin 1:	C: Common signal			
	Pin 2:	C: Common signal			
Terminal block #3:	712:	Digital inputs #7 to #12			
		0=open or short cut			
		1=AC or DC voltage between 12 and 250V			
Pin layout	Pin 1:	7: Digital input #7			
	Pin 6:	12: Digital input #12			
Digital input groups #2 to #4		like Digital input group #1			
INFO	This LED is on, if at least one of the digital inputs is high (1).				
	This LED is off, if all digital inputs are low (0).				



14.4 Connection diagram

14.4.1 Cabling of the digital inputs with DC signals

In the below drawing you see the cabling of the 48 digital inputs of the module with DC signals.

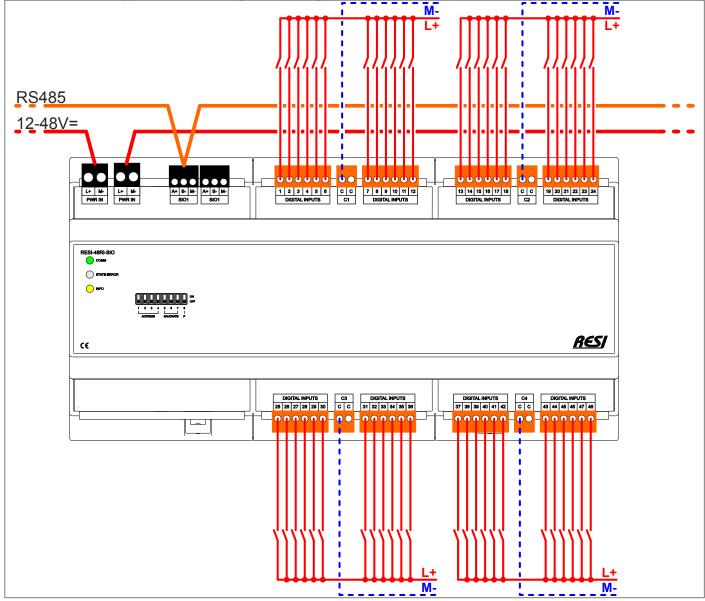
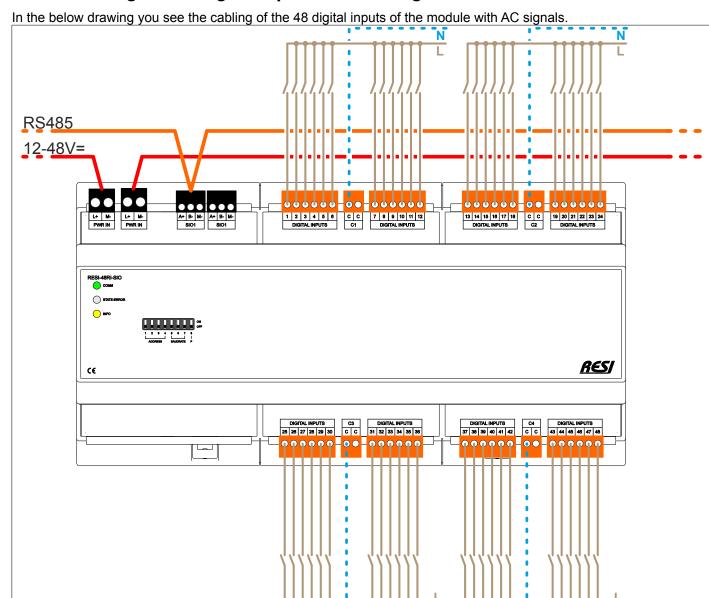


Figure: Cabling of the digital inputs of the IO module with DC signals

Don't forget, that you can use signals from different DC power supplies for each input group, because all four digital input groups are galvanically insulated to each other group. Also you can mix AC and DC input groups on one module!





14.4.2 Cabling of the digital inputs with AC signals

Figure: Cabling of the digital inputs of the IO module with AC signals

Don't forget, that you can use signals from different AC power supplies for each digital input group, because all digital input groups are galvanically insulated to each other group. Also you can mix AC and DC input signals on one module!

Ν

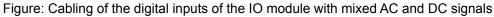
Ν



14.4.3 Mixed cabling of the digital inputs with AC and DC signals

In the below drawing you see the cabling of the 48 digital inputs of the module with mixed AC and DC signals. For each of the four digital input groups yopu can use a different power source.







14.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-48RI-SIO-MODBUS+ASCII-ENxx.pdf

14.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-48RI-SIO-MODBUS+ASCII-ENxx.pdf



15 RESI-32DI-SIO, RESI-32DI-ETH

15.1 General information

This series of IO modules offer the following features:

- 32 digital inputs for 12-48Vdc signals
- No galvanic insulation to the rest of the module (Ground of digital inputs is tied to system ground)
- 16 digital inputs are grouped on an 18 pin removable terminal each
- RESI-32DI-SIO: Galvanic insulated RS485 interface for communication with a host system
- RESI-32DI-ETH: Ethernet interface for communication with a host system

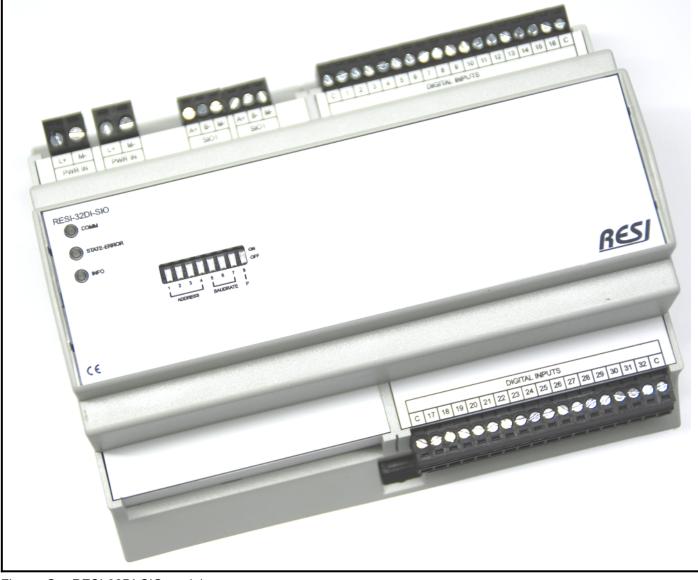


Figure: Our RESI-32DI-SIO module

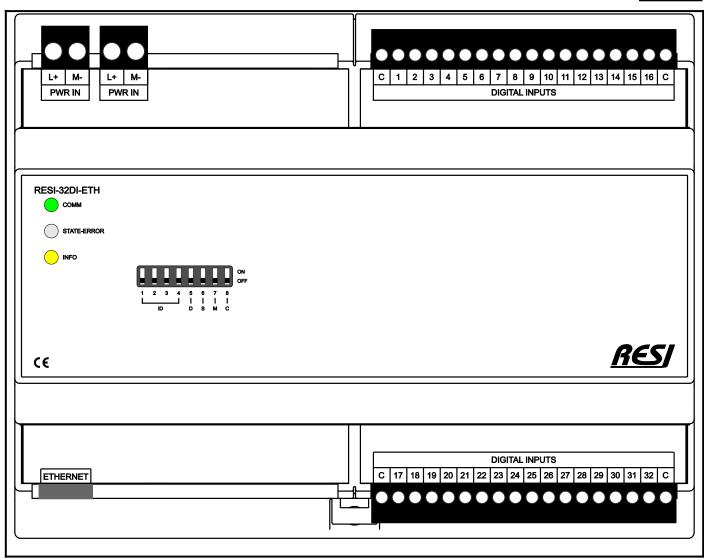


Figure: Our RESI-32DI-ETH module



15.2 Technical specification

Beside the basic technical data, which fulfill all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-32DI-SIO:	<0.3W
RESI-32DI-ETH:	<0.8W
Product housing	BIG IO XT8
Product weight	
RESI-32DI-SIO:	295g
RESI-32DI-ETH:	280g
Digital inputs	
Total amount of inputs	32
Sampling rate	Every 5ms
DC rating	
Input voltage range	12-48V= +/-10%
Input current	per channel
	approx. 0,8mA@12V=
	approx. 1.5mA@20V=
	approx. 1.8mA@24V=
	approx. 2.5mA@32V=
	approx. 4.0mA@48V=
Input power consumption	max. 0.3W/channel
Logic levels	0: <3.8V=
	1: >4.7V=
Cable connection	in two groups, 16 digital inputs each
	Via 2 18-pin plug-in terminal blocks
Terminal type	RM3.5
Galvanic insulation	No, ground of digital inputs is wired to ground of CPU system
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255
Default Ethernet settings	
IP address	192.168.1.13
IP mask	255.255.255.0
Gateway	192.168.1.1
UnitID	255
User	RESI
Password	RESI



15.3 Additional terminals & LED states

DIGITAL INPUTS	32 digital inputs for 12-48Vdc signals Two 18 pin plug-in terminal blocks		
		C:	Common ground: wired to system ground
	132:	Digital input 1-32	
		0=open or connected to ground	
		1=DC voltage between 12 and 48V=	
Pin layout	18 pin plug-in terminal #1		
	Pin 1:	C: Common ground	
	Pin 2:	1: Digital input #1	
	Pin 17:	16: Digital input #16	
	Pin 18:	C: Common ground	
	18 pin plug-in terminal #2		
	Pin 1:	C: Common ground	
	Pin 2:	17: Digital input #17	
	 Pin 17:	32: Digital input #32	
	Pin 18:	C: Common ground	
INFO	If at least one of the digital inputs is activated (ON), this LED is ON.		
	If none of the digital inputs are activated (OFF), this LED is OFF.		



15.4 Connection diagram

15.4.1 Cabling of the digital inputs with DC signals

In the below drawing you see the cabling of the 32 digital inputs of the module with DC signals. All four terminals C are internally connected to the ground signal of the IO module.

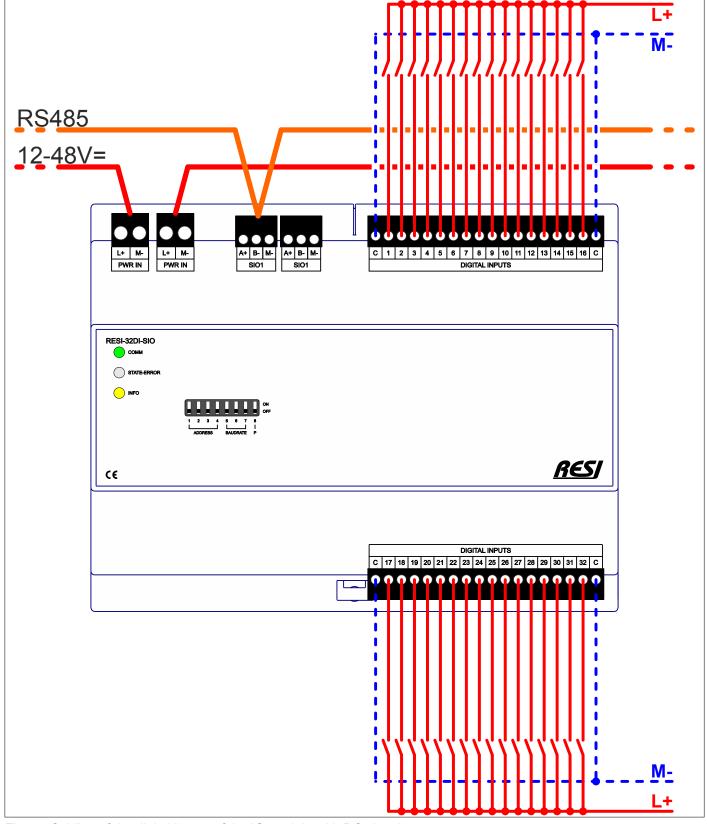


Figure: Cabling of the digital inputs of the IO module with DC signals



15.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-32DI-SIO-MODBUS+ASCII-ENxx.pdf

RESI-L-32DI-ETH-MODBUS+ASCII-ENxx.pdf

15.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-32DI-SIO-MODBUS+ASCII-ENxx.pdf RESI-L-32DI-ETH-MODBUS+ASCII-ENxx.pdf

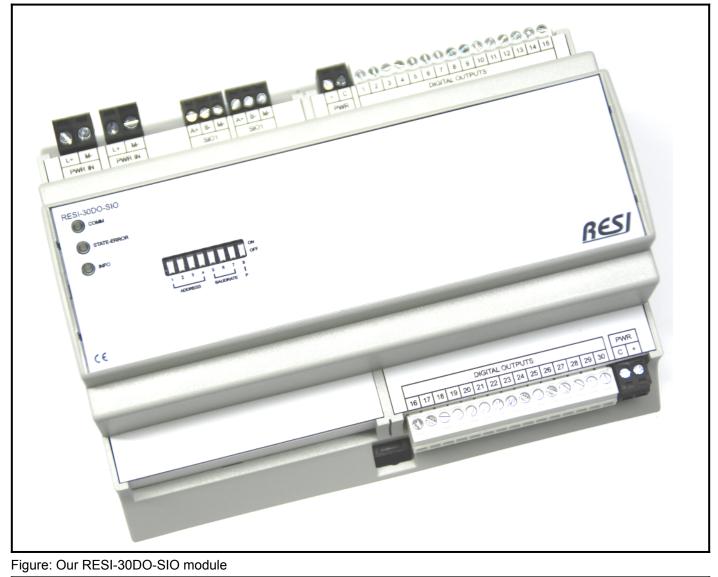


16 RESI-30DO-SIO, RESI-30DO-ETH

16.1 General information

This series of IO modules offer the following features:

- 30 digital outputs for DC signals ≤30V, ≤350mA
- Organized into two groups of 15 digital outputs with individual power supply ≤30V, ≤1.8A
- Galvanic insulation of each output group to the rest of the module
- 15 digital outputs are grouped on an 15 pin removable terminal block
- RESI-30DO-SIO: Galvanic insulated RS485 interface for communication with a host system
- RESI-30DO-ETH: Ethernet interface for communication with a host system





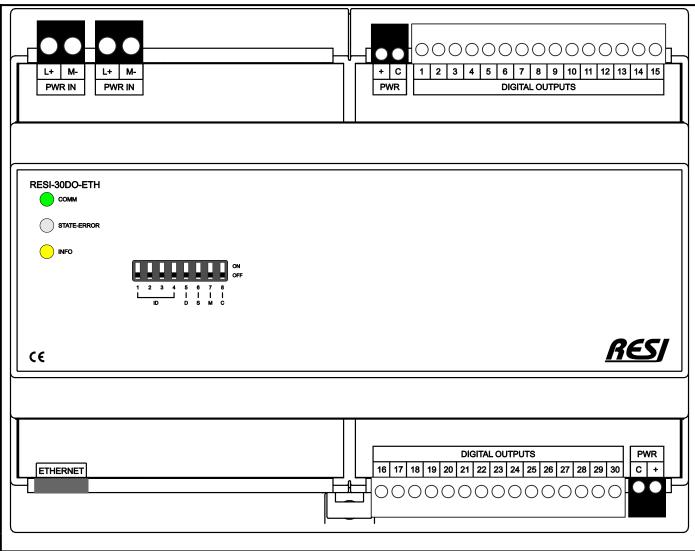


Figure: Our RESI-30DO-ETH module



16.2 Technical specification

Beside the basic technical data, which fulfill all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-30DO-SIO:	<0.3W
RESI-33DO-ETH:	<0.8W
Product housing	BIG IO XT8
Product weight	
RESI-30DO-SIO:	295g
RESI-30DO-ETH:	285g
Digital outputs	
Total amount of outputs	30
Groups	2 groups with independent power supplies
Power supply for output group	0-30V= +/-10%, ≤1.8A
Update rate	≤2ms
DC rating	
Output voltage range	0-30V= +/-10%
Output current	max. 350mA/channel, max. 1.8A/group
Output diagnose	Yes
Output temperature protection	Yes
	103
Cable connection	in two groups, 15 digital outputs each
	Via 2 15-pin plug-in terminal blocks for the digital outputs
	Via 2 2-pin plug-in terminal blocks for the power supply
Terminal type	RM3.5
Galvanic insulation	Yes, each output group has its own power supply and is insulated
	to the rest of the module
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255
Default Ethernet settings	400.400.4.40
IP address	192.168.1.16
IP mask	255.255.255.0
Gateway	192.168.1.1
UnitID	255
	RESI
User	RESI
Password	



16.3 Additional terminals & LED states

DIGITAL OUTPUTS	30 digital outputs for DC output signals ≤30V, ≤350mA/channel Two 15 pin plug-in terminal blocks for the digital outputs		
	Terminal type:	RM3.5	
	115:	Digital outputs 1-15	
	1631:	Digital outputs 16-31	
		DC Signal, ≤30V, ≤350mA	
DIGITAL OUTPUTS			
POWER SUPPLY	Two 2 pin plug-in terminal blocks for the power supply of the digital output group		
	Terminal type:	RM3.5	
	PWR:+:	Power supply input ≤30V, ≤1.8A	
	PWR:C:	Power supply ground signal	
Pin layout	2 pin plug-in termin	al #1	
	Pin 1:	PWR:+: Power supply for DOs 1-15 ≤30V, ≤1.8A	
	Pin 2:	PWR:C: Power supply ground for DOs 1-15	
	18 pin plug-in termi	nal #2	
	Pin 1:	1: Digital output #1, DC Signal, ≤30V, ≤350mA	
	Pin 2:	2: Digital output #2	
	… Pin 14:	14: Digital output #14	
	Pin 15:	15: Digital output #15	
	2 pin plug-in terminal #3		
	Pin 1:	PWR:+: Power supply for DOs 16-30 ≤30V, ≤1.8A	
	Pin 2:	PWR:C: Power supply ground for DOs 16-30	
	18 pin plug-in termi		
	Pin 1:	1: Digital output #16,DC Signal, ≤30V, ≤350mA	
	Pin 2:	2: Digital output #17	
	 Pin 14:	14: Digital output #29	
	Pin 15:	15: Digital output #30	
INFO	If alt least o	ne of the digital outputs is activated (ON), this LED is ON.	
	If none of the digital outputs are activated (OFF), this LED is OFF.		



16.4 Connection diagram

16.4.1 Cabling of the digital inputs with DC signals

In the below drawing you see the cabling of the 32 digital inputs of the module with DC signals. All four terminals C are internally connected to the ground signal of the IO module.

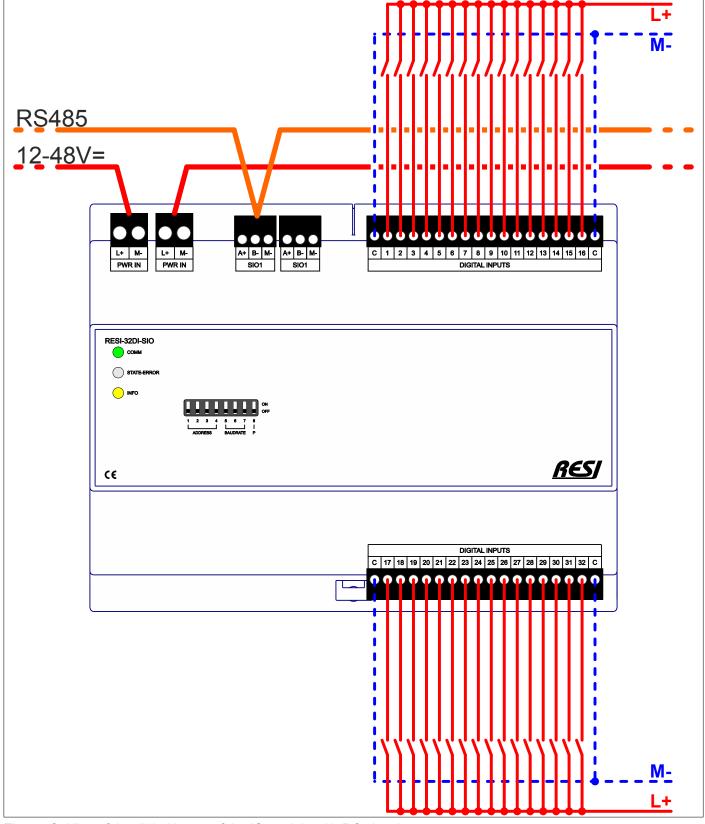


Figure: Cabling of the digital inputs of the IO module with DC signals



16.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-30DO-SIO-MODBUS+ASCII-ENxx.pdf RESI-L-30DO-ETH-MODBUS+ASCII-ENxx.pdf

16.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-30DO-SIO-MODBUS+ASCII-ENxx.pdf RESI-L-30DO-ETH-MODBUS+ASCII-ENxx.pdf



17 RESI-64DI-SIO

17.1 General information

This series of IO modules offer the following features:

- 64 digital inputs for 12-48Vdc signals
- No galvanic insulation to the rest of the module (Ground of digital inputs is tied to system ground)
- 16 digital inputs are grouped on an 18 pin removable terminal each
- Galvanic insulated RS485 interface for communication with a host system

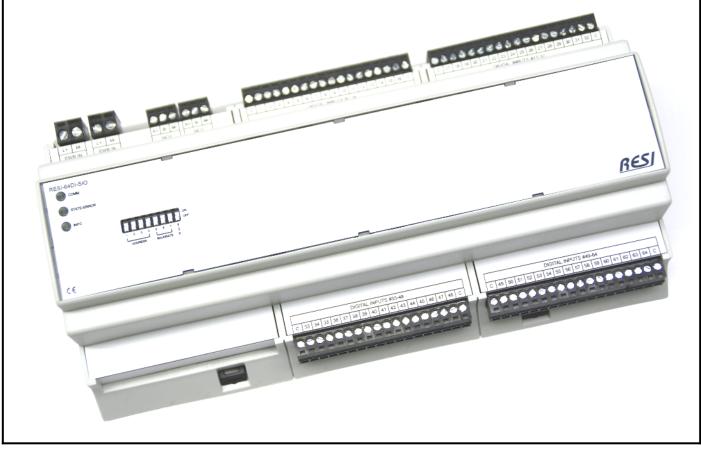


Figure: Our RESI-64DI-SIO module



17.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	<0.3W
Product housing	BIG IO XT12
Product weight	430g
Digital inputs	
Total amount of inputs	64
Sampling rate	Every 5ms
DC rating	
Input voltage range	12-48V= +/-10%
Input current	per channel
	approx. 0,8mA@12V=
	approx. 1.5mA@20V=
	approx. 1.8mA@24V=
	approx. 2.5mA@32V=
	approx. 4.0mA@48V=
Input power consumption	max. 0.3W/channel
Logic levels	0: <3.8V=
	1: >4.7V=
Cable connection	in four groups, 16 digital inputs each
	Via 4 18-pin plug-in terminal blocks
Terminal type	RM3.5
Galvanic insulation	No, ground of digital inputs is wired to ground of CPU system
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255



17.3 Additional terminals & LED states

DIGITAL INPUTS	64 digital inputs for 12-48Vdc signals Four 16 pin plug-in terminal blocks		
	Terminal type:	RM3.5	
	C:	Common ground: wired to system ground	
	164:	Digital input 1-64	
		0=open or connected to ground	
		1=DC voltage between 12 and 48V=	
Pin layout	16 pin plug-in terminal #1		
	Pin 1:	C: Common ground	
	Pin 2:	1: Digital input #1	
	Pin 17:	16: Digital input #16	
	Pin 18:	C: Common ground	
	16 pin plug-in termi	nal #2	
	Pin 1:	C: Common ground	
	Pin 2:	17: Digital input #17	
	 Pin 17:	32: Digital input #32	
	Pin 18:	C: Common ground	
	1 11 10.		
	16 pin plug-in terminal #3		
	Pin 1:	C: Common ground	
	Pin 2:	33: Digital input #33	
		10. Distallance #40	
	Pin 17:	48: Digital input #48	
	Pin 18:	C: Common ground	
	16 pin plug-in terminal #4		
	Pin 1:	C: Common ground	
	Pin 2:	49: Digital input #49	
	Pin 17:	64: Digital input #64	
	Pin 18:	C: Common ground	
INFO	This LED is on, if at	t least one of the digital inputs is high (1).	
	This LED is off, if all digital inputs are low (0).		



17.4 Connection diagram

17.4.1 Cabling of the digital inputs with DC signals

In the below drawing you see the cabling of the 64 digital inputs of the module with DC signals. All eight terminals C are internally connected to the ground signal of the IO module.

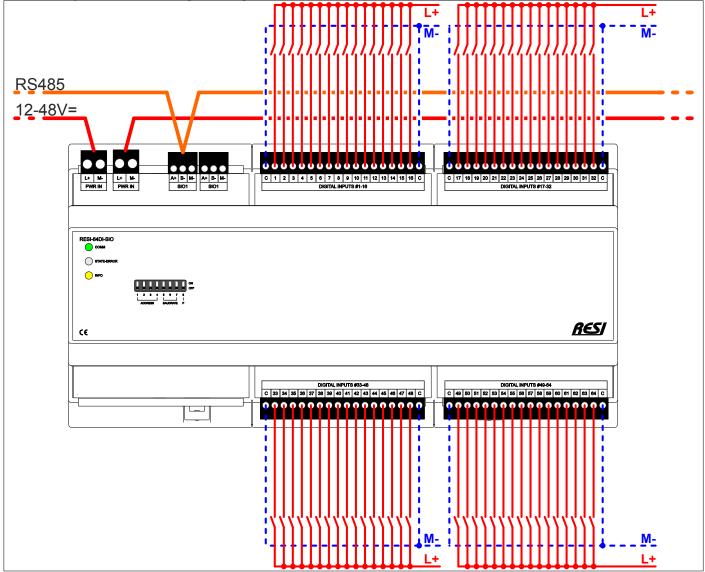


Figure: Cabling of the digital inputs of the IO module with DC signals



17.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-64DI-SIO-MODBUS+ASCII-ENxx.pdf

17.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-64DI-SIO-MODBUS+ASCII-ENxx.pdf



18 RESI-8CO-SIO

18.1 General information

This series of IO modules offer the following features:

- 8 mono stable relay outputs with special power relays
- 3 clamps per relay: NO contact, NC contact and common root contact (C)
- Switching power per relay output: max. 30Vdc, max. 250Vac, max. 8A
- Contact material AgSnO2
- Each relay output is cabled via extra 3 pin removable terminal
- Galvanic insulated RS485 interface for communication with a host system

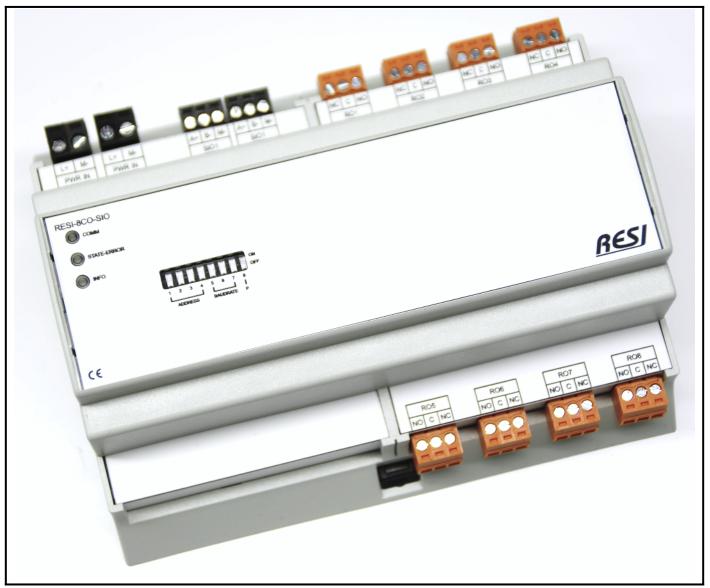


Figure: Our RESI-8CO-SIO module



18.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	<2.5W	
Due durat la cue in a		
Product housing	BIG IO XT8	
Product weight	325g	
Relay outputs		
Total amount of outputs	8	
Relay type	mono stable relay with contacts for NO clamp,	
	NC clamp and common root clamp	
Maximum output voltage	250Vac or 30Vdc	
Maximum output current	8A	
Switching cycles	10 ⁷ switching cycles	
Contact material	AgSnO ₂	
Cable connection	Via 8 3-pin plug-in terminal block	
Terminal type	RM3.5	
Galvanic insulation	Yes, via relais	
Default serial settings		
Baud rate	via DIP switch	
Parity	none	
Stop bit(s)	one	
UnitID	255	



18.3 Additional terminals & LED states

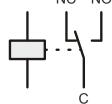
RELAY OUTPUTS	8 relay outputs for 250Vac/30Vdc signals Eight 3 pin plug-in terminal blocks	
	Terminal type:	RM3.5
	RO1Ro8	
	NO:	Normally open switching contact of the relay
		=OFF: opened, =ON: closed
	C:	Common root contact of the relay
	NC:	Normally closed switching contact of the relay
Pin layout	Pin 1:	NO
·	Pin 2:	С
	Pin 3:	NC
INFO	This LED is on, if at least one of the digital outputs is high (on) (1).	
	This LED is off, if al	l digital outputs are low (off) (0).



18.4 Connection diagram

18.4.1 Cabling of the relay outputs of the module

In the below drawing you see the cabling of the 8 relay outputs of the module. Each relay offers three contacts: One common root contact, one closing contact (NO) and one opening contact (NC).



If the relay is OFF (powerless), the NC contact is tied to the common root contact (C) and the NO contact is open.

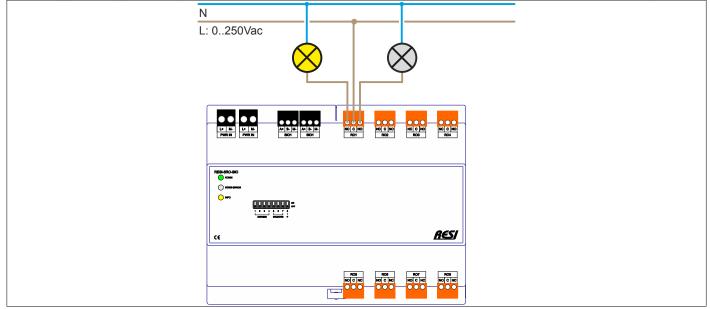


Figure: Cabling of the relay output 1, relay is OFF

If the relay is under power (ON), then the NC contact is open, and the NO contact is tied to the common root contact (C).

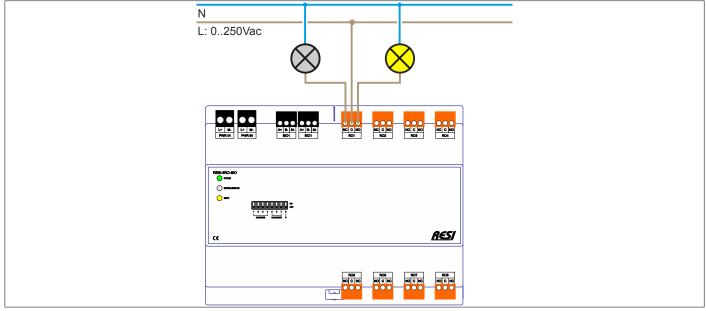


Figure: Cabling of the relay output 1, relay is ON



The following illustration shows the cabling of all 8 relays using only the NO contact. Only if the relay is ON, the current flows from the root contact to the switching contact NO to the consumer.

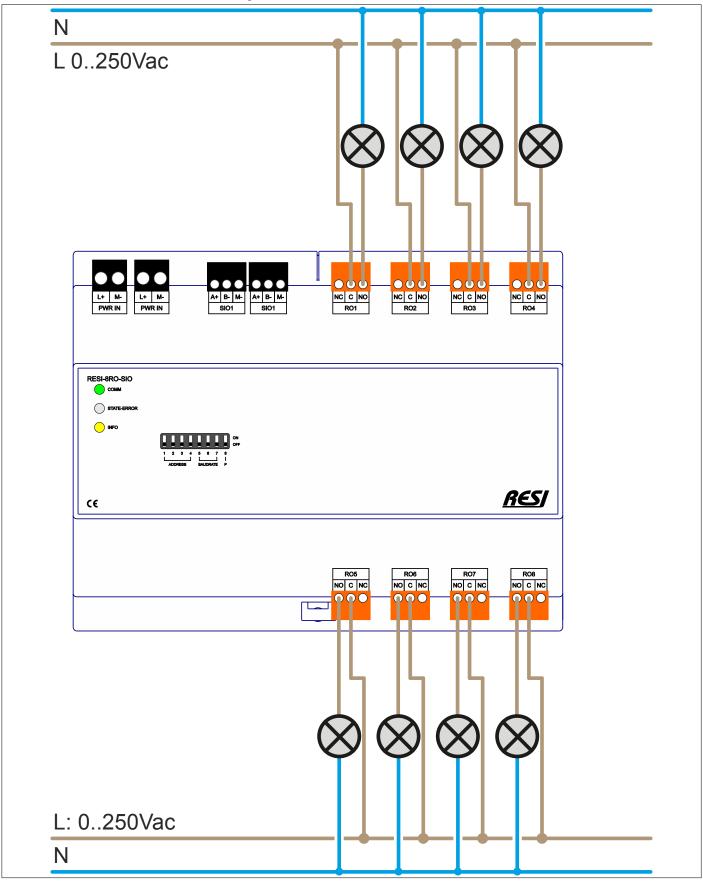


Figure: Cabling of all 8 relay outputs using the NO contact, all 8 relays are OFF



Here we show a DC cabling of all 8 relay with the NO contacts. Of course you can mix AC and DC signals on the relay outputs of the modules.

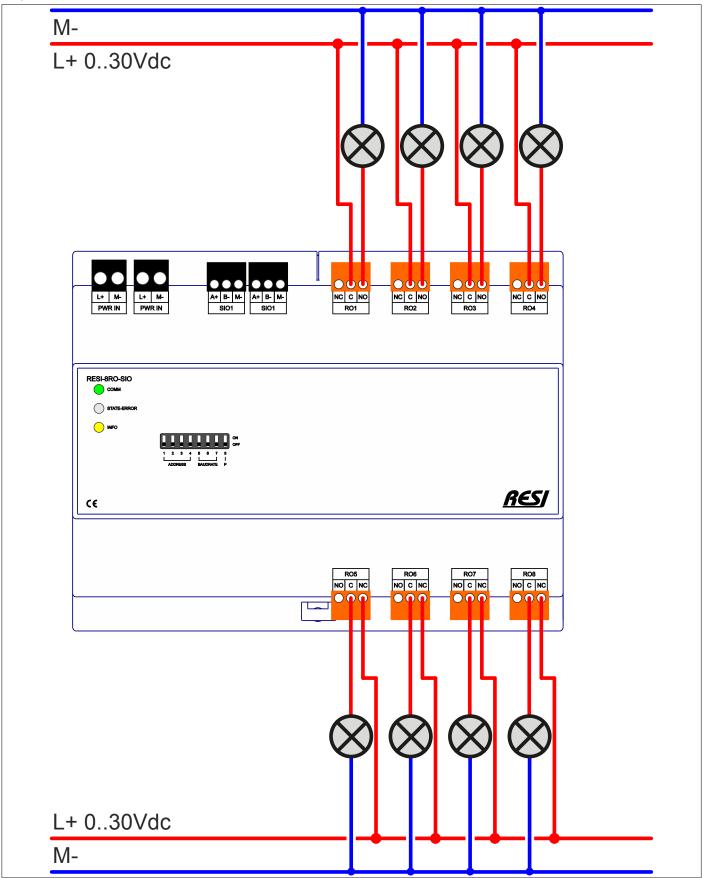


Figure: Cabling of all 8 relay outputs using the NO contact, all 8 relays are OFF



18.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-8CO-SIO-MODBUS+ASCII-ENxx.pdf

18.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-8CO-SIO-MODBUS+ASCII-ENxx.pdf

19 RESI-S16DI8PO-SIO, RESI-S8PO-SIO

19.1 General information

This series of IO modules offer the following features:

- Only RESI-S16DI8PO-SIO: 16 digital inputs for 12-48Vdc signals
- 8 bistable relay outputs with special power relays
- Maximum switching power: max. 250Vac, max. 16A, max 200µF
- Internal FRAM memory to save the last relay position
- Automatic recovery of the correct relay position after power loss
- Remanent counter for each output counting the switching cycles of the relays
- Only RESI-S16DI8PO-SIO:
 - Stand-alone operation mode: Internal logic functions between the digital inputs and the relay outputs
 - Configure simple logic functions like switch light on/off, central light on, central light off, stairway light with off delay timer, etc. with push buttons
- Galvanic insulated RS485 interface for communication with a host system

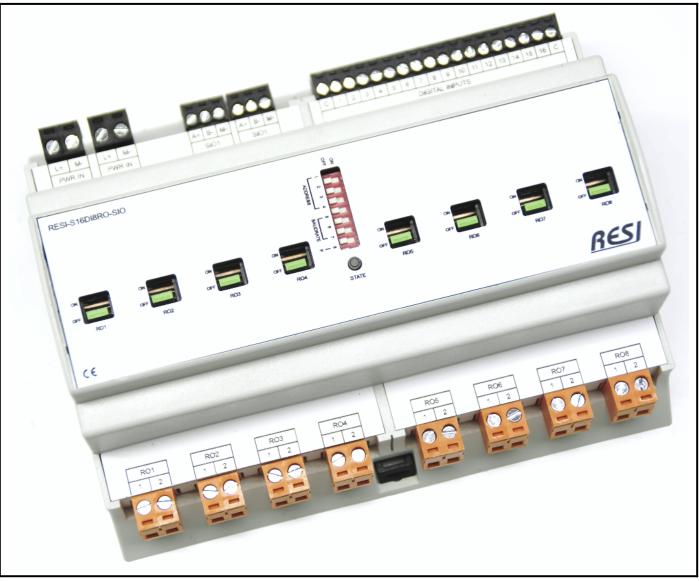


Figure: Our RESI-S16DI8PO-SIO module



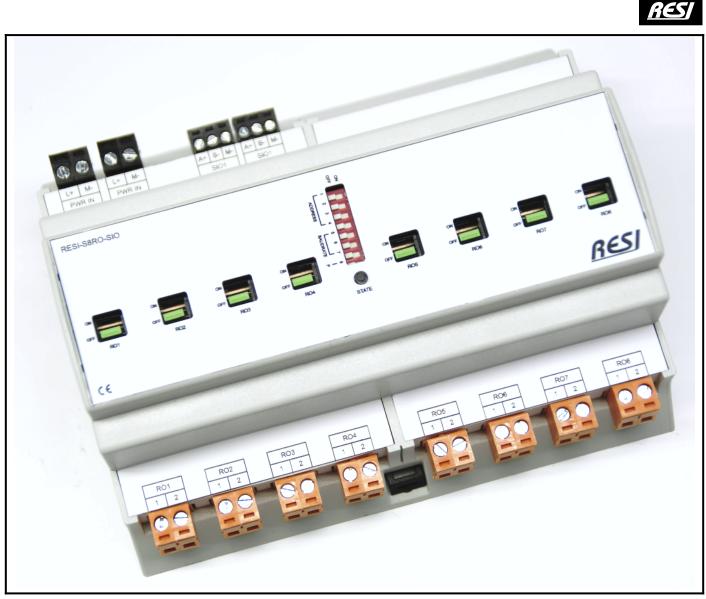


Figure: Our RESI-S8PO-SIO module



19.2 Internal logic functions

The IO module offers internal logic functions, which are handled by the module autonomous. All parameters for this logic functions are stored in the internal permanent memory FRAM. After a power loss all this configuration is not deleted and the module executes the logic functions again.

This internal logic functions can operate side by side with control commands via MODBUS/RTU or ASCII.

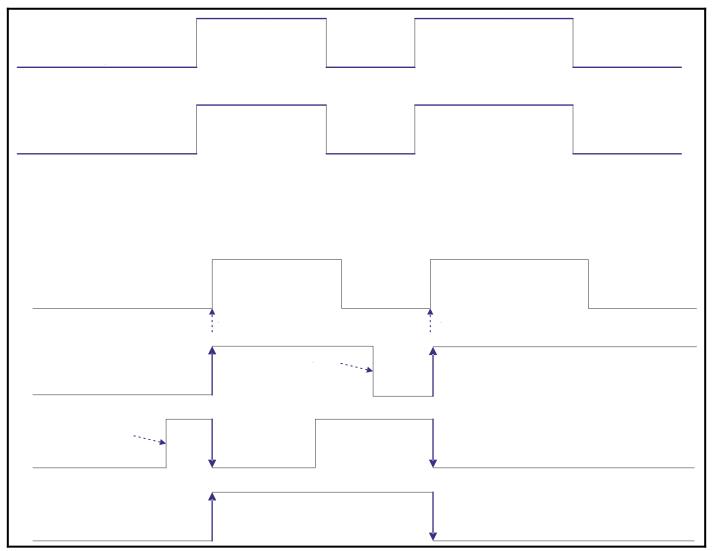


Figure: Internal logic functions



19.2.1 Switch on or off the internal logic processing

There is a general switch to enable or disable the execution of the internal logic operations. Therefore on the MODBUS/RTU interface you will find the register ENABLE LOGIC FUNCTIONS (4x21001). On the ASCII protocol the command SET SPECIAL MODE and GET SPECIAL MODE controls this feature.

Only if this register contains 1, the internal logic is executed by the module. Of course you will need a correct configuration for a desired logic function, if the module should react to a digital input.

- Activate logic function: Write to the MODBUS register ENABLE LOGIC FUNCTIONS the value 1 or execute the ASCII command SET SPECIAL MODE:1
- Deactivate logic function: Write to the MODBUS Register ENABLE LOGIC FUNCTIONS the value 0 or execute the ASCII command SET SPECIAL MODE:0
- Request the current execution status of logic function: Read out the current value in the MODBUS register ENABLE LOGIC FUNCTIONS. If this value is 1, the module executes the internal logic functions. If this value is 0, no logic functions are executed. Or you request the current status with the ASCII command GET SPECIAL MODE. If the answer is GSMODE:1,0x1, the internal logic is executed by the module. If the answer is GSMODE:0,0x0, no logic execution is active.

19.2.2 Reset internal logic

Sometimes it is very convenient to delete the complete configuration of the internal logic functions. This is handled by the ASCII command RESET SPECIAL MODE. On the MODBUS side you have to write the value 1 to the register CLEAR ALL LOGIC FUNCTIONS (4x21002). The module deletes the complete internal configuration permanently in the FRAM memory and no logic functions are executed.

19.2.3 Logic function SWITCH

This is the simplest logic function. You can map for each relay output a digital input. If this digital input is high (1), the corresponding output relay will be switched on. If this digital input is low (0), the mapped output relay will be switched off.

Example: Switch the output relay RO1 on and off with the digital input DI1

Over the ASCII interface you have to send the following commands: PC->IO: #SET SWITCH1:0x0001 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 0x0001 in MODBUS register SWITCH RO1 (4x20001) PC->IO: Write value 0x0001 in MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration.

Example: Switch the output relay DO1 with digital input DI1 on and off, with DI2 the relay RO2, with DI3 the relay RO3 and so on.

Over the ASCII interface you have to send the following commands: PC->IO: #SET SWITCH1:0x0001 IO->PC: #OK PC->IO: #SET SWITCH2:0x0002 IO->PC: #OK PC->IO: #SET SWITCH3:0x0004 IO->PC: #OK PC->IO: #SET SWITCH4:0x0008 IO->PC: #OK



PC->IO: #SET SWITCH5:0x0010 IO->PC: #OK PC->IO: #SET SWITCH6:0x0020 IO->PC: #OK PC->IO: #SET SWITCH7:0x0040 IO->PC: #OK PC->IO: #SET SWITCH8:0x0080 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 0x0001 to MODBUS register SWITCH RO1 (4x20001) PC->IO: Write value 0x0002 to MODBUS register SWITCH RO2 (4x20002) PC->IO: Write value 0x0004 to MODBUS register SWITCH RO3 (4x20003) PC->IO: Write value 0x0008 to MODBUS register SWITCH RO4 (4x20004) PC->IO: Write value 0x0010 to MODBUS register SWITCH RO5 (4x20005) PC->IO: Write value 0x0020 to MODBUS register SWITCH RO6 (4x20006) PC->IO: Write value 0x0040 to MODBUS register SWITCH RO7 (4x20007) PC->IO: Write value 0x0080 to MODBUS register SWITCH RO8 (4x20008) PC->IO: Write value 0x0001 to MODBUS register SWITCH RO8 (4x20008) PC->IO: Write value 0x0001 to MODBUS register SWITCH RO8 (4x20008)

Now you can switch on or off all 8 relay outputs RO1 to RO8 with the first 8 digital inputs DI1 to DI8.



19.2.4 Logic function SWITCH ON

This logic function checks the status of the mapped digital inputs and sets the corresponding relay output to a defined state. In case of the function SWITCH ON to 1, if the module detects a rising edge on one of the mapped digital inputs.

Example: The relay output RO1 is switched on by one of the four digital inputs DI1, DI2, DI3 and DI4

Over the ASCII interface you have to send the following commands: PC->IO: #SET SWITCH ON1:0x000F IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 0x000F to MODBUS register SWITCH ON RO1 (4x20017) PC->IO: Write value 0x0001 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration.

Example: Central light on with digital input DI16

Over the ASCII interface you have to send the following commands: PC->IO: #SET SWITCH ON1:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON2:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON3:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON4:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON5:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON6:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON7:0x8000 IO->PC: #OK PC->IO: #SET SWITCH ON8:0x8000 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers:

PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO1 (4x20017) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO2 (4x20018) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO3 (4x20019) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO4 (4x20020) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO5 (4x20021) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO5 (4x20022) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO6 (4x20022) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO7 (4x20023) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO7 (4x20023) PC->IO: Write value 0x8000 to MODBUS register SWITCH ON RO7 (4x20023)



PC->IO: Write value 0x8000 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

If you connect a push button switch to the digital input 16 and press this button, all eight relay outputs are switched on immediately. If you don't press the button, you can switch each of the eight relay on or off via MODBUS or ASCII protocol

19.2.5 Logic function SWITCH OFF

This logic function checks the status of the mapped digital inputs and sets the corresponding relay output to a defined state. In case of the function SWITCH OFF to 0, if the module detects a rising edge on one of the mapped digital inputs.

Example: Switch off relay output RO2 with one of the three digital inputs DI1, DI3, DI6

Over the ASCII interface you have to send the following commands:

Bit 0 stands for DI1 -> 1 Bit 2 stands for DI3 -> 4 Bit 5 stands for DI6 -> 32 Results in 1+4+32 -> 37 PC->IO: #SET SWITCH OFF2:37 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 37 to MODBUS register SWITCH OFF RO2 (4x20026) PC->IO: Write value 0x0001 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration.

Example: Central light off with DI15

Over the ASCII interface you have to send the following commands: PC->IO: #SET SWITCH OFF1:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF2:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF3:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF4:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF5:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF6:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF7:0x4000 IO->PC: #OK PC->IO: #SET SWITCH OFF8:0x4000 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK



Via the MODBUS interface you have to set the following registers:

- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO1 (4x20025)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO2 (4x20026)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO3 (4x20027)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO4 (4x20028)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO5 (4x20029)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO6 (4x20030)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO7 (4x20031)
- PC->IO: Write value 0x4000 to MODBUS register SWITCH OFF RO8 (4x20032)
- PC->IO: Write value 0x0001 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration. If you connect a pushbutton switch to digital input DI15, all eight relay outputs are switched immediately to 0, if the button is pressed. If the button is released, you can switch on or off each output relay via the MODBUS or ASCII protocol.

19.2.6 Logic function TOGGLE

This logic function checks the status of the mapped digital inputs and sets the corresponding relay output to a defined state. In case of the function TOGGLE, the module inverts the current state of the relay output, if the module detects a rising edge on one of the mapped digital inputs.

Example: Toggle switch: With one of the two digital inputs DI1, DI2 we want to invert the relay output RO4.

Over the ASCII interface you have to send the following commands:

Bit 0 stands for DI1 -> 1 Bit 1 stands for DI2 -> 2 Results in 1+2 -> 3 PC->IO: #SET TOGGLE4:3 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 3 to MODBUS register TOGGLE RO4 (4x20012) PC->IO: Write value 0x0001 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration. If you connect two push buttons to the digital inputs DI1 and DI2 and press one of them, the current status of the relay output RO4 is inverted.

19.2.7 Logic function PULSE

This logic function checks the status of the mapped digital inputs and sets the corresponding relay output to a defined state. In case of the function PULSE, the module starts an off delay timer with the time span of PULSE TIME on, if the module detects a rising edge on one of the mapped digital inputs.

Example: Stairway lighting: With one of the two digital inputs DI1, DI2 we want to switch on the output relay RO1 for 30 seconds.

Over the ASCII interface you have to send the following commands:

Bit 0 stands for DI1 -> 1 Bit 1 stands for DI2 -> 2 Results in 1+2 -> 3 PC->IO: #SET PULSE4:3



IO->PC: #OK The time is defined in 1/10s. So the value 300 defines a time of 30 seconds. PC->IO: #SET PULSE TIME4:300 IO->PC: #OK PC->IO: #SET SPECIAL MODE:1 IO->PC: #OK

Via the MODBUS interface you have to set the following registers: PC->IO: Write value 3 to MODBUS register PULSE RO1 (4x20033) PC->IO: Write value 300 as a 32 bit value to the two registers PULSE TIME RO1 4x20065-4x20066. The number 0x12345678 will be divided into two 16 bit values and stored in this way: 4x200065:0x1234 and 4x20066:0x5678 300 as hexadecimal number is 0x0000012C. PC->IO: Write value 0x0000 to MODBUS register PULSE TIME RO1 (4x20065) PC->IO: Write value 0x012C to MODBUS register PULSE TIME RO1 (4x20066)

or:

PC->IO: Write value 300 as a 32 bit value to the two registers PULSE TIME RO1 4x20081-4x20082 The number 0x12345678 will be divided into two 16 bit values and stored in this way: 4x200081:0x5678 and4x20066:0x1234 300 as hexadecimal number is 0x0000012C.

PC->IO: Write value 0x012C to MODBUS register PULSE TIME RO1 (4x20081)

PC->IO: Write value 0x0000 to MODBUS register PULSE TIME RO1 (4x20082)

PC->IO: Write value 0x0001 to MODBUS register ENABLE LOGIC FUNCTIONS (4x21001)

The other relay outputs are not affected by this configuration. If you connect two push buttons to the digital inputs DI1 and DI2 and you press one of the two buttons, the relay output RO4 will be on for 30 seconds. After this time span the relay output will be switched off automatically. If you press one of the two buttons again, if the output relay is on, the time span of 30 seconds starts again.



19.3 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-S16DI8PO-SIO	<2.0W
RESI-S8PO-SIO	<2.0W
Product housing	
RESI-S16DI8PO-SIO	BIG IO XT8
RESI-S8PO-SIO	BIG IO XT8
Product weight	
RESI-S16DI8PO-SIO	565g
RESI-S8PO-SIO	555g
Digital inputs	
only RESI-S16DI8PO-SIO	
Total amount of inputs	16
Sampling rate	Every 5ms
Input voltage range	12-48V= +/-10%
Input current	approx. 1mA per channel
Logic levels	0: <3V=
	1: >5V=
Cable connection	Via 18-pin plug-in terminal block
Terminal type	RM3.5
Galvanic insulation	No
Relay outputs	
Number of outputs	8 bistable relays
	for socket-outlets and light applications
Relay type	Bistable with manual operation
Incandescent electric lamp load	Max 4.800 W
Capacitive load	Max. 200µF
Maximum voltage	250Vac
Maximum current	16A
Mechanical lifetime	10 ⁶ cycles of operation
Contact material	AgSnO ₂
Insulation	Creepage and clearance distance 8mm
Cable connection	Via 8 2-pin plug-in terminal blocks
Terminal type	RM5
Galvanic insulation	Yes, with the relay



Output power per channel:

4.800 W 5.000 W 2.500 W / 200 μF 2 x 5.000 W 5.000 W
2.500 W / 200 μF 2 x 5.000 W
2 x 5.000 W
5.000 W
2.000 VA
5.000 W
5.000 W / 200 µF
4.000 W
3.000 W / 200 µF
-

Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255



19.4 Additional terminals & LED states

DIGITAL INPUTS	16 digital inputs for 12-48Vdc signals One 18 pin plug-in terminal block		
	Terminal type: RM3	.5	
	C:	Ground of the module	
	DI1-DI16:	Digital inputs	
		0=open or GND,	
		1=+12Vdc+48Vdc	
Pin layout	Pin 1:	C=GND	
	Pin 2:	1=DI1	
	Pin 3:	2=DI2	
	Pin 4:	3=DI3	
	Pin 5:	4=DI4	
	Pin 6:	5=DI5	
	Pin 7:	6=DI6	
	Pin 8:	7=DI7	
	Pin 9:	8=DI8	
	Pin 10:	9=DI9	
	Pin 11:	10=DI10	
	Pin 12:	11=DI11	
	Pin 13:	12=DI12	
	Pin 14:	13=DI13	
	Pin 15:	14=DI14	
	Pin 16:	15=DI15	
	Pin 17:	16=DI16	
	Pin 18:	C=GND	
RELAY OUTPUTS	8 bistable relays for max 250Vac signals		
	Eight 2 pin plug-in terminal blocks for Form A relay		
	Terminal type:	RM5	
	1:	Switching contact of the relay +	
	2:	Switching contact of the relay -	
Pin layout	Pin 1:	1=Switching contact of the relay +	
	Pin 2:	2=Switching contact of the relay -	



19.5 Connection diagram

19.5.1 Cabling of the digital inputs

Only for RESI-S16DI8PO-SIO: In the below drawing you see the cabling of the 16 digital inputs of the module. Both terminals C are internally connected to the ground signal.

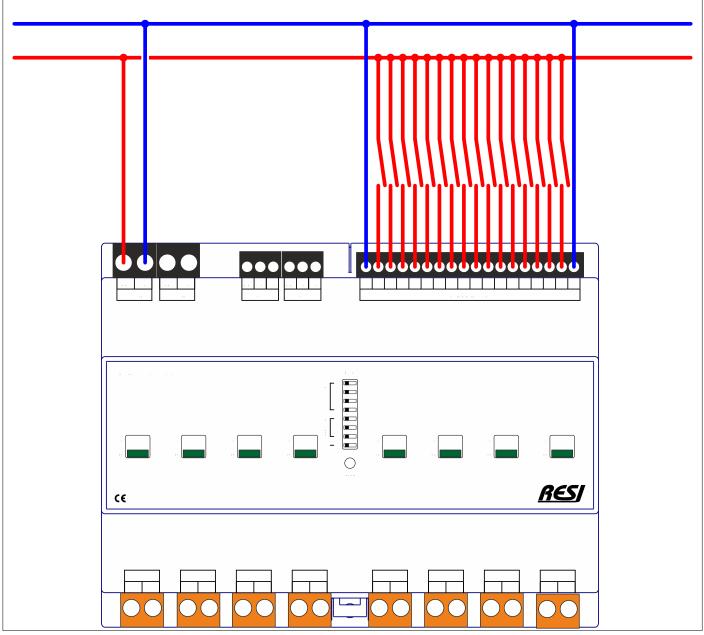


Figure: Connecting the digital inputs to the IO module



19.5.2 Cabling of the bistable relay outputs

In the below drawing the cabling of the bistable relay outputs is shown.

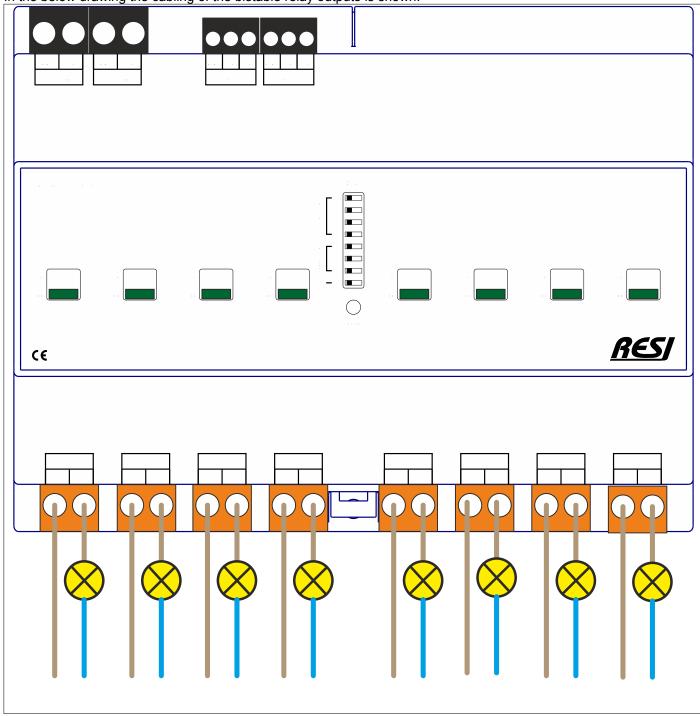


Figure: Connecting the bistable relay outputs to the IO module



19.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-S16DI8PO,S8PO-SIO-MODBUS+ASCII-ENxx.pdf

19.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-S16DI8PO,S8PO-SIO-MODBUS+ASCII-ENxx.pdf



20 RESI-20RI8SB-SIO, RESI-8SB-SIO, RESI-10RI4SB-SIO, RESI-4SB-SIO

20.1 General information

This series of IO modules offer the following features:

- Special module for controlling shades and blinds with relays and time control
- IO Module does all the time critical control for the shades/blinds internally
- RESI-8SB-SIO: module to control up to 8 shades/blinds with 16 relays
- RESI-4SB-SIO: module to control up to 4 shades/blinds with 8 relays
- RESI-20RI8SB-SIO: Additional 20 digital inputs for 12-250Vac/dc signals
- RESI-10RI4SB-SIO: Additional 10 digital inputs for 12-250Vac/dc signals
- Internal FRAM memory to save all setup information for each shade/blind
- Galvanic insulated RS485 interface for communication with a host system



Figure: Our RESI-20RI8SB-SIO module

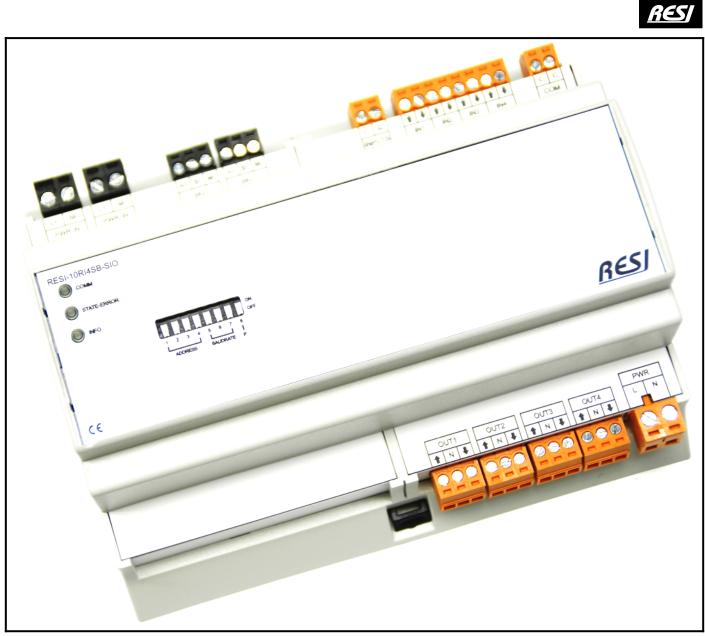


Figure: Our RESI-10RI4SB-SIO module





Figure: Our RESI-8SB-SIO module



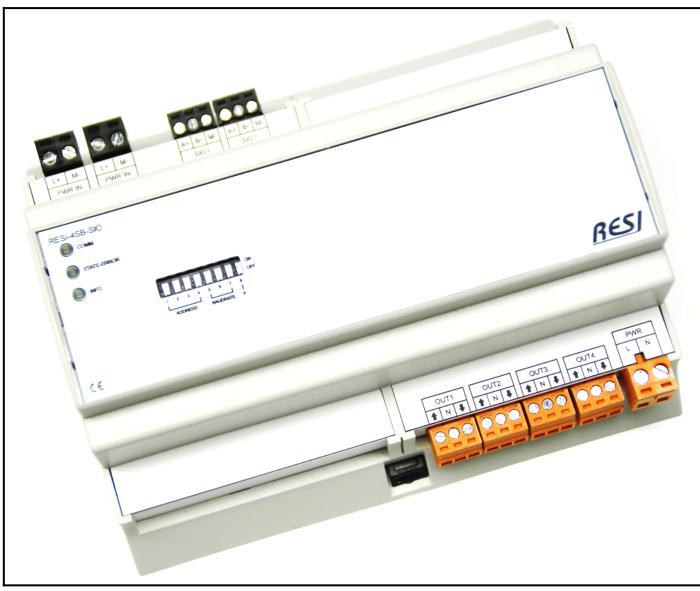


Figure: Our RESI-4SB-SIO module



20.2 Basic function

These IO modules are designed to control shades, blinds, sun blinds, awnings or roller shutter engines with AC or DC power supply with 3 connections.

Our IO module RESI-20RI8SB-SIO and RESI-8SB-SIO offers the control of up to eight individual engines. The IO module version RESI-10RI4SB-SIO and RESI-4SB-SIO offers the control of up to four individual engines.

In addition the IO modules RESI-20RI8SB-SIO and RESI-10RI4SB-SIO offer digital inputs for direct control of the engines with push buttons either with 24Vdc or 110/230Vac signals. Also the digital inputs can be used for wind/rain alarms sensor with relay output or for group control of more than one engine.

Of course all unused digital inputs and relay outputs can be used for other purposes in your application. e.g. for collecting error signals or for controlling other devices with a potential free contact.

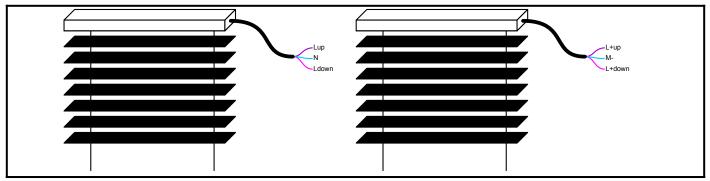


Figure: Control electrical shades with 3 wire connection

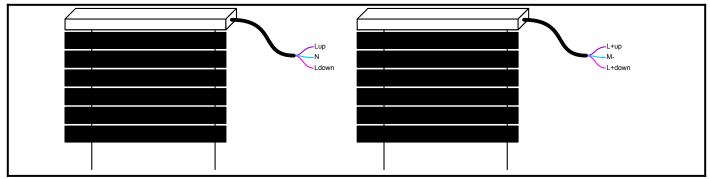


Figure: Control electrical roller shutter with 3 wire connection

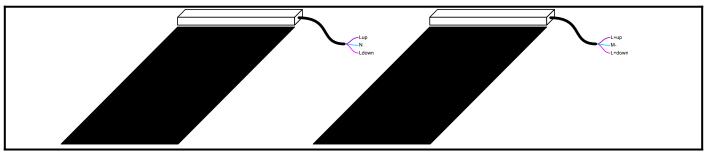


Figure: Control electrical sun blinds or awnings with 3 wire connection



20.2.1 IMPORTANT HINT: PARALLEL CABLING NOT ALLOWED

All engines must have their own outlet. It is not allowed to connect more than one engine to one outlet. This can damage your engine immediately due to erroneous currents in the parallel cabled engines!

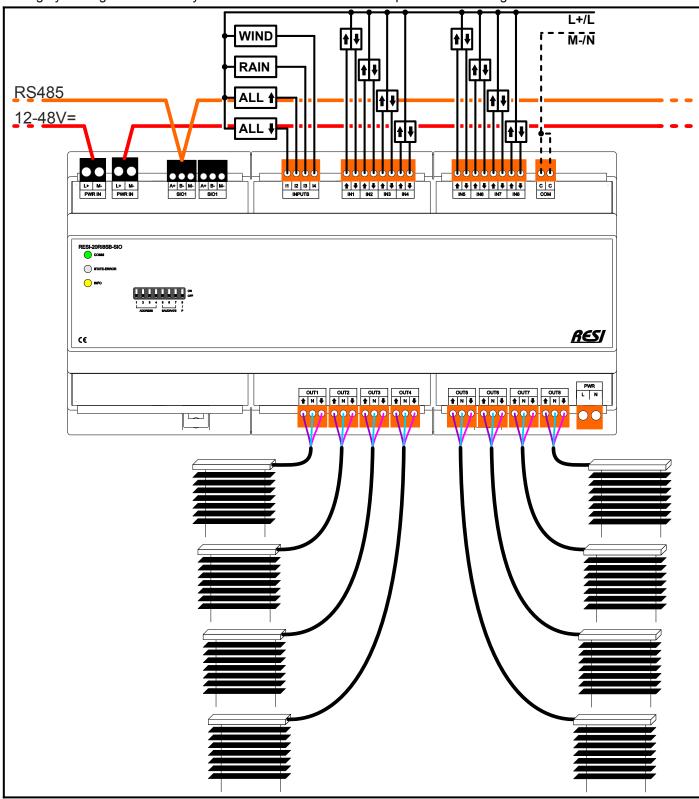


Figure: Correct wiring of all engines

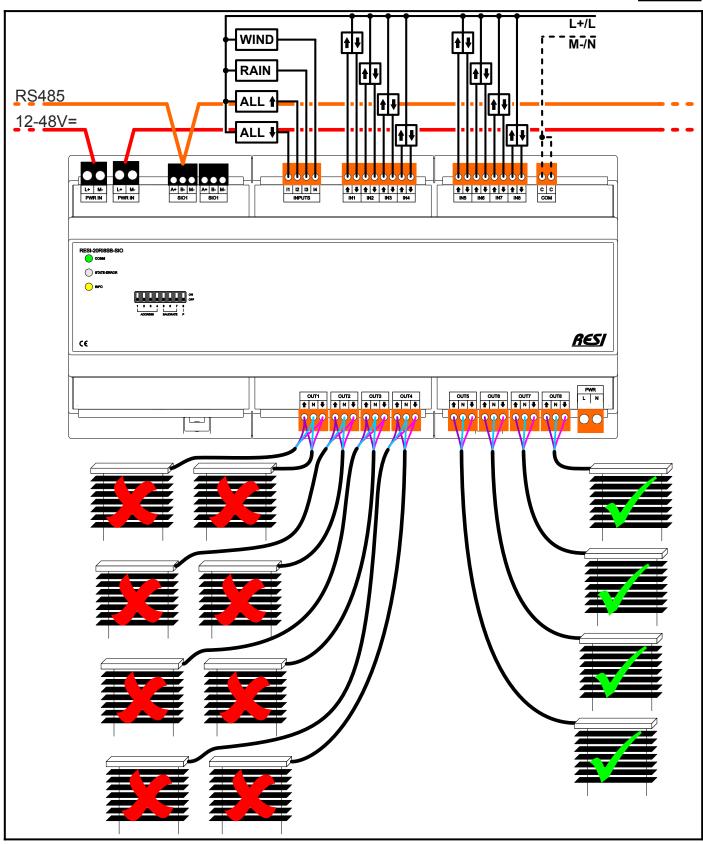


Figure: Incorrect wiring of all engines - NOT ALLOWED!!!!

RES



20.2.2 Basic configuration of shade/blind outlets

Each shade/blind outlet has its own configuration parameter block, which defines a lot of parameters used to control the individual outlet. Please consult the paper **RESI-L-20RI8SB,8SB,10RI4SB,4SB-SIO-MODBUS+ASCII-ENxx.pdf** for more detailed specification of all parameters. We will mention here only the most important parameters for a better understanding of the operation.

The first configuration block for OUT1 is located between 4x01001,3x01001,I:1000 and 4x01200,3x01200,I:1999. The second configuration block for OUT2 is located between 4x01201,3x01201,I:1200 and 4x01400,3x01400,I:1399. The third configuration block for OUT3 is located between 4x01401,3x01401,I:1400 and 4x01600,3x01600,I:1599. The 4th configuration block for OUT4 is located between 4x01601,3x01601,I:1600 and 4x01800,3x01800,I:1799. The 5th configuration block for OUT5 is located between 4x01801,3x01801,I:1800 and 4x02000,3x02000,I:1999. The 6th configuration block for OUT6 is located between 4x02001,3x02001,I:2000 and 4x02200,3x02200,I:2199. The 7th configuration block for OUT7 is located between 4x02201,3x02201,I:2200 and 4x02400,3x02400,I:2399. The 8th configuration block for OUT8 is located between 4x02401,3x02401,I:2400 and 4x02600,3x02600,I:2599. Of course, RESI-20RI8SB_SIO, RESI-8SB-SIO uses all eight configuration block, but RESI-10RI4SB-SIO, RESI-4SB-SIO uses only the first four configuration blocks. OUT5 to OUT8 configuration block is unused in this IO modules.

All configuration parameters are stored internally intot a permanent ferro-magentic memory with almost unlimited write cycles! After you have set all parameters you have to restart the IO module (power of-on cylce or software reset) to activate all new parameters!

We use OUT1 as a sample here to explain the functionality of the configuration registers.

BILIND & SHUTTER GROUP: Outputs DO1+DO2: CONFIG

BILIND & SHUTTER GROUP: Outputs DOI+DO2: CONFIGURATION							
MODE	3x01001	3.0x0003		N/A:NO CHANGE	UINT 16	NO	
	4×01001	B:00 03			R/W		
	1:1000	0.0000					
		BLIND		SELECT FROM LIST			
Current mode of the first blinds / shu = 0: NONE: Both digital outputs are = 1: TWO OUTPUTS: Both digital o = 2: SHUTTER: Both digital outputs = 2: BUIND: Both digital outputs	always off utputs can be used as norm s form a shutter WITHOUT s	slat adjustment					

This is the most important register to configure the correct function of the outlet. Each outlet consists of two relays, which are controlled as a group. The mode SHUTTER is designed for sun blinds or roller shutter without the ability to control the slat position. The mode BLIND allows the positioning of the slats also. The mode TWO OUTPUTS allow the use of the two outputs as general outputs for other purposes.

	-						
REVERT	3x01002	0,0x0000		N/A:NO CHANGE	UINT16	NO	
	4x01002	B:00 00			R/W		
	1:1001						
		NORMAL OUTPUTS [DO1=UP;DO2=DOWN]		SELECT FROM LIST			
Defines whether the direction of the shu	Defines whether the direction of the shutter or blind should be reversed:						
= 0: NORMAL: digital output # 1 moves up, # 2 down							
= 1 INVERTED Digital output # 1 mov	es down #2 un						

= 1: INVERTED: Digital output # 1 moves down, # 2 up

This is very useful if you have a false cabling of the UP/DOWN direction of your engine. Normally relay output #1 should move the shade/blind upwards and relay output #2 shout move the shade/blind downwards. Activating this configuration will invert the behavior of the two relay outputs.

TIME UP	3x01003 4x01003	42,0x002A B:00 2A			UINT 16 R/W	NO
	I:1002					
		42s		VALUE IN XX SECONDS		
ovement time of the shutter / blind up .65535 seconds	wards in seconds.					
IME EXTEND UP	3x01004 4x01004 I:1003	500,0×01F4 B:01 F4	0		UINT16 R/W	NO
		05,00%		VALUE IN XX,XX%		
xtension of the upward movement tim 2500 → 025%	e in % in order to reach	the end position correctly.		· ·		
TIME DOWN	3x01005 4x01005 I:1004	42,0x002A B:00 2A		42	UINT16 R/W	NO
		42s		VALUE IN XX SECONDS		
ovement time of the shutter / blind do .65535 seconds	wnwards in seconds.			· ·		
IME EXTEND DOWN	3x01006 4x01006 I:1005	500,0×01F4 B:01 F4	0		UINT16 R/W	NO
		05.00%		VALUE IN XX,XX%		
Extension of the downward movement 2500 → 025%	time in % in order to rea	ach the end position correctly.				

These parameters define the timing for a complete movement of the shade/blind in 1/10th seconds from position 100% (fully closed) to %0 (Fully opened) (TIME UP) and vice versa (TIME DOWN). The two percentage registers TIME EXTEND UP and TIME EXTEND DOWN are ony used in positioning commands reaching the two end values 0% and 100%. Then the engine run time will be extended by the defined percentage to securely reach the final position.



An example: You have configured 100 Seconds for TIME UP and TIME DOWN and 10% for TIME EXTEND UP and TIME EXTEND DOWN. After referencing the engine to position 0% you send a move to 50% command. This will mean that the engine will be on for 50.0s. After reaching this position you send a positioning command move to 100%. Then the actor will move for 50s plus 10% from $100s \rightarrow 10s$. So in total the engine is on for 60s. After that the final position 100% is reached. Now you send a move to 0% command. Again the engine will be on for 100s and 10% of $100\% \rightarrow$ in total 110s to reach always the upper position. After that movement the position 0% is reached.

This is an implicit reference move for the two final positions 0% and 100% to correct most of the time based errors over the time.

PAUSE UP DOWN	3x01007 4x01007 I:1006	500,0x01F4 B:01 F4		UINT16 R/W	NO
		500ms	PAUSE IN XXms		
Pause between moving up/down the	shutters/blinds in milliseco	nds			

This parameter is used in every direction change between upwards and downwards movement to stop the previous movement before the next movement is started. A good value for most applications is 500ms to 1s. It is also used to give the engine time to change the flow direction of the current in the motor winding.

MOTOR DELAY ON	3x01008 4x01008 I:1007	200,0x00C8 B:00 C8			UINT16 R/W	NO
		200ms		MOTOR DELAY ON IN XXms		
Motor on-delay time in milliseconds until the motor reaches full force. 010000ms						
MOTOR DELAY OFF	3x01009 4x01009 I:1008	200,0x00C8 B:00 C8			UINT16 R/W	NO
		200ms		MOTOR DELAY OFF IN XXms		
Delay time when switching off the motor in milliseconds until the motor has no more power. 0. 10000ms						

MOTOR DELAY ON is used to delay the correction of the position after starting a new movement. Therefore this time is added to the calculated movement time from the actual position to the next position. After the engine is on for this amount of time, the current position is updated. This parameter is used to cover the issue, that after you switch the relay output to 1, the relay itself and the engine need time to build up a force to move the shade/blind.

MOTOR DELAY OFF is the same after the end of a movement. When you switch off the digital output, the relay and the engine aren't switched off immediately. The have a litte delay while the shade/blind will move. So this additional time is used to correct the final position of the shade/blind.

For both parameters values between 50ms and 300ms are useful.

SLAT ANGLE UP	3x01015 4x01015 I:1014	90,0x005A B:00 5A			UINT 16 R/W	NO	
		90°		SLAT ANGLE UP IN XX°			
Position of the slat when moving up in degrees 0180 \rightarrow 0 °180 °	Position of the slat when moving up in degrees. For raffstores 90 ° (horizontal) for other blinds 0 ° (vertical upward) 180 → 0 °180 °						
0 ° vertically upwards 90 ° horizontal 180 ° vertically downwards							
SLAT ANGLE HORIZONTAL	3x01016 4x01016 I:1015	90,0x005A B:00 5A			UINT16 R/W	NO	
		90°		SLAT ANGLE HORIZONTAL IN XX°			
Position of the slat for horizontal position in deg 0.180 → 0 °180 ° 0 ° vertically upwards 90 ° horizontal 180 ° vertically downwards	_						
SLAT ANGLE DOWN	3x01017 4x01017 I:1016	180,0x00B4 B:00 B4			UINT 16 R/W	NO	
		180°		SLAT ANGLE DOWN IN XX°			
Position of the slat when moving down in degrees. For raffstores 180 ° (vertically downwards) for other blinds 180 ° (vertically downward) 0180 → 0 °180 °							
0 ° vertically upwards 90 ° horizontal 180 ° vertically downwards							

To control the slat angle correctly you have to define the end angles of the slats and the angle for horizontal position of the slat. See below picture for the correct naming of the parameters in relation to the slat position.

For example a standard Raffstore (external venetian blind) is fully opened, when the slat is in horizontal position. So you have to set the top position SLAT ANLGE UP to 90° and also the horzontal position is the same, so SLAT ANGLE HORIZONTAL is also set to 90°. The fully closed Raffstore will have the slats moved to vertical down. So the parameter SLAT ANGLE DOWN is set to 180°.

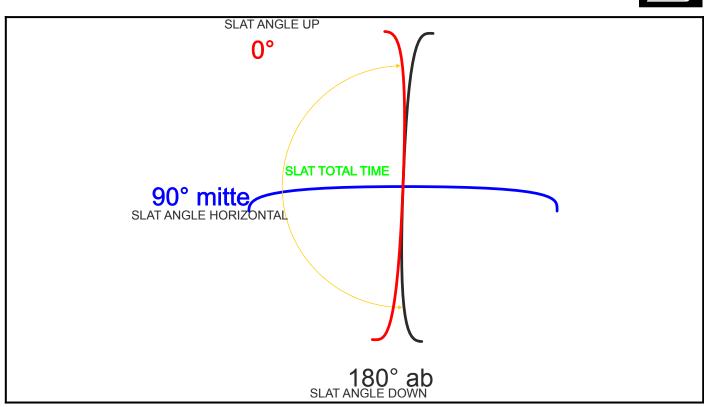


Figure: Definition of the SLAT ANGLE parameters

SLAT TOTAL TIME	3x01012 4x01012 I:1011	1100,0x044C B:04 4C			UINT 16 R/W	NO
		1100ms		SLAT TOTAL TIME IN XXms		
Total adjustment time of the slat from position 0 10065535ms	9% (=SLAT ANG	LE UP) to position 100% (=SLAT ANGLE DOWN) in mil	liseconds			
SLAT STEP TIME	3x01013 4x01013 I:1012	200,0x00C8 B:00 C8			UINT16 R/W	NO
		200ms		SLAT STEP TIME IN XXms		
Time for an adjustment step for slat in milliseconds 10.65536ms Actual number of slat positions is calculated with: Number of steps = SLAT STEP TIME / SLAT TOTAL TIME Percent per slat adjustment step are calculated with: Percent = 100% / number of steps						
SLAT PAUSE TIME	3x01014 4x01014 I:1013	2500,0x09C4 B:09C4			UINT 16 R/W	NO
		2500ms		SLAT PAUSE TIME IN XXms		
Pause time between two adjustment steps of the slat in milliseconds 0.30000ms						

Only valid for mode SHADE: SLAT TOTAL TIME describes the time in Milliseconds the engine needs to move from position SLAT ANGLE UP to position SLAT ANGLE DOWN. This time describes 100% of the SLAT movement time. All slat position commands are then between these two slat positions: A position 0% means the slat angle SLAT ANGLE UP, a position 50% means the slat angle (SLAT ANGLE DOWN-SLAT ANGLE UP)/2+SLAT ANGLE UP, a position 100% means the slat angle SLAT ANGLE DOWN.

Due to the physical behaviour of a SHADE the controller knows now, that if the down movement is longer than the configured SLAT TOTAL TIME, the new slat angle is SLAT ANGLE DOWN and the slat position will be 100% (fully closed). Also if the up movement is longer than SLAT TOTAL TIME the new slat angle is SLAT ANGLE UP and the new slat position will be 0%. Is the movement shorter than SLAT TOTAL TIME, the slat position will be corrected before the vertical position is updated.

The parameter SLAT STEP TIME is sued to calculate the number of maximum steps you can use while STEPPING mode for the slats. e.g. The SLAT TOTAL TIME is 2000ms and the SLAT STEP TIME is 500ms. So you can do 2000ms/500ms=4 steps from slat position 0% to slat position 100% and vice versa.

SLAT PAUSE TIME defines a pause time in Milliseconds between to consecutive steps to give the user a chance to release the button while slats are stepping. Usually you should use 500ms to 5000ms here. So a total stepping sequence with the SLAT parameters SLAT TOTAL TIME=2000ms, SLAT STEP TIME=500ms, SLAT PAUSE TIME=2000ms, slat start position is 0%, will be:



- Start of slat stepping
- A. Move from 0% to 25%
- B. Wait for 2000ms
- C. Move from 25% to 50%
- D. Wait for 2000ms
- E. Move from 50% to 75%
- F. Wait for 2000ms
- G. Move from 75% to 100% $\,$
- H. FINISHED
- I: User releases the push button

In the mode BLIND no slat positioning is done by the IO module.

The slat timining is really critical to the time based calulation of the slat position and the position of the blinds. Therefore we offer four additional parameters to adjust the problem of the different timing for a upward and downward movement of a slat:

SLAT DEAD TIME UP	3x01018 4x01018 I:1017	100,0x0064 B:00 64			UINT16 R/W	NO
		100ms		SLAT DEAD TIME UP IN XXms		
Delay time of the slats, before the slat is rea If the used blind in the horizontal upper posi 010000ms	lly adjusted, if an up tion has a dead tim	ward movement has taken place, which led to the comp e between the release of the main tape until the first mo	lete opening of the s vement downwards,	slats (0 ° or 90 °). then this parameter compensates this delay. Setting in r	nilliseconds.	
SLAT DEAD TIME DOWN	3x01019 4x01019 I:1018	10,0x000A B:00 0A			UINT16 R/W	NO
		10ms		SLAT DEAD TIME DOWN IN XXms		
010000ms		ward movement has taken place, which led to the comp e between the release of the main tape until the first mov	lete opening of the s vement downwards,	slats (0 ° or 90 °). then this parameter compensates this delay. Setting in r	nilliseconds.	
SLAT DELAY UP	3x01020 4x01020 I:1019	500,0x01F4 B:01 F4			UINT16 R/W	NO
		500ms		SLAT DELAY UP IN XXms		
	. ,			first reaction of the slat. This depends on the current sla 00%) and the previous blind movement was a downward		in milliseconds.
SLAT DELAY DOWN	3x01021 4x01021 I:1020	200,0x00C8 B:00 C8			UINT16 R/W	NO
		200ms		SLAT DELAY DOWN IN XXms		
Some types of blinds require an additional s	tart-up allowance w	hen the slat is closed, due to the tensioning and loosening	ig of the tapes, until	the first reaction of the slat. This depends on the current	t slat position.	
This start-up delay until the slat is turned is a 010000ms	always taken into ad	count when the blind is closed, when the slats are in the	open position (0%)	and the previous blind movement was an upward move	ment. Setting in millis	econds.

SLAT DEADTIME UP and SLAT DEADTIME DOWN activate the engine without adjusting the slat or blind position, if the final slat posotion will be one of the two end positions. Here values between 50ms and 200ms are useful, depending on the construction of the blind.

SLAT DELAY UP and SLAT DELAY DOWN are additional times for every slat movement before the slat and blind position is updated. Here 100ms to 700ms are usefull values.



20.2.3 Digital input configuration of shade/blind outlets

Each engine outlet OUTx can be controlled directly with a few MODBUS registers described below. But in addition, the RESI-20RI8SB-SIO and RESI-10RI4SB-SIO modules offer digital inputs for direct control of shades and blinds with two push buttons. Also you can configure, that the push buttons control more than one engine outlet (virtual group of shades/blinds).

For each engine outlet you can configure 10 (for RESI-20RI8SB-SIO) or 5 (for RESI-10RI4SB-SIO) digital inputs groups named DIGITAL INPUT GROUP1 to DIGITAL INPUT GROUP10.

DIGITAL INPUT GROUP1 will use digital input 1+2.

DIGITAL INPUT GROUP2 will use digital input 3+4.

...

DIGITAL INPUT GROUP8 will use digital input 15+16.

DIGITAL INPUT GROUP9 will use digital input 17+18.

DIGITAL INPUT GROUP10 will use digital input 19+20.

Each digital input group has the following modes:

=0: mode NOTHING:

The two corresponding digital inputs are NOT used to trigger any movement for the engine outlet. So the digital inputs can be used by the application for other purposes e.g. error inputs,...

=1: Mode UPDOWN 1:

If the outlet is in mode 3 (BLINDS) the digital inputs trigger the following actions:

Short key press detected for push button connected to digital input #1: Blind starts to move upwards to position 0%. Blind will either stop at position 0% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Short key press detected for push button connected to digital input #2: Blind starts to move downwards to position 100%. Blind will either stop at position 100% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Long key press started on push button connected to digital input #1: Slat starts to step to slat position 0%. Slat will either stop at slat position 0% or if you release the push button connected to digital input 1.

Long key press started on push button connected to digital input #2: Slat starts to step to slat position 100%. Slat will either stop at slat position 100% or if you release the push button connected to digital input 2.

If the outlet is in mode 2 (SHADES) the digital inputs trigger the following actions:

Short key press detected for push button connected to digital input #1: Blind starts to move upwards to position 0%. Blind will either stop at position 0% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Short key press detected for push button connected to digital input #2: Blind starts to move downwards to position 100%. Blind will either stop at position 100% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Long key press started on push button connected to digital input #1: Nothing happens.

Long key press started on push button connected to digital input #2: Nothing happens.

=2: Mode UPDOWN 2:

If the outlet is in mode 3 (BLINDS) the digital inputs trigger the following actions:

Short key press detected for push button connected to digital input #1: Blind starts to move upwards to position 0%. Blind will either stop at position 0% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Short key press detected for push button connected to digital input #2: Blind starts to move downwards to position 100%. Blind will either stop at position 100% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Long key press started on push button connected to digital input #1: Slat starts to step to slat position 0%. Slat will either stop at slat position 0% or if you release the push button connected to digital input 1.

Long key press started on push button connected to digital input #2: Slat starts to step to slat position 100%. Slat will either stop at slat position 100% or if you release the push button connected to digital input 2.

If the outlet is in mode 2 (SHADES) the digital inputs trigger the following actions:



Short key press detected for push button connected to digital input #1: Blind starts to move upwards to position 0%. Blind will either stop at position 0% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Short key press detected for push button connected to digital input #2: Blind starts to move downwards to position 100%. Blind will either stop at position 100% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Long key press started on push button connected to digital input #1: The shade steps its position upwards to 0%. The stepping stops if the shade reaches the final position 0% or if the use releases the push button connected to digital input 1.

Long key press started on push button connected to digital input #2: The shade steps its position downwards to 100%. The stepping stops if the shade reaches the final position 100% or if the use releases the push button connected to digital input 2.

=3: Mode UPDOWN 3:

If the outlet is in mode 2 (SHADES) or 3 (BLINDS) the digital inputs trigger the following actions:

Short key press detected for push button connected to digital input #1: Blind or shade starts to move upwards to position 0%. Blind will either stop at position 0% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Short key press detected for push button connected to digital input #2: Blind or shade starts to move downwards to position 100%. Blind will either stop at position 100% or if you do a short key press on one of the two push buttons connected to digital input 1 or 2.

Long key press started on push button connected to digital input #1: Blind or shade starts to move to position 0%. Blind or shade stops after reaching final position 0% or if you release the push button connected to digital input 1.

Long key press started on push button connected to digital input #2: Blind or shade starts to move to position 100%. Blind or shade stops after reaching final position 100% or if you release the push button connected to digital input 2.

In this mode, no slat positioning ins available over the two digital inputs.

=3: Mode WIND+RAIN ALARM:

In this mode the first digital input acts as a wind alarm input and the second digital input acts as a rain alarm input.

If the module detects a rising edge on the digital input 1 the wind alarm is triggered. The engine outlet activates the wind alarm program and moves the shade/blind in a defined position.

If the module is in wind alarm and detects a falling edge on the first input, the wind alarm is deactivated and the module moves the shades/blinds to the defined position for WIND ALARM ENDS.

The same is done for the rain alarm input. Please see chapter wind and rain alarm behavior.



BLIND & SHUTTER GROUP: DIGITA		NFIGURATION			
DIGITAL INPUT GROUP1	3x01041 4x01041 I:1040	1,0x0001 B:00 01	N/A:NO CHANGE	UINT16 R/W	NO
		UP DOWN 1	SELECT FROM LIST		
Function for the digital input group IN1:	+∎DI2 (S:SHUT	TER, B:BLIND)			
1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09	6. SHORT DOW	IN: S+B:MOVE TO 100%. LONG UP:S+B:MOVE UP. LO	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP2	3x01042 4x01042 I:1041	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN2:	6, SHORT DOW 6, SHORT DOW 6 SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEF N: S+B:MOVE TO 100% LONG UP:S+B:MOVE UP LO	EP SLATS UP, LONG DOWN: S:NOTHING, B:STEP SLATS DOWN 9 SLATS UP, LONG DOWN: S:STEP DOWN, B:STEP SLATS DOWN NG DOWN: S+B:MOVE DOWN		
DIGITAL INPUT GROUP3	3x01043 4x01043 1:1042	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN3:	+ ₽ DI2 (S:SHU1	TER, B:BLIND)			
UDEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 09 4:WIND+RAIN:DI1:WIND ALARM INPUT, DI2	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW RAIN ALARM I	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LOI NPUT	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP4	3x01044 4x01044 I:1043	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN4: DI1+ 0:DEACTIVATED	r.				
1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 09 4:WIND+RAIN:DI1:WIND ALARM INPUT, DI2	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW :RAIN ALARM I	IN: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE IN: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEF IN: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LOI NPUT	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP5	3x01045 4x01045 I:1044	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN5:	+∎DI2 (S:SHUT	TER, B:BLIND)			
1:UP DOWN 1:SHORT UP: S+8:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+8:MOVE TO 09 3:UP DOWN 3:SHORT UP: S+8:MOVE TO 09 4:WIND+RAIN:DI1:WIND ALARM INPUT, DI2	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW RAIN ALARM I	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING, B:STE N: S+B:MOVE TO 100%, LONG UP:S:STEP UP, B:STEF N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LO NPUT	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP6	3x01046 4x01046 I:1045	0,0×0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
	• DIA (0.01111	DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN6:	· ·		P SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP7	3x01047 4x01047 I:1046	0,0x0000 B:00 00	N/A:NO CHANGE	UINT16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN7: DI1+ 0:DEACTIVATED	■DI2 (S:SHUT	TER, B:BLIND)			
1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 09 3:WIND+RAIN:DI1:WIND ALARM INPUT, DI2	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW :RAIN ALARM I	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LOI NPUT	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP8	3x01048 4x01048 I:1047	0,0x0000 B:00 00	N/A:NO CHANGE	UINT 16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group IN8:	+€DI2 (S:SHUT	TER, B:BLIND)			
1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 09 4:WIND+RAIN:DI1:WIND ALARM INPUT, DI2	6, SHORT DOW 6, SHORT DOW RAIN ALARM I:	/N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEF /N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LO NPUT			
DIGITAL INPUT GROUP9	3x01049 4x01049 I:1048	4,0x0004 B:00 04	N/A:NO CHANGE	UINT16 R/W	NO
Function for the digital input group INPUTS: IN	1.0102/0.00001	WIND+RAIN	SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEF N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LO	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		
DIGITAL INPUT GROUP10	3x01050 4x01050 I:1049	0,0x0000 B:00 00	N/A:NO CHANGE	UINT 16 R/W	NO
		DEACTIVATED	SELECT FROM LIST		
Function for the digital input group INPUTS: IN 0:DEACTIVATED		•			
1:UP DOWN 1:SHORT UP: S+B:MOVE TO 09 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 09	6, SHORT DOW 6, SHORT DOW	/N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEF /N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LO	EP SLATS UP, LONG DOWN:S:NOTHING,B:STEP SLATS DOWN P SLATS UP, LONG DOWN:S:STEP DOWN,B:STEP SLATS DOWN NG DOWN:S+B:MOVE DOWN		



20.2.4 MODBUS input configuration of shade/blind outlets

To ease the use of the IO module with MODBUS master controllers like DDCs, touchbpanels, Micro controller, ... we have implemented virtual digital inputs in MODBUS registers for every engine outlet. Each engine outlet OUTx can be controlled directly with a few MODBUS registers described below.

For each engine outlet you can configure 10 (for RESI-20RI8SB-SIO) or 5 (for RESI-10RI4SB-SIO) MODBUS registers named MODBUS INPUT GROUP1 to MODBUS INPUT GROUP10.

Each MODBUS input group is configured in the same way like the DIGITAL INPUT GROUPx. So see the previous chapter, what the modes mean in detail.

In addition the controller offers the general MODBUS holding registers MODBUS DIGITAL INPUT MBDI1 to MODBUS DIGITAL INPUT MBDI20, which represents a virtual digital input controlled by MODBUS write commands.

Two MODBUS registers are always related the one MODBUS INPUT GROUP:

MODBUS INPUT GROUP1 uses MODBUS DIGITAL INPUT MBDI1 and MODBUS DIGITAL INPUT MBDI2 MODBUS INPUT GROUP2 uses MODBUS DIGITAL INPUT MBDI3 and MODBUS DIGITAL INPUT MBDI4 MODBUS INPUT GROUP3 uses MODBUS DIGITAL INPUT MBDI5 and MODBUS DIGITAL INPUT MBDI6

MODBUS INPUT GROUP10 uses MODBUS DIGITAL INPUT MBDI19 and MODBUS DIGITAL INPUT MBDI20

You can write the following values into the register pairs MODBUS DIGITAL INPUT MBDIx (x=1 to 20):

First register (e.g. MBDI1)

=0: NOTHING happens

=1: Execute a short key press action. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the shade/blind starts to move up or stops the current movement.

=2: Execute a long key press start action. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the blind starts to step the slats up or steps the position up.

=3: Execute a long key press end action. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the blind stops the current movement of the slats/shade.

Second register (e.g. MBDI2)

=0: NOTHING happens

=1: Execute a short keypress. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the shade/blind starts to move down or stops the current movement.

=2: Execute a long key press start action. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the blind starts to step the slats down or steps the position up.

=3: Execute a long key press end action. Depending on the configuration of the current MODBUS INPUT GROUPx mode, the blind stops the current movement of the slats/shade.

So in your application you need to set up the configuration registers and the n you can use the digital inputs with push buttons to trigger/stop your shades/blinds or you use the MODBUS DIGITAL INPUT MBDIx registers to trigger/stop the movement of the shades/blinds!



BLIND & SHUTTER GROUP: MODBU	IS INPUT CO	NFIGURATION				
MODBUS INPUT GROUP1	3x01051 4x01051 I:1050	1,0x0001 B:00 01		N/A:NO CHANGE	UINT16 R/W	NO
5		UP DOWN 1		SELECT FROM LIST		
Function for the MODBUS input group #1: (S:S 0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0% 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 0% 4:WIND+RAIN:D11:WIND ALARM INPUT, D12:	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEI N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING,B:STEP SLATS DOWN 3 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP2	3x01052 4x01052 I:1051	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #2: (S:S		DEACTIVATED		SELECT FROM LIST		
0 DEACTIVATED	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEI N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100% LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	G DOWN:S:NOTHING,B:STEP SLATS DOWN 5 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP3	3x01053 4x01053 I:1052	0,0×0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #3: (S:S		DEACTIVATED		SELECT FROM LIST		
0 DEACTIVATED	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW RAIN ALARM II	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEI N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING, B:STEP SLATS DOWN S DOWN:S:STEP DOWN, B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP4	3x01054 4x01054 I:1053	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #4: (S:S		DEACTIVATED		SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0% 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 0% 4:WIND+RAIN:DI1:WIND ALARM INPUT, DI2:	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW RAIN ALARM II	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEF N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO			
MODBUS INPUT GROUP5	3x01055 4x01055 I:1054	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #5: (S:S		DEACTIVATED		SELECT FROM LIST		
0 DEACTIVATED	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEF N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING,B:STEP SLATS DOWN 3 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP6	3x01056 4x01056 I:1055	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #6: (S:S				SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0%	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEF N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LONG IG DOWN:S+B:MO	IG DOWN:S:NOTHING B:STEP SLATS DOWN S DOWN:S:STEP DOWN,B:STEP SLATS DOWN JVE DOWN		
MODBUS INPUT GROUP7	3x01057 4x01057 I:1056	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #7: (S:S		DEACTIVATED		SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0%	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEF N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	SLATS UP, LONG	G DOWN:S:STEP DOWN,B:STEP SLATS DOWN		
MODBUS INPUT GROUP8	3x01058 4x01058 I:1057	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #8: (S:S				SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0%	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STE/ N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING,B:STEP SLATS DOWN 3 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP9	3x01059 4x01059 I:1058	4,0x0004 B:00 04		N/A:NO CHANGE	UINT16 R/W	NO
Evention for the MODPHO instance (0. /0.2		WIND+RAIN		SELECT FROM LIST		
Function for the MODBUS input group #9: (S:S 0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0% 3:UP DOWN 3:SHORT UP: S+B:MOVE TO 0% 4:WIND+RAIN:D11:WIND ALARM INPUT, D12	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEI N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING,B:STEP SLATS DOWN 3 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		
MODBUS INPUT GROUP10	3x01060 4x01060 I:1059	0,0x0000 B:00 00		N/A:NO CHANGE	UINT16 R/W	NO
Function for the MODBUS input group #10: (S:				SELECT FROM LIST		
0:DEACTIVATED 1:UP DOWN 1:SHORT UP: S+B:MOVE TO 0% 2:UP DOWN 2:SHORT UP: S+B:MOVE TO 0%	6, SHORT DOW 6, SHORT DOW 6, SHORT DOW	N: S+B:MOVE TO 100%, LONG UP:S:NOTHING,B:STEF N: S+B:MOVE TO 100%, LONG UP:S:STEP UP,B:STEP N: S+B:MOVE TO 100%, LONG UP:S+B:MOVE UP, LON	P SLATS UP, LON SLATS UP, LON IG DOWN:S+B:MO	IG DOWN:S:NOTHING,B:STEP SLATS DOWN 3 DOWN:S:STEP DOWN,B:STEP SLATS DOWN DVE DOWN		



	NT STATUS 3x10101	OF ALL MODBUS DIGITAL INPUTS MBDI1MBDI 2???		LIINT 1C	NO
10DBUS DIGITAL INPUT MBDI1	4x10101 I:10100		N/A:NO CHANGE	UINT16 R/W	NO
		????	SELECT FROM LIST		
urrent status of MODBUS digital input MBDI)):Nothing I:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	ζ.				
IODBUS DIGITAL INPUT MBDI2	3x10102 4x10102 I:10101	????	1:SHORT KEYPRESS	UINT 16 R/W	YES
		????	SELECT FROM LIST		
urrent status of MODBUS digital input MBDb DNothing L'Execute short keypress 2'Execute long keypress start 3:Execute long keypress end	с.				
IODBUS DIGITAL INPUT MBDI3	3x10103 4x10103 I:10102	????	N/A:NO CHANGE	UINT 16 R/W	NO
urrent status of MODBUS digital input MBDb 2:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	ζ.	????	SELECT FROM LIST		
ODBUS DIGITAL INPUT MBDI4	3x10104 4x10104 I:10103	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
urrent status of MODBUS digital input MBDb 0:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	_				
10DBUS DIGITAL INPUT MBDI5	3x10105 4x10105 I:10104	????	N/A:NO CHANGE	UINT 16 R/W	NO
urrent status of MODBUS digital input MBDI		????	SELECT FROM LIST		
0:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end		2000			10
IODBUS DIGITAL INPUT MBDI6	3x10106 4x10106 I:10105	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
urrent status of MODBUS digital input MBDb):Nothing L:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	ς.				
IODBUS DIGITAL INPUT MBDI7	3x10107 4x10107 I:10106	????	N/A:NO CHANGE	UINT 16 R/W	NO
urrent statue of MODBLIC diated input MDDI	,	????	SELECT FROM LIST		
urrent status of MODBUS digital input MBDb D:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	ζ.				
IODBUS DIGITAL INPUT MBDI8	3x10108 4x10108 I:10107	????	N/A:NO CHANGE	UINT 16 R/W	NO
urrent status of MODBUS digital input MBDI		????	SELECT FROM LIST		
urrent status of MODBOS digital input MBDD 0:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	ζ.				
ODBUS DIGITAL INPUT MBDI9	3x10109 4x10109 I:10108	????	N/A:NO CHANGE	UINT 16 R/W	NO
urrent status of MODBUS digital input MBDI) D:Nothing L:Execute short keypress	ζ.	7777	SELECT FROM LIST		
1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end 10DBUS DIGITAL INPUT MBDI10	3x10110 4x10110 I:10109	????	N/A:NO CHANGE	UINT 16 R/W	NO
	1.10109	????	SELECT FROM LIST		
Current status of MODBUS digital input MBDI 0:Nothing 1:Execute short keypress 2:Execute long keypress start 3:Execute long keypress end	Ċ.				



MODBUS DIGITAL INPUT MBDI11	3x10111 4x10111 I:10110	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDI =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	ί.				
MODBUS DIGITAL INPUT MBDI12	3x10112 4x10112 I:10111	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDb =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	ς.				
MODBUS DIGITAL INPUT MBDI13	3x10113 4x10113 I:10112	????	N/A:NO CHANGE	UINT16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDb =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	ς.				
MODBUS DIGITAL INPUT MBDI14	3x10114 4x10114 I:10113	????	N/A:NO CHANGE	UINT16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDb =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end					
MODBUS DIGITAL INPUT MBDI15	3x10115 4x10115 I:10114	????	N/A:NO CHANGE	UINT16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDb =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	ζ.				
MODBUS DIGITAL INPUT MBDI16	3x10116 4x10116 I:10115	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDI =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	κ.				
MODBUS DIGITAL INPUT MBDI17	3x10117 4x10117 I:10116	????	N/A:NO CHANGE	UINT16 R/W	NO
Current status of MODBUS digital input MBDI	,	????	SELECT FROM LIST		
ellinothing =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	κ.				
MODBUS DIGITAL INPUT MBDI18	3x10118 4x10118 I:10117	????	N/A:NO CHANGE	UINT16 R/W	NO
Current status of MODBUS digital input MBDIx	(????	SELECT FROM LIST		
ONOthing ONOthing	h.				
MODBUS DIGITAL INPUT MBDI19	3x10119 4x10119 I:10118	????	N/A:NO CHANGE	UINT16 R/W	NO
Current status of MODBUS digital input MBDIx		2222	SELECT FROM LIST		
eChrothing =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	κ.				
MODBUS DIGITAL INPUT MBDI20	3x10120 4x10120 I:10119	????	N/A:NO CHANGE	UINT 16 R/W	NO
		????	SELECT FROM LIST		
Current status of MODBUS digital input MBDI =0:Nothing =1:Execute short keypress =2:Execute long keypress start =3:Execute long keypress end	ς.				



20.2.5 Wind and rain alarm behavior

You can configure the behaviour in case of wind and rain alarm. Therefore you can configure, which digital input is used for wind alarm and which digital input is used for rain alarm for each engine outlet individually.

Use the registers DIGITAL INPUT GROUPx and mode 4:WIND+RAIN ALARM to define which digital inputs are used to trigger the wind and rain alarms.

You can also trigger the wind and rain alarm via simulated MODBUS DIGITAL INPUT MBDIx. Define the used MODBUS registers in MODBUS INPUT GROUPx by writing mode 4:WIND+RAIN ALARM into the corresponding register.

Or write the specific command into the COMMAND register of every engine outlet group to activate/deactivate WIND or RAIN alarm.

For every engine outlet you can define, what happens in case of a wind alarm or a rain alarm. For this, the following configuration registers are used:

BILIND & SHUTTER GROUP: WIND	ALARM CONF	FIGURATION				
WIND START MODE	3x01101 4x01101 I:1100	3,0x0003 B:00 03		N/A:NO CHANGE	UINT16 R/W	NO
		MOVE TO POSITION		SELECT FROM LIST		
Configured start mode for the wind alarm func = 0: DEACTIVATED: Nothing happens when = 1: MOVE 0%: Move to position 0% = 2: MOVE 100%: Move to position 100% = 3: MOVE POS: Move to position WIND POS = 4: MOVE LAST POS: Do nothing	wind alarm rises	AT POSITION				
WIND END MODE	3x01102 4x01102 I:1101	4,0x0004 B:00 04		N/A:NO CHANGE	UINT16 R/W	NO
		MOVE TO LAST POSITION		SELECT FROM LIST		
 CDEACTIVATED: Nothing happens when 1: MOVE 0% Move to position 0% 2: MOVE 100% Move to position 100% 3: MOVE 200% Move to position WIND POS 4: MOVE LAST POS: Move to last position b 4: MOVE LAST POS. Move to last position b WIND POSITION 	3x01103	0,0x0000	0		UINT 16	NO
	4x01103 I:1102	B:00 00			R/W	
		00,00%		VALUE IN XX,XX%		
Vertical position for this blind / shutter in perce 0%:complete open (upper position) 100%:complete closed (lower position)	nt for wind alarm	mode MOVE POS				
WIND SLAT POSITION	3x01104 4x01104 I:1103	0,0x0000 B:00 00	0		UINT 16 R/W	NO
		00,00%		VALUE IN XX,XX%		
Vertical position for the slats of this blind in per 0% in position SLAT ANGLE UP 100% in position SLAT ANGLE DOWN	cent for wind ala	rm mode MOVE POS				

WIND START MODE defines what happens, if the wind alarm arises. You can choose between:

=0: DEACTIVATED: Nothing happens in case of a wind alarm

=1: MOVE TO 0%: Move the shade/blind completely up to position 0% (Fully opened)

=2: MOVE TO 100%: Move the shade/blind completely down to position 100% (Fully closed). In this case the slats are also closed.

=3: MOVE TO WIND POSITION+WIND SLAT POSITION: You can define an individual position for every engine outlet in the two registers WIND POSITION between 0% and 100% and WIND SLAT POSITION between 0% and 100%. This should be a save position, where you cannot destroy the shade/blind due to too much wind! =4: MOVE LAST POSITION: Nothing happens in case of a wind alarm

WIND END MODE defines what happens, if the wind alarm goes away. You can choose between:

=0: DEACTIVATED: Nothing happens, the shade/blind stays in the current position

=1: MOVE TO 0%: Move the shade/blind completely up to position 0% (Fully opened)

=2: MOVE TO 100%: Move the shade/blind completely down to position 100% (Fully closed). In this case the slats are also closed.

=3: MOVE TO WIND POSITION+WIND SLAT POSITION: You can define an individual position for every engine outlet in the two registers WIND POSITION between 0% and 100% and WIND SLAT POSITION between 0% and 100%. This should be a save position, where you cannot destroy the shade/blind due to too much wind!

=4: MOVE LAST POSITION: Move to the last position before the wind alarm arises. This position is automatically stored by the IO module in case of an wind alarm.

BILIND & SHUTTER GROUP: RAIN	ALARM CON	FIGURATION				
RAIN START MODE	3x01105 4x01105 I:1104	3,0x0003 B:00 03		N/A:NO CHANGE	UINT16 R/W	NO
		MOVE TO POSITION		SELECT FROM LIST		
Configured start mode for the rain alarm funct = 0: DEACTIVATED: Nothing happens when = 1: MOVE DP: Move to position 0% = 2: MOVE 100%: Move to position 100% = 3: MOVE POS: Move to position RAIN POSI = 4: MOVE LAST POS. Do nothing	tion: rain alarm rises ITION, RAIN SLA	AT POSITION				
RAIN END MODE	3x01106 4x01106 I:1105	4,0x0004 B:00 04		N/A:NO CHANGE	UINT16 R/W	NO
Configured end mode for the wind alarm func		MOVE TO LAST POSITION		SELECT FROM LIST		
 OEACTIVATED: Nothing happens when = 0. DEACTIVATED: Nothing happens when = 1: MOVE 0P: Move to position 0% = 2: MOVE 100%: Move to position 100% = 3: MOVE POS: Move to position RAIN POSI = 4: MOVE LAST POS: Move to last position b = 4: MOVE LAST POS: Move to last position b 						10
RAIN POSITION	3x01107 4x01107 I:1106	0,0×0000 B:00 00	0		UINT16 R/W	NO
		00,00%		VALUE IN XX,XX%		
Vertical position for this blind / shutter in perce 0%:complete open (upper position) 100%:complete closed (lower position)	nt for rain alarm	mode MOVE POS				
RAIN SLAT POSITION	3x01108 4x01108 I:1107	0,0x0000 B:00 00	0		UINT16 R/W	NO
		00,00%		VALUE IN XX,XX%		
Vertical position for the slats of this blind in per 0% in position SLAT ANGLE UP 100% in position SLAT ANGLE DOWN	rcent for rain alar	m mode MOVE POS				

RAIN START MODE defines what happens, if the rain alarm arises. You can choose between:

=0: DEACTIVATED: Nothing happens in case of a rain alarm

=1: MOVE TO 0%: Move the shade/blind completely up to position 0% (Fully opened)

=2: MOVE TO 100%: Move the shade/blind completely down to position 100% (Fully closed). In this case the slats are also closed.

=3: MOVE TO RAIN POSITION+RAIN SLAT POSITION: You can define an individual position for every engine outlet in the two registers RAIN POSITION between 0% and 100% and RAIN SLAT POSITION between 0% and 100%. This should be a save position, where you cannot destroy the shade/blind due to too much rain!

=4: MOVE LAST POSITION: Nothing happens in case of a rain alarm

RAIN END MODE defines what happens, if the rain alarm goes away. You can choose between:

=0: DEACTIVATED: Nothing happens, the shade/blind stays in the current position

=1: MOVE TO 0%: Move the shade/blind completely up to position 0% (Fully opened)

=2: MOVE TO 100%: Move the shade/blind completely down to position 100% (Fully closed). In this case the slats are also closed.

=3: MOVE TO RAIN POSITION+RAIN SLAT POSITION: You can define an individual position for every engine outlet in the two registers RAIN POSITION between 0% and 100% and RAIN SLAT POSITION between 0% and 100%. This should be a save position, where you cannot destroy the shade/blind due to too much rain!

=4: MOVE LAST POSITION: Move to the last position before the rain alarm arises. This position is automatically stored by the IO module in case of a rain alarm.

A word to the priority:

Priority 0: NORMAL OPERATION: User can use the digital and MODBUS inputs or send commands to the outlet, as long as the control is not locked by special commands.

Priority 1: RAIN ALARM: A occurring rain alarm will lock the NORMAL OPERATION and move the shades/blinds to the position defined by the RAIN ALARM configuration. If the rain alarm vanishes the shades/blinds are moved to the end positions defined in the rain alarm configuration. After that NORMAL OPERATION is active again. But, this priority can be interrupted by a WIND ALARM!

Priority 2: WIND ALARM: A occurring wind alarm will lock the NORMAL OPERATION or interrupt an active RAIN ALARM and move the shades/blinds to the position defined by the WIND ALARM configuration. If the wind alarm vanishes the shades/blinds are moved to the end positions defined in the wind alarm configuration. If the rain alarm is still active, the positions of rain alarm are restored. In case of no rain alarm, NORMAL OPERATION is active again.



Status of all digital inputs or MODBUS digital inputs 20.2.6

The IO module offers a lot of MODBUS status registers for getting the current state of the digital inputs and the simulated MODBUS digital inputs.

You can request the current status for all digital inputs with the registers:

DIGITAL INPUTS: CURRENT STATUS OF ALL DIGITAL INPUTS DI1DI20								
STATUS DI1-DI16	3x10002	0,0x0000			UINT 16			
	4x10002	B:00 00			R/O			
	I:10001							
		0000.0000.0000.0000						
Returns the current state of digital inputs DI1 to Each bit stands for a digital input:	5 DI16.							
Bit 0: IN1 DI1 (=0:DI is OFF, =1:DI is ON)								
Bit 1: IN1 DI2 (=0:DI is OFF, =1:DI is ON)								
Bit 2: IN2 DI3 (=0:DI is OFF, =1:DI is ON)								
Bit 3: IN2 4 DI4 (=0:DI is OFF, =1:DI is ON)								
Bit 4: IN3 🕇 DI5 (=0:DI is OFF, =1:DI is ON)								
Bit 5: IN3 4 DI6 (=0:DI is OFF, =1:DI is ON)								
Bit 6: IN4 1 DI7 (=0:DI is OFF, =1:DI is ON)								
Bit 7: IN4 4 DI8 (=0:DI is OFF, =1:DI is ON)								
Bit 8: IN5 🕇 DI9 (=0:DI is OFF, =1:DI is ON)								
Bit 9: IN5 4 DI10 (=0:DI is OFF, =1:DI is ON)								
Bit 10: IN6 1 DI11 (=0:DI is OFF, =1:DI is ON								
Bit 11: IN6 4 DI12 (=0:DI is OFF, =1:DI is ON								
Bit 12: IN7 1 DI13 (=0:DI is OFF, =1:DI is ON								
Bit 13: IN7 4 DI14 (=0:DI is OFF, =1:DI is ON								
Bit 14: IN8 1 DI15 (=0:DI is OFF, =1:DI is ON								
Bit 15: IN8 DI16 (=0:DI is OFF, =1:DI is ON	3x10003	0.0.0000						
STATUS DI17-DI20	4x10003	0,0x0000 B:00.00			UINT16 R/O			
	1:10002	B:00 00			R/O			
		0000.0000.0000.0000						
Returns the current state of digital inputs DI17	to DI20. Each bit	t stands for a digital input:		1				
Returns the current state of digital inputs DI17 Bit 0: INPUTS IN1 DI17 (=0:DI is OFF, =1:DI is Bit 1: INPUTS IN2 DI18 (=0:DI is OFF, =1:DI is Bit 2: INPUTS IN3 DI19 (=0:DI is OFF, =1:DI is	s ON)							
Bit 1: INPUTS IN2 DI18 (=0:DI is OFF, =1:DI is	SON)							
Bit 3: INPUTS IN3 D119 (=0.D1 is OFF, =1.D1 is	SON							
Bits 4-15: 0	,							

Also the IO module forms some counter registers for every digital input to count special events like short and long key press or rising and falling edges.

DIGITAL INPUTS: STATUS FOR D	IGITAL INPUT	DI1		
RISE DI1	3x20001 4x20001 I:20000	0,0×0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 1 DI1:Counter for rising edges on digi				
FALL DI1	3x20002 4x20002 I:20001	0,0×0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 1 DI1:Counter for falling edges on dig				
CHANGE DI1	3x20003 4x20003 1:20002	0,0×0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 DI1:Counter for status changes for	digital input DIx			
SHORT KEYPRESS DI1	3x20004 4x20004 1:20003	0,0x0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 1 DI1:Counter for short keypress ever		lx		
LONG KEYPRESS START DI1	3x20005 4x20005 I:20004	0,0×0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 DI1:Counter for long keypress start				
LONG KEYPRESS END DI1	3x20006 4x20006 I:20005	0,0x0000 B:00 00	UINT 16 R/O	
		0 event(s)		
IN1 🕇 DI1:Counter for long keypress end e	events for digital inp	ut DIx		



The same registers are calculated for the MODBUS INPUT REGISTER MBDIx:

DIGITAL INPUTS: STATUS FOR MO	DBUS DIGIT.	AL INPUT DI1		
RISE MBDI1	3x20201 4x20201 I:20200	0,0x0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for rising edges on MODBUS digital in	put Dix			
FALL MBDI1	3x20202 4x20202 I:20201	0,0x0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for falling edges on MODBUS digital i			 	
CHANGE MBDI1	3x20203 4x20203 I:20202	0,0x0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for status changes for MODBUS digit				
SHORT KEYPRESS MBDI1	3x20204 4x20204 I:20203	0,0×0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for short keypress events for MODBU		x		
LONG KEYPRESS START MBDI1	3x20205 4x20205 I:20204	0,0x0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for long keypress start events for MO		ut Dix		
LONG KEYPRESS END MBDI1	3x20206 4x20206 I:20205	0,0×0000 B:00 00	UINT16 R/O	
		0 event(s)		
Counter for long keypress end events for MOD	BUS digital inpu	t Dix		

Also the usage of the digital inputs can be activated or deactivated with this register. This is useful for general time programs, which should enable/disable the use of local push buttons to control the shades/blinds.

LUCK:DIGITAL INPUTS					
LOCK DIGITAL INPUTS	3x30001	0.0x0000	N/A:NO CHANGE	UINT 16	NO
	4x30001	B:00 00		R/W	
	1:30000				
		NO	SELECT FROM LIST		
Are the physical digital inputs locked for shotter	/blind control ?				
Are the physical digital inputs locked for shotter =0:NO =1:YES					
=1:YES					

The same lock mechanism is available for the MODBUS DIGITAL INPUTS:

LOCK:MODBUS INPUTS								
LOCK MODBUS INPUTS	3x30002 4x30002 I:30001	0,0x0000 B:00 00		1:YES	UINT16 R/W	YES		
		NO		SELECT FROM LIST				
Are the MODBUS inputs locked for shotter/blind control ?								

20.2.7 MODBUS control and status of shade/blind outlets

Beside the possibility to control the engine outlet with push buttons on digital inputs or with virtual push buttons in the MODBUS DIGITAL INPUT MBDIx registers, you can control amnd monitor every outlet with the following registers:

BILIND & SHUTTER GROUP: Outputs DO1+DO2: CONTROL							
COMMAND	3x00101 4x00101 I:100	0,0x0000 B:00 00		400:DO REFERENCE MOVE	UINT16 R/W	YES	
		ONE		SELECT FROM LIST			
Now/post command for this bli	nd / chuttor						

This is the general command register. For some commands a shade/blind destination positon is used. Or in addition a destination slat position is required. So set up these registers first, before you write your command to the COMMAND register:

NEXT MOVE POSITION	3x00105 4x00105 I:104	0,0x0000 B:00 00	0		UINT16 R/W	NO
		00,00%		VALUE IN XX,XX%		
Next vertical position for this blind / shutter in percent 0%.complete open (upper position) 100%.complete closed (lower position)						
NEXT SLAT POSITION	3x00106 4x00106 I:105	0,0x0000 B:00 00	0		UINT16 R/W	NO
		00,00%	•	VALUE IN XX,XX%		
Next vertical position for the slats of this blind in 0% in position SLAT ANGLE UP 100% in position SLAT ANGLE DOWN	percent					

The following commands are available: 0:NONE 100:MOVE TO 0% 101:MOVE TO 10% 102:MOVE TO 20% 103:MOVE TO 30% 104:MOVE TO 40% 105:MOVE TO 50% 106:MOVE TO 60% 107:MOVE TO 70% 108:MOVE TO 80% 109:MOVE TO 90% 110:MOVE TO 100% 120:MOVE TO POSITION **130:MOVE TO POSITION IN STEPS** 131:MOVE STEP UP 132:MOVE STEP DOWN 200:MOVE TO SLAT 0% 201:MOVE TO SLAT 10% 202:MOVE TO SLAT 20% 203:MOVE TO SLAT 30% 204:MOVE TO SLAT 40% 205:MOVE TO SLAT 50% 206:MOVE TO SLAT 60% 207: MOVE TO SLAT 70% 208:MOVE TO SLAT 80% 209:MOVE TO SLAT 90% 210:MOVE TO SLAT 100% 220:MOVE TO SLAT POSITION 230:MOVE TO SLAT POSITION IN STEPS 231:MOVE SLAT STEP UP 232: MOVE SLAT STEP DOWN 300:POSITION 301: POSITION OVER ZERO 400:DO REFERENCE MOVE 999:ABORT 10000: INHIBIT MANUAL OPERATION 10001:ALLOW MANUAL OPERATION 10002: INHIBIT BUS OPERATION 10003: ALLOW BUS OPERATION 10004:DO MASTER UP 10005:DO MASTER DOWN 10006:DO MASTER INHIBIT ON 10007:DO MASTER INHIBIT OFF 10008:DO MASTER WIND ON 10009:DO MASTER WIND OFF 10010:DO MASTER RAIN ON 10011:DO MASTER RAIN OFF

If you want to abort a current running command, use this register:

ABORT	3x00109 4x00109 I:108	0,0x0000 B:00 00	0	UINT16 R/O	
Abort request for current movement =0:NO =1:YES		NO			



To monitor the current position of the shade/blind and to visualize the current position of the slats, read-out these registers:

CURRENT MOVE POSITION	3x00103 4x00103 I:102	0,0x0000 B:00 00			UINT 16 R/O		
		00,00%					
Current vertical position for this blind / shutter in percent 9%:complete open (upper position) OD%:complete closed (lower position)							
CURRENT SLAT POSITION	3x00104 4x00104 I:103	0,0x0000 B:00 00			UINT 16 R/O		
		00,00%					
Current position for the slat in percent Poixin position SLAT ANGLE UP 100% in position SLAT ANGLE DOWN							

To monitor the real digital outputs, read-out this register with the current state of the relays. This state affects also the invert state for the relay group:

REAL DOS	3x00108	0,0x0000	0		UINT16	
	4x00108	B:00 00			R/O	
	I:107					
		DO1=0 DO2=0				
Real state of the two digital outputs for the shutter/blind after possible inversion: Bit 0:DO1 (UP) Bit 1:DO2 (DOWN)						

If the MODE is set to TWO DOS, use this register to set the two relays to a specific state:

=0: Both relays are OFF

=1: DO1 is ON and DO2 is OFF =2: DO1 is OFF and DO2 is ON =3: DO1 is ON and DO2 is ON

-5. DOT IS ON and DO						
DOS	3x00107 4x00107 I:106	0,0x0000 B:00 00	0		UINT16 R/W	NO
		DO1=0 DO2=0		BIT 0:DO1 (UP), BIT 1:DO2 (DOWN)		
State of the two digital outputs for the shutter/ Bit 0:DO1 (UP) Bit 1:DO2 (DOWN)	blind:					

There are some information registers to read for further infos:

ERROR	3x00110 4x00110 I:109	0,0x0000 B:00 00	0	UINT16 R/O	
		Error:0			
Current error code					

This is the current error code of the engine outlet. Only if this value is 0, the outlet will work. In any other case, no movement is done on the outlet.

IS REFERENCED	3x00111 4x00111 I:110	0,0x0000 B:00 00	0		UINT16 R/O	
		NO				
Is the shutter/blind currently referenced =0:NO =1:YES						

After a restart of the module the current position of the shade/blind and the slats are unknown. So every trigger of a movement down will trigger automatically a reference movement. or you start with the COMMAND DO REFERENCE.

The reference movement is a moving upwards for the defined time plus 20% reserve to securely reach always the upper position of the shade/blind.

The current state of the wind and rain alarm can be requested with the registers:

WIND ALARM STATE	3x00112 4x00112 I:111	0,0x0000 B:00 00	0	UINT16 R/O	
		NO			
Is wind alarm currently activated =0:NO =1:YES					-
RAIN ALARM STATE	3x00113 4x00113 I:112	0,0x0000 B:00 00	0	UINT16 R/O	
		NO			
Is rain alarm currently activated =0:NO =1:YES					



In the status register you will see the current activity of the engine outlet.

STATUS	3x00102 4x00102 I:101	0,0x0000 B:00 00	-		UINT 16 R/O	
		NO ACTION				
Current status for this blind / shutter						

The following status codes are used: 0:NO ACTION 1:MOVING DOWN 2:MOVING UP 3:REFERENCING, 4:MOVING DOWN IN STEPS 5:MOVING UP IN STEPS 6:MOVING SLATS DOWN 7:MOVING SLATS UP 8:WAITING 98:PARAM ERROR 99:ERROR



20.3 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption			
RESI-20RI8SB-SIO	<2.6W		
RESI-8SB-SIO	<2.6W		
RESI-10RI4SB-SIO	<1.3W		
RESI-4SB-SIO	<1.3W		
Product housing			
RESI-20RI8SB-SIO, RESI-8SB-SIO	BIG IO XT12		
RESI-10RI4SB-SIO, RESI-4SB-SIO	BIG IO XT8		
Product weight			
RESI-20RI8SB-SIO	480g		
RESI-8SB-SIO	458g		
RESI-10RI84B-SIO	323g		
RESI-4SB-SIO	310g		
Digital inputs			
only RESI-20RI8SB-SIO and RESI-10RI4	SB-SIO		
Total amount of inputs	RESI-20RI8SB-SIO: 20	RESI-8SB-SIO: 0	
	RESI-10RI4SB-SIO: 10	RESI-4SB-SIO: 0	
Sampling rate	Every 5ms		
DC rating			
Input voltage range	12-250V~= +/-10%		
Input current	per channel		
	approx. 0.7mA@12V=		
	approx. 0.7mA@24V=		
	approx. 0.7mA@32V=		
	approx. 0.7mA@48V=		
	approx. 0.7mA@250V=		
Input power consumption	max. 0.2W/channel		
Logic levels	0: <4.5V=		
	1: >7.5V=		
AC rating			
Input voltage range	12-250V= +/-10%		
Input current	per channel		
	approx. 0.7mA@12V~		
	approx. 0.7mA@24V~		
	approx. 0.7mA@48V~		
	approx. 0.7mA@110V~		
	approx. 0.7mA@230V~		
	approx. 0.7mA@250V~		
Input power consumption	max. 0.2W/channel		
Logic levels	0: <4.5V~		
	1: >7.5V~		
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Cable connection	
RESI-20RI8SB-SIO	Via 2-pin plug-in terminal block for common signal
	and two 8-pin plug in terminal blocks for DI1DI16
	and one 4-pin plug in terminal block for DI17-DI20
RESI-10RI4SB-SIO	Via 2-pin plug-in terminal block for common signal
	and one 8-pin plug in terminal blocks for DI1DI8
	and one 2-pin plug in terminal block for DI9-DI10
Terminal type	RM3.5
Galvanic insulation	Yes, all digital inputs as group to IO module
Relay outputs	
Number of outputs	
RESI-20RI8SB-SIO, RESI-8SB-SIO	16 mono stable relays
RESI-10RI4SB-SIO, RESI-4SB-SIO	8 mono stable relays
	organized as group with common power supply
Relay type	Mono stable
Maximum voltage	250Vac
Maximum current	6A
Mechanical lifetime	10 ⁶ cycles of operation
Contact material	AgSnO ₂
Max. switching power AC1	1500VA
Max. switching power AC15 (230V~)	300VA
Max. switching power AC3	185W
Max. switching power DC1	6A@30V=
	0.2A@110V=
	0.12A@220V=
Insulation	Creepage and clearance distance 8mm
Cable connection	Power supply: via one 2-pin plug in terminia block
RESI-20RI8SB-SIO, RESI-8SB-SIO	shade/blind outlet: via eight 3-pin plug-in terminal blocks
RESI-10RI4SB-SIO, RESI-4SB-SIO	shade/blind outlet: via four 3-pin plug-in terminal blocks
Terminal type	RM3.5
Galvanic insulation	Yes, with the relay
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255



20.4 Additional terminals & LED states

DIGITAL INPUTS RESI-20RI8SB-SIO	20 digital inputs for 12-2	250\/ac/dc signals
	C:	GND or neutral connector
	DI1-DI20:	Digital inputs
	511 5120.	0=open or GND,
		1=12Vac/dc250Vac/dc
	One 2-pin plug-in termir	nal block for common ground or neutral
	Terminal type: RM3.5	
	Pin1:C:	M-,N: Ground/neutral for all digital inputs
	Pin 2:C:	M-,N: Ground/neutral for all digital inputs
	One 8 pin plug-in termir	nal block for digital inputs DI1DI8
	Terminal type: RM3.5	<u> </u>
	Pin 1:DI1:IN 1: ▲	First digital input for shade/blind group #1-up
	Pin 2:DI2:IN 1:♥	Second digital input for shade/blind group #1-down
	Pin 3:DI3:IN 2:▲	First digital input for shade/blind group #2-up
	Pin 4:DI4:IN 2:★	Second digital input for shade/blind group #2-down
	Pin 5:DI5:IN 3: ▲	First digital input for shade/blind group #3-up
	Pin 6:DI6:IN 3:★	Second digital input for shade/blind group #3-down
	Pin 7:DI7:IN 4: ♠	First digital input for shade/blind group #4-up
	Pin 8:DI8:IN 4:★	Second digital input for shade/blind group #4-down
	One 8 pin plug-in termir	nal block for digital inputs DI9DI16
	Terminal type: RM3.5	
	Pin 1:DI9:IN 5: ▲	First digital input for shade/blind group #5-up
	Pin 2:DI10:IN 5:★	Second digital input for shade/blind group #5-down
	Pin 3:DI11:IN 6: ♦	First digital input for shade/blind group #6-up
	Pin 4:DI12:IN 6:★	Second digital input for shade/blind group #6-down
	Pin 5:DI13:IN 7: ♠	First digital input for shade/blind group #7-up
	Pin 6:DI14:IN 7: ◆	Second digital input for shade/blind group #7-down
	Pin 7:DI15:IN 8: ▲	First digital input for shade/blind group #8-up
	Pin 8:DI16:IN 8:★	Second digital input for shade/blind group #8-down
	One 4 pin plug-in termir	nal block for digital inputs DI17DI20
	Terminal type: RM3.5	
	Pin 1:DI17:INPUTS:I1	First digital input for wind/rain alarm or group functions
	Pin 2:DI18:INPUTS:I2	Second digital input for wind/rain alarm or group functions
	Pin 3:DI19:INPUTS:I3	Third digital input for wind/rain alarm or group functions
	Pin 4:DI20:INPUTS:I4	Fourth digital input for wind/rain alarm or group functions



DIGITAL INPUTS RESI-10RI4SB-SIO 10 digital inputs for 12-250Vac/dc signals C: GND or neutral connector DI1-DI10: **Digital inputs** 0=open or GND, 1=12Vac/dc..250Vac/dc One 2-pin plug-in terminal block for common ground or neutral Terminal type: RM3.5 Pin1:C: M-,N: Ground/neutral for all digital inputs Pin 2:C: M-,N: Ground/neutral for all digital inputs One 8 pin plug-in terminal block for digital inputs DI1..DI8 Terminal type: RM3.5 Pin 1:DI1:IN 1:▲ First digital input for shade/blind group #1-up Pin 2:DI2:IN 1:♥ Second digital input for shade/blind group #1-down Pin 3:DI3:IN 2:▲ First digital input for shade/blind group #2-up Second digital input for shade/blind group #2-down Pin 4:DI4:IN 2:★ First digital input for shade/blind group #3-up Pin 5:DI5:IN 3:▲ Pin 6:DI6:IN 3:♥ Second digital input for shade/blind group #3-down Pin 7:DI7:IN 4:▲ First digital input for shade/blind group #4-up Pin 8:DI8:IN 4:★ Second digital input for shade/blind group #4-down One 2 pin plug-in terminal block for digital inputs DI17..DI20 Terminal type: RM3.5 Pin 1:DI17:INPUTS:I1 First digital input for wind/rain alarm or group functions Pin 2:DI18:INPUTS:I2 Second digital input for wind/rain alarm or group functions



RELAY OUTPUTS

RESI-20RI8SB-SIO,	RESI-8SB-SIO

	rminal blocks for power supply of all 8 shade/blind outlets
Terminal type:	RM5
Pin 1:PWR:L	L+/L: DC or AC power supply 12-250Vac or 12-30Vdc
Pin 2: PWR:N	M-/N: DC or AC power supply AC neutral or DC ground
Eight 3 pin plug-in t	erminal blocks for shade/blind outlets (x=18)
Terminal type:	RM3.5
Pin 1:OUTx: ♠	Switched relay output for shade/blind moving up
 Pin 2:N	M-/N: AC neutral or DC ground from power supply

RELAY OUTPUTS RESI-10RI4SB-SIO, RESI-4SB-SIO

One 2 pin plug-in te	rminal blocks for power supply of all 8 shade/blind outlets
Terminal type:	RM5
Pin 1:PWR:L	L+/L: DC or AC power supply 12-250Vac or 12-30Vdc
Pin 2: PWR:N	M-/N: DC or AC power supply AC neutral or DC ground
 Four 3 pin plug-in te	erminal blocks for shade/blind outlets (x=1.4)
Four 3 pin plug-in te Terminal type:	erminal blocks for shade/blind outlets (x=14) RM3.5
 Terminal type:	RM3.5



20.5 Connection diagram

20.5.1 Cabling of the digital inputs

Only for RESI-20RI8SB-SIO and RESI-10RI4SB-SIO: In the below drawing you see the cabling of the digital inputs of the module. You can use the digital inputs either for DC signals or for AC signals.

DC power supply L+/M- in the range of 12-48V=.

AC power supply L/N in the range from 12-250V~.

Internal digital 50/60Hz AC software filter for all digital inputs.

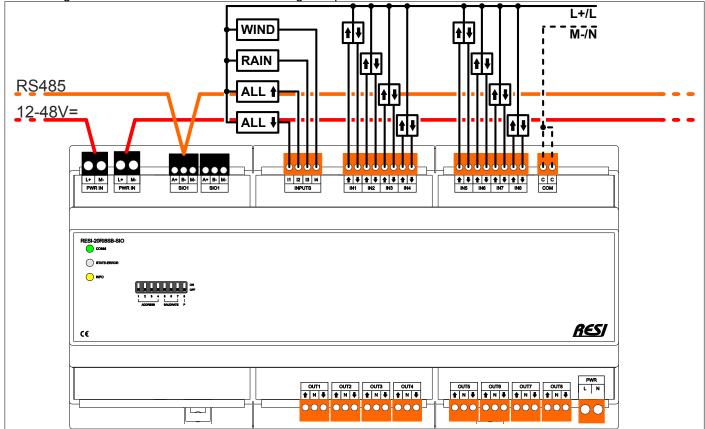


Figure: Connecting the digital inputs to the RESI-20RI8SB-SIO IO module

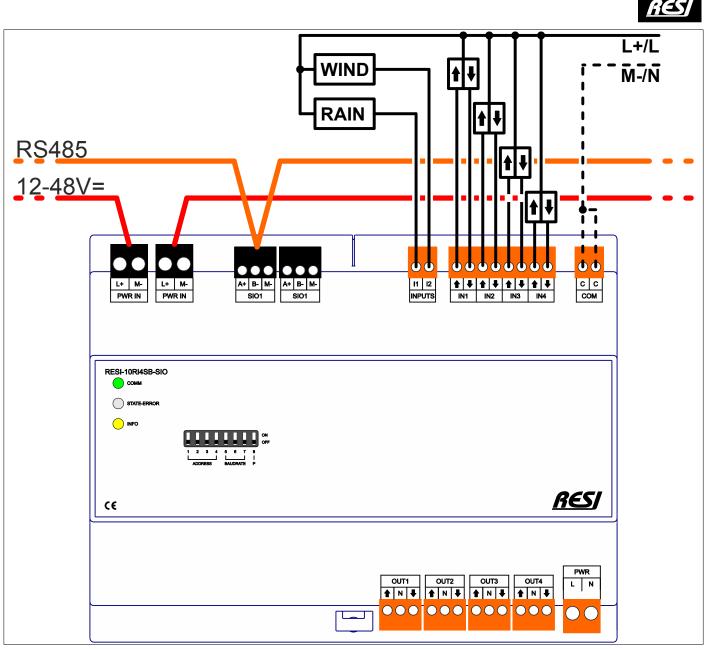
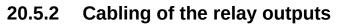
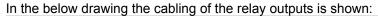


Figure: Connecting the digital inputs to the RESI-10RI4SB-SIO IO module





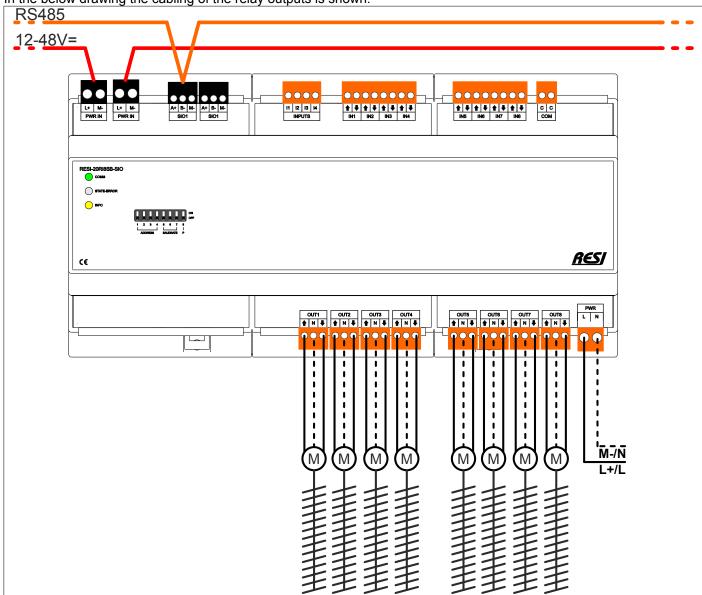


Figure: Connecting the shades/blinds to a RESI-20RI8SB-SIO module



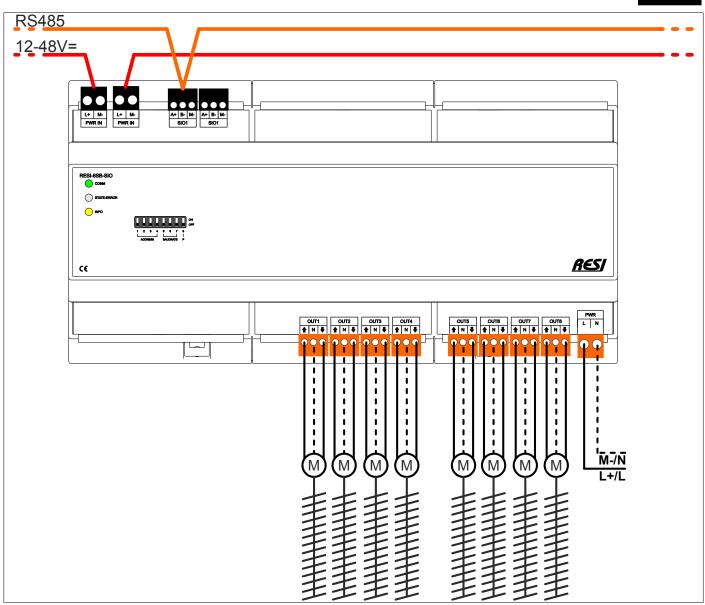


Figure: Connecting the shades/blinds to a RESI-8SB-SIO module

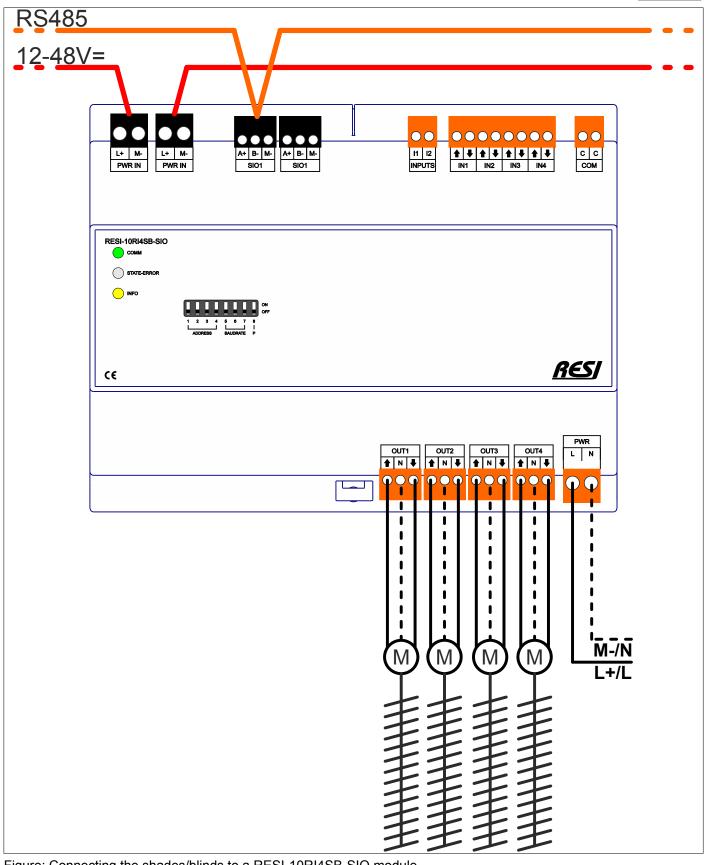


Figure: Connecting the shades/blinds to a RESI-10RI4SB-SIO module

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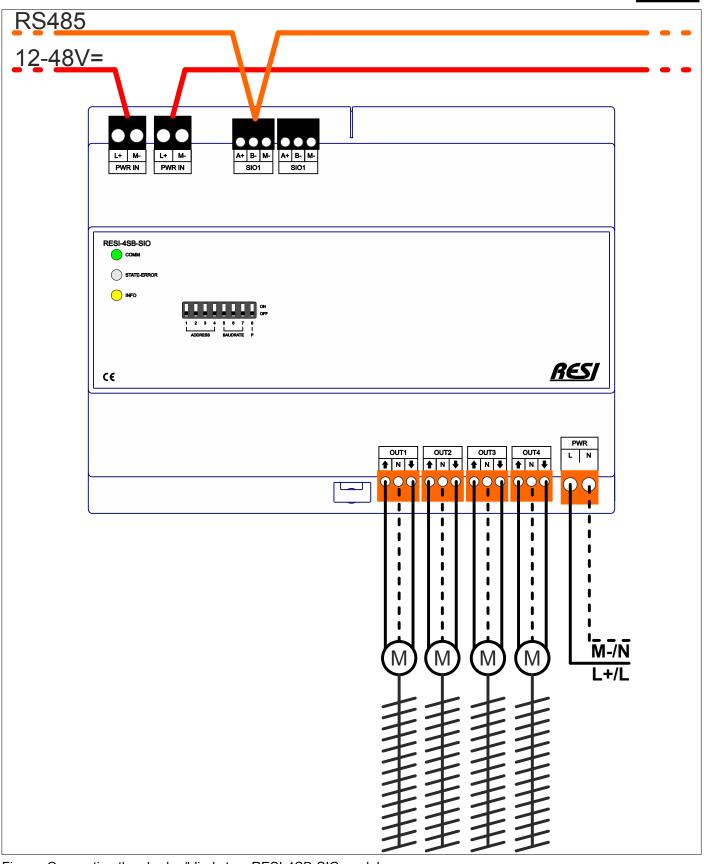


Figure: Connecting the shades/blinds to a RESI-4SB-SIO module



20.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-20RI8SB,8SB,10RI4SB,4SB-SIO-MODBUS+ASCII-ENxx.pdf

20.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-20RI8SB,8SB,10RI4SB,4SB-SIO-MODBUS+ASCII-ENxx.pdf



20.8 RESI configuration & test software

RESI offers a simple configuration & test software based on Windows. Simple unzip the contents into a folder and start in this folder the application RESI_SCADA_2D.exe.

After a few seconds you will see the following screen:





Now click onto System Configuration to setup your serial connection:

System Configuration	, v				
System Configu	ration				1 t
COM4	57600Bd	8,N,1	UnitID:1	ок	
Serial Interface	Baudrate	Parameter	UnitID	Communication	
HW:1000 SW:0022					
SW:0022 RESI-4SB-SIO					
Current module	(2) 2				RESI
	(C) Copyright 2004	F-2022 by RESI Informatik & Auton	nation Gmithe & Di Heinz-Christian	SIGL,MSc. All rights reserved. www.RE	51.00

Adjust the serial interface to your RS485 connection COMx and setup the communication parameters according your DIP switch settings on your IO module. Don#t forget to define the correct UnitID (Bus Number) for the communication. If everything is ok, you will see the green OK filed and in the left corner the actual connected IO module. Go back to the main screen. Now you have more options:

RESI-xRIySB-SIO, RES	I-ySB-SIO CONFIG-TOO	L Software V1.00			
RESI-xRIyS	B-SIO,RESI-y	SB-SIO CON	FIG-TOOL S	oftware V1.00	☆ t_
Shutter/Blind Group #1	Shutter/Blind Group #2	Shutter/Blind Group #3	Shutter/Blind Group #4		
Citodp #1	01000 #2	01000 #0	01000		
Digital Inputs	MODBUS Digital				
and Outputs	Inputs				
Config Shutter/Blind	Config Shutter/Blind	Config Shutter/Blind	Config Shutter/Blind		
Group #1	Group #2	Group #3	Group #4		
Config Inputs	Config Inputs	Config Inputs	Config Inputs		
Shutter/Blind Group #1	Shutter/Blind Group #2	Shutter/Blind Group #3	Shutter/Blind Group #4		
Config	Config	Config	Config		
Alarms Shutter/Blind Group #1	Alarms Shutter/Blind Group #2	Alarms Shutter/Blind Group #3	Alarms Shutter/Blind Group #4		
Gloup #1	0100p #2	Өнөөр жо	0100p #4		
					System
					Configration
HW:1000 SW:0022					
RESI-4SB-SIO Current module					RESI
Carren moune		C) Copyright 2008-2022 b	oy RESI Informatik & Autor	nation GmbH & DI Heinz-Christian SIGL, MSc. All rights reserved, www.RESI.cc	



Now click onto Config Shutter/Blind Group #1, you will see the following screen:

Configure Shutter/Blind Group						
Configure Shutt	er/Blind Group				1 L	
	OK Communication					
BLIND 0x0003,3	NORMAL 0x0000.0	42s 0x002A,42	5,00% 0x01F4,500	42s 0x002A,42	5,00% 0x01F4,500	
MODE 4x01001	REVERT 4×01002	TIME UP 4x01003	TIME EXTEND UP 4×01004	TIME DOWN 4x01005	TIME EXTEND DOWN 4x01006	
500ms 0x01F4,500	200ms 0x00C8,200	200ms 0x00C8,200	5,00% 0×01F4,500	5000ms 0x1368,5000		
PAUSE UP DOWN 4x01007	MOTOR DELAY ON 4x01008	MOTOR DELAY OFF 4x01009	STEP PERCENT 4x01010	STEP TIME PAUSE 4x01011		
1100ms 0x044C,1100	200ms 0×00C8,200	2500ms 0x09C4,2500	90° 0×005A,90	90° 0×005A,90	180° 0×0084,180	
SLAT TOTAL TIME 4x01012	SLAT STEP TIME 4x01013	SLAT PAUSE TIME 4x01014	SLAT ANGLE UP 4x01015	SLAT ANGLE HORIZONTAL 4x01016	SLAT ANGLE DOWN 4x01017	
100ms 0x0064,100	10ms 0x000A,10	500ms 0x01F4,500	200ms 0x00C8,200			
SLAT DEAD TIME UP 4×01018	SLAT DEAD TIME DOWN 4x01019	SLAT DELAY UP 4x01020	SLAT DELAY DOWN 4x01021			
0:NO RESET 0x0000,0						
SOFTWARE RESET 4x06001						
HW:1000 SW:0022						
RESI-4SB-SIO Current module	(C) Copyright 2004	8-2022 by RESI Informatik & Autom	iation GmbH & DI Heinz-Christian :	SIGL,MSc. All rights reserved, www	NRESIG	

Here you see all actual configured values for the first engine outlet OUT1. Simply click onto the fields to change the current settings to your desired values. Please consult the previous chapter for more detailed information about the contents of the individual registers. Don't forget to restart your module after you have changed the settings. use SOFTWARE RESET for this or a power off and on cycle. Execute this setup and configuration for the other groups as well!

Then go back to the main menu and select Config Inputs Shutter/Blind Group #1. You will see the following picture:

Configure Inputs Shutter/E					
	OK Communication				
1:UP DOWN 1 0x0001,1	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0
DIGITAL INPUT GROUP1 4x01041	DIGITAL INPUT GROUP2 4xD1042	DIGITAL INPUT GROUP3 4x01D43	DIGITAL INPUT GROUP4 4x01044	DIGITAL INPUT GROUPS 4×01045	DIGITAL INPUT GROUP6 4x01046
0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	4:WIND+RAIN 0x0004,4	0:DEACTIVATED 0x0000,0		
DIGITAL INPUT GROUP7 4x01047	DIGITAL INPUT GROUP8 4x01048	DIGITAL INPUT GROUP9 4x01049	DIGITAL INPUT GROUP10 4x01050		
1:UP DOWN 1 0x0001,1	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0
MODBUS INPUT GROUP1 4x01051	MODBUS INPUT GROUP2 4x01052	MODBUS INPUT GROUP3 4×01053	MODBUS INPUT GROUP4 4x01054	MODBUS INPUT GROUP5 4×01055	MODBUS INPUT GROUP6 4x01056
D:DEACTIVATED 0x0000,0	0:DEACTIVATED 0x0000,0	4:WIND+RAIN 0x0004,4	0:DEACTIVATED 0x0000,0		
MODBUS INPUT GROUP7 4x01057	MODBUS INPUT GROUP8 4×01058	MODBUS INPUT GROUP9 4×01059	MODEUS INPUT GROUP10 4x01060		
HW:1000 SW:0022 RESI-4SB-SI0					RESI
Current module	(C) Copyright 200	8-2022 by RESI Informatik & Autor	nation GmbH & DI Heinz-Christian	SIGL,MSc. All rights reserved, ww	W.RESLCC



Here you define which digital inputs will trigger a movement on the selected engine outlet. Also you can define which digital inputs will trigger a wind and rain alarm.

In the same setup window you can define which of the defined MODBUS digital inputs will trigger a movement of the shade/blind outlet.

HINT: If you configure for more than one engine outlet the same DIGITAL INPUT GROUPs all the defined engines will start their movement at the same time.

If you configure for more than one engine outlet the same MODBUS INPUT GROUPs all the defined engines will start their movement at the same time.

After that setup, go back to main menu and click on Config Alarms Shutter/Blind Group #1:

📸 Configure Alarms Shutter/B	lind Group				- 0 2
Configure Alarm	ns Shutter/Blind G	Group			1
	Cum	Shutter/Blind Group #1 ent ALARMS CONFIGURATION Gro	що		OK Communication
3:MOVE TO POSITION 0x0003,3	4:MOVE TO LAST POSITION 0x0004,4	0,00% 0×0000,0	0,00% 0×0000,0		
WIND START MODE 4x01101	WIND END MODE 4x01102	WIND POSITION 4x01103	WIND SLAT POSITION 4x01104		
3:MOVE TO POSITION 0x0003,3	4:MOVE TO LAST POSITION 0x0004,4	0,00% 0x0000,0	0,00% 0x0000,0		
RAIN START MODE 4x01105	RAIN END MODE 4x01105	RAIN POSITION 4x01107	RAIN SLAT POSITION 4×01108		
HW:1000 SW:0022 RESI-4SB-SI0 Current module	(C). Converse 1000	2.000 ku DEDI kitowatik 2. juta	wellen Owlell & Di Linica Obertan	SIGL_MSc. All rights reserved, www.R	<u>RES</u>

Here you define the behaviour in case of a wind or rain alarm. This alarm is either triggered by the selected digital inputs or MODBUS inputs or is triggered by sending a special command to the engine outlet.

Repeat this setup for all groups of your IO module.



After that go back to the main menu to test a certain shutter/blind. In our case we click onto Shutter/Blind Group #1. You will see the following picture:

🞇 Shutter/Blind Group										- 9 %
Shutter/Blind G	roup									
	Shutter/Blind Group #I								OK Communication	
BLIND	NORMAL		Current DO1=0	r Group	DO1=0		0		NO	NO
0x0003,3	0,0000x0		DO2=0 0×0000,0		DO2=0 0x0000,0		0x0000,0			
Mode: 4×01001	Revert 4x0	01002	DOS:4>	×00107	REAL DOS	S:4×00108	Error 4×001		LOCK DIS: 4x30001	LOCK MBDIS: 4x30002
0:NONE 0x0000,0			NO ACTION 0x0000,0				DO ABORT	DO REF- ERENCE	DO POS	DO POS OVER ZERO
Command	±4×00101			Status:4	¥×00102		Command: 4×00101	Command: 4×00101	Command: 4×00101	Command: 4×00101
0,00 % 0×0000,0	0,00 % 0×0000,0			Current I		[%]	NO	NO		
Next Position:4x00105	Current Position	n:4x00103	Top (0%) Position 0,00 % Bettern (100%) ^(K) Is Referenced: 4x00111 Is Abort: 4x00109			Is Abort: 4x00109				
0,00 % 0x0000,0	0,00 % 0×0000,0		Current Slat				0 0×0000,0		0 0x0000,0	
Next Stat Position:4x00106	Current Slat Posit	tion:4x00104	Top (0%)	Position	n 0,00 %	Bottorn (100%)	State: 4×00123		MoveState: 4x00124	
NO 3:MOVE TO 0x0003,3	l l l l l l l l l l l l l l l l l l l	4:MOVE TO L POSITION Dx0004,4	AST	0,00 % 0x0000,0		0,00 % 0x0000,0				
Is Wind Alarm: 4x00121 Wind Start M	lode:4x01101	Wind End Mo	de:4x01102	Wind Positio	on:4x01103	Wind Slat Pos	ition: 4×01104			
NO 3:MOVE TO 0x0003,3	F	4:MOVE TO L POSITION Dx0004,4	AST	0,00 % 0x0000,0		0,00 % 0×0000,0				
Is Rein Alarm 4x00122 Rain Start M	de:4x01106	Rain Positio	Rein Position: 4x01107 Rein Stat Position: 4x01108							
HW:1000 SW:0022 RESI-4SB-SIO Current module	(C)	Copyright 2008	2022 by RESI	Informatik & Autom	nation GmioH & D	I Heinz-Christian :	SIGL,MSc. All righ	ts reserved. www	N.RESILCC	<u>165</u>

In the first row you see the current MODE and REVERT settings for easy check. To test your device, the fields COMMAND, ERROR CODE and STATUS is of interest. Also note that in our case the shutter/blind is not referenced up to now. So we click onto the file COMMAND, scroll down in the list and select the command:

400:DO REFERENCE MOVE and click	UNU UK.
COMMAND	
Select a new command for this shutter/blind group	
Celect a new command for this shatterblind group	
130:MOVE TO POSITION IN STEPS	
131:MOVE STEP UP	
132:MOVE STEP DOWN	
200:MOVE SLATS TO 0%	
201:MOVE SLATS TO 10%	
202:MOVE SLATS TO 20%	
203:MOVE SLATS TO 30%	
204 MOVE SLATS TO 40%	
205:MOVE SLATS TO 50%	
206:MOVE SLATS TO 60%	
207: MOVE SLATS TO 70%	
208:MOVE SLATS TO 80% 209:MOVE SLATS TO 90%	
210:MOVE SLATS TO 100%	
220:MOVE SLATS TO POSITION	
230:MOVE SLATS TO POSITION IN STEPS	
231 MOVE SLATS STEP UP	
232:MOVE SLATS STEP DOWN	
300:MOVE TO POSITION	
301:MOVE TO POSITION OVER ZERO	
Q 400:DO REFERENCE MOVE	
Cancel	

You will see, that the relay for moving upwards will be activated and the status changes to REFERENCING:

Shutter/Blind Group										- • ×	
Shutter/Blind G	roup									î t	
	Shutter/Blind Group #1							Commu	ок		
				t Group							
BLIND 0x0003,3	NORMAL 0x0000,0		DO1=1 (UP) DO2=0 0x0001,1		DO1=1 DO2=0 0x0001,1		0 0x0000,0		NO	NO	
Mode: 4x01001	Revert	4×01002	DOS:4:	<00107	REAL DOS	s:4×00108	Error 4×00		LOCK DIS: 4x30001	LOCK MBDIS: 4x30002	
0:NONE 0x0000,0			REFERENCI 0x0003,3	NG			DO ABORT	DO REF- ERENCE	DO POS DO POS OVER ZERO		
Comman	d:4x00101			Status:/	4×00102		Command: 4×00101	Command: 4×00101	Command: 4×00101	Command: 4x00101	
0,00 % 0×0000,0	0,00 % 0×0000,0		Current Position			[%]	NO Is Referenced	NO Is Abort;			
Next Position:4x00105	Current Posi	tion:4x00103	Top (0%)	Positio	n 0,00 %						
0,00 % 0x0000,0	0,00 % 0x0000,0			Current Sla		Bottorn (100%)	1010 0x03F2,1010		1020 0x03FC,1020		
Next Slat Position:4x00106	Current Slat Po	sition:4x00104	Top (0%)	Position	n 0,00 %	Bottom (100%)	State: 4×00123		MoveState: 4x00124		
NO 3:MOVE TO 0x0003,3	POSITION	4:MOVE TO I POSITION 0x0004,4	LAST	0,00 % 0×0000,0		0,00 % 0×0000,0					
Is Wind Alerm: 4x00121 Wind Start M	Aode: 4x01101	Wind End Mo	de:4x01102	Wind Positi	on:4x01103	Wind Slat Pos	ition: 4×01104				
NO 3:MOVE TO 0x0003,3				0,00 % 0×0000,0		0,00 % 0×0000,0					
Is Rein Alarm 4x00122 Rain Start Mode:4x01105 Rain End Mode			de:4x01106	Rain Positio	or: 4x01107	Rain Slat Posi	tion:4x01108				
HW:1000 SW:0022 RESI-4SB-SIO Current module	HW/1000 SW/0022 RESI4SB-SIO										

Now wait for the end of the reference phase, you now see the following picture. Note that the flag IS REFERENCE is set to YES. Now you can start normal positioning commands.

🞇 Shutter/Blin	🚔 Shutter/Blind Group 📃 🖂								- 0 %		
Shutter	/Blind Gr	oup									<u>í</u> t
	Shutter/Blind Group #1									Commu)K nication
BLIND		NORMAL		DO1=0	t Group	DO1=0		0		NO	NO
0x0003,3		0,0000x0		DO2=0 0x0000.0		DO2=0 0x0000.0		0,0000x0			
Mode:4	×01001	Revert:	4×01002	DOS:4	×00107	REAL DO	S:4x00108	Error 4×00	Code: 110	LOCK DIS: 4x30001	LOCK MBDIS: 4x30002
0:NONE 0x0000,0				NO ACTION 0x0000,0				DO ABORT	DO REF- ERENCE	DO POS	DO POS OVER ZERO
	Command	£4×00101			Status:	4x0D102		Command: 4x00101	Command: 4x00101	Command: 4x00101	Command: 4×00101
0,00 % 0×0000,0		0,00 % 0x0000,0			Current			YES	NO		
Next Positio	on:4x00105	Current Posi	tion: 4×00103	Top (0%) Position 0,00 % Bottom (100%)			Is Referenced: 4x00111	ls Abort 4x00109			
0,00 % 0×0000,0		0,00 % 0x0000,0		Current Slat Position			0 0×0000,0		0 0×0000,0		
Next Slat Posi	tion:4x00106	Current Slat Po	sition: 4×00104	Top (0%)	Top (0%) Position 0,00 % Bottom (100%)			State:4x00123		MoveState:4x00124	
NO Is Wind Alarm:	3:MOVE TO 0x0003,3	POSITION	4:MOVE TO POSITION 0x0004,4	LAST	0,00 % 0x0000,0		0,00 % 0x0000,0				
4×00121	Wind Start M		Wind End Mo		Wind Positi	on:4x01103	Wind Slat Pos	ition:4x01104			
NO	3:MOVE TO 0x0003,3	POSITION	4:MOVE TO POSITION 0x0004,4	LAST	0,00 % 0x0000,0		0,00 % 0,0000,0				
Is Rein Alerm: 4x00122 Rein Start Mode: 4x01105 Rein End Mo				de:4×01106	Rain Positio	or: 4×01107	Rain Slat Pos	tion: 4×01108			
SW:002 RESI-41	HW:1000 SW 0022 RESI-4SB-SIO Current module (C) Copyright 2008-2022 by RESI Informatik & Automation GmbH & DI Henz-Christian SiGL,MSc. All rights reserved, www.RESi.cc										



Again click on the field COMMAND and select the command and press OK:

COMMAND
Select a new command for this shutter/blind group
0:NONE 100:MOVE TO 0% 101:MOVE TO 10% 102:MOVE TO 20% 103:MOVE TO 30% 104:MOVE TO 50% 105:MOVE TO 50% 106:MOVE TO 50% 108:MOVE TO 90% 109:MOVE TO 90% 110:MOVE TO 90% 110:MOVE TO POSITION 130:MOVE TO POSITION IN STEPS 131:MOVE STEP UP 132:MOVE STEP UP 132:MOVE SLATS TO 0% 201:MOVE SLATS TO 10% 202:MOVE SLATS TO 30% 204:MOVE SLATS TO 40%

While the shutter/blind is moving you will notice, that the current position is updated and the status reflects the current movement.

📸 Shutter/Blind										(
Shutter/	Blind Gr	oup									1
				Group	r/Blind #1 t Group					Commu	DK
BLIND 0x0003,3		NORMAL 0x0000,0		DO1=0 DO2=1 (DOV 0x0002.2		DO1=0 DO2=1 0x0002.2		0 0x0000,0		NO	NO
Mode:4×	.01001	Revert:4	x01002	DOS:4	×00107		S:4x00108	Error 4×00	Code: 110	LOCK DIS: 4x30001	LOCK MEDIS: 4×30002
0:NONE 0x0000,0				MOVING DO 0x0001,1	WN			DO ABORT	DO REF- ERENCE	DO POS	DO POS OVER ZERO
	Command	:4x00101			Status:4	k:00102		Command: 4x00101	Command: 4x00101	Command: 4x00101	Command: 4x00101
50,00 % 0x1388,5000		13,91 % 0x056F,1391			Current I			YES	NO		
Next Position	r(4×00105	Current Posit	ion:4x00103	Top (0%) Position 13,91 % Bodom (100%) [%] IS R 4x0			Is Referenced 4x00111	Is Abort 4x00109			
0,00 % 0x0000,0		0,00 % 0x0000,0			Current Sla		Bodom (100% [%]	2010 0x07DA,2010)	2030 0x07EE,2030	D
Next Slat Positi		Current Slat Po		Top (0%)		0,00 %	_	State:4	x00123	MoveStat	e:4x00124
	3:MOVE TO I 0x0003,3	POSITION	4:MOVE TO I POSITION Dx00D4,4	LAST	0,00 % 0x0000,0		0,00 % 0×0000,0				
Is Wind Alarm: 4x00121	Wind Start Mo	ode:4x01101	Wind End Ma	de:4x01102	Wind Positio	m:4x01103	Wind Slat Pos	ition:4x01104			
	3:MOVE TO I 0x0003,3	POSITION	4:MOVE TO I POSITION Dx00D4,4	LAST	0,00 % 0x000x0		0,00 % 0x0000,0				
ls Rain Alarm 4x00122	Is Rain Alvent 4x00122 Rain Start Mode:4x01105 Rain End Mode:4x01105 Rain Foelbox:4x01107 Rain Start Poelbox:4x01108										
SW:002 RESI-4S	HAV: 1000 SV/ 1002 RESI 4SB-Silo curvert insolate (C) Copyright 2008-2022 by RESI Minmalk & Automátor SmbH & DI Heinz-Ortidan SIGUIS: All rights reserved, www.RESI co										



After reaching the end position the slat position is updated also according to the current action.

Shutter/Blind Group	d Gro	oup									- 0 X
				Shutte Group Current							OK unication
BUND 0x0003,3		NORMAL 0x0000,0		DO1=0 DO2=0 0×0000,0	·	DO1=0 DO2=0 Dx0000,0		0 0x0000,0		NO	NO
Mode:4x01001		Revert 4	x01002	DOS:43	×00107	REAL DO	S:4x00108	Error 4x00	Code: 110	LOCK DIS: 4x30001	LOCK MEDIS: 4x30002
0:NONE 0x0000,0				NO ACTION 0x0000,0				DO ABORT	DO REF- ERENCE	DO POS	DO POS OVER ZERO
00	mmand:4:	×00101			Status:4	×00102		Command: 4x00101	Command: 4x00101	Command: 4x00101	Command: 4x00101
50,00 % 0×1388,5000	Ċ	50,00 % 0x1388,5000 Current Post		Top (0%)	Current Position			YES Is Referenced: 4x00111	NO Is Abort: 4x00109		
Next Position 4x0010 0,00 % 0x0000,0 Next Siet Position 4x001	Ċ	Current Slat Po)	Tup (0%)	Position Current Sta Position	it Position	Bottom (100%)	0 0x0000,0		0 0×0000,0	er 4x00124
	E TO PO	OSITION	4: MOVE TO I POSITION Dx00D4,4	LAST	0,00 % 0x0000,0	10000 W	0,00 % 0×0000,0	State:4x00123		Moresta	24,00124
4x00121 Wind	E TO PO	6:4x01101 OSITION	Wind End Mo 4: MOVE TO I POSITION		Wind Positio	n:4x01103	Wind Stat Pos 0,00 % 0x0000.0	at Position: 4x01104			
ls Rain Alarm		e:4×01105	POSITION DxC0D4,4 Rain End Mo				Rain Slat Posi	tion:4x01108			
HW:1000 SW:0022 RESI-4SB-SI0 Current incoule		(1	C) Copyright 2009	8-2022 by RESI	Informatik & Autom	ation GmbH & [)] Heinz-Christian (sigl,msc. Al rig	nts reserved, www		<u>365</u>]

So you can test the complete behaviour on this plage for every engine outlet.

Now go back to the main menu and open the page Digital Inputs and Outputs. You will see the following picture:

📸 RESI- 10DI4SB-MODBUS Digi	tal Inputs & Outputs				- 9 8
RESI-10DI4SB-N	IODBUS Digital In	puts & Outputs			(i) L
0000000000 0x0000.0		00000000 0×0000.0			
0,000,0		0x0000,0			ОК
DH1DH0:4x10002		D01.D08.4x10004		Co	mmunication
R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0		
LS:0 LE:0	LS:0 LE:0	LS:0 LE:0	LS:0 LE:0		
DH:4x20001-20006	IN1 DN DI2:4x20011-20016	DI3:4x20021-20026	N2 DN DH:4:20031-20036		
R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0		
LS:0 LE:0 N3UP	LS:D LE:0 IN3 DN	LS:0 LE:0 N4 UP	LS:0 LE:0		
DI5:4x20041-20046	DI6:4x20051-20056	DI7:4x20061-20066	Di8.4::20071-20076		
R:0 F:0 C:0 S:0	R:0 F:0 C:0 S:0				
LS:0 LE:0 NSUP	LS:0 LE:0				
DI9.4×20081-20086	DI10.4x20091-20096				
HW:1000 SW:0022					
RESI-4SB-SI0					<u>RES</u> I
Current madule	(C) Copyright 2005	8-2022 by RESI Informatik & Autom	ation GmbH & DI Heinz-Christian	SIGL,MSc. All rights reserved, www.RESLcc	

In the upper region you see the current status of the digital inputs and outputs. Below you see for every digital input the current counters.

- R: stands for the amount of counted rising edges
- F: stands for the amount of counted falling edges
- C: stands for the amount of counted total events
- S: stands for the amount of counted short key press events
- LS: stands for the amount of counted long key press start events
- LE: stands for the amount of counted long key press end events



Due to the group configuration the digital input will trigger a movement on the engine outlet. Go back to the main screen and select the page MODBUS digital inputs:

MODBUS Digital Inputs	Inputs			- 0 💌
000000000 0×0000,0		0000000 0×0000,0		ок
DH1DH0:4x10002		DO1_DO8:4x10004		Communication
R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	
MODBUS DH:4x20201-20206	MODEUS DI2:4x20211-20216	MODBUS DI3:4::20221-20226	MCDBUS DH:4x20231-20236	
R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	
MODBUS DI5:4x20241-20246	MODEUS DI6:4x20251-20258	MODBUS DI7:4::20261-20266	MODBUS DI8.4x20271-20276	
R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	
MODBUS DI9:4x20281-20286	MODEUS D/10:4×20291-20296	MODBUS DI11:4x20301-20305	MODBUS Df12:4x20311-20316	
R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	
MODBUS DI13:4x20321-20326	MODEUS DI14:4x20331-20336	MODBUS DH 5:4:(20341-20346	MCOBUS DH6:4x20351-20356	
R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	R:0 F:0 C:0 S:0 LS:0 LE:0	
MODBUS DI17:4x20361-20366	MODEUS DI18:4x20371-20376	MODBUS DI19.4x20381-20386	MODBUS DI20.4x20391-20396	
HW:1000 SW:0022 RESI4SB-SI0 Current incode	(C) Copyright 200	8-2022 by RESI Informatik & Auton	adion GmbH & DI Heinz-Christian SIGL,MSc. Al ré	gits reserved. www.RESI ac

Here you see again the current status of the digital inputs and outputs. But you see also the current status of all simulated MODBUS digital inputs.

Click onto one of the filed, you will get the following menu:

MODBUS DI
Select a new mode for MODBUS DI
O:DEACTIVATED 1:SHORT KEYPRESS
2:LONG KEYPRESS START 3:LONG KEYPRESS END
Cancel

You see, that writing on the specific MODBUS register simulates a certain key press event like on the digital inputs. If you have associated the MODBUS input to a engien outlet e.g. a writing of 1 for a short key press will start a movement of the shutter/blind. A second writing on the same register will stop the current movement.

Below you see for every MODBUS digital input the current counters.

- R: stands for the amount of counted rising edges
- F: stands for the amount of counted falling edges
- C: stands for the amount of counted total events
- S: stands for the amount of counted short key press events
- LS: stands for the amount of counted long key press start events



LE: stands for the amount of counted long key press end events

So in the simplest control software you have to write to two consecutive MODBUS digital input registers to control the shutter/blind. An example for that:

We have configured MODBUS INPUT GROUP#1 to SHUTTER/BLIND GROUP #1 with the function 1:UP DOWN 1 in the page CONFIG SHUTTER/BLIND GROUP #1.

Then on the page MODBUS Digital Inputs the two inputs MODBUS DI1 and MODBUS DI2 control the first shutter/blind outlet OUT1 as follows:

- A. Write 1(SHORT KEY PRESS) to register MODBUS DI2
- B. Shutter/Blind OUT1 will start moving downward
- C. Write 1(SHORT KEY PRESS) to register MODBUS DI1
- D. Shutter/Blind OUT1 will stop current movement
- E. Write 1(SHORT KEY PRESS) to register MODBUS DI1
- F. Shutter/Blind OUT1 will start moving upward
- G. Write 2(LONG KEY PRESS START) to register MODBUS DI2
- H. Slat will step downward
- I. Write e(LONG KEY PRESS END) to register MODBUS DI2
- J. Slat will stop
- K. Write 1(SHORT KEY PRESS) to register MODBUS DI2
- L. Shutter/Blind OUT1 will start moving downward
- M. Wait until the downward movement is stopped due to the end of the shutter/blind
- N. Now the final position 100% is reached and the slats are fully closed 100%



21 RESI-4LED-SIO

21.1 General information

This series of IO modules offer the following features:

- 12 dimmable PWM output channels for LED stripes, 0..48Vdc, max. 5A each channel, organized in 4 groups with three channels A,B and C each
- Each LED group offers six selectable modes: OFF, ON, FLASHING, FADING, RANDOM, SEQUENCE
- External power supply for LED stripes, 0..48Vdc, max. 15A
- DIP switch for setting the baud rates, the type of interface and the bus number
- LED indicator for the communication
- Mounting onto EN50022 DIN rail or wall mounting
- Galvanic insulated RS485 interface for communication with a host system

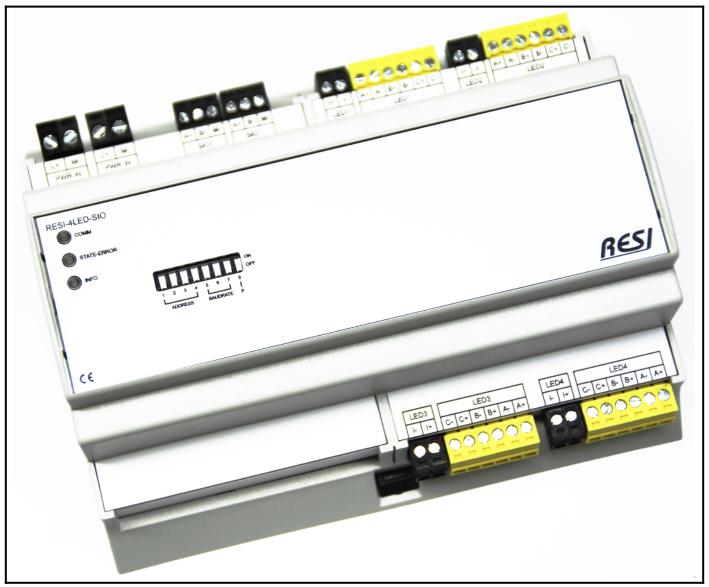


Figure: Our RESI-4LED-SIO module



21.2 The modes of the LED module

The LED module offers six modes. Each of the four LED groups has its own mode. You can switch the mode by setting a special register via MODBUS/RTU or by executing the #SMODEx ASCII command. Be aware that the converter does not save a mode in remanent memory. After reset the module starts always in mode ON for all four LED groups!

21.2.1 LED mode OFF

In this mode all three outputs of a LED group are switched to 0. It doesn't matter, what values are actual in the three set point registers LOx. The registers for the three actual output values CLOx return always the value 0.

21.2.2 LED mode ON

In this mode all three outputs are switched immediately to the current values in the three registers Lox of the corresponding LED group. The three registers for the actual output values CLOx of the affected LED group deliver always the same value as the three registers LOx to indicate, that the values are really outputted to the three PWM channels of the LED group.

21.2.3 LED mode FLASH

In this mode all three outputs are switched as a recycler relay between the three current values in the registers LOx and 0 of the LED group. While ON time span, the module outputs the three values of the set point registers Lox to the real outputs for a timespan defined in the register MINIMUM TIMEx in 1/10s. In this time the registers for the actual output values CLOx of the affected LED group deliver always the same value as in the registers LOx to indicate, that the values are really outputted to the three PWM channels of the affected LED group. Then the converter switches all three channels to 0 for the OFF time span. This time span is defined with the value of the MAXIMUM TIMEx register in 1/10s. In this time span the registers for the actual output values CLOx of the affected LED group deliver always the value 0. This time span the registers for the actual output values CLOx of the affected LED group deliver always the value 0. This ON/OFF cycle is repeated endlessly.

Steps for FLASH:

Step 1: Output of the three set point values LOx A, LOx B, LOx C to the real PWM outputs

Step 2: Wait for MINIMUM TIMEx in 1/10s

Step 3: output of the values 0, 0, 0 to the real PWM outputs

Step 4: Wait for MAXIMUM TIMEx in 1/10s

Step 5: continue with step 1

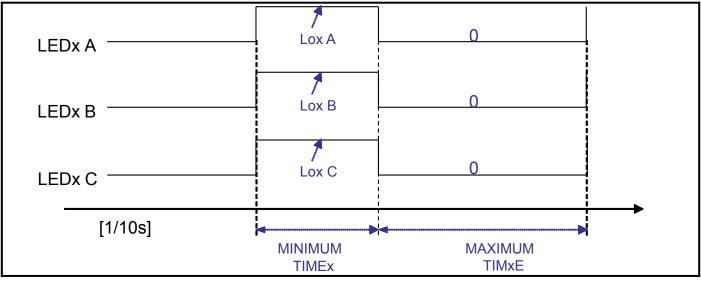


Figure: Timing diagram of mode FLASH



21.2.4 LED mode FADE

In this mode the converter doesn't change the three PWM outputs of a LED group not immediately, if the set point registers Lox are changed. No, it uses a ramp to change slowly from the current value to the new value. This ramp is defined in the register FADE SPEEDx. The setup is done in steps per 1/100s and is valid for all three channels of the affected LED group. To set a new value write into one of the three set point registers LOx. The LED group fades each output channel from the current value to the new set point value. If you read the registers CLOx of the LED group while fading, you will get every value change from the old value to the new value for each channel. Also the register IS FADE ACTIVEx will return a 1 while fading is running at least on one of the three channels of a LED group. When the LED group reaches the new set point values, reading of the registers CLOx will return the same values as in the registers LOx for the affected LED group. Also the register value of IS FADE ACTIVEx will be 0.

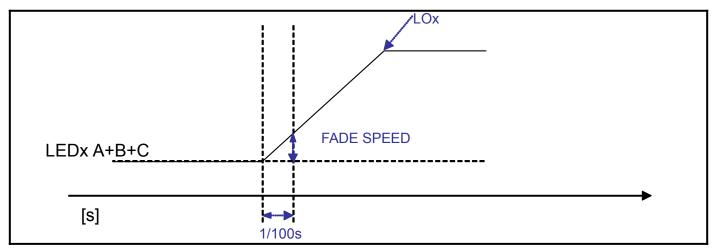


Figure: Timing diagram of mode FADE

21.2.5 LED mode RANDOM

In this mode the module generates random values for each of the three outputs of a LED group. For this random number guessing process, you can setup a time interval. If this time interval expires the system dices new random values for the three outputs of the affected LED group. The time interval is defined by the register MINIMUM TIMEx and the register MAXIMUM TIMEx in seconds. The system generates a random time interval between those two parameters. If the time expires, the system dices new random values for the three registers RLOx of the affected LED group. Then the system fades the current values stored in the registers CLOx to the new random values RLOx. This fade ramp is defined in the register FADE SPEEDx. The setup is done in steps per 1/100s. If you read the register IS FADE ACTIVE 4x00014 will return a 1 while fading is running at least on one of the three output channels of the LED group. When the module reaches the new values, reading of the registers CLOx will return the same values as stored in the registers RLOx. Also the register value of IS FADE ACTIVEx will be 0. The diced values in the registers RLOx will be in the range of 0 to LOx.

Steps for RANDOM:

Step 1: Dice three random numbers in the range of 0..LOx and store the values in RLOx

- Step 2: Dice a random wait period between MINIMUM TIMEx and MAXIMUM TIMEx in seconds
- Step 3: Fade up or down from the actual output values CLOx to the new end values RLOx

Step 4: If the random wait period is over, continue with step 1

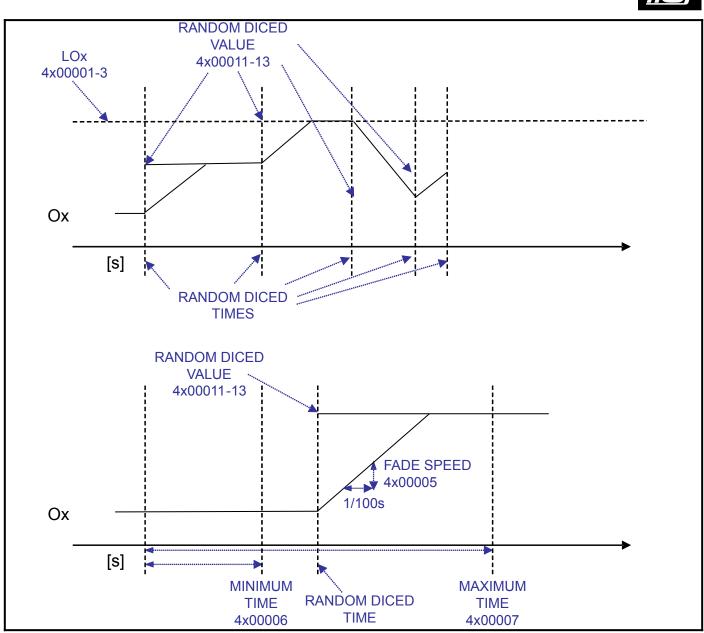


Figure: Timing diagram of mode RANDOM

21.2.6 LED mode SEQUENCE

In this mode, the module creates a sequential flash light with the three PWM outputs of a LED group. The outputs flashes between the three set points LOx A, LOx B and LOx C and 0 of the affected LED group in sequence. In the first ON phase the module sets the real output CLOx A to the set point LOx A, the other two outputs are set to 0. This phase lasts for MINIMUM TIMEx in 1/10s. While this period of time, the current value register CLOx A delivers the same value as stored in LOx A, and the other two current value registers CLOx B and CLOx C deliver the value 0. Then the module switches all three outputs to 0 for a time period defined with the register MAXIMUM TIMEx in 1/10s (OFF time period). While this period of time, all three output registers CLOx deliver the value 0. Now the system repeats the ON phase with the next set point register LOx B. The two registers CLOx A and CLOx C are set to 0 in this phase. Next the OFF time period is executed. The last phase is the ON phase with the register LOx A and CLOx B are 0 in this phase. The last OFF time period is executed. This three times ON/OFF cycle is repeated endlessly.

Steps for SEQUENCE:

Step 1: Output the three set points LOx A, 0, 0 to the three PWM outputs Step 2: wait for MINIMUM TIMEx in 1/10s Step 3: Output the values 0, 0, 0 to the three PWM outputs Step 4: wait for MAXIMUM TIMEx in 1/10s Step 5: Output the three set points 0, LOx B, 0 to the three PWM outputs



Step 6: wait for MINIMUM TIMEx in 1/10s

- Step 7: Output the values 0, 0, 0 to the three PWM outputs
- Step 8: wait for MAXIMUM TIMEx in 1/10s
- Step 9: Output the three set points 0, 0, LOx C to the three PWM outputs
- Step 10: wait for MINIMUM TIMEx in 1/10s
- Step 11: Output the values 0, 0, 0 to the three PWM outputs
- Step 12: wait for MAXIMUM TIMEx in 1/10s
- Step 13: continue with step 1

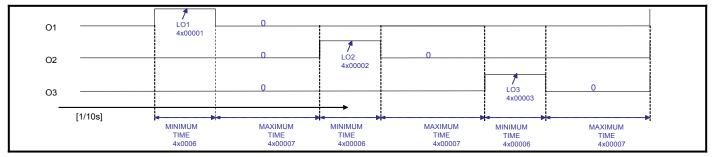


Figure: Timing diagram of mode SEQUENCE



21.3 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-4LED-SIO	<0.5W
Product housing	
RESI-4LED-SIO	BIG IO XT8
Product weight	
RESI-4LED-SIO	295g
LED stripe PWM output	
Total amount of PWM outputs	12
LED groups	4 LED groups organized with
	3 individual dimmable outputs
	each with own power supply
Amount of PWM outputs per LED group	3 individual dimmable outputs
Output signal	PWM with 400Hz
LED stripes	RGB, RGBW, dual white or mono color LED stripes
LED connection	via common anode
LED Output voltage	048Vdc
LED Output current per channel	max. 5A per LED output
LED Input voltage per LED group	048Vdc, depending on LED stripe types
LED Input current per LED group	max. 15A
	180W@12Vdc
	360W@24Vdc
	720W@48Vdc
LED group power supply	Via 2-pin plug-in terminal block in black
LED group dimmable outputs	Via 6-pin plug-in terminal block in yellow
Terminal type	RM3.5
Galvanic insulation to the CPU logic	Yes
	All LED groups are internally coupled via the common ground

Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bit(s)	one
UnitID	255



21.4 Additional terminals & LED states

LED1	3 dimmable PW	/M outputs with own LED power supply		
	One 2 pin plug-	in terminal block for LED power supply in black		
	Terminal type: F	RM3.5		
	l+:	LED group power supply (048Vdc, max. 15A)		
	I-:	LED group power supply Ground		
Pin layout	Pin 1:	I+: Power supply		
	Pin 2:	I-: Power supply ground		
		in terminal block for LED output channels 1-3 in yellow		
	Terminal type: F	RM3.5		
	A+:	LED output channel 1 common anode		
	A-:	LED output channel 1 PWM pulsed cathode (max. 5A)		
	B+:	LED output channel 2 common anode		
	B-:	LED output channel 2 PWM pulsed cathode (max. 5A)		
	C+:	LED output channel 3 common anode		
	C-:	LED output channel 3 PWM pulsed cathode (max. 5A)		
	HINT:	The connectors I+, A+, B+ and C+ are internally tied togethe		
		The used LED stripes must have a common anode pin!		
Pin layout	Pin 1:	A+		
	Pin 2:	A-		
	Pin 3:	B+		
	Pin 4:	В-		
	Pin 5:	C+		
	Pin 6:	C-		
LED GROUP				
LED2	3 dimmable PWM outputs with own LED power supply			
	like LED GROUP LED1			
LED GROUP				
LED3	3 dimmable PWM outputs with own LED power supply			
	like LED GROU	IP LED1		
LED GROUP				
LED4	3 dimmable PWM outputs with own LED power supply			
	like LED GROU	like LED GROUP LED1		



21.5 Connection diagram

21.5.1 Connection of LED stripes power supply

In the below drawings we will show the cabling of various types of LED stripes to our module. We will discuss how to connect different types of LED stripes to our module in detail.

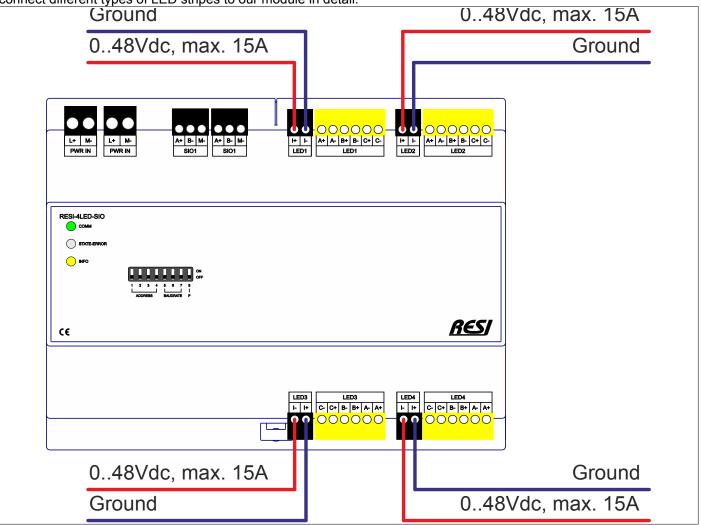


Figure: Power supply for the LED stripes

The module offers 4 independed LED groups LED1, LED2 LED3 and LED4. Each of the LED groups offers three individual dimmable outputs A, B and C.

For the LED stripes of each of the four LED groups you can use individual power supplies or one for all four LED groups together. It depends on the power consumption and the voltage level of the used LED stripes. Therefore each LED group offers two terminals I+ and I-. Depending on the type of LED stripe, you can use different types of power supplies. It is very important, that the maximum current, which the power supply delivers, must not exceed 15A! Due to this the following limitations arise for powering the LED stripes:

- LED stripes for 12Vdc voltage: 12Vdc*15A -> max. 180W power supply
- LED stripes for 24Vdc voltage: 24Vdc*15A -> max. 360W power supply
- LED stripes for 48Vdc voltage: 48Vdc*15A -> max. 720W power supply

But be careful! Each dimmable PWM output can only drive max. 5A current for dimming!

IMPORTANT: Each of the four LED groups can have its own power supply. They can have different voltage levels for each LED group e.g. 12vdc on LED group LED1 and 24Vdc on LED group LED2. But due to the design of the module all four ground terminals (I-) are bridged internally!



21.5.2 Connection of one mono color LED stripe to one group

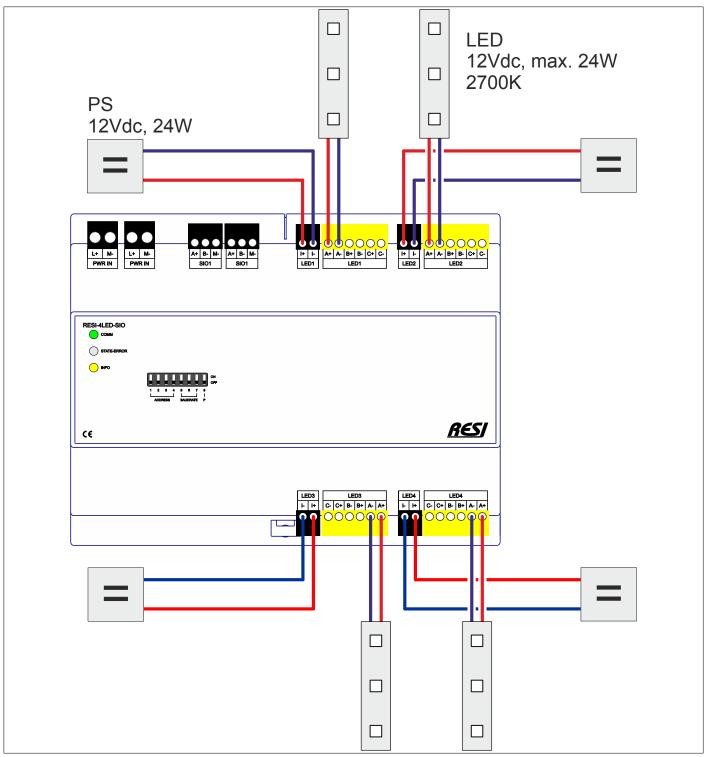


Figure: Cabling of one 12Vdc LED stripe with 24W power consumption, luminous color 2700K, per LED group. Due to the reason, that the LED stripe consumes only 24W, we use also a 24W power supply. This results in an input current for the clamps I+ and I- of 2A (This is far below 15A and therefore ok). The output current flow over the terminal A is 2A (<5A, again this is ok).



21.5.3 Connection of three mono color LED stripes to one group

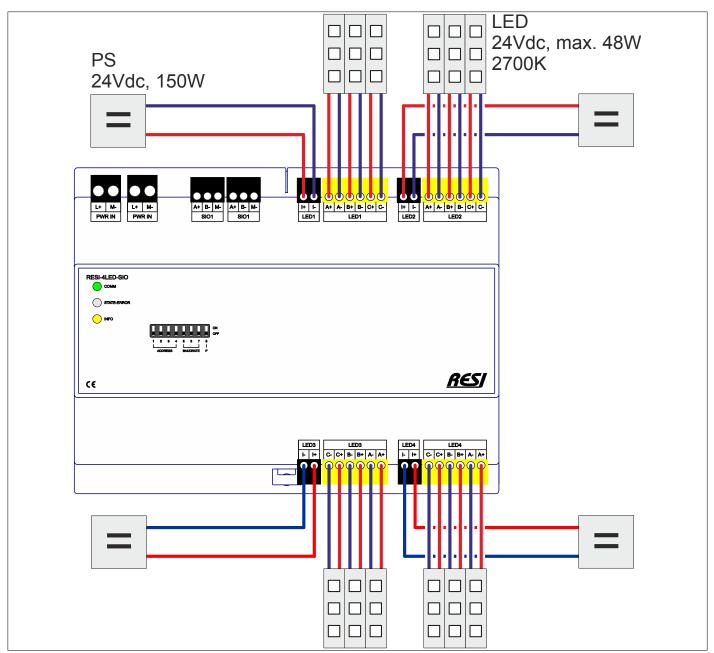


Figure: Cabling of three 24Vdc LED stripes with 48W power consumption of each LED stripe per LED group. Each of the three LED stripes of a LED group can be dimmed individually. This example uses all three outputs A, B and C of a LED group. Each of the three LED stripes consumes a maximum of 48W of power. We use a power supply with 3x48W -> 150W. The input current, which flows over the terminals I+ and I- is now max. 6.25A. That's far beyond the limit of 15A and ok. Due to the fact, that on each output we have only connected a 48W LED stripe, the current flow over each of the three outputs A, B and C is max. 2A. That's again is beyond the limit of 5A and ok.



21.5.4 Connection of two mono color LED stripes to one group

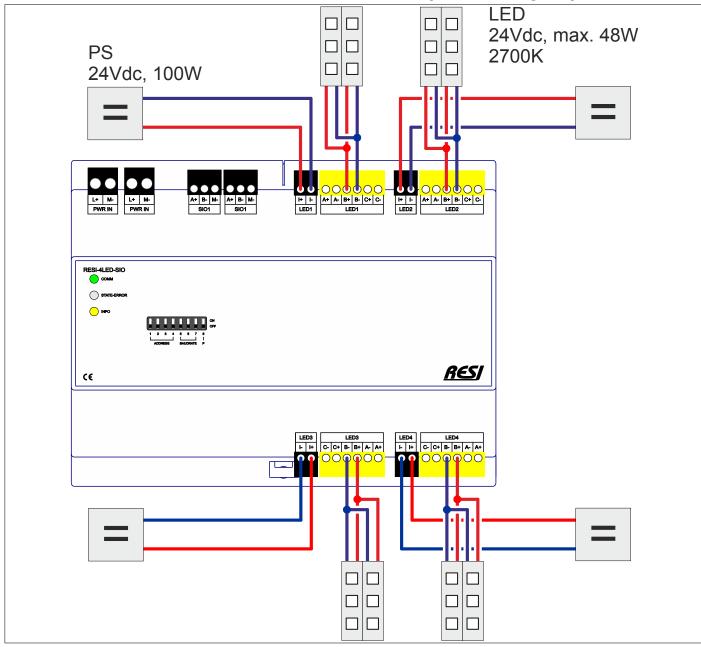


Figure: Cabling of two 24Vdc LED stripes with 48W power consumption of each LED stripe on the output B per LED group. Both LED stripes are dimmed as a group with output B of the LED group. We use a 100W power supply on the input I+ and I-. This results in an input current of 4.17A, which is again below the maximum current of 15A and ok. Now we have connected two LED stripes to one output. This results in a total power consumption of 96W on the output B. This leads to an output current of 4A. That's again lower than 5A and ok.



21.5.5 Connection of one RGB LED stripe to one group

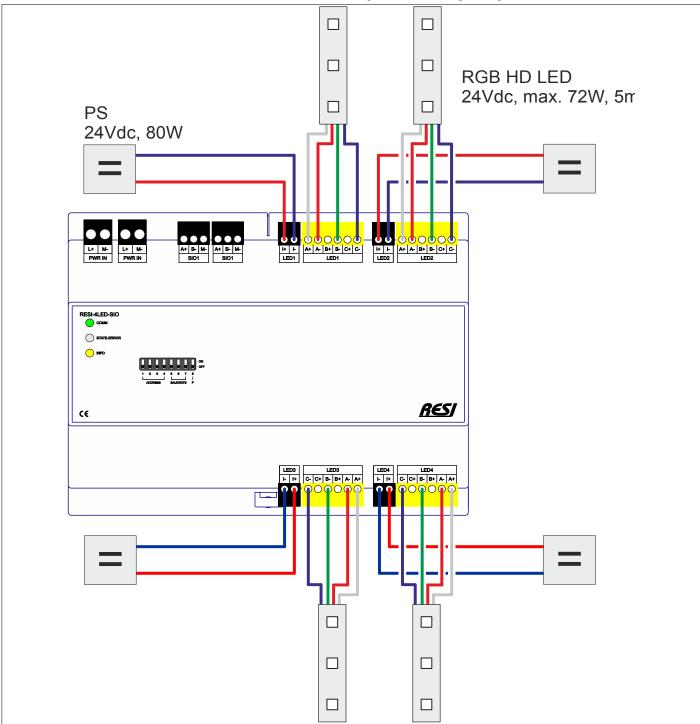


Figure: In this example we use a RGB LED HD stripe per LED group. This stripe offers three dimmable channels, one for the color red, one for green and one for blue. The common anode of the LED stripe is connected to the terminal A+ of our module. The 80W power supply delivers a maximum current of 3,34A. This is far beyond the allowed 15A and ok. Each output channel must drive only 1/3rd of the 72W total power consumption of the LED stripe. This equals to 24W, resulting in a maximum current for each output of 1A. Again this is far beyond the allowed 5A for each channel and ok.



21.5.6 Connection of one dynamic white LED stripe to one group

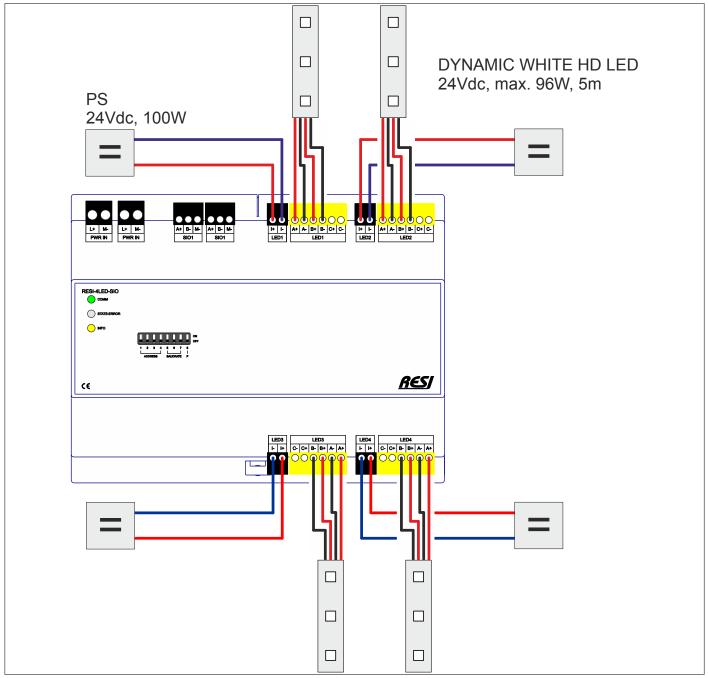


Figure: Cabling of a dynamic white LED stripe per LED group. This type of LED stripe combines two different LED types with different luminant colors into one product. Each of the two build-in LED stripes consumes 48W of power and you can mix up different luminant colors mostly from warm white to cold white. Connect the four cables of the LED stripe a shown in the above drawing. We also connect the both anodes of the dual LED stripe to the clamps A+ and B+. The cable for warm white is connected to the output A- and the cable for the cold white LEDs is connected to the output B+. The output clamps C+ and C- stay unconnected. Due to the fact, that the outputs A and B have to drive only 48W each, the maximum output current per channel is 2A. This is far beyond the allowed 5A and ok. The input current on the clamps I+ and I- lies by maximum 4.16A with the 100W power supply. This again is far under the allowed 15A and ok.

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21.5.7 Connection of one cold+warm white LED stripe to one group

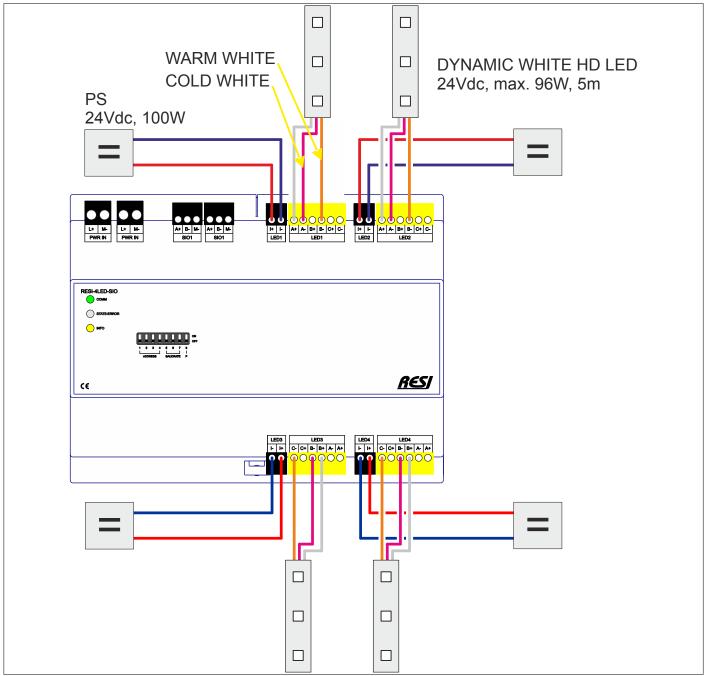


Figure: Cabling of a warm white/cold white LED stripe per LED group. This type of LED stripe combines two different LED types with different luminant colors into one product. Each of the two build-in LED stripes consumes 48W of power and you can mix up different luminant colors mostly from warm white to cold white. Connect the three cables of the LED stripe a shown in the above drawing. We also connect the anode of the dual LED stripe to the clamps A+. The cable for cold white is connected to the output A- and the cable for the warm white LEDs is connected to the output B+. The output clamps C+ and C- stay unconnected. Due to the fact, that the outputs A and B have to drive only 48W each, the maximum output current per channel is 2A. This is far beyond the allowed 5A and ok. The input current on the clamps I+ and I- lies by maximum 4.16A with the 100W power supply. This again is far under the allowed 15A and ok.



21.5.8 Connection of one RGBW LED stripe to two groups

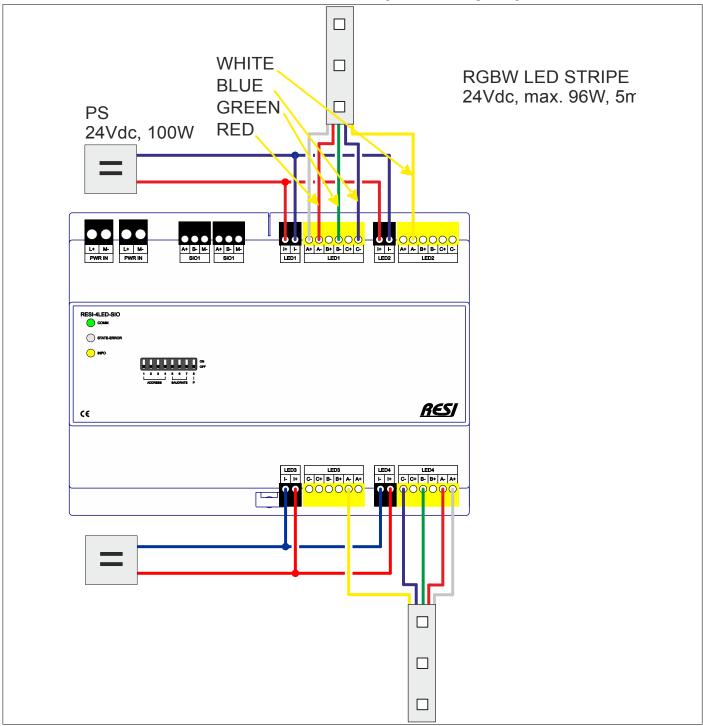


Figure: Cabling of a RGBW LED stripe with two LED groups. This type of LED stripe needs 4 PWM outputs to control all four different LED colors. So we use from LED group 1 A- to dimm the red LEDs, B- to dimm the green LEDs and C- to dimm the blue LEDs. Then we tie the power suuply of the LED group 2 to the power supply of the LED group 1. No we connect the white LEDs to the A- on the second LED group.



21.6 Assignment of the channel numbers to the output clamps

Here you can find a definition, how the channel numbers are mapped to the output terminals:

LED group	Clamp	Group Number	Group channel	Channel number
LED1	A+ A-	1	1	1
LED1	B+ B-	1	2	2
LED1	C+ C-	1	3	3
LED2	A+ A-	2	1	4
LED2	B+ B-	2	2	5
LED2	C+ C-	2	3	6
LED3	A+ A-	3	1	7
LED3	B+ B-	3	2	8
LED3	C+ C-	3	3	9
LED4	A+ A-	4	1	10
LED4	B+ B-	4	2	11
LED4	C+ C-	4	3	12



21.7 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-4LED-SIO-MODBUS+ASCII-ENxx.pdf

21.8 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-4LED-SIO-MODBUS+ASCII-ENxx.pdf



22 RESI-8RTD-SIO

22.1 General information

This series of IO modules offer the following features:

- 8 sensor inputs for temperature sensors
- Measurement accuracy +/-0.1%
- Measurement resolution +/-0.001%
- Measurement range -200°C...+850°C
- Various sensor types are applicable: PT100, PT1000, PT10, PT50, PT200, PT500, NI120, NI1000-DIN43760
- Various standards for linearisation are select-able: Europa, America, Japan, ITS-90
- Output of the temperatures in °Celsius [°C], °Fahrenheit [°F] or °Kelvin [°K]
- Different measurement currents are select-able: 5µA, 10µA, 25µA, 50µA, 100µA, 250µA,500µA, 1mA
- Various sensor connection types: 2 wire, 3 wire or 4 wire sensors connectable
- Internal calculation of an average temperature per channel
- Galvanic insulated RS485 interface for communication with a host system

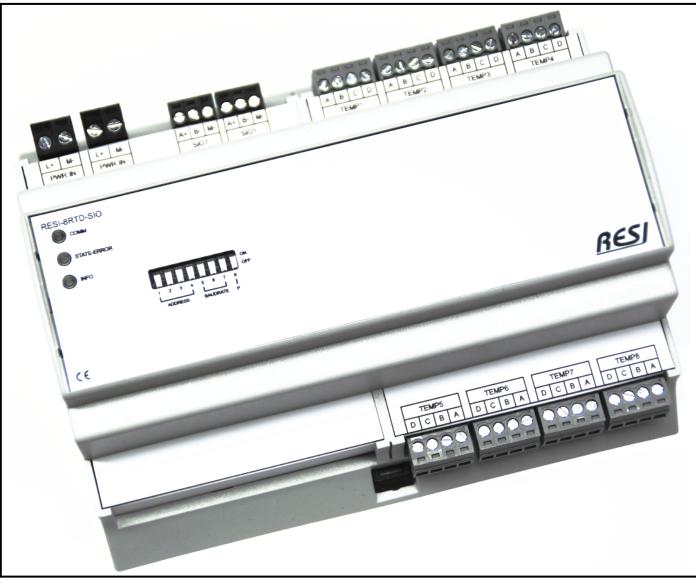


Figure: Our RESI-8RTD-SIO module



22.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	<0.8W	
Product housing	BIG IO XT8	
Product weight	290g	
Temperature inputs		
Number	8	
Signal type	Temperature measurement	
Measurement type	Measurement of resistance	
Sensor connection	4 wire measurement	
ADC	24 bit sigma delta ADC	
Accuracy	+/-0.1°C for PT-100, PT-200, PT-500, PT-1000	
	+/-0.1°C NI-120, NI-1000-DIN43760	
	+/-3°C for PT-10, PT-50	
Resolution +/-0.001°C		
Reference stability	10ppm/°C	
Sensor types	PT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200,	
	PT-500, NI-120, NI-1000 DIN43760	
Linearisation standards	Europa, America, Japan, ITS-90	
Excitation current for measurement	5μΑ, 10μΑ, 25μΑ, 50μΑ, 100μΑ, 250μΑ, 500μΑ, 1mA	
Cable connection	Via 8 4-pin plug-in terminal block	
Terminal type	RM3.5	
Galvanic isolation	Yes, to the rest of the module, not to the other temperature inputs	
Default serial settings		
Baud rate	via DIP switch	
Parity	none	
Stop bit(s)	one	
UnitID	255	



22.3 Additional terminals & LED states

TEMPERATURE INPUTS	UTS 8 temperature inputs for RTD temperature sensors				
	Eight 4 pin plug-in terminal block				
	Terminal type:	RM3.5			
	TEMPx:A:	Temperature Sensor Cable 1A			
	TEMPx:B:	Temperature Sensor Cable 1B			
	TEMPx:C: Temperature Sensor Cable 2A				
	TEMPx:D:	Temperature Sensor Cable 2B			
Connecting 4-wire tempe	rature sensors:				
Pin layout	Pin 1:	A: Wire 1 of Sensor			
	Pin 2:	B: Wire 2 of Sensor			
	Pin 3:	C: Wire 3 of Sensor			
	Pin 4:	D: Wire 4 of Sensor			
HINT:	Sensor element between	n wire 2 and 3, wire 1 and 2 on left side of sensor element			
	and wire 3 and 4 on righ	and wire 3 and 4 on right side of sensor element			
Connecting 3-wire tempe	rature sensors:				
Pin layout	Pin 1:	A: Wire 1 of Sensor			
	Pin 2:	B: Wire 2 of Sensor			
	Pin 3:	C: Wire 3 of Sensor			
	Pin 4:	D: Bridged to terminal C			
HINT:	Sensor element between wire 2 and 3, wire 1 and 2 on left side of sensor element				
	and wire 3 on right side of sensor element				
Connecting 2-wire tempe	ratura concorci				
Pin layout	Pin 1:	A: Bridged to terminal B			
i in ayout	Pin 2:	B: Wire 1 of Sensor			
	Pin 3:	C: Wire 2 of Sensor			
	Pin 4:	D: Bridged to terminal C			
HINT:		n wire 1 and 2, wire 1 on left side of sensor element			
	and wire 2 on right side of sensor element				
INFO	If everything is ok this LED is on. If there is an internal error				
	with the temperature me	easurement, this LED flashes fast.			



22.4 Schematic diagram

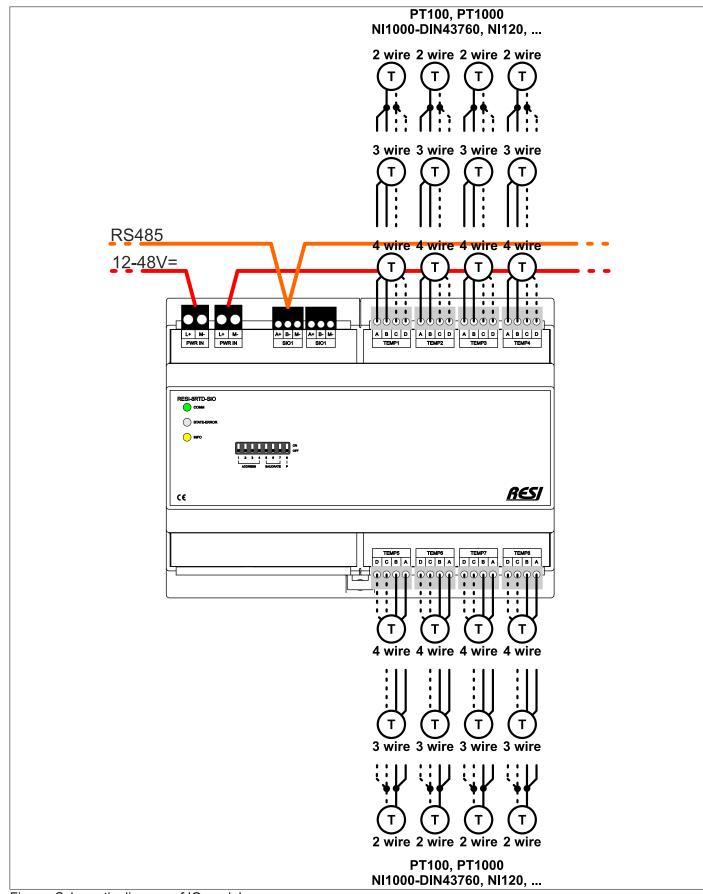


Figure: Schematic diagram of IO module



22.5 Cabling of temperature sensors

A typical temperature sensor with different connection cables is shown in the figure below:

- 2 wire: A red and white cable
- 3 wire: Two red and one white cable
- 4 wire: Two read and two white cable

The sensor element is always mounted between the red and white cables!

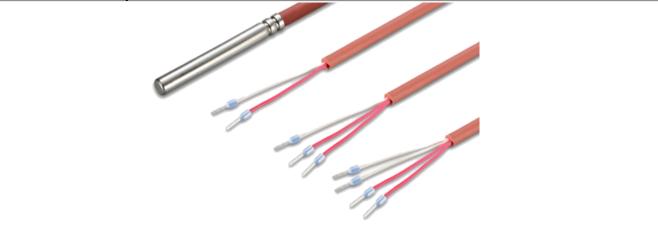


Figure: Typical temperature sensor with different connection cables



22.5.1 Cabling of 4-wire temperature sensors

In the below drawing you see the cabling of 4-wire temperature sensors:

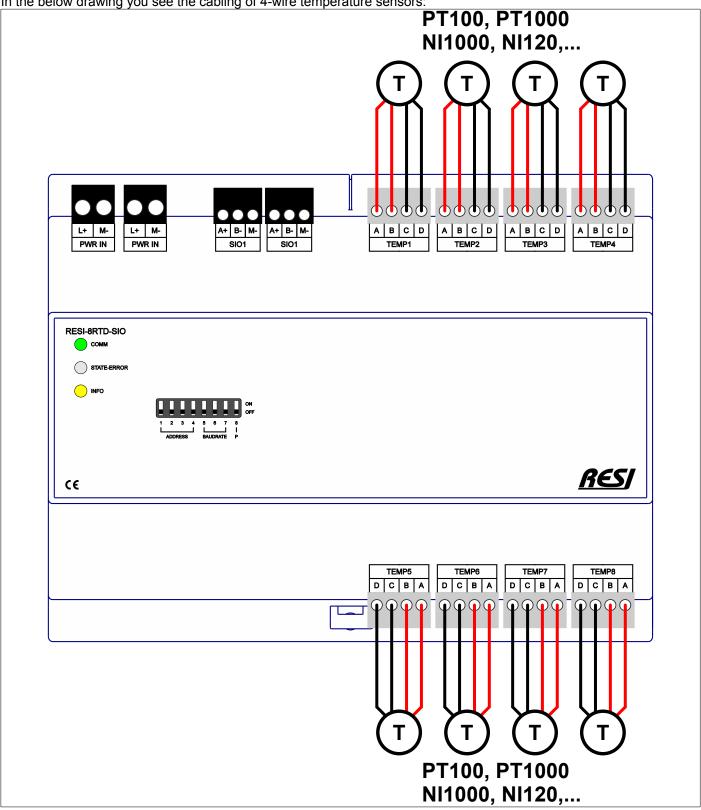


Figure: Cabling of temperature sensors with 4 wires

Don't forget, that you can mix the type of temperature sensors for each channel!



22.5.2 Cabling of 3-wire temperature sensors

In the below drawing you see the cabling of 3-wire temperature sensors:

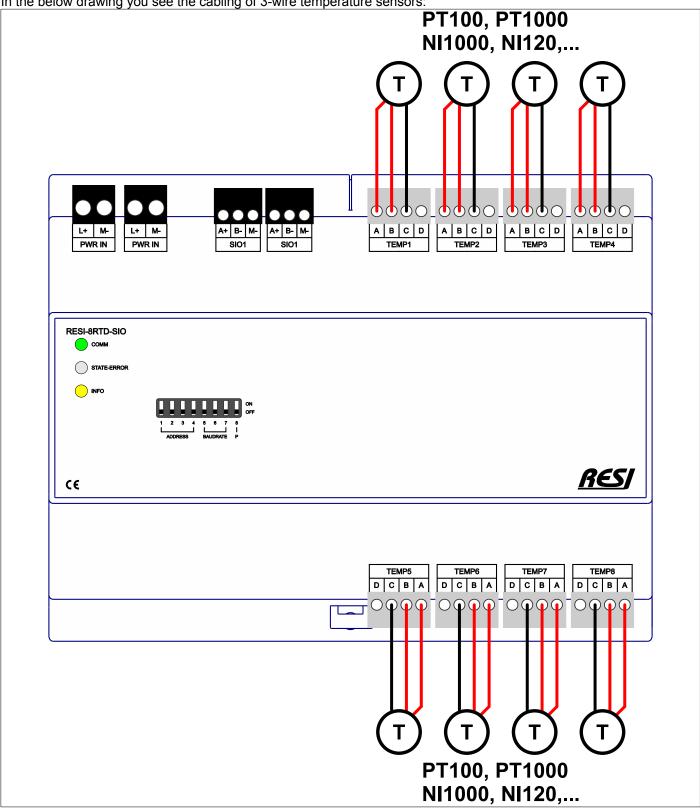


Figure: Cabling of temperature sensors with 3 wires

Don't forget, that you can mix the type of temperature sensors for each channel!



22.5.3 Cabling of 2-wire temperature sensors

In the below drawing you see the cabling of 2-wire temperature sensors:

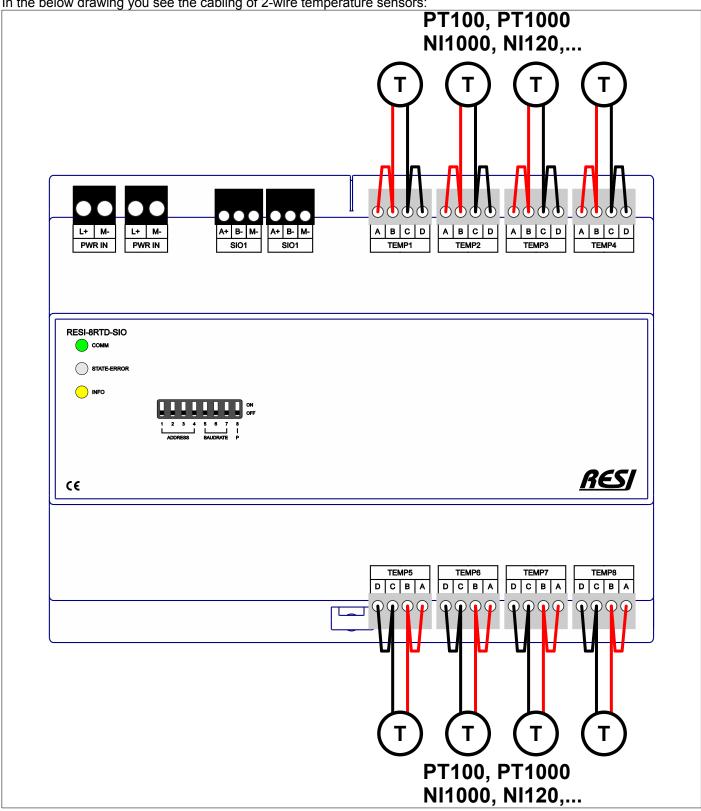


Figure: Cabling of temperature sensors with 2 wires

Don't forget, that you can mix the type of temperature sensors for each channel!



22.6 Useable sensor types and measurement accuracy

This section describes the suitable sensors and explains the measurement accuracy of the sensor inputs of the module.

HINT: Use our free software RESI MODBUSConfigurator to configure and test our 8RTD module. You can also use your own software to handle the complete configuration while writing to MODBUS/RTU registers or with ASCII text commands.

22.6.1.1 Useable sensor types

The following types of sensors can be used per input:

Platin sensors:

- **PT-100** sensors: Measurement range from 1.95Ω to 34.5Ω , -200° C to $+850^{\circ}$ C
- PT-1000 sensors: Measurement range from 195Ω to 3450Ω, -200°C to +850°C
- **PT-1000** sensors with an α =0.00375: Measurement range from 195 Ω to 3450 Ω , -200°C to +850°C
- **PT-10** sensors: Measurement range from 1.95Ω to 34.5Ω , $-200^{\circ}C$ to $+850^{\circ}C$
- PT-50 sensors: Measurement range from 9.75Ω to 172.5Ω, -200°C to +850°C
- PT-200 sensors: Measurement range from 39Ω to 690Ω, -200°C to +850°C
- PT-500 sensors: Measurement range from 97.5Ω to 1725Ω, -200°C to +850°C

Nickel sensors:

- NI-120 sensors: Measurement range from 66.6Ω to 380.3Ω, -80°C to +260°C
- NI-1000 DIN43760 sensors: Sensors with linearisation according to DIN43760

Each of the two sensor inputs of the module can measure a different sensor type!

You can use all sensor accuracy classes (class AA, A, B, C). Please consult the DIN EN 60751:2009-05 for an exact definition of the sensor accuracy. Don't forget, that the whole measurement error for the temperature measurement consists always out of the error of the sensor element itself, the error of the used cabling and the measurement errors of the measurement electronic.

Out resistance measurement electronic uses an internal $2k\Omega$ sense resistor. With an excitation current of 500μ A the voltage drop on this resistor is 1V. This is the ideal range, to achieve the highest measurement accuracy. Use sensor type PT100, PT200, PT500, PT-1000, NI-120 or NI-1000 DIN43760 to achieve the best accuracy of our module with +/-0.1°C.

For PT10 and PT50 sensors this internal sense resistor is too big. So the reachable accuracy lies only about +/-3°C.

22.6.1.2 Configurable excitation current

For each input you can define an individual excitation current for the measurement:

- 5µA
- 10µA
- 25µA
- 50µA
- 100µA
- 250µA
- 500µA
- 1mA

The electronic executes an internal reference measurement on an Rsense resistor with $2k\Omega$ (Accuracy +/-0.05%). Please adjust the excitation current for each channel in a way, that the resulting maximum voltage drop on this internal Rsense resistor <=1.0V.

U=R*I -> U=2kΩ*500µA -> 1V



This results in a maximum excitation current of 500µA with this module. If the excitation current exceeds this voltage range, the module signals this error with "ADC-Out-of-Range" in the status flags of each channel.

The ideal excitation current of the module is 500µA! With smaller excitation currents the measurement will be more and more inaccurate!

22.6.1.3 Selectable linearisation standard

A PLATIN resistor (PT sensor) is defined with a standardized characteristic. This is the Callendar-Van Dusen equation:

This is defined as follows:

RT = R0 • (1 + a • T + b • T2 + (T - 100°C) • c • T3) for T < 0°C, RT = R0 • (1 + a • T + b • T2) for T > 0°C

The equation is used with different coefficients depending of the selected linearisation standard to calculate a temperature from the measured resistor.

STANDARD	ALPHA (α)	а	b	С
Europe DIN EN 60751 IEC 751 JIS C1604-1997	α=0x00385	3.908300*10 ^{.03}	-5.775000*10 ⁻⁰⁷	-4.183000*10 ⁻¹²
America SAMA Standard	α=0x003911	3.969200*10 ⁻⁰³	-5.849500*10 ⁻⁰⁷	-4.232500*10 ⁻¹²
Japan JIS C1604-1987	α=0x003916	3.973900*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
ITS-90	α=0x003926	3.984800*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
RTD-1000-375	α=0x00375	3.810200*10 ⁻⁰³	-6.018880*10 ⁻⁰⁷	-6.000000*10 ⁻¹²
NI-120	N/A	N/A	N/A	N/A

22.6.1.4 Sensor evaluation and accuracy

Our module computes the final temperature value °Celsius [°C] and delivers this temperature on various MODBUS registers in various number formats and via various ASCII commands to the host.

In addition our module can convert the temperature also in °Fahrenheit [°F] with the formula:

T[°F]=T[°C]*1.8+32

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in Fahrenheit is not necessary.

Also our module converts the temperature data into °Kelvin [°K] with the formula:

T[°K]=T[°C] +273.15

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in kelvin is not necessary.

Our module uses a 24 bit sigma/delta ADC with a noise suppression for 50/60Hz internally. Our module achieves a very high measurement accuracy of +/-0.1°C and a measurement resolution of +/-0.001°C!

Our module measures every channel around 1 time per second. In addition our module computes an average temperature for each channel with a user selectable time range in seconds, to suppress short noise signals in standard applications.

A manual adjustable zero offset allows a zero point shift to compensate static effects of the cabling, especially useful for 2 wire sensors.



Our module offers a very complex internal hardware to evaluate if the measured temperature is valid or not. Therefore the module offers for each channel a status representing the result of the last converted temperature. This status uses 8 bits, which have the following meaning:

BIT	NAME	DESCRIPTION
0	VALID	=1: If the measurement result is valid, this bit is set and all other bits in the status are 0!
		=0: if the system detects a conversion error or problem, this bit is 0 and the measurement result must be discarded!
1	ADC OUT OF RANGE	=1: If the product of $2k\Omega$ * excitation current >1V, this bit is 1 and the measurement result is invalid.
		The absolute input voltage of the ACD beyond ±1.125 • VREF/2
		=0: Everything is ok
2	SENSOR UNDER RANGE	=1: The current measured temperature is beyond the lower limit for the selected sensor type. For PT: -200°C, for NI-120: -80°C
		=0: Everything is ok
3	SENSOR OVER RANGE	=1: The current measured temperature is above the upper limit for the selected sensor type. For PT: +850°C, for NI-120: +260°C
		=0: Everything is ok
4	NOT USED	Ignore this bit
5	NOT USED	Ignore this bit
6	HARD ADC OUT OF RANGE	=1: Erroneous readout of the ADC value. A possibility is an extreme high noise level on the signal. The sensor value will be discarded. A second option is an open wiring for the sensor.
		=0: Everything is ok
7	SENSOR HARD FAULT	=1: Sensor wiring is open or no sensor is cabled to the module. Sensor has a shortcut or the internal sense resistor has an error.
		=0: Everything is ok



22.7 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-8RTD,8RTD2-SIO-MODBUS+ASCII-ENxx.pdf

22.8 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-8RTD,8RTD2-SIO-MODBUS+ASCII-ENxx.pdf



23 RESI-8RTD2-SIO

23.1 General information

This series of IO modules offer the following features:

- 8 sensor inputs for temperature sensors
- Measurement accuracy +/-0.1%
- Measurement resolution +/-0.001%
- Measurement range -200°C...+850°C
- Various sensor types are applicable: PT100, PT1000, PT10, PT50, PT200, PT500, NI120, NI1000-DIN43760
- Various standards for linearisation are select-able: Europa, America, Japan, ITS-90
- Output of the temperatures in °Celsius [°C], °Fahrenheit [°F] or °Kelvin [°K]
- Different measurement currents are select-able: 5µA, 10µA, 25µA, 50µA, 100µA, 250µA,500µA, 1mA
- Various sensor connection types: 2 wire sensors connectable
- Internal calculation of an average temperature per channel
- Galvanic insulated RS485 interface for communication with a host system

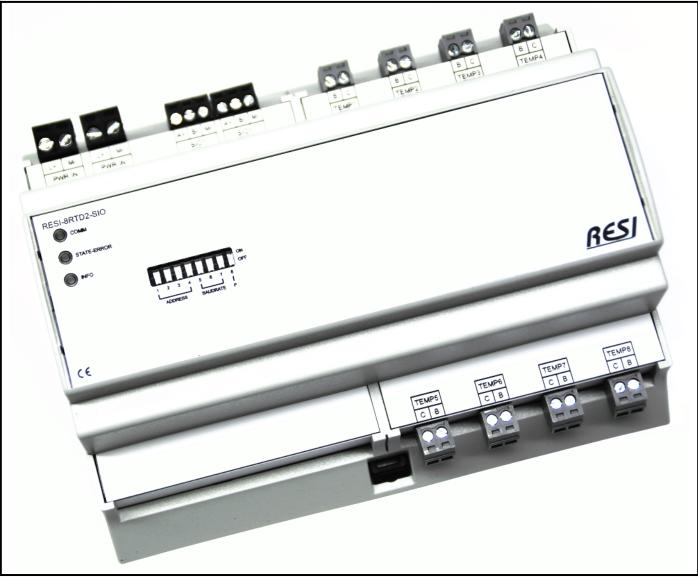


Figure: Our RESI-8RTD2-SIO module



23.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Default serial settings	Power consumption	<0.8W
Temperature inputs Number 8 Signal type Temperature measurement Measurement type Measurement of resistance Sensor connection 2 wire measurement ADC 24 bit sigma delta ADC Accuracy +/-0.1°C for PT-100, PT-200, PT-500, PT-1000 +/-0.1°C NI-120, NI-1000-DIN43760 +/-3°C for PT-10, PT-50 Resolution +/-0.001°C Reference stability 10ppm/°C Sensor types PT-100, PT-1000 pT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760 Linearisation standards Europa, America, Japan, ITS-90 Excitation current for measurement 5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mA Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature input	Product housing	BIG IO XT8
Number8Signal typeTemperature measurementMeasurement typeMeasurement of resistanceSensor connection2 wire measurementADC24 bit sigma delta ADCAccuracy+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C for PT-10, PT-50Resolution+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputDefault serial settings	Product weight	290g
Signal typeTemperature measurementMeasurement typeMeasurement of resistanceSensor connection2 wire measurementADC24 bit sigma delta ADCAccuracy+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C NI-120, NI-1000-DIN43760+/-0.1°C NI-120, NI-1000-DIN43760*/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200,PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputDefault serial settings	Temperature inputs	
Measurement typeMeasurement of resistanceSensor connection2 wire measurementADC24 bit sigma delta ADCAccuracy+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C NI-120, NI-1000-DIN43760+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputDefault serial settings	Number	8
Sensor connection2 wire measurementADC24 bit sigma delta ADCAccuracy+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C NI-120, NI-1000-DIN43760+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputDefault serial settings	Signal type	Temperature measurement
ADC24 bit sigma delta ADCAccuracy+/-0.1°C for PT-100, PT-200,PT-500, PT-1000+/-0.1°C NI-120, NI-1000-DIN43760+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000, PT-1000 α =0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature input:Default serial settings	Measurement type	Measurement of resistance
Accuracy+/-0.1°C for PT-100, PT-200, PT-500, PT-1000+/-0.1°C NI-120, NI-1000-DIN43760+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeGalvanic isolationYes, to the rest of the module, not to the other temperature input:Default serial settings	Sensor connection	2 wire measurement
+/-0.1°C NI-120, NI-1000-DIN43760 +/-3°C for PT-10, PT-50 Resolution +/-0.001°C Reference stability 10ppm/°C Sensor types PT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760 Linearisation standards Europa, America, Japan, ITS-90 Excitation current for measurement 5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mA Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature input	ADC	24 bit sigma delta ADC
+/-3°C for PT-10, PT-50Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature input:Default serial settings	Accuracy	+/-0.1°C for PT-100, PT-200,PT-500, PT-1000
Resolution+/-0.001°CReference stability10ppm/°CSensor typesPT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature input:Default serial settings		+/-0.1°C NI-120, NI-1000-DIN43760
Reference stability 10ppm/°C Sensor types PT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760 Linearisation standards Europa, America, Japan, ITS-90 Excitation current for measurement 5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mA Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature inputs		+/-3°C for PT-10, PT-50
Sensor typesPT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200, PT-500, NI-120, NI-1000 DIN43760Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputsDefault serial settings	Resolution	+/-0.001°C
PT-500, NI-120, NI-1000 DIN43760 Linearisation standards Europa, America, Japan, ITS-90 Excitation current for measurement 5μA, 10μA, 25μA, 50μA, 100μA, 250μA, 500μA, 1mA Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature inputs	Reference stability	10ppm/°C
Linearisation standardsEuropa, America, Japan, ITS-90Excitation current for measurement5μA, 10μA, 25μA, 50μA, 100μA, 250μA, 500μA, 1mACable connectionVia 8 2-pin plug-in terminal blockTerminal typeRM3.5Galvanic isolationYes, to the rest of the module, not to the other temperature inputDefault serial settings	Sensor types	PT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200,
Excitation current for measurement 5µA, 10µA, 25µA, 50µA, 100µA, 250µA, 500µA, 1mA Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature inputs Default serial settings		PT-500, NI-120, NI-1000 DIN43760
Cable connection Via 8 2-pin plug-in terminal block Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature input Default serial settings	Linearisation standards	Europa, America, Japan, ITS-90
Terminal type RM3.5 Galvanic isolation Yes, to the rest of the module, not to the other temperature inputs Default serial settings	Excitation current for measurement	5μΑ, 10μΑ, 25μΑ, 50μΑ, 100μΑ, 250μΑ, 500μΑ, 1mA
Galvanic isolation Yes, to the rest of the module, not to the other temperature input Default serial settings	Cable connection	Via 8 2-pin plug-in terminal block
Default serial settings	Terminal type	RM3.5
	Galvanic isolation	Yes, to the rest of the module, not to the other temperature inputs
Developte vie DID southele	Default serial settings	
Baud rate Via DIP switch	Baud rate	via DIP switch
Parity none	Parity	none
Stop bit(s) one	Stop bit(s)	one
UnitID 255	UnitID	255



23.3 Additional terminals & LED states

TEMPERATURE INPL	JTS 8 temperature input	8 temperature inputs for RTD temperature sensors		
	Eight 4 pin plug-in t	Eight 4 pin plug-in terminal block		
	Terminal type:	RM3.5		
	TEMPx:A:	Temperature Sensor Cable 1A		
	TEMPx:B:	Temperature Sensor Cable 1B		
	TEMPx:C:	Temperature Sensor Cable 2A		
	TEMPx:D:	Temperature Sensor Cable 2B		
Connecting 2-wire te	mperature sensors:			
Pin layout	Pin 1:	A: Wire 1 of sensor		
	Pin 2:	B: Wire 2 of Sensor		
Connecting 3-wire te	mperature sensors:			
Pin layout	Pin 1:	A: Wire 1 and wire 2 of Sensor		
	Pin 2:	B: Wire 3 of Sensor		
Connecting 4-wire te	mperature sensors:			
Pin layout	Pin 1:	A: Wire 1 and Wire 2 of Sensor		
	Pin 2:	B: Wire 3 and wire 4 of Sensor		
INFO	If everything is ok th	nis LED is on. If there is an internal error		
	with the temperature measurement, this LED flashes fast.			



23.4 Schematic diagram

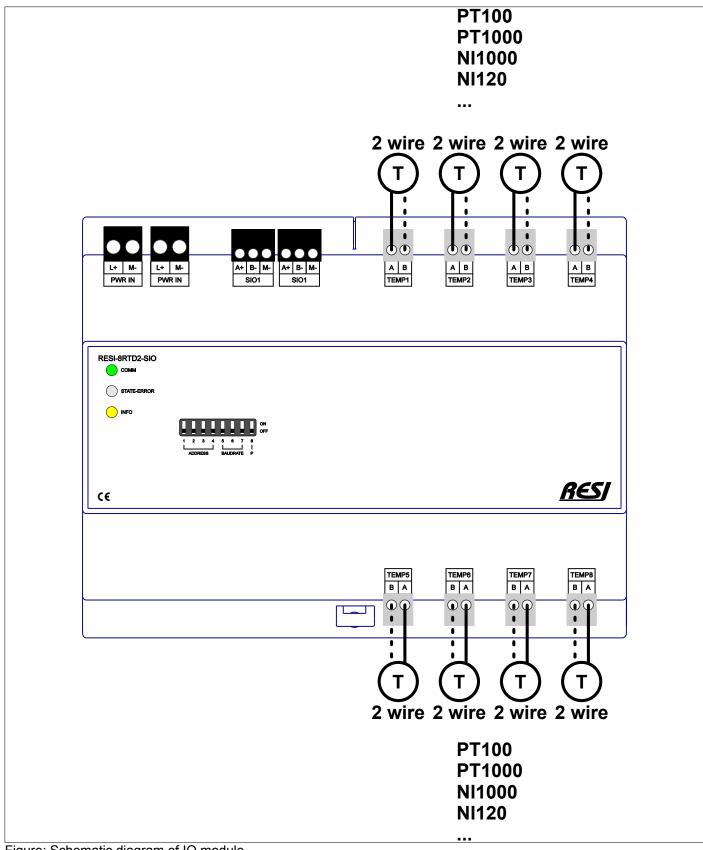


Figure: Schematic diagram of IO module



23.5 Cabling of temperature sensors

A typical temperature sensor with different connection cables is shown in the figure below:

- 2 wire: A red and white cable
- 3 wire: Two red and one white cable
- 4 wire: Two read and two white cable

The sensor element is always mounted between the red and white cables!



Figure: Typical temperature sensor with different connection cables



23.5.1 Cabling of 2-wire temperature sensors

In the below drawing you see the cabling of 2-wire temperature sensors:

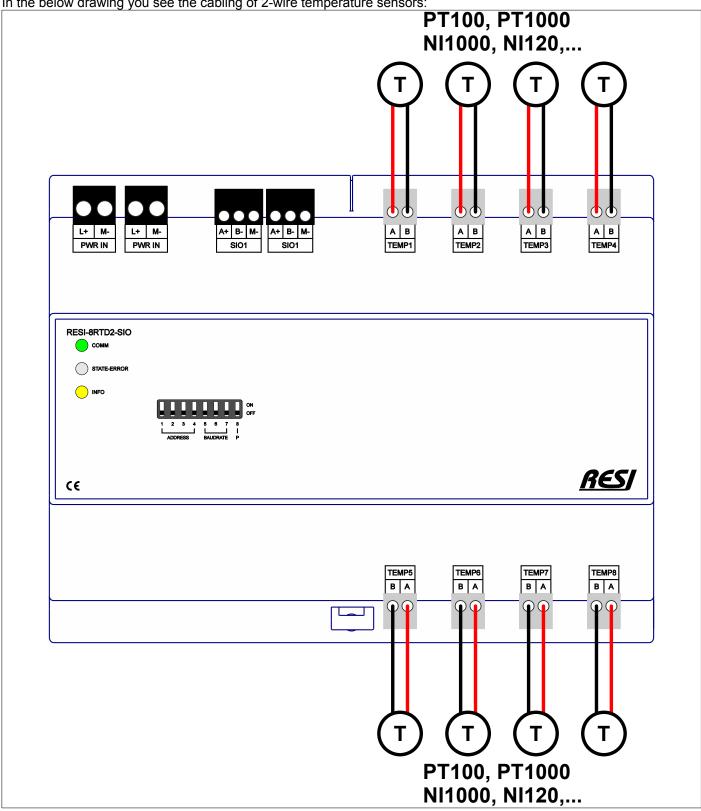


Figure: Cabling of temperature sensors with 2 wires

Don't forget that you can mix different types of sensor elements on each channel!



23.5.2 Cabling of 3-wire temperature sensors

In the below drawing you see the cabling of 3-wire temperature sensors:

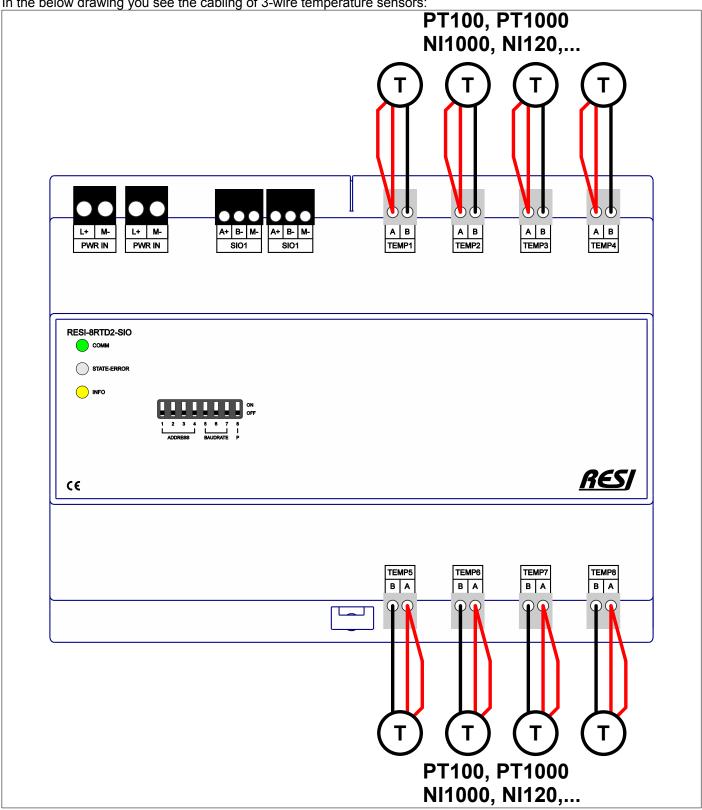


Figure: Cabling of temperature sensors with 3 wires

Don't forget that you can mix different types of sensor elements on each channel!



23.5.3 Cabling of 4-wire temperature sensors

In the below drawing you see the cabling of 2-wire temperature sensors:

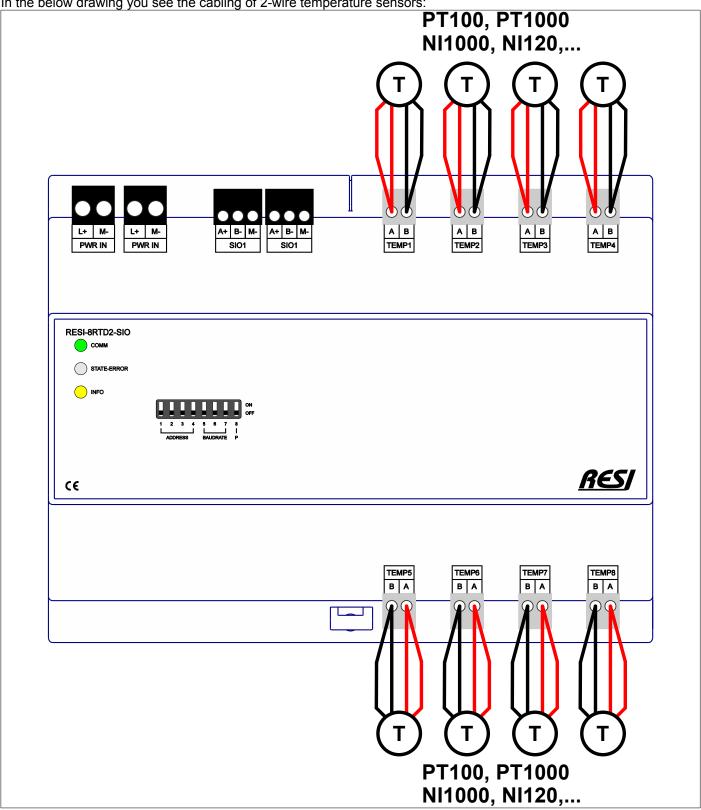


Figure: Cabling of temperature sensors with 4 wires

Don't forget that you can mix different types of sensor elements on each channel!



23.6 Useable sensor types and measurement accuracy

This section describes the suitable sensors and explains the measurement accuracy of the sensor inputs of the module.

HINT: Use our free software RESI MODBUSConfigurator to configure and test our 8RTD2 module. You can also use your own software to handle the complete configuration while writing to MODBUS/RTU registers or with ASCII text commands.

23.6.1.1 Useable sensor types

The following types of sensors can be used per input:

Platin sensors:

- PT-100 sensors: Measurement range from 1.95Ω to 34.5Ω, -200°C to +850°C
- PT-1000 sensors: Measurement range from 195Ω to 3450Ω, -200°C to +850°C
- **PT-1000** sensors with an α =0.00375: Measurement range from 195 Ω to 3450 Ω , -200°C to +850°C
- **PT-10** sensors: Measurement range from 1.95Ω to 34.5Ω , $-200^{\circ}C$ to $+850^{\circ}C$
- **PT-50** sensors: Measurement range from 9.75Ω to 172.5Ω , -200° C to $+850^{\circ}$ C
- **PT-200** sensors: Measurement range from 39Ω to 690Ω , $-200^{\circ}C$ to $+850^{\circ}C$
- PT-500 sensors: Measurement range from 97.5Ω to 1725Ω, -200°C to +850°C

Nickel sensors:

- NI-120 sensors: Measurement range from 66.6Ω to 380.3Ω, -80°C to +260°C
- NI-1000 DIN43760 sensors: Sensors with linearisation according to DIN43760

Each of the two sensor inputs of the module can measure a different sensor type!

You can use all sensor accuracy classes (class AA, A, B, C). Please consult the DIN EN 60751:2009-05 for an exact definition of the sensor accuracy. Don't forget, that the whole measurement error for the temperature measurement consists always out of the error of the sensor element itself, the error of the used cabling and the measurement errors of the measurement electronic.

Out resistance measurement electronic uses an internal $2k\Omega$ sense resistor. With an excitation current of 500μ A the voltage drop on this resistor is 1V. This is the ideal range, to achieve the highest measurement accuracy. Use sensor type PT100, PT200, PT500, PT-1000, NI-120 or NI-1000 DIN43760 to achieve the best accuracy of our module with +/-0.1°C.

For PT10 and PT50 sensors this internal sense resistor is too big. So the reachable accuracy lies only about +/-3°C.

23.6.1.2 Configurable excitation current

For each input you can define an individual excitation current for the measurement:

- 5µA
- 10µA
- 25µA
- 50µA
- 100µA
- 250µA
- 500µA
- 1mA

The electronic executes an internal reference measurement on an Rsense resistor with $2k\Omega$ (Accuracy +/-0.05%). Please adjust the excitation current for each channel in a way, that the resulting maximum voltage drop on this internal Rsense resistor <=1.0V.

U=R*I -> U=2kΩ*500µA -> 1V



This results in a maximum excitation current of 500µA with this module. If the excitation current exceeds this voltage range, the module signals this error with "ADC-Out-of-Range" in the status flags of each channel.

The ideal excitation current of the module is 500µA! With smaller excitation currents the measurement will be more and more inaccurate!

23.6.1.3 Selectable linearisation standard

A PLATIN resistor (PT sensor) is defined with a standardized characteristic. This is the Callendar-Van Dusen equation:

This is defined as follows:

RT = R0 • (1 + a • T + b • T2 + (T - 100°C) • c • T3) for T < 0°C, RT = R0 • (1 + a • T + b • T2) for T > 0°C

The equation is used with different coefficients depending of the selected linearisation standard to calculate a temperature from the measured resistor.

STANDARD	ALPHA (α)	а	b	с
Europe DIN EN 60751 IEC 751 JIS C1604-1997	α=0x00385	3.908300*10 ⁻⁰³	-5.775000*10 ⁻⁰⁷	-4.183000*10 ⁻¹²
America SAMA Standard	α=0x003911	3.969200*10 ⁻⁰³	-5.849500*10 ⁻⁰⁷	-4.232500*10 ⁻¹²
Japan JIS C1604-1987	α=0x003916	3.973900*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
ITS-90	α=0x003926	3.984800*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
RTD-1000-375	α=0x00375	3.810200*10 ⁻⁰³	-6.018880*10 ⁻⁰⁷	-6.000000*10 ⁻¹²
NI-120	N/A	N/A	N/A	N/A

23.6.1.4 Sensor evaluation and accuracy

Our module computes the final temperature value °Celsius [°C] and delivers this temperature on various MODBUS registers in various number formats and via various ASCII commands to the host.

In addition our module can convert the temperature also in °Fahrenheit [°F] with the formula:

T[°F]=T[°C]*1.8+32

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in Fahrenheit is not necessary.

Also our module converts the temperature data into °Kelvin [°K] with the formula:

T[°K]=T[°C] +273.15

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in kelvin is not necessary.

Our module uses a 24 bit sigma/delta ADC with a noise suppression for 50/60Hz internally. Our module achieves a very high measurement accuracy of +/-0.1°C and a measurement resolution of +/-0.001°C!

Our module measures every channel around 1 time per second. In addition our module computes an average temperature for each channel with a user selectable time range in seconds, to suppress short noise signals in standard applications.

A manual adjustable zero offset allows a zero point shift to compensate static effects of the cabling, especially useful for 2 wire sensors.



Our module offers a very complex internal hardware to evaluate if the measured temperature is valid or not. Therefore the module offers for each channel a status representing the result of the last converted temperature. This status uses 8 bits, which have the following meaning:

BIT	NAME	DESCRIPTION
0	VALID	=1: If the measurement result is valid, this bit is set and all other bits in the status are 0!
		=0: if the system detects a conversion error or problem, this bit is 0 and the measurement result must be discarded!
1	ADC OUT OF RANGE	=1: If the product of $2k\Omega$ * excitation current >1V, this bit is 1 and the measurement result is invalid.
		The absolute input voltage of the ACD beyond ±1.125 • VREF/2
		=0: Everything is ok
2	SENSOR UNDER RANGE	=1: The current measured temperature is beyond the lower limit for the selected sensor type. For PT: -200°C, for NI-120: -80°C
		=0: Everything is ok
3	SENSOR OVER RANGE	=1: The current measured temperature is above the upper limit for the selected sensor type. For PT: +850°C, for NI-120: +260°C
		=0: Everything is ok
4	NOT USED	Ignore this bit
5	NOT USED	Ignore this bit
6	HARD ADC OUT OF RANGE	=1: Erroneous readout of the ADC value. A possibility is an extreme high noise level on the signal. The sensor value will be discarded. A second option is an open wiring for the sensor.
		=0: Everything is ok
7	SENSOR HARD FAULT	=1: Sensor wiring is open or no sensor is cabled to the module. Sensor has a shortcut or the internal sense resistor has an error.
		=0: Everything is ok



23.7 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-8RTD,8RTD2-SIO-MODBUS+ASCII-ENxx.pdf

23.8 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-8RTD,8RTD2-SIO-MODBUS+ASCII-ENxx.pdf



24 RESI-12AIU-SIO, RESI-12AIU-ETH

24.1 General information

This series of IO modules offer the following features:

- 12 high precision analog inputs for -10Vdc..+10Vdc signals (-10.24Vdc to +10.24Vdc)
- ADC resolution 16 bit, accuracy +/-0.1%
- RESI-xxx-SIO: Galvanic isolated RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

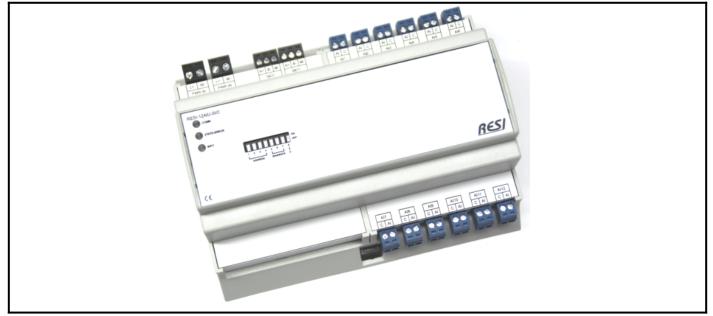


Figure: Our serial IO module



24.2 Technical specification

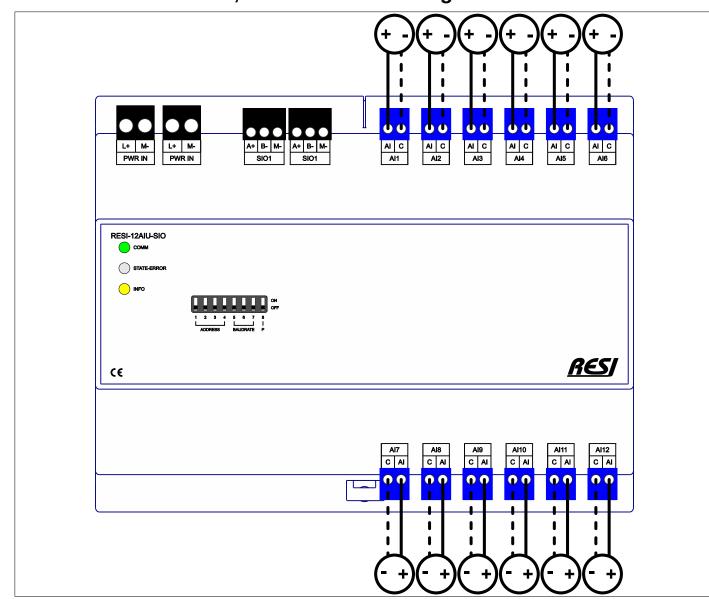
Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-12AIU-ETH <0.8W RESI-12AIU-ETH <1.2W Product housing RESI-12AIU-ETH BIG IO XT8 RESI-12AIU-ETH BIG IO XT8 Product weight RESI-12AIU-ETH BIG IO XT8 Product weight 290g RESI-12AIU-ETH 290g Analog inputs Number 12 Update speed Every 100ms Range -10V+10V ADC resolution 16 bit Input voltage range -102.4V+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 UnitID 255 UnitID 255 User RESI User RESI	Power consumption	
Product housing RESI-12AIU-SIO BIG IO XT8 RESI-12AIU-ETH BIG IO XT8 Product weight RESI-12AIU-ETH RESI-12AIU-ETH 285g RESI-12AIU-ETH 290g Analog inputs	RESI-12AIU-SIO	<0.8W
RESI-12AIU-SIO BIG IO XT8 RESI-12AIU-ETH BIG IO XT8 Product weight	RESI-12AIU-ETH	<1.2W
RESI-12AIU-SIO BIG IO XT8 RESI-12AIU-ETH BIG IO XT8 Product weight		
RESI-12AIU-ETH BIG IO XT8 Product weight RESI-12AIU-SIO RESI-12AIU-ETH 290g Analog inputs	Product housing	
Product weight RESI-12AIU-SIO 285g RESI-12AIU-ETH 290g Analog inputs Number 12 Update speed Every 100ms Range -10V.+10V ADC resolution 16 bit Input voltage range -10.24V+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitD 255 Default Ethernet settings IP mask IP mask 255.255.255.0 gateway tbd UnitD 255	RESI-12AIU-SIO	
RESI-12AIU-SIO 285g RESI-12AIU-ETH 290g Analog inputs	RESI-12AIU-ETH	BIG IO XT8
RESI-12AIU-ETH 290g Analog inputs	Product weight	
Analog inputs Number 12 Update speed Every 100ms Range -10V+10V ADC resolution 16 bit Input voltage range -10.24V+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings	RESI-12AIU-SIO	285g
Number12Update speedEvery 100msRange-10V+10VADC resolution16 bitInput voltage range-10.24V+10.24VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.0gatewaytbdUnitID255	RESI-12AIU-ETH	290g
Update speedEvery 100msRange-10V+10VADC resolution16 bitInput voltage range-10.24V+10.24VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.0gatewaytbdUnitID255UserRESI	Analog inputs	
Range-10V.+10VADC resolution16 bitInput voltage range-10.24V.+10.24VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Number	12
ADC resolution 16 bit Input voltage range -10.24V+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address tbd IP mask 255.255.255.0 gateway tbd UnitID 255	Update speed	Every 100ms
Input voltage range -10.24V.+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings	Range	-10V+10V
Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Image: Comparison of the module inputs Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP mask IP mask 255.255.255.0 gateway tbd UnitID 255	ADC resolution	16 bit
Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Image: Setting Sett	Input voltage range	-10.24V+10.24V
Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Via DIP switch Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address tbd IP mask 255.255.255.0 gateway tbd UnitID 255	Accuracy	+/-0.1%
Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address tbd IP mask 255.255.255.0 gateway tbd UnitID 255	Cable connection	via terminals
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Galvanic isolation	Yes, to the rest of the module, not to the other analogue inputs
ParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Default serial settings	
StopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Baud rate	via DIP switch
UnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Parity	none
Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Stopbits	one
IP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	UnitID	255
IP mask255.255.0gatewaytbdUnitID255UserRESI	Default Ethernet settings	
gateway tbd UnitID 255 User RESI	IP address	tbd
UnitID 255 User RESI	IP mask	255.255.255.0
User RESI	gateway	tbd
	UnitID	255
password RESI	User	RESI
	password	RESI



24.3 Additional terminals & LED states

ANALOG INPUTS	12 analog inputs for -10V0V+10V signals		
	Twelve 2 pin plug-in terminal blocks		
	Terminal type:	RM3.5	
	C:	Ground for all analog inputs	
	AI1-AI12 AI:	Analog inputs	
Pin layout	AI:	Signal input for analog input #x	
	C:	Signal ground for analog input #x	
		All signal grounds are internally bridged	
ERROR	If everything is OK,	this LED is off. If there is an internal error at the analog inputs,	
	this LED flashes quickly in RED.		



24.4 RESI-12AIU-SIO,ETH: Schematic diagram

Figure: Schematics for the IO modules



24.5 RESI-12AIU-SIO,ETH: Wiring diagram

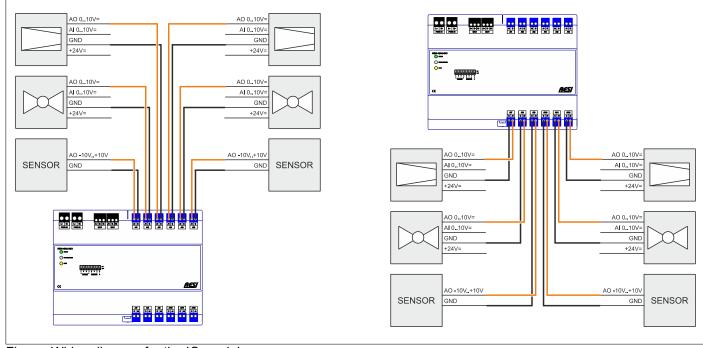


Figure: Wiring diagram for the IO modules



24.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-12AIU-SIO-ETH-MODBUS+ASCII-ENxx.pdf

24.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-12AIU-SIO-ETH-MODBUS+ASCII-ENxx.pdf



25 RESI-12AOU-SIO, RESI-12AOU-ETH

25.1 General information

This series of IO modules offer the following features:

- 12 high precision analog outputs for -10Vdc..+10Vdc signals
- ADC resolution 12 bit, accuracy +/-0.1%
- RESI-xxx-SIO: Galvanic isolated RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

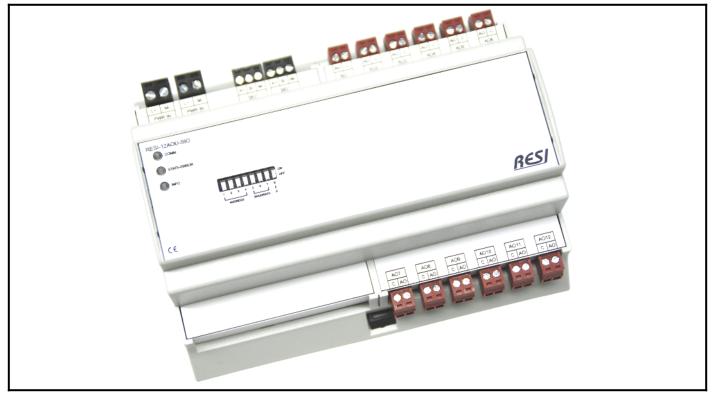


Figure: Our serial IO module



25.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-12AOU-ETH <1.5W Product housing ERSI-12AOU-SIO RESI-12AOU-ETH BIG IO XT8 Product weight ESI-12AOU-ETH RESI-4AOU-ETH BIG IO XT8 Product weight ESI-4AOU-ETH RESI-4AOU-ETH 290g Analog outputs	Power consumption	
Product housing RESI-12AOU-SIO BIG IO XT8 RESI-12AOU-ETH BIG IO XT8 Product weight RESI-4AOU-SIO RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs Image: Comparison of the system	RESI-12AOU-SIO	<1.1W
RESI-12AOU-SIO BIG IO XT8 RESI-12AOU-ETH BIG IO XT8 Product weight RESI-4AOU-SIO RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs Number Number 12 Update speed Every 100ms Range -10V+10V ACcuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings	RESI-12AOU-ETH	<1.5W
RESI-12AOU-SIO BIG IO XT8 RESI-12AOU-ETH BIG IO XT8 Product weight RESI-4AOU-SIO RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs Number Number 12 Update speed Every 100ms Range -10V+10V ACcuracy +/-O.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings one Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 125 IP mask 255.255.0 gateway tbd UnitID 255 UnitID 255		
RESI-12AOU-ETH BIG IO XT8 Product weight RESI-4AOU-SIO RESI-4AOU-ETH 290g Analog outputs	Product housing	
Product weight RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs	RESI-12AOU-SIO	BIG IO XT8
RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs	RESI-12AOU-ETH	BIG IO XT8
RESI-4AOU-SIO 285g RESI-4AOU-ETH 290g Analog outputs	Product weight	
RESI-4AOU-ETH 290g Analog outputs 12 Number 12 Update speed Every 100ms Range -10V+10V ADC resolution 12 bit Output voltage range -10V+10V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings Ibd IP mask 255.255.255.0 gateway tbd UnitID 255	RESI-4AOU-SIO	285g
Number12Update speedEvery 100msRange-10V+10VADC resolution12 bitOutput voltage range-10V+10VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP mask255.255.255.0gatewaytbdUserRESI	RESI-4AOU-ETH	-
Number12Update speedEvery 100msRange-10V+10VADC resolution12 bitOutput voltage range-10V+10VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP mask255.255.255.0gatewaytbdUserRESI	Analog outputs	
Range -10V.+10V ADC resolution 12 bit Output voltage range -10V.+10V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP mask 255.255.255.0 gateway tbd UnitID 255	Number	12
Range-10V.+10VADC resolution12 bitOutput voltage range-10V.+10VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255	Update speed	Every 100ms
ADC resolution 12 bit Output voltage range -10V.+10V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings	Range	
Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Image: Second sec	ADC resolution	12 bit
Cable connectionvia terminalsGalvanic isolationYes, to the rest of the module, not to the other analogue inputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255	Output voltage range	-10V+10V
Galvanic isolation Yes, to the rest of the module, not to the other analogue inputs Default serial settings Via DIP switch Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address IP mask 255.255.255.0 gateway tbd UnitID 255	Accuracy	+/-0.1%
Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address IP address tbd IP mask 255.255.255.0 gateway tbd UnitID 255	Cable connection	via terminals
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Galvanic isolation	Yes, to the rest of the module, not to the other analogue inputs
ParitynoneStopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Default serial settings	
StopbitsoneUnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Baud rate	via DIP switch
UnitID255Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Parity	none
Default Ethernet settingsIP addresstbdIP mask255.255.255.0gatewaytbdUnitID255UserRESI	Stopbits	one
IP address tbd IP mask 255.255.255.0 gateway tbd UnitID 255 User RESI	UnitID	255
IP mask 255.255.0 gateway tbd UnitID 255 User RESI	Default Ethernet settings	
gateway tbd UnitID 255 User RESI	IP address	tbd
UnitID 255 User RESI	IP mask	255.255.255.0
User RESI	gateway	tbd
	UnitID	255
password RESI	User	RESI
	password	RESI



25.3 Additional terminals & LED states

ANALOG OUTPUTS	12 analog outputs for -10V0V+10V signals		
	Twelve 2 pin plug-ir	n terminal blocks	
	Terminal type:	RM3.5	
	C:	Ground for all analog inputs	
	A01-A012:	Analog outputs	
Pin layout	AO:	Signal output for analog output #x	
	C:	Signal ground for analog output #x	
		All signal grounds are internally bridged	
ERROR	If everything is OK, this LED is off. If there is an internal error at the analog inputs		
	this LED flashes qu	ickly in RED.	



AI ΑΙ ΑΙ ΑΙ ΑΙ Α I I I I I I I I I I 1 1 -1 t 1 I I I I I I 00 00 00 00 00 0 ١ AO C AO C AO C AO C AO C AO C L+ M-L+ M-A+ B-A05 PWR IN PWR IN AO1 A02 AO3 A04 AO6 SIO1 SIO1 RESI-12AOU-SIO 🔵 сомм Î RES| CE AO8 C AO A07 AO9 AO10 AO11 AO12 C AO C AO C AO C AO C AO 00 00 00 00 00 00 Τ 1 1 1 1 I I 1 I I I I L L 1 1 1 AI Α A Α ΑΙ Α

25.4 RESI-12AOU-SIO,ETH: Schematic diagram

Figure: Schematics for the IO modules



RESI-12AOU-SIO, ETH: Wiring diagram 25.5

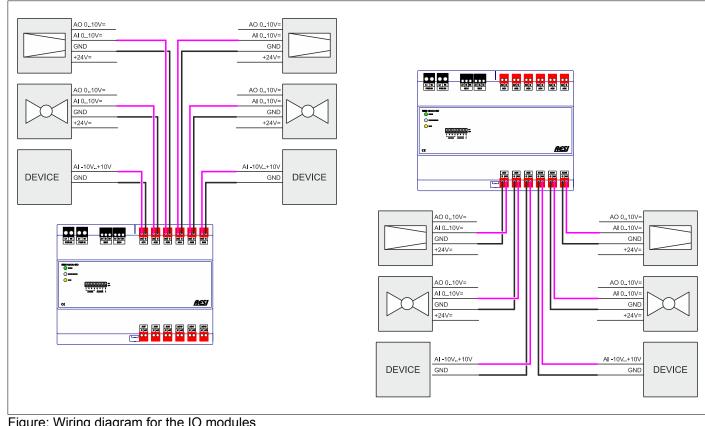


Figure: Wiring diagram for the IO modules



25.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-12AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf

25.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-12AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf



26 RESI-2RI-SIO, RESI-2RI-ETH

26.1 General information

This series of IO modules offer the following features:

- 2 digital inputs for 10...250Vac/dc signals
- Galvanic insulation between digital inputs and rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module



Figure: Our Ethernet IO module



26.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption		
RESI-2RI-SIO	<0.7W	
RESI-2RI-ETH	<1.1W	
Product housing		
RESI-2RI-SIO	CEM17	
RESI-2RI-ETH	CEM35	
Product weight		
RESI-2RI-SIO	55g	
RESI-2RI-ETH	89g	
Digital inputs		
Number	2	
Signal type	10250Vac/dc	
Cable connection	via terminals	
Galvanic isolation	Yes, between the two inputs and the CPU module	
	not between the two digital inputs	
Default serial settings		
Baud rate	via DIP switch	
Parity	none	
Stopbits	one	
UnitID	255	
Default Ethernet settings		
IP address	192.168.0.40	
IP mask	255.255.255.0	
gateway	192.168.0.1	
UnitID	255	
User	RESI	
password	RESI	



26.3 Additional terminals & LED states

DIGITAL INPUTS	2 digital inputs for 1	0250Vac/dc signals	
	One 3 pin terminal	block	
	Terminal type:	USLIM	
	C:	Common for both digital inputs	
	DI1,DI2:	Digital inputs	
Pin layout	DI1:	Signal input for digital input #1	
	DI2:	Signal input for digital input #2	
	C:	Common for both digital inputs	
INFO	If at least one of the	e digital inputs is ON, this LED is on.	
	If no digital input is	ON, this LED is OFF too.	



26.4 RESI-2RI-SIO,ETH: Schematic diagram

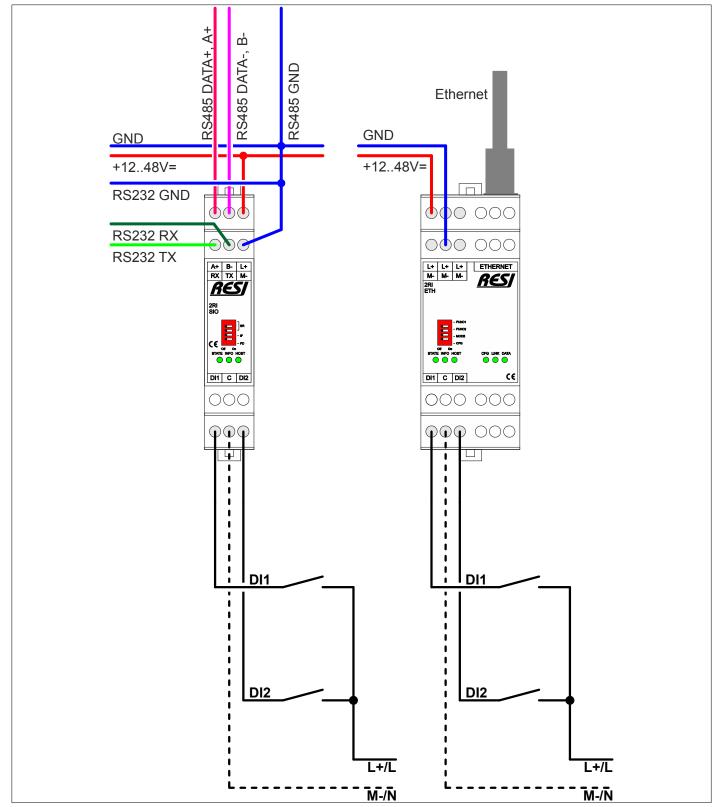


Figure: Schematics for the IO modules

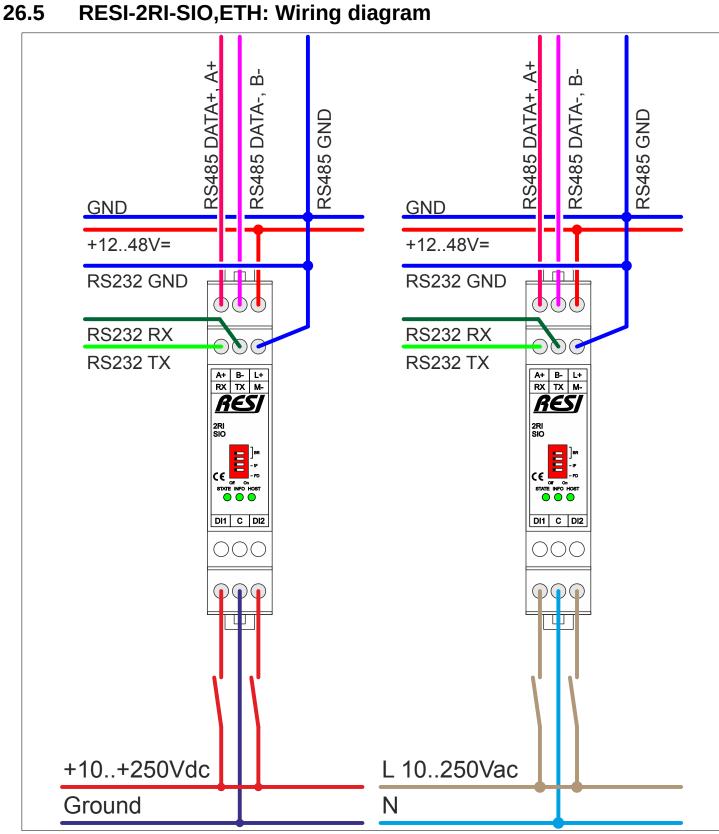


Figure: Wiring diagram for the IO modules

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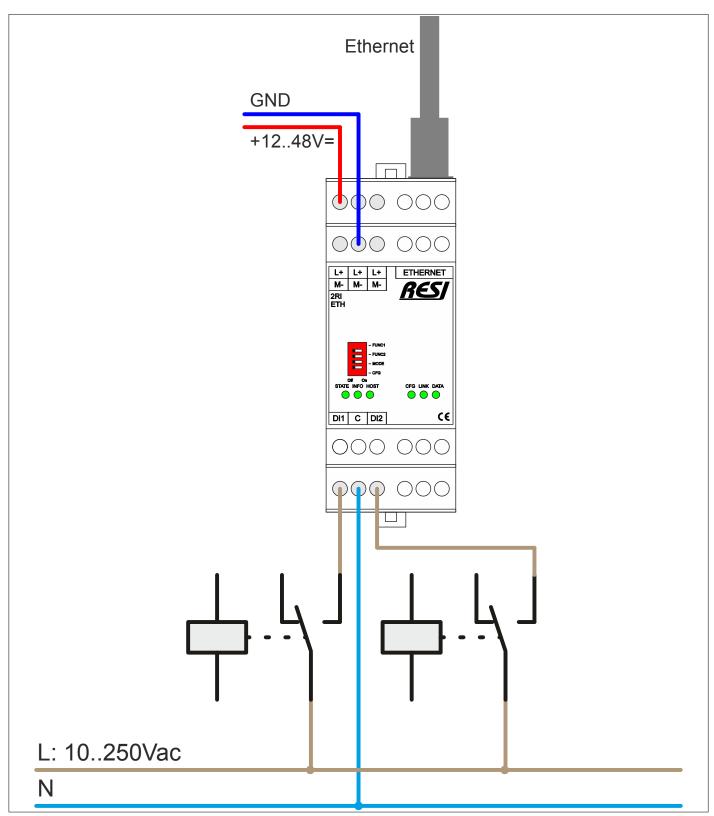


Figure: Wiring diagram for the IO modules



26.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2RI-SIO-ETH-MODBUS+ASCII-ENxx.pdf

26.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2RI-SIO-ETH-MODBUS+ASCII-ENxx.pdf



27 RESI-4DI-SIO, RESI-4DI-ETH

27.1 General information

This series of IO modules offer the following features:

- 4 digital inputs for 12...48Vdc signals
- Galvanic insulation between digital inputs and rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI	
ABO	

Figure: Our Ethernet IO module



27.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-4DI-SIO	<0.8W
RESI-4DI-ETH	<1.2W
Dre doot have in a	
Product housing	
RESI-4DI-SIO	CEM17
RESI-4DI-ETH	CEM35
Product weight	
RESI-4DI-SIO	58g
RESI-4DI-ETH	92g
Digital inputs	
Number	4
Signal type	1248Vdc
Cable connection	via terminals
Galvanic isolation	Yes, between the four inputs and the CPU module
	not between the four digital inputs
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.41
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI
<u> </u>	



27.3 Additional terminals & LED states

DIGITAL INPUTS	4 digital inputs for 1248Vdc signals Two 3 pin terminal blocks	
		M-:
	DI1DI4:	Digital inputs
Pin layout	DI1:	Signal input for digital input #1
	DI2:	Signal input for digital input #2
	DI3:	Signal input for digital input #3
	DI4:	Signal input for digital input #4
	M-:	Common ground for all four digital inputs
		Both M- clamps are internally bridged
INFO	If at least one of the digital inputs is ON, this LED is on.	
	If no digital input is ON, this LED is OFF too.	



27.4 RESI-4DI-SIO,ETH: Schematic diagram

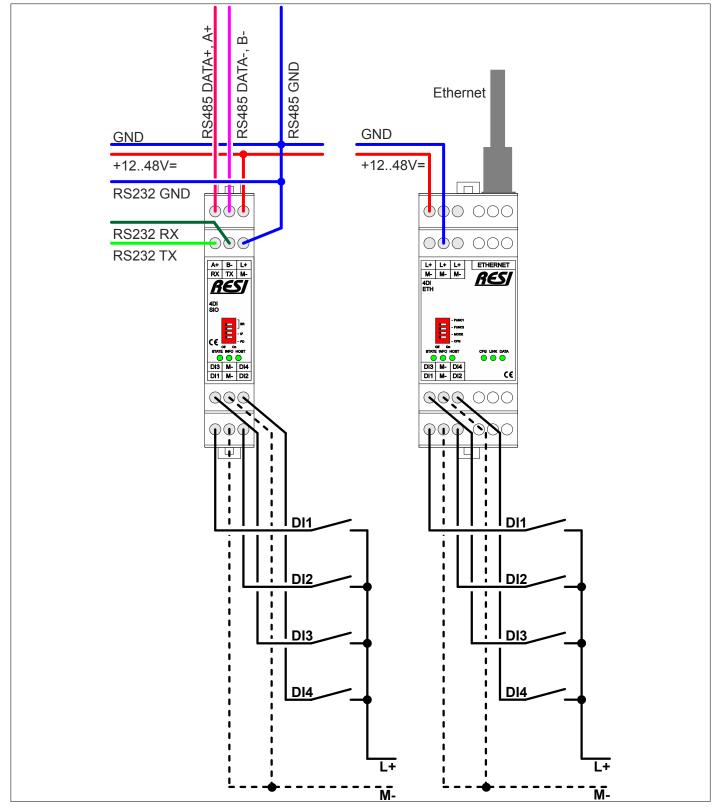


Figure: Schematics for the IO modules



27.5 RESI-4DI-SIO,ETH: Wiring diagram

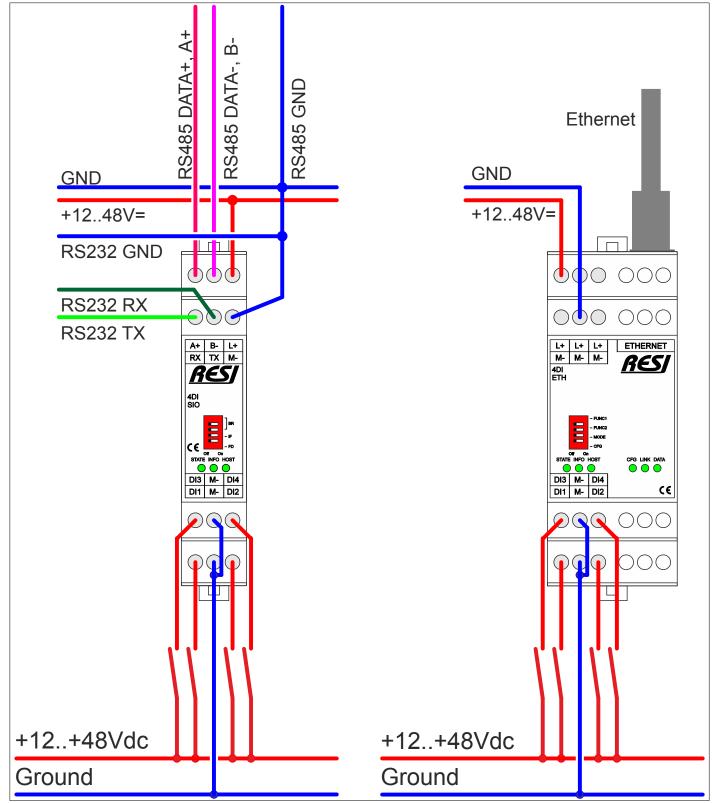


Figure: Wiring diagram for the IO modules



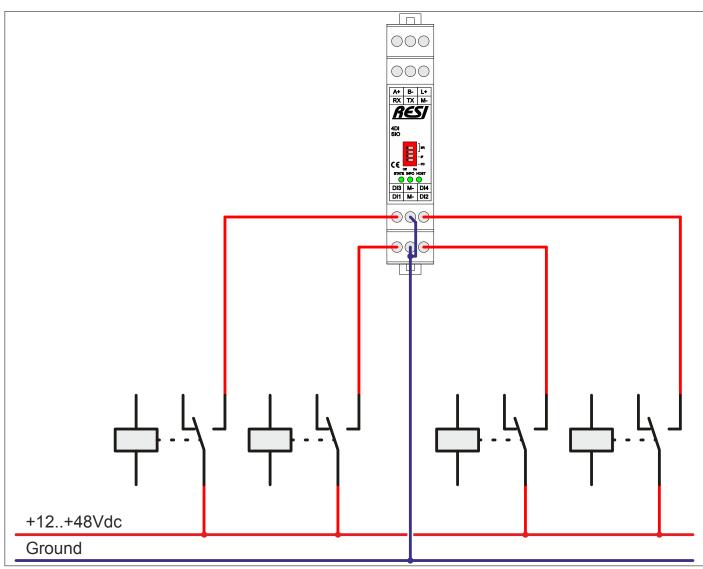


Figure: Wiring diagram for the IO modules



27.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-4DI-SIO-ETH-MODBUS+ASCII-ENxx.pdf

27.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-4DI-SIO-ETH-MODBUS+ASCII-ENxx.pdf



28 RESI-1S0-SIO, RESI-1S0-ETH

28.1 General information

This series of IO modules offer the following features:

- 1 counter input for S0 signals with 15V= output voltage
- Galvanic insulation between S0 signal and rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI	
Er. The second contract of the second contrac	

Figure: Our Ethernet IO module



28.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-1S0-SIO	<1.4W
RESI-1S0-ETH	<1.8W
Product housing	
RESI-1S0-SIO	CEM17
RESI-1S0-ETH	CEM35
Product weight	
RESI-1S0-SIO	53g
RESI-1S0-ETH	87g
Counter inputs	
Number	1
Signal type	S0 class B
S0 output voltage	max. 15V=
S0 output current	max. 20mA, typical 13.6mA
S0 pulse length	>=30ms
	Internal configurable digital filter for glitches
Cable connection	via terminals
Galvanic isolation	Yes, between the S0 input and the CPU module

HINT: The counted impulses are internally stored in a ferromagnetic RAM. After power on of the module, the last counter is readout from this FRAM. So no loss of counts can happen.

Default serial settings		
Baud rate	via DIP switch	
Parity	none	
Stopbits	one	
UnitID	255	

Default Ethernet settings

0		
IP address	192.168.0.20	
IP mask	255.255.255.0	
gateway	192.168.0.1	
UnitID	255	
Lloor		

User	RESI	
password	RESI	



28.3 Additional terminals & LED states

COUNTER INPUTS	1 counter input for \$	S0 impulses
	One 3 pin terminal block	
	Terminal type:	USLIM
	S0+:	Positive S0 input
	S0-:	Negative S0 input
Pin layout	S0+:	Positive S0 input
	N/C:	not connected
	S0-:	Negative S0 input
INFO	If the S0 input is closed (ON), this LED is ON.	
	If the S0 input is op	ened (OFF), this LED is OFF.



28.4 RESI-1S0-SIO,ETH: Schematic diagram

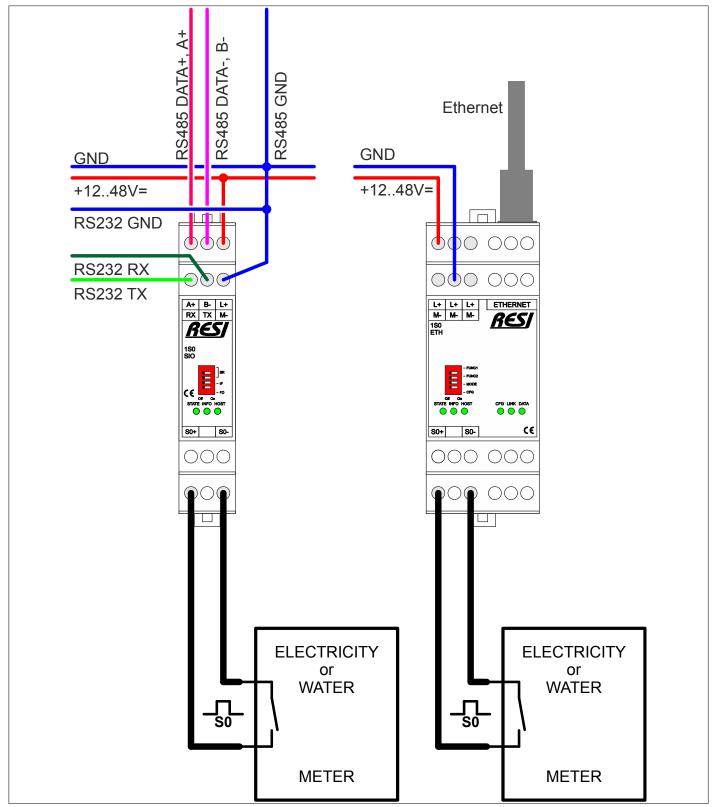


Figure: Schematics for the IO modules

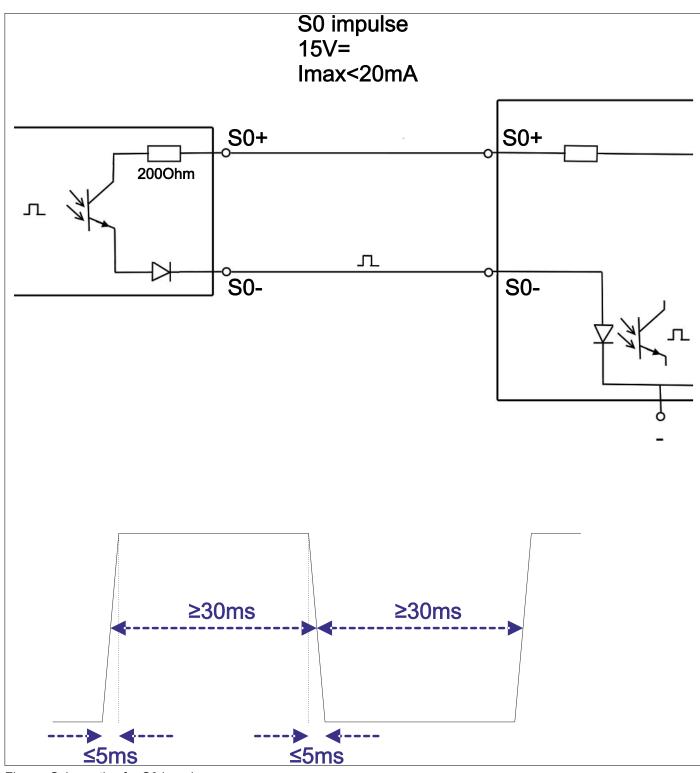


Figure: Schematics for S0 impulse

RE S



28.5 RESI-1S0-SIO,ETH: Wiring diagram

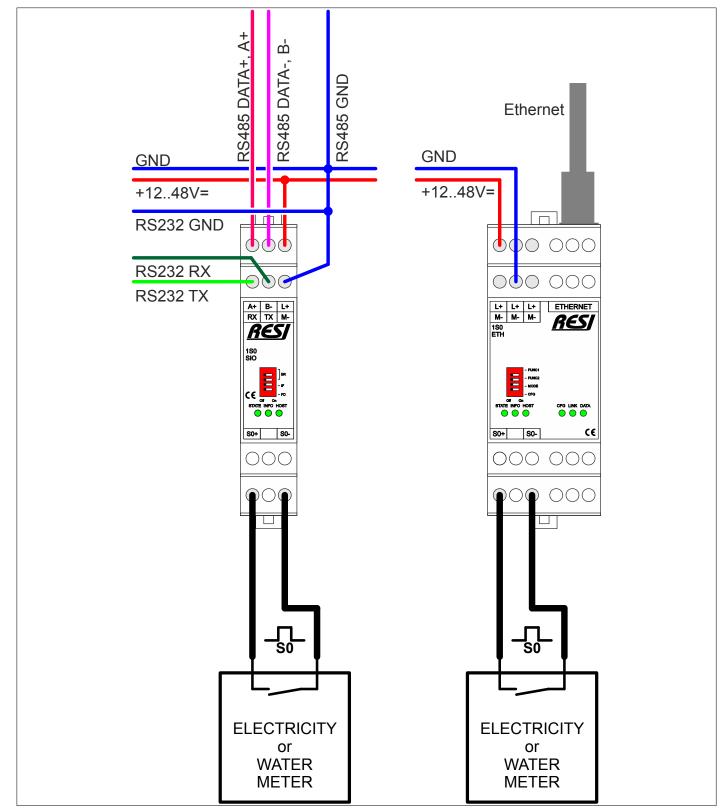


Figure: Wiring diagram for the IO modules



28.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-1S0-SIO-ETH-MODBUS+ASCII-ENxx.pdf

28.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-1S0-SIO-ETH-MODBUS+ASCII-ENxx.pdf



29 RESI-2S0-SIO, RESI-2S0-ETH

29.1 General information

This series of IO modules offer the following features:

- 2 counter inputs for S0 signals with 15V= output voltage
- Galvanic insulation between S0 signals and rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

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er time to the ce	

Figure: Our Ethernet IO module



29.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2S0-SIO	<1.5W
RESI-2S0-ETH	<1.9W
Product housing	
RESI-2S0-SIO	CEM17
RESI-2S0-ETH	CEM35
Draduat waight	
Product weight	
RESI-2S0-SIO	56g
RESI-2S0-ETH	90g
Counter inputs	
Number	2
Signal type	S0 class B
S0 output voltage	max. 15V=
S0 output current	max. 20mA, typical 8.2mA
S0 pulse length	>=30ms
	Internal configurable digital filter for glitches
Cable connection	via terminals
Galvanic isolation	Yes, between the two S0 inputs and the CPU module
	but nopt between the two S0 inputs

HINT: The counted impulses are internally stored in a ferromagnetic RAM. After power on of the module, the last counter is readout from this FRAM. So no loss of counts can happen.

via DIP switch	
none	
one	
255	
	none one

Default Ethernet settings		
IP address	192.168.0.21	
IP mask	255.255.255.0	
gateway	192.168.0.1	
UnitID	255	
User	RESI	
password	RESI	



29.3 Additional terminals & LED states

COUNTER INPUTS	2 counter input for S0 impulses Two 3 pin terminal blocks	
	Terminal type:	USLIM
	S0+A:	Positive S0 input #1
	S0-A:	Negative S0 input #1
	S0+B:	Positive S0 input #2
	S0-B:	Negative S0 input #2
Pin layout	S0+A:	Positive S0 input #1
	N/C:	not connected
	S0-A:	Negative S0 input #1
	S0+B:	Positive S0 input #2
	N/C:	not connected
	S0-B:	Negative S0 input #2
INFO	If at least one of the S0 inputs is closed (ON), this LED is ON.	
	If all of the S0 input	s are opened (OFF), this LED is OFF.



29.4 RESI-2S0-SIO,ETH: Schematic diagram

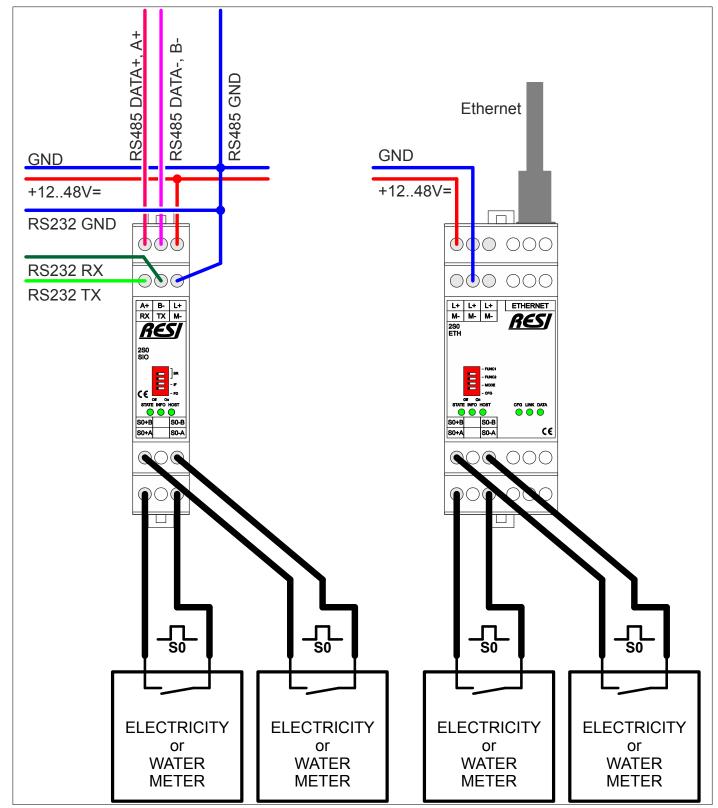


Figure: Schematics for the IO modules

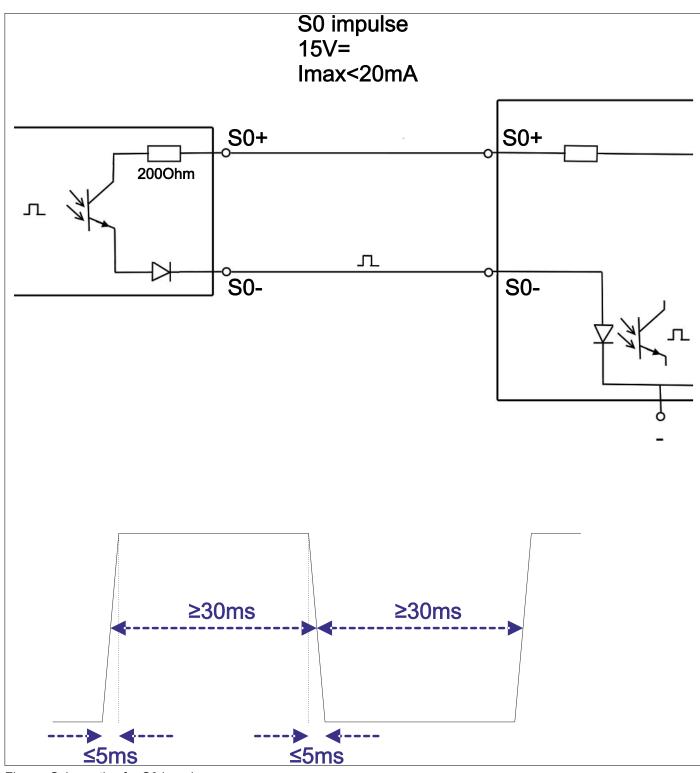


Figure: Schematics for S0 impulse

RE S



29.5 RESI-2S0-SIO,ETH: Wiring diagram

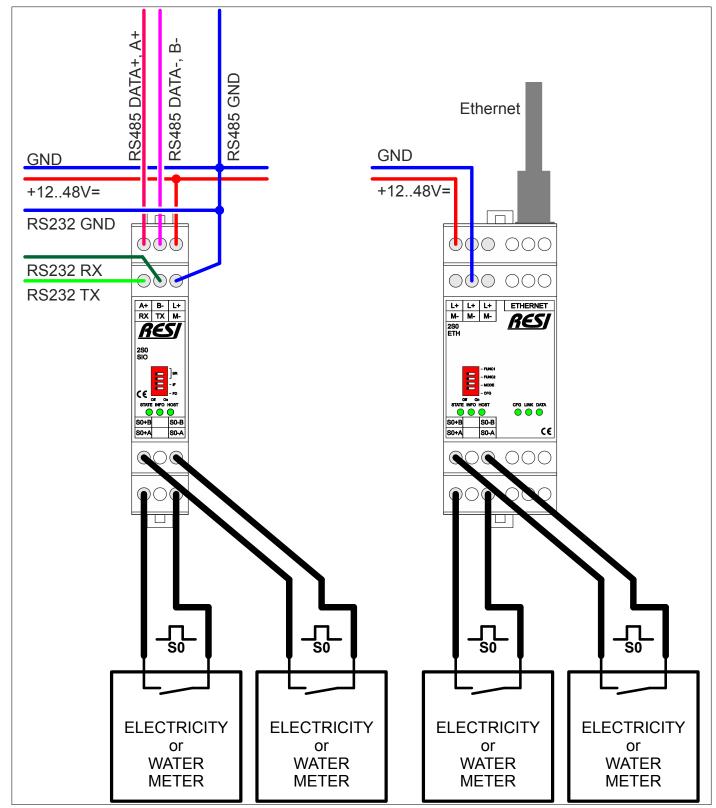


Figure: Wiring diagram for the IO modules



29.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2S0-SIO-ETH-MODBUS+ASCII-ENxx.pdf

29.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2S0-SIO-ETH-MODBUS+ASCII-ENxx.pdf



30 RESI-1RO-SIO, RESI-1RO-ETH

30.1 General information

This series of IO modules offer the following features:

- 1 relay output with changeover contacts (NO and NC)
- Contact rating: max. 250Vac, 30Vdc, 8A
- Galvanic insulation with the relay from the rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI BESI L'IL' I BESI L'IL' I BESI L'IL
Ren Herrich Herrich CE
8 A 3

Figure: Our Ethernet IO module



30.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-IRO-SIO <0.9W RESI-IRO-ETH <1.3W Product housing RESI-IRO-SIO CEM17 RRSI-IRO-ETH CEM35 Product weight RESI-IRO-SIO 59g RESI-IRO-SIO 59g RESI-IRO-SIO 59g Relay outputs Number 1 Relay output current max. 250Vac or 30Vdc Relay output current max. 8A Relay output current max. 8A Relay output current max. 8A Maximum contact rating with 250Vac: 2000VA with 30Vdc: 2400W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate via DIP switch Pratity none Stopbits one UnitID 255 Default Ethernet settings 192 168.0.42 IP mask 255 255.0 gateway	Power consumption	
Product housing RESI-IRO-SIO CEM17 RESI-IRO-ETH CEM35 Product weight ESI-IRO-ETH RESI-IRO-ETH 93g Relay outputs Number Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 240W Wd Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnnitD 255 UntID 255 UntID 255 User RES	RESI-1RO-SIO	<0.9W
RESI-IRO-SIO CEM17 RESI-IRO-ETH CEM35 Product weight RESI-IRO-SIO RESI-IRO-SIO 59g RESI-IRO-ETH 93g Relay outputs Number Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 200VA with 30Vdc: 240W Maximum contact voltage Z50Vac or 125Vdc with 0.2A Cable connection Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.42 IP mask 255.255.25.0 gateway 192.168.0.1 UnitID 255	RESI-1RO-ETH	<1.3W
RESI-IRO-SIO CEM17 RESI-IRO-ETH CEM35 Product weight RESI-IRO-SIO RESI-IRO-SIO 59g RESI-IRO-ETH 93g Relay outputs Number Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 200VA with 30Vdc: 240W Maximum contact voltage Z50Vac or 125Vdc with 0.2A Cable connection Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.42 IP mask 255.255.25.0 gateway 192.168.0.1 UnitID 255		
RESI-IRO-ETH CEM35 Product weight FRESI-IRO-SIO RESI-IRO-ETH 93g Relay outputs 1 Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output voltage max. 250Vac or 30Vdc Relay output voltage max. 8A Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 240W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address IP address 192.168.0.42 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	Product housing	
Product weight RESI-1RO-SIO 59g RESI-1RO-ETH 93g Relay outputs 1 Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 240W Maximum contact voltage Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UntitD 255 Default Ethernet settings IP address IP address 192.168.0.42 IP mask 255.255.0 IP address 192.168.0.1 UnitID 255	RESI-1RO-SIO	CEM17
RESI-1RO-SIO 59g RESI-1RO-ETH 93g Relay outputs Number Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 2400W with 30Vdc: 2400W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitD 255 Default Ethernet settings IP address IP mask 255.255.255.0 gateway 192.168.0.1 UnitD 255 User RESI	RESI-1RO-ETH	CEM35
RESI-1RO-SIO 59g RESI-1RO-ETH 93g Relay outputs Number Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 2400W with 30Vdc: 2400W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitD 255 Default Ethernet settings IP address IP mask 255.255.255.0 gateway 192.168.0.1 UnitD 255 User RESI		
RESI-1RO-ETH 93g Relay outputs 1 Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA With 30Vdc: 240W With 30Vdc: 240W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Product weight	
Relay outputs Number 1 Relay output voltage max. 250Vac or 30Vdc Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA with 30Vdc: 240W Maximum contact voltage Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate Via DIP switch Parity Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.42 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	RESI-1RO-SIO	59g
Number1Relay output voltagemax. 250Vac or 30VdcRelay output currentmax. 8ARelay typeChangeover relay with NO and NC contactsContact materialAu-flashed AgNiMaximum contact ratingwith 250Vac: 2000VAwith 30Vdc: 240WMaximum contact voltage250Vac or 125Vdc with 0.2ACable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.00gateway192.168.0.1UnitID255	RESI-1RO-ETH	93g
Number1Relay output voltagemax. 250Vac or 30VdcRelay output currentmax. 8ARelay typeChangeover relay with NO and NC contactsContact materialAu-flashed AgNiMaximum contact ratingwith 250Vac: 2000VAwith 30Vdc: 240WMaximum contact voltage250Vac or 125Vdc with 0.2ACable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.00gateway192.168.0.1UnitID255		
Relay output voltagemax. 250Vac or 30VdcRelay output currentmax. 8ARelay typeChangeover relay with NO and NC contactsContact materialAu-flashed AgNiMaximum contact ratingwith 250Vac: 2000VAwith 30Vdc: 240WMaximum contact voltage250Vac or 125Vdc with 0.2ACable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.0gateway192.168.0.1UnitID255IVarRESI	Relay outputs	
Relay output current max. 8A Relay type Changeover relay with NO and NC contacts Contact material Au-flashed AgNi Maximum contact rating with 250Vac: 2000VA	Number	1
Relay typeChangeover relay with NO and NC contactsContact materialAu-flashed AgNiMaximum contact ratingwith 250Vac: 2000VAwith 30Vdc: 240WMaximum contact voltageCable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.0gateway192.168.0.1UnitID255UserRESI	Relay output voltage	max. 250Vac or 30Vdc
Contact materialAu-flashed AgNiMaximum contact ratingwith 250Vac: 2000VAwith 30Vdc: 240WMaximum contact voltage250Vac or 125Vdc with 0.2ACable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.00gateway192.168.0.1UnitID255	Relay output current	max. 8A
Maximum contact rating with 250Vac: 2000VA with 30Vdc: 240W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Relay type	Changeover relay with NO and NC contacts
with 30Vdc: 240W Maximum contact voltage 250Vac or 125Vdc with 0.2A Cable connection via terminals Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings	Contact material	Au-flashed AgNi
Maximum contact voltage250Vac or 125Vdc with 0.2ACable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255	Maximum contact rating	with 250Vac: 2000VA
Cable connectionvia terminalsGalvanic isolationYes, with the relay itself to the rest of the moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255		with 30Vdc: 240W
Galvanic isolation Yes, with the relay itself to the rest of the module Default serial settings Via DIP switch Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Maximum contact voltage	250Vac or 125Vdc with 0.2A
Default serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255	Cable connection	via terminals
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255UnitID255RESIRESI	Galvanic isolation	Yes, with the relay itself to the rest of the module
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255UnitID255RESIRESI		
ParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Default serial settings	
StopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.42IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Baud rate	via DIP switch
UnitID 255 Default Ethernet settings 192.168.0.42 IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI	Parity	none
Default Ethernet settings IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Stopbits	one
IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI	UnitID	255
IP address 192.168.0.42 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI		
IP mask 255.255.0 gateway 192.168.0.1 UnitID 255 User RESI	Default Ethernet settings	
gateway 192.168.0.1 UnitID 255 User RESI		
UnitID 255 User RESI	IP mask	
User RESI	gateway	192.168.0.1
	UnitID	255
password RESI		
	password	RESI



30.3 Additional terminals & LED states

RELAY OUTPUT	1 relay output for 250Vac, 30Vdc,8A One 3 pin terminal block	
	Terminal type:	USLIM
	NO:	Maker contact of relay (Form A)
	C:	Common root for NO and NC contacts
	NC:	Breaker contact of relay (Form B)
Pin layout	NO:	Maker contact of relay (Form A)
	C:	Common root for NO and NC contacts
	NC:	Breaker contact of relay (Form B)
INFO	If the relay output is activated (ON), this LED is ON.	
	If the relay output is deactivated (OFF), this LED is OFF.	



30.4 RESI-1RO-SIO,ETH: Schematic diagram

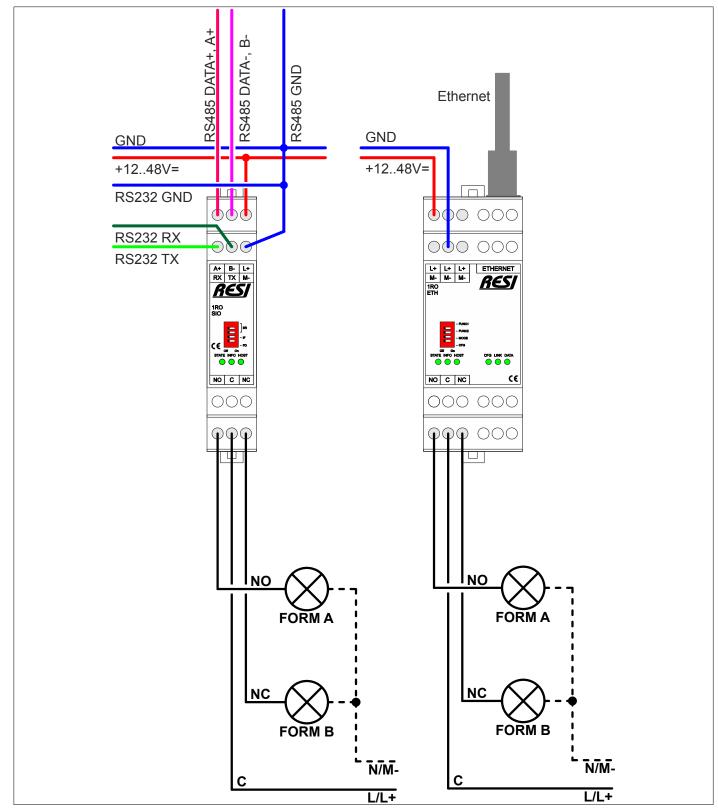


Figure: Schematics for the IO modules



30.5 RESI-1RO-SIO,ETH: Wiring diagram

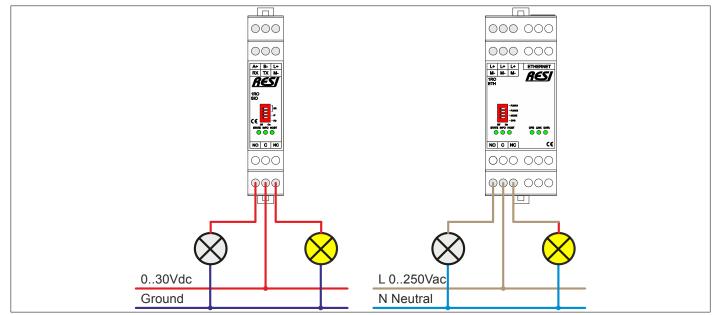


Figure: Wiring diagram for the IO modules, relay is deactivated (OFF)

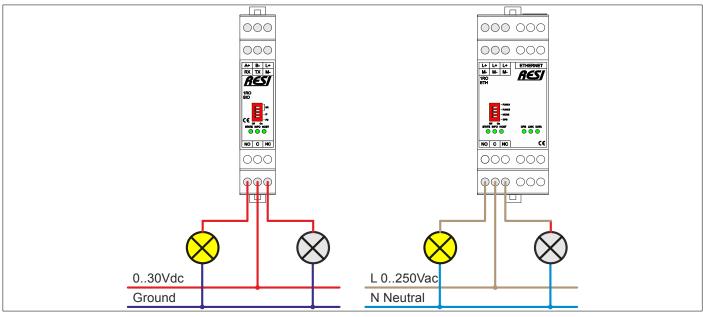


Figure: Wiring diagram for the IO modules, relay is activated (ON)



30.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-1RO-SIO-ETH-MODBUS+ASCII-ENxx.pdf

30.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-1RO-SIO-ETH-MODBUS+ASCII-ENxx.pdf



31 RESI-2RO-SIO, RESI-2RO-ETH

31.1 General information

This series of IO modules offer the following features:

- 2 relay outputs with maker contacts (NO) and common root contact
- Contact rating: max. 250Vac, 30Vdc, 8A
- Galvanic insulation with the relays from rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module



Figure: Our Ethernet IO module



31.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2RO-SIO	<1.2W
RESI-2RO-ETH	<1.6W
Product housing	
RESI-2RO-SIO	CEM17
RESI-2RO-ETH	CEM35
Product weight	
RESI-2RO-SIO	69g
RESI-2RO-ETH	104g
Relay outputs	2
Number	2
Relay output voltage	max. 250Vac or 30Vdc
Relay output current	max. 8A
Relay type	Two Form A relay with maker contact NO
	Common root contact for both relays
Contact material	Au-flashed AgNi
Maximum contact rating	with 250Vac: 2000VA
	with 30Vdc: 240W
Maximum contact voltage	250Vac or 125Vdc with 0.2A
Cable connection	via terminals
Galvanic isolation	Yes, with the relay itself to the rest of the module
Default aprial acttings	
Default serial settings	via DIP switch
Baud rate	
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.43
IP mask	255.255.255.0
Gateway	192.168.0.1
UnitID	255
User	RESI
Password	RESI



31.3 Additional terminals & LED states

RELAY OUTPUTS	2 relay outputs for 250Vac, 30Vdc,8A Two 3 pin terminal blocks	
	Terminal type:	USLIM
	R01:	Maker contact of relay #1 (NO, Form A)
	RO2:	Maker contact of relay #2 (NO, Form A)
	L/L+:	Common root for both relays
	N/M-:	Neutral/Ground signal, bridged
Pin layout	RO1:	Maker contact of relay #1 (NO, Form A)
	RO2:	Maker contact of relay #2 (NO, Form A)
	L/L+:	Common root for both relays
	N/M-:	Neutral/Ground signal, bridged
	N/M-:	Neutral/Ground signal, bridged
	N/M-:	Neutral/Ground signal, bridged
INFO	If one of the relay o	utputs is activated (ON), this LED is ON.
	If none of the relay outputs is activated (OFF), this LED is OFF.	



31.4 RESI-2RO-SIO,ETH: Schematic diagram

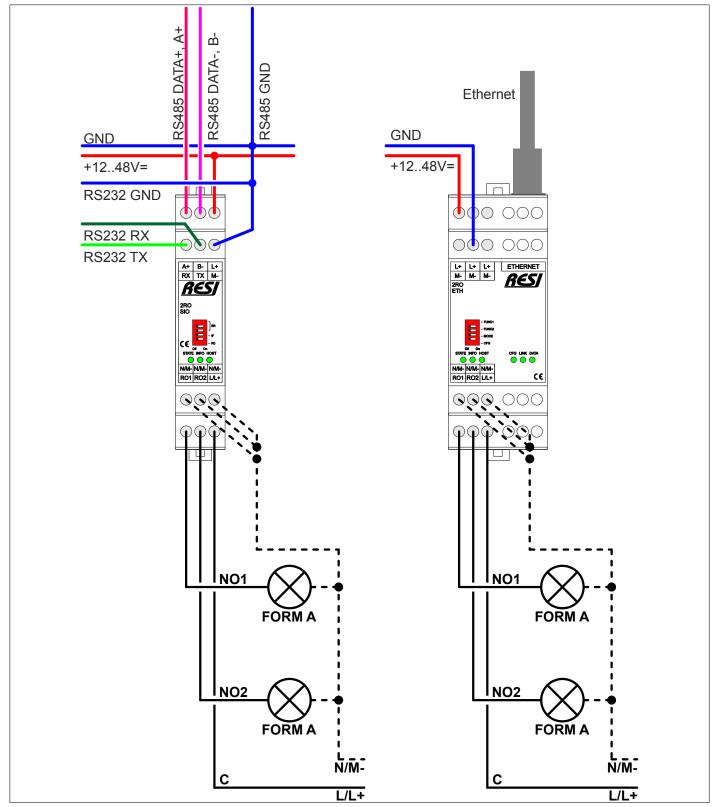


Figure: Schematics for the IO modules



31.5 RESI-2RO-SIO,ETH: Wiring diagram

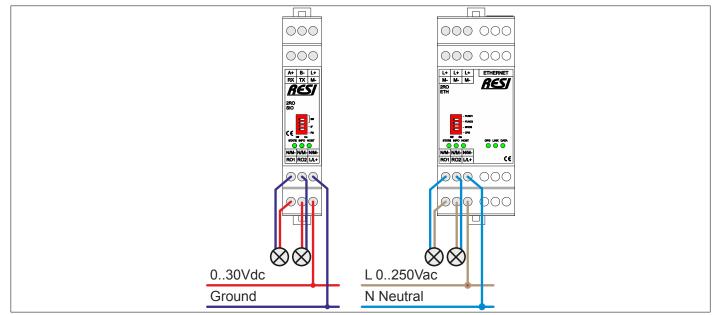


Figure: Wiring diagram for the IO modules, both relays are deactivated (OFF)

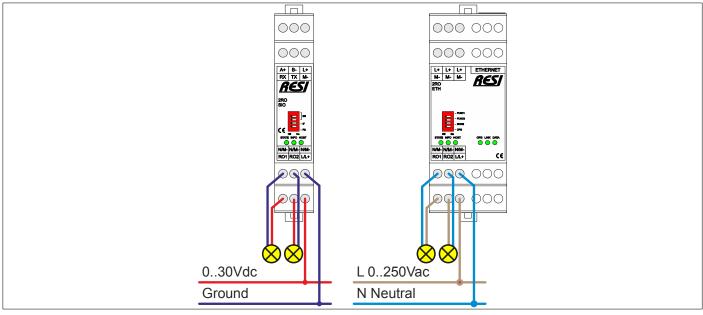


Figure: Wiring diagram for the IO modules, both relays are activated (ON)



31.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2RO-SIO-ETH-MODBUS+ASCII-ENxx.pdf

31.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2RO-SIO-ETH-MODBUS+ASCII-ENxx.pdf



32 RESI-4DO-SIO, RESI-4DO-ETH

32.1 General information

This series of IO modules offer the following features:

- 4 digital outputs for max. 30V= and 150mA output current per output
- Integrated over temperature and over current fault detection and open load detection
- DC Input supply max. 30V=
- No galvanic insulation from rest of the module
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI BESI	

Figure: Our Ethernet IO module



32.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-4DO-SIO	?W, tbd</th
RESI-4DO-ETH	?W, tbd</td
Product housing	
RESI-4DO-SIO	CEM17
RESI-4DO-ETH	CEM35
Product weight	
RESI-4DO-SIO	59g
RESI-4DO-ETH	93g
Digital outputs	
Number	4
Output voltage	max. 30Vdc
Output current	typical 150mA , max. 350mA
Cable connection	via terminals
Galvanic isolation	No
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.45
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI



32.3 Additional terminals & LED states

DIGITAL OUTPUTS	4 digital outputs for 30Vdc, 150mA Two 3 pin terminal blocks	
	Terminal type:	USLIM
	DO1DO4:	Digital output #1 to #4
	L+:	Power supply for digital output
	M-:	Ground of power supply for digital outputs
Pin layout	DO1:	Digital output #1 signal
	M-:	Ground of power supply for digital outputs
	DO2:	Digital output #2 signal
	DO3:	Digital output #3 signal
	L+:	Power supply for digital output
	DO4:	Digital output #4 signal
INFO	If one of the digital outputs is activated (ON), this LED is ON.	
	If none of the digital outputs is activated (OFF), this LED is OFF.	



32.4 RESI-4DO-SIO,ETH: Schematic diagram

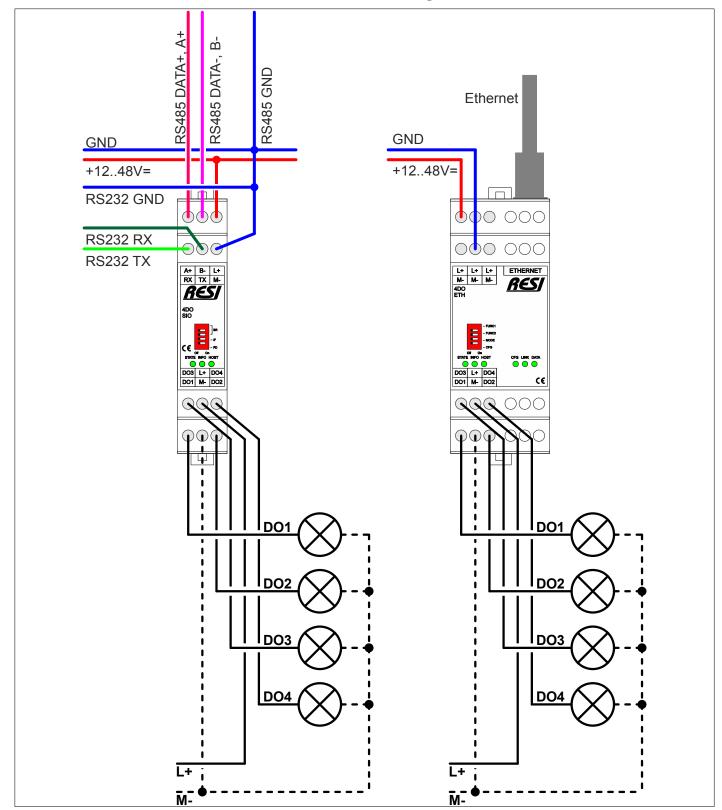


Figure: Schematics for the IO modules



32.5 RESI-4DO-SIO,ETH: Wiring diagram

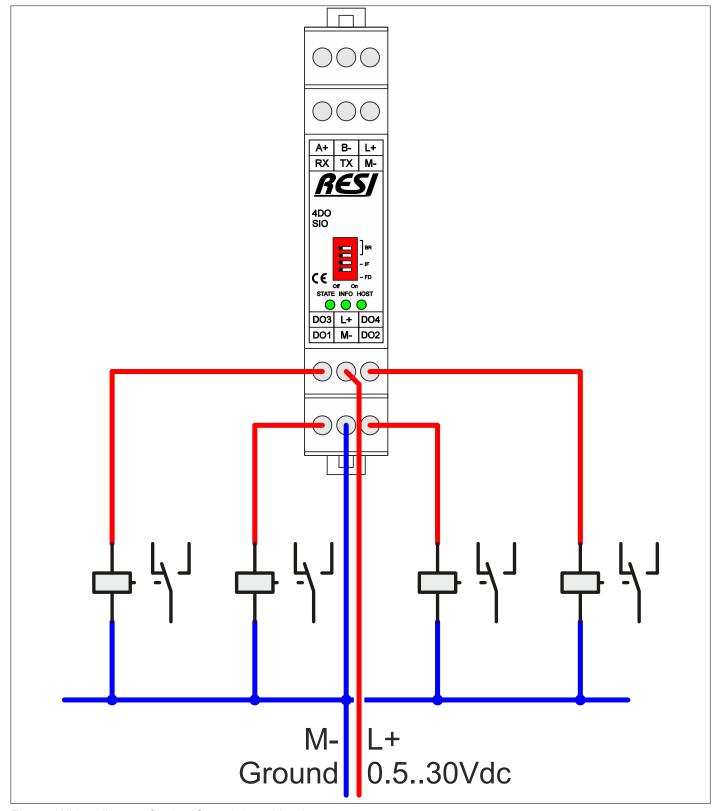


Figure: Wiring diagram for the IO modules with relays

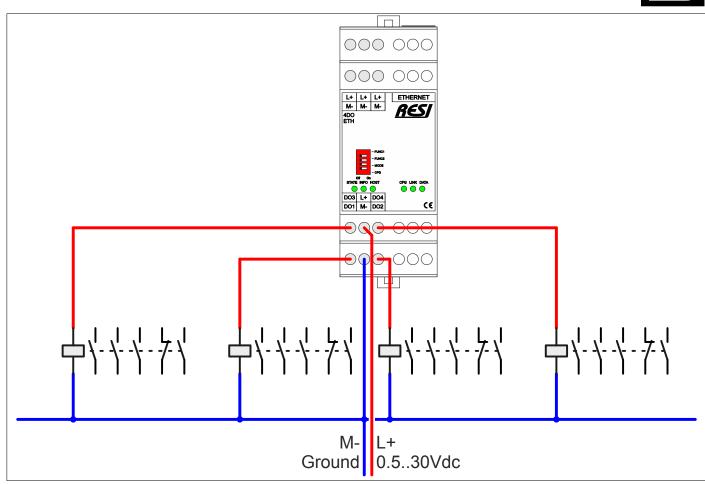


Figure: Wiring diagram for the IO modules with power contactors

13



32.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-4DO-SIO-ETH-MODBUS+ASCII-ENxx.pdf

32.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-4DO-SIO-ETH-MODBUS+ASCII-ENxx.pdf



33 RESI-2SSR-1A-SIO, RESI-2SSR-1A-ETH

33.1 General information

This series of IO modules offer the following features:

- 2 solid state relays for max. 600V~= and max. 1A output current per output
- Galvanic insulation with the solid state relay
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI BESI	
en the set of the set	
20 B	

Figure: Our Ethernet IO module



33.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2SSR-1A-SIO	<0.7W
RESI-2SSR-1A-ETH	<1.1W
Des des 6 haves in a	
Product housing	
RESI-2SSR-1A-SIO	CEM17
RESI-2SSR-1A-ETH	CEM35
Product weight	
RESI-2SSR-1A-SIO	60g
RESI-2SSR-1A-ETH	94g
Solid state outputs	
Number	2
Output voltage	max. 600Vac/dc
Output current	max. 1A
Cable connection	via terminals
Galvanic isolation	Yes, with the solid state relay itself
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.44
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI

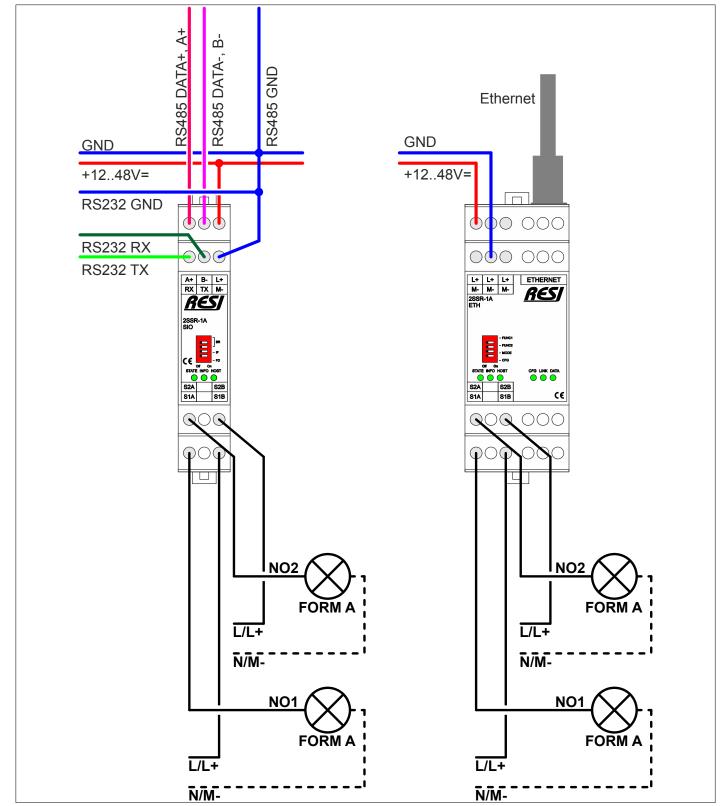


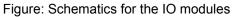
33.3 Additional terminals & LED states

SOLID STATE RELAYS	2 solid state relays for max. 600Vac/dc, 1A		
	Two 3 pin terminal t	Two 3 pin terminal blocks	
	Terminal type:	USLIM	
	S1A, S1B:	Solid state relay #1 Form A maker contact (NO)	
	S2A, S2B:	Solid state relay #2 Form A maker contact (NO)	
Pin layout	S1A:	Solid state relay #1 maker contact (NO) 1	
	N/C:	Not connected	
	S1B:	Solid state relay #1 maker contact (NO) 2	
	S2A:	Solid state relay #2 maker contact (NO) 1	
	N/C:	Not connected	
	S2B:	Solid state relay #2 maker contact (NO) 2	
INFO	If one of the solid state relays is activated (ON), this LED is ON. If none of the solid state relays is activated (OFF), this LED is OFF.		



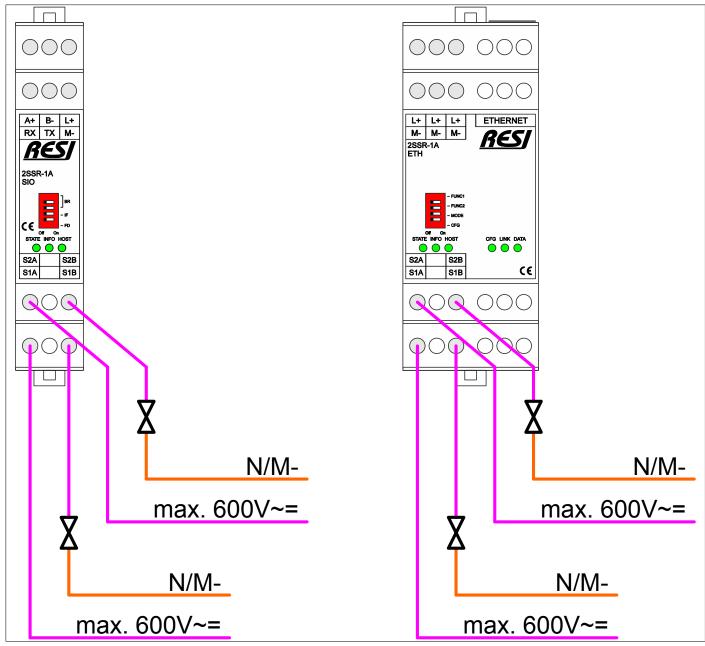
33.4 RESI-2SSR-1A-SIO,ETH: Schematic diagram







33.5 RESI-2SSR-1A-SIO,ETH: Wiring diagram





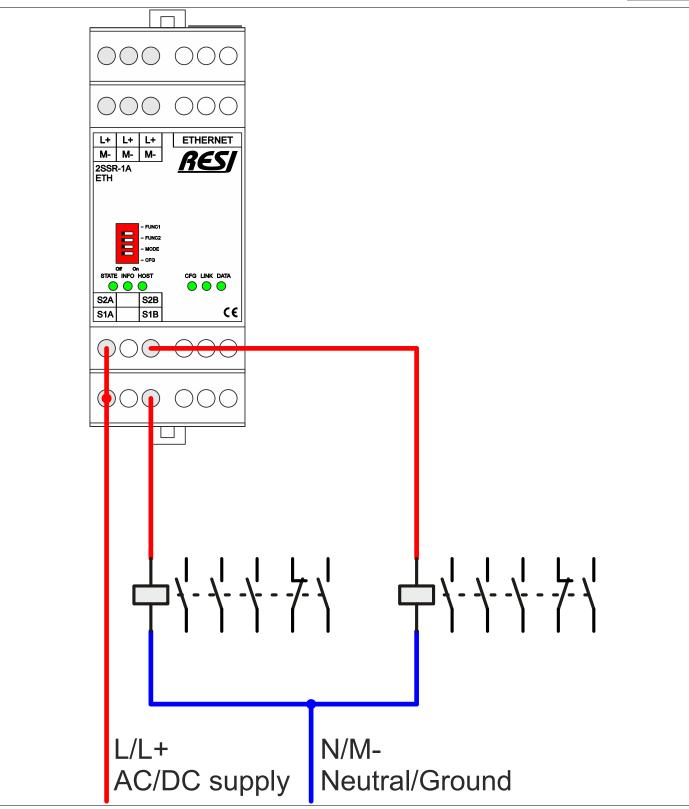


Figure: Wiring diagram for the IO modules with power contactors



33.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2SSR-xA-SIO-ETH-MODBUS+ASCII-ENxx.pdf

33.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2SSR-xA-SIO-ETH-MODBUS+ASCII-ENxx.pdf



34 RESI-2SSR-6A-SIO, RESI-2SSR-6A-ETH

34.1 General information

This series of IO modules offer the following features:

- 2 solid state relays for max. 60V~= and max. 6A output current per output
- Galvanic insulation with the solid state relay
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

B BESI	
8 8 8 9 P	

Figure: Our Ethernet IO module



34.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2SSR-1A-SIO	<0.7W
RESI-2SSR-1A-ETH	<1.1W
Product housing	
RESI-2SSR-1A-SIO	CEM17
RESI-2SSR-1A-ETH	CEM35
Product weight	
RESI-2SSR-1A-SIO	60g
RESI-2SSR-1A-ETH	94g
Solid state outputs	
Number	2
Output voltage	max. 60Vac/dc
Output current	max. 6A
Cable connection	via terminals
Galvanic isolation	Yes, with the solid state relay itself
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.44
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI
<u>'</u>	

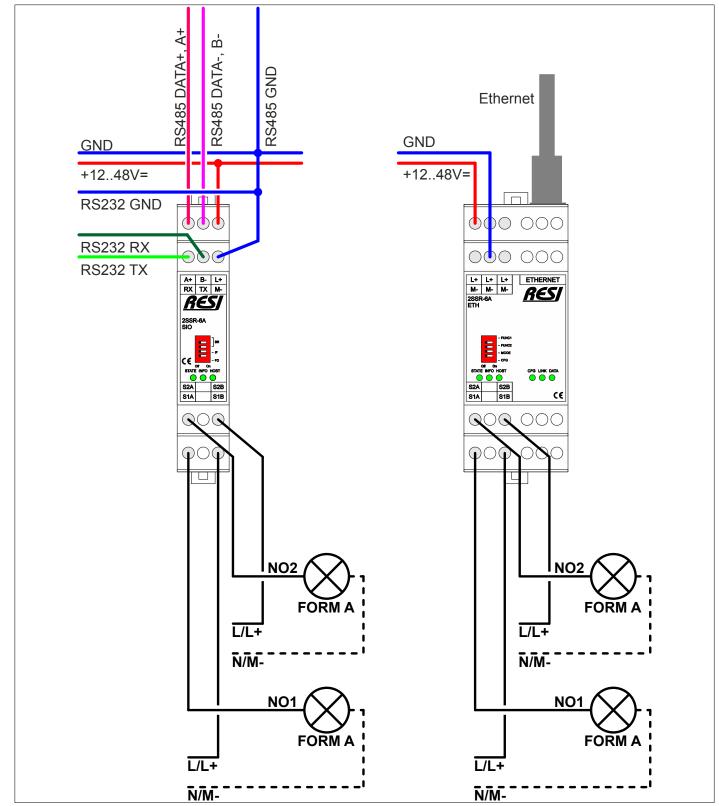


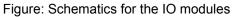
34.3 Additional terminals & LED states

SOLID STATE RELAYS	2 solid state relays for max. 60Vac/dc, 6A Two 3 pin terminal blocks		
	Terminal type:	USLIM	
	S1A, S1B:	Solid state relay #1 Form A maker contact (NO)	
	S2A, S2B:	Solid state relay #2 Form A maker contact (NO)	
Pin layout	S1A:	Solid state relay #1 maker contact (NO) 1	
,	N/C:	Not connected	
	S1B:	Solid state relay #1 maker contact (NO) 2	
	S2A:	Solid state relay #2 maker contact (NO) 1	
	N/C:	Not connected	
	S2B:	Solid state relay #2 maker contact (NO) 2	
INFO	If one of the solid state relays is activated (ON), this LED is ON.		
	If none of the solid	state relays is activated (OFF), this LED is OFF.	



34.4 RESI-2SSR-6A-SIO,ETH: Schematic diagram







34.5 RESI-2SSR-6A-SIO,ETH: Wiring diagram

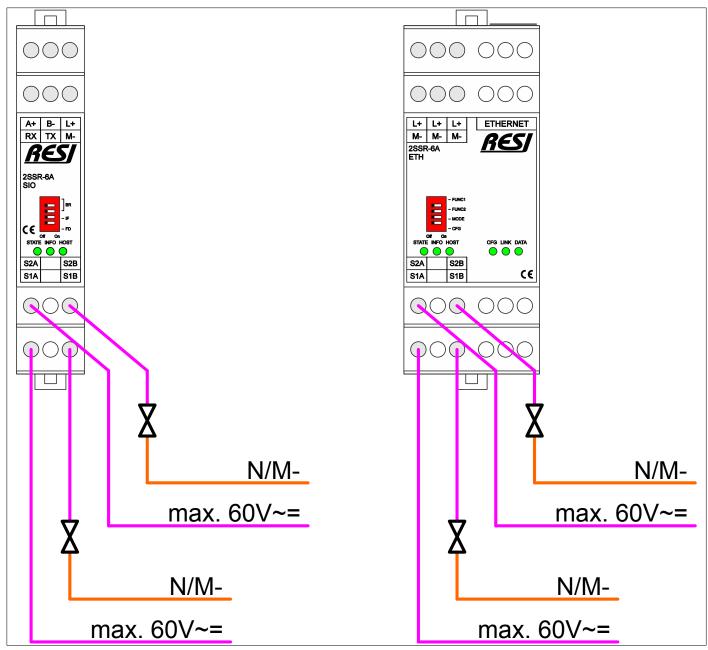


Figure: Wiring diagram for the IO modules

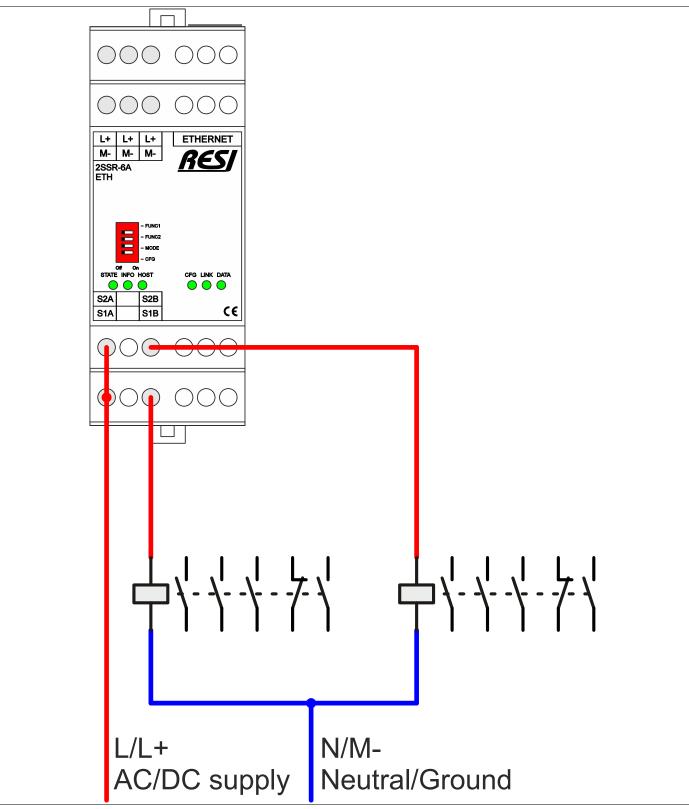


Figure: Wiring diagram for the IO modules with power contactors



34.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2SSR-xA-SIO-ETH-MODBUS+ASCII-ENxx.pdf

34.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2SSR-xA-SIO-ETH-MODBUS+ASCII-ENxx.pdf



35 RESI-2RTD-SIO, RESI-2RTD-ETH

35.1 General information

This series of IO modules offer the following features:

- 2 sensor inputs for temperature sensors
- Measurement accuracy +/-0.1%
- Measurement resolution +/-0.001%
- Measurement range -200°C...+850°C
- Various sensor types are applicable: PT100, PT1000, PT10, PT50, PT200, PT500, NI120, NI1000-DIN43760
- Various standards for linearisation are select-able: Europa, America, Japan, ITS-90
- Output of the temperatures in °Celsius [°C], °Fahrenheit [°F] or °Kelvin [°K]
- Different measurement currents are select-able: 5µA, 10µA, 25µA, 50µA, 100µA, 250µA,500µA, 1mA
- Various sensor connection types: 2 wire, 3 wire or 4 wire sensors connectable
- Internal calculation of an average temperature per channel
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

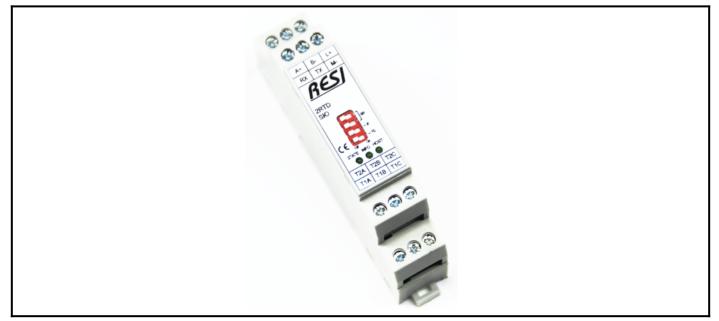


Figure: Our serial IO module





Figure: Our Ethernet IO module



35.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2RTD-SIO	<0.8W
RESI-2RTD-ETH	<1.2W
Product housing	
RESI-2RTD-SIO CEM17	
RESI-2RTD-ETH	CEM35
Product weight	
RESI-2RTD-SIO	61g
RESI-2RTD-ETH	95g
Temperature inputs	
Number	2
Signal type	Temperature measurement
Measurement type	Measurement of resistance
ADC	24 bit sigma delta ADC
Accuracy	+/-0.1°C for PT-100, PT-200,PT-500, PT-1000
	+/-0.1°C NI-120, NI-1000-DIN43760
	+/-3°C for PT-10, PT-50
Resolution	+/-0.001°C
Reference stability	10ppm/°C
Sensor types	PT-100, PT-1000, PT-1000 α=0.00375, PT-10, PT-50, PT-200,
	PT-500, NI-120, NI-1000 DIN43760
Linearisation standards	Europa, America, Japan, ITS-90
Excitation current for measurement	5μΑ, 10μΑ, 25μΑ, 50μΑ, 100μΑ, 250μΑ, 500μΑ, 1mA
Cable connection	via terminals
Galvanic isolation	Yes, to the rest of the module, not to the other temperature input
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.44
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
-	
User	RESI
password	RESI
·	



35.3 Additional terminals & LED states

TEMPERATURE INPUTS	2 RTD inputs for temperature sensors		
	Two 3 pin terminal blocks		
	Terminal type:	USLIM	
	T1A, T1B, T1C:	Temperature input #1	
	T2A, T2B, T2C:	Temperature input #2	
Pin layout	T1A:	Temperature input #1 signal A	
	T1B:	Temperature input #1 signal B	
	T1C:	Temperature input #1 signal C	
	T2A:	Temperature input #2 signal A	
	T2B:	Temperature input #2 signal B	
	T2C:	Temperature input #2 signal C	
2 wire sensor:	Sensor is cabled between T1C and T1B		
	T1A:	bridged with T1B	
	T1B:	bridged with T1A and sensor wire 2 (right cable of sensor)	
	T1C:	sensor wire 1 (left cable of sensor)	
3 wire sensor:	Sensor is cabled betwee	en T1C, T1B and T1A	
	T1A: Sensor cable 3 (right cable of sensor, 2nd cable) T1B: Sensor cable 2 (right cable of sensor, 1st cable)		
	T1C: Sensor cable 1 (le	ft cable of sensor)	
4 wire sensor:			
	Sensor is cabled betwe	en T1C, T1B and T1A	
	T1A: Sensor cable 4 (right cable of sensor, 2nd cable) T1B: Sensor cable 3 (right cable of sensor, 1st cable)		
	T1C: Sensor cable 1+2	(both cables on the left side of sensor)	
INFO	If everything is ok this L	ED is on. If there is an internal error	
		easurement, this LED flashes fast.	



35.4 RESI-2RTD-SIO,ETH: Schematic diagram

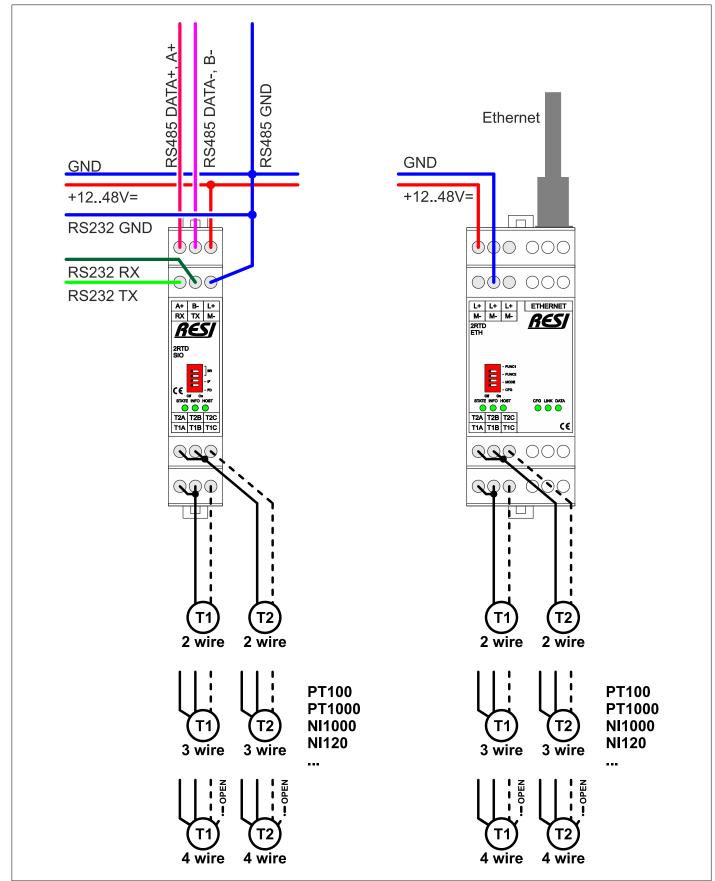


Figure: Schematics for the IO modules



35.5 Cabling of temperature sensors

A typical temperature sensor with different connection cables is shown in the figure below:

- 2 wire: A red and white cable
- 3 wire: Two red and one white cable
- 4 wire: Two read and two white cable

The sensor element is always mounted between the red and white cables!

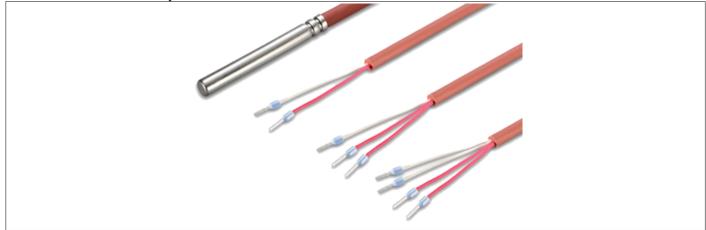


Figure: Typical temperature sensor with different connection cables

35.5.1 Wiring of 2 wire sensors

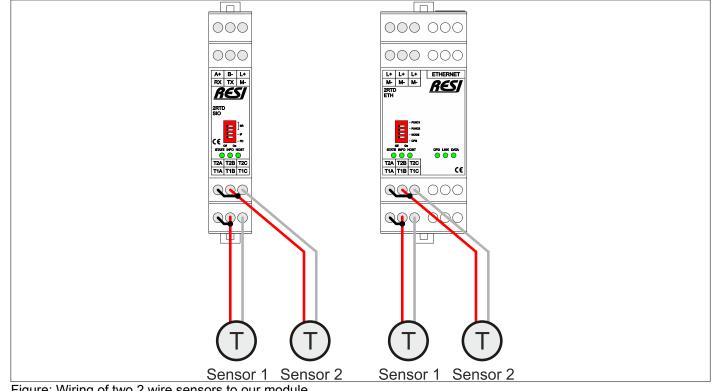
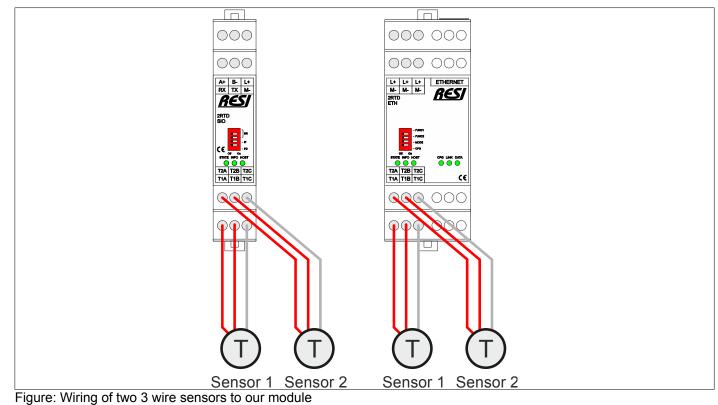


Figure: Wiring of two 2 wire sensors to our module

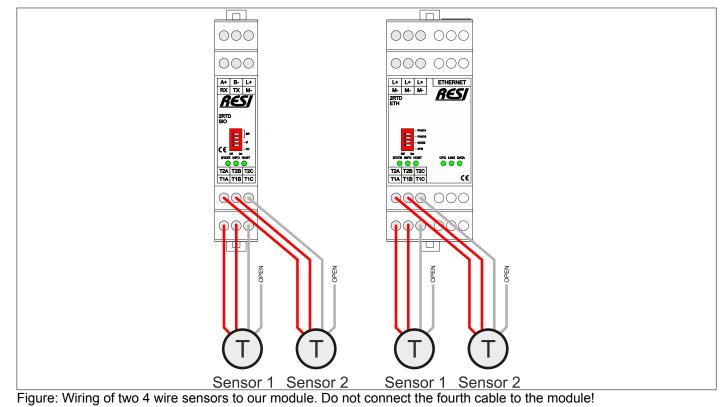
IMPORTANT: Due to the reason, that our module is doing always a 3 wire measurement, you have to set always a bridge cable between the clamps TxA and TxB! Keep this bridge cable between the two terminals as short as possible!



35.5.2 Wiring of 3 wire sensors



35.5.3 Wiring of 4 wire sensors





35.6 Useable sensor types and measurement accuracy

This section describes the suitable sensors and explains the measurement accuracy of the sensor inputs of the module.

HINT: Use our free software RESI MODBUSConfigurator to configure and test our 2RTD module. You can also use your own software to handle the complete configuration while writing to MODBUS/RTU registers or with ASCII text commands.

35.6.1.1 Useable sensor types

The following types of sensors can be used per input:

Platin sensors:

- PT-100 sensors: Measurement range from 1.95Ω to 34.5Ω, -200°C to +850°C
- PT-1000 sensors: Measurement range from 195Ω to 3450Ω, -200°C to +850°C
- **PT-1000** sensors with an α =0.00375: Measurement range from 195 Ω to 3450 Ω , -200°C to +850°C
- **PT-10** sensors: Measurement range from 1.95Ω to 34.5Ω , $-200^{\circ}C$ to $+850^{\circ}C$
- PT-50 sensors: Measurement range from 9.75Ω to 172.5Ω, -200°C to +850°C
- PT-200 sensors: Measurement range from 39Ω to 690Ω, -200°C to +850°C
- PT-500 sensors: Measurement range from 97.5Ω to 1725Ω, -200°C to +850°C

Nickel sensors:

- NI-120 sensors: Measurement range from 66.6Ω to 380.3Ω, -80°C to +260°C
- NI-1000 DIN43760 sensors: Sensors with linearisation according to DIN43760

Each of the two sensor inputs of the module can measure a different sensor type!

You can use all sensor accuracy classes (class AA, A, B, C). Please consult the DIN EN 60751:2009-05 for an exact definition of the sensor accuracy. Don't forget, that the whole measurement error for the temperature measurement consists always out of the error of the sensor element itself, the error of the used cabling and the measurement errors of the measurement electronic.

Out resistance measurement electronic uses an internal $2k\Omega$ sense resistor. With an excitation current of 250μ A the voltage drop on this resistor is 0.5V. This is the ideal range, to achieve the highest measurement accuracy. Use sensor type PT100, PT200, PT500, PT-1000, NI-120 or NI-1000 DIN43760 to achieve the best accuracy of our module with +/-0.1°C.

For PT10 and PT50 sensors this internal sense resistor is too big. So the reachable accuracy lies only about +/-3°C.

35.6.1.2 Configurable excitation current

For each input you can define an individual excitation current for the measurement:

- ∎ 5µA
- 10µA
- 25µA
- 50µA
- 100µA
- 250µA
- 500µA
- ∎ 1mA

The electronic executes an internal reference measurement on an Rsense resistor with $2k\Omega$ (Accuracy +/-0.05%). Also we use internal resistors to protect the inputs. Please adjust the excitation current for each channel in a way, that the resulting maximum voltage drop on this internal Rsense resistor <=0.5V.

U=R*I -> U=2kΩ*250µA -> 0.5V

This results in a maximum excitation current of 250µA with this module. If the excitation current exceeds this voltage range, the module signals this error with "ADC-Out-of-Range" in the status flags of each channel.

The ideal excitation current of the module is 250µA! With smaller excitation currents the measurement will be more and more inaccurate!



35.6.1.3 Selectable linearisation standard

A PLATIN resistor (PT sensor) is defined with a standardized characteristic. This is the Callendar-Van Dusen equation:

This is defined as follows:

RT = R0 • (1 + a • T + b • T2 + (T - 100°C) • c • T3) for T < 0°C, RT = R0 • (1 + a • T + b • T2) for T > 0°C

The equation is used with different coefficients depending of the selected linearisation standard to calculate a temperature from the measured resistor.

STANDARD	ALPHA (α)	а	b	С
Europe DIN EN 60751 IEC 751 JIS C1604-1997	α=0x00385	3.908300*10 ⁻⁰³	-5.775000*10 ⁻⁰⁷	-4.183000*10 ⁻¹²
America SAMA Standard	α=0x003911	3.969200*10 ⁻⁰³	-5.849500*10 ⁻⁰⁷	-4.232500*10 ⁻¹²
Japan JIS C1604-1987	α=0x003916	3.973900*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
ITS-90	α=0x003926	3.984800*10 ⁻⁰³	-5.870000*10 ⁻⁰⁷	-4.400000*10 ⁻¹²
RTD-1000-375	α=0x00375	3.810200*10 ⁻⁰³	-6.018880*10 ⁻⁰⁷	-6.000000*10 ⁻¹²
NI-120	N/A	N/A	N/A	N/A

35.6.1.4 Sensor evaluation and accuracy

Our module computes the final temperature value °Celsius [°C] and delivers this temperature on various MODBUS registers in various number formats and via various ASCII commands to the host.

In addition our module can convert the temperature also in °Fahrenheit [°F] with the formula:

T[°F]=T[°C]*1.8+32

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in Fahrenheit is not necessary.

Also our module converts the temperature data into °Kelvin [°K] with the formula:

T[°K]=T[°C] +273.15

Also this temperature value can be read out with MODBUS Register or ASCII text commands. An own conversion on the host from Celsius in kelvin is not necessary.

Our module uses a 24 bit sigma/delta ADC with a noise suppression for 50/60Hz internally. Our module achieves a very high measurement accuracy of +/-0.1°C and a measurement resolution of +/-0.001°C!

Our module measures every channel around 1 time per second. In addition our module computes an average temperature for each channel with a user selectable time range in seconds, to suppress short noise signals in standard applications.

A manual adjustable zero offset allows a zero point shift to compensate static effects of the cabling, especially useful for 2 wire sensors.



Our module offers a very complex internal hardware to evaluate if the measured temperature is valid or not. Therefore the module offers for each channel a status representing the result of the last converted temperature. This status uses 8 bits, which have the following meaning:

NAME	DESCRIPTION
VALID	=1: If the measurement result is valid, this bit is set and all other bits in the status are 0!
	=0: if the system detects a conversion error or problem, this bit is 0 and the measurement result must be discarded!
ADC OUT OF RANGE	=1: If the product of $2k\Omega$ * excitation current >0.5V, this bit is 1 and the measurement result is invalid.
	The absolute input voltage of the ACD beyond ±1.125 • VREF/2
	=0: Everything is ok
SENSOR UNDER RANGE	=1: The current measured temperature is beyond the lower limit for the selected sensor type. For PT: -200°C, for NI-120: -80°C
	=0: Everything is ok
SENSOR OVER RANGE	=1: The current measured temperature is above the upper limit for the selected sensor type. For PT: +850°C, for NI-120: +260°C
	=0: Everything is ok
	Ignore this bit
NOT USED	Ignore this bit
HARD ADC OUT OF RANGE	=1: Erroneous readout of the ADC value. A possibility is an extreme high noise level on the signal. The sensor value will be discarded. A second option is an open wiring for the sensor.
	=0: Everything is ok
SENSOR HARD FAULT	=1: Sensor wiring is open or no sensor is cabled to the module. Sensor has a shortcut or the internal sense resistor has an error.
	=0: Everything is ok
	VALID VALID ADC OUT OF RANGE SENSOR UNDER RANGE SENSOR OVER RANGE NOT USED NOT USED HARD ADC OUT OF RANGE SENSOR



35.7 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2RTD-SIO-ETH-MODBUS+ASCII-ENxx.pdf

35.8 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2RTD-SIO-ETH-MODBUS+ASCII-ENxx.pdf



36 RESI-4AIU-SIO, RESI-4AIU-ETH

36.1 General information

This series of IO modules offer the following features:

- 4 high precision analog inputs for -10Vdc..+10Vdc signals (-10.24Vdc to +10.24Vdc)
- ADC resolution 16 bit, accuracy +/-0.1%
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI
THE THE TOP CE
Contraction of the second seco

Figure: Our Ethernet IO module



36.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-4AIU-SIO <0.8W RESI-4AIU-ETH <1.2W Product housing RESI-4AIU-ETH CEM35 Product weight RESI-4AIU-ETH CEM35 Product weight RESI-4AIU-ETH 62g Analog inputs Number 4 Update speed Every 100ms Range -10V.+10V ADC resolution 16 bit Input voltage range -1024V.+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.51 IP mask 255.255.0.0 gateway 192.168.0.1 UnitID 255 User RESI password RESI	Power consumption	
Product housing RESI-4AIU-SIO CEM17 RESI-4AIU-ETH CEM35 Product weight RESI-4AIU-ETH RESI-4AIU-ETH 96g Analog inputs Number 4 Update speed Every 100ms Range -10V.+10V ADC resolution 16 bit Input voltage range -102.4V.+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.51 IP mask 255.255.50.0 gateway 192.168.0.1 UnitID 255	RESI-4AIU-SIO	<0.8W
RESI-4AIU-SIO CEM17 RESI-4AIU-ETH CEM35 Product weight RESI-4AIU-SIO RESI-4AIU-ETH 96g Analog inputs Number Number 4 Update speed Every 100ms Range -10V.+10V ADC resolution 16 bit Input voltage range -10.24V.+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP2.168.0.51 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	RESI-4AIU-ETH	<1.2W
RESI-4AIU-SIO CEM17 RESI-4AIU-ETH CEM35 Product weight RESI-4AIU-SIO RESI-4AIU-ETH 96g Analog inputs Number Number 4 Update speed Every 100ms Range -10V.+10V ADC resolution 16 bit Input voltage range -10.24V.+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP2.168.0.51 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255		
RESI-4AIU-ETH CEM35 Product weight ESI-4AIU-SIO RESI-4AIU-ETH 96g Analog inputs	Product housing	
Product weightRESI-4AIU-SIO62gRESI-4AIU-ETH96gAnalog inputsNumber4Update speedEvery 100msRange-10V.+10VADC resolution16 bitInput voltage range-10.24V+10.24VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYesDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitD255Default Ethernet settingsIP address192.168.0.51IP mask255.255.25.0gateway192.168.0.1UnitD255UserRESI	RESI-4AIU-SIO	CEM17
RESI-4AIU-SIO 62g RESI-4AIU-ETH 96g Analog inputs	RESI-4AIU-ETH	CEM35
RESI-4AIU-SIO 62g RESI-4AIU-ETH 96g Analog inputs		
RESI-4AIU-ETH 96g Analog inputs Number 4 Update speed Every 100ms Range -10V+10V ADC resolution 16 bit Input voltage range -10.24V+10.24V Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.51 IP address 192.168.0.1 UnitID 255 UitID 255		
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Number4Update speedEvery 100msRange-10V+10VADC resolution16 bitInput voltage range-10.24V+10.24VAccuracy+/-0.1%Cable connectionvia terminalsGalvanic isolationYesDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.51IP mask255.255.255.0gateway192.168.0.1UnitID255	Analog inputs	
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Accuracy +/-0.1% Cable connection via terminals Galvanic isolation Yes Default serial settings		
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Galvanic isolationYesDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.51IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI		
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gateway 192.168.0.1 UnitID 255 User RESI		
UnitID 255 User RESI		
User RESI		
password RESI	User	RESI
	password	RESI



36.3 Additional terminals & LED states

ANALOG INPUTS	4 analog inputs for -10V0V+10V signals Two 3 pin terminal blocks		
	Terminal type:	USLIM	
	C:	Ground for all analog inputs	
	AI1-AI4:	Analog inputs	
Pin layout	Al1:	Signal input for analog input #1	
	AI2:	Signal input for analog input #2	
	AI3:	Signal input for analog input #3	
	Al4:	Signal input for analog input #4	
	C:	Signal ground for analog inputs #1-#4	
		Both signal grounds are internally bridged	
INFO	If everything is OK,	this LED is on. If there is an internal error at the analog inputs,	
	this LED flashes quickly.		



36.4 RESI-4AIU-SIO,ETH: Schematic diagram

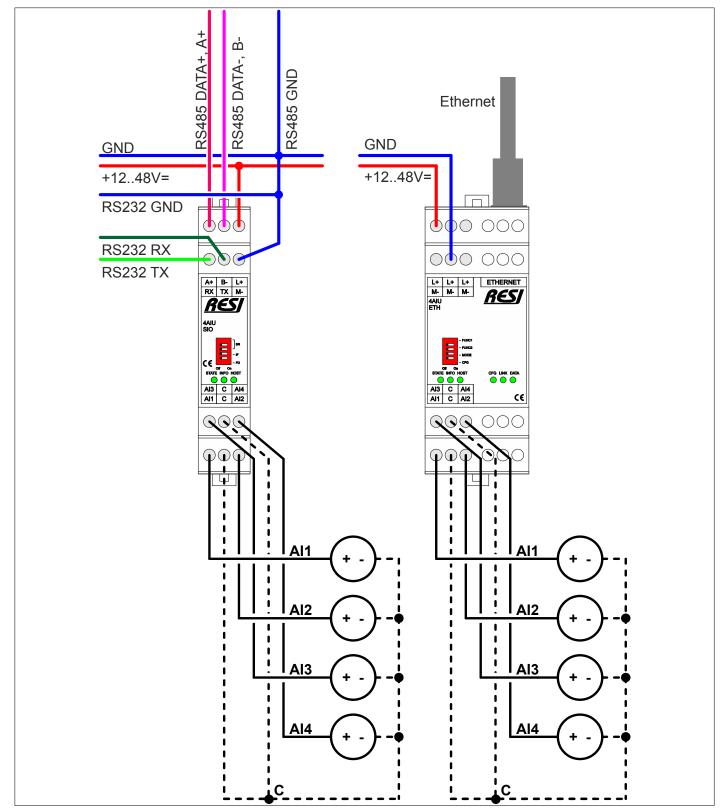


Figure: Schematics for the IO modules



36.5 RESI-4AIU-SIO,ETH: Wiring diagram

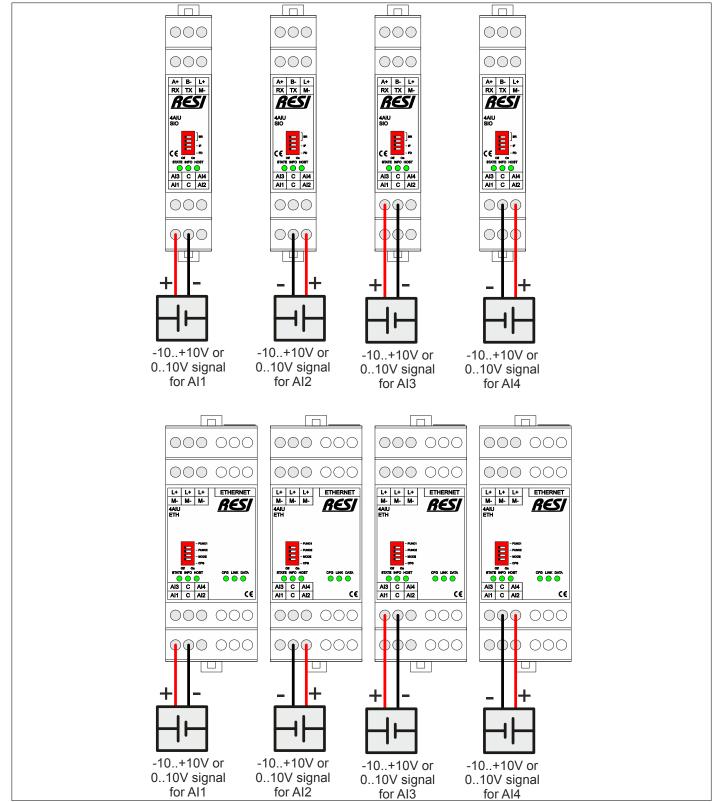


Figure: Wiring diagram for the IO modules



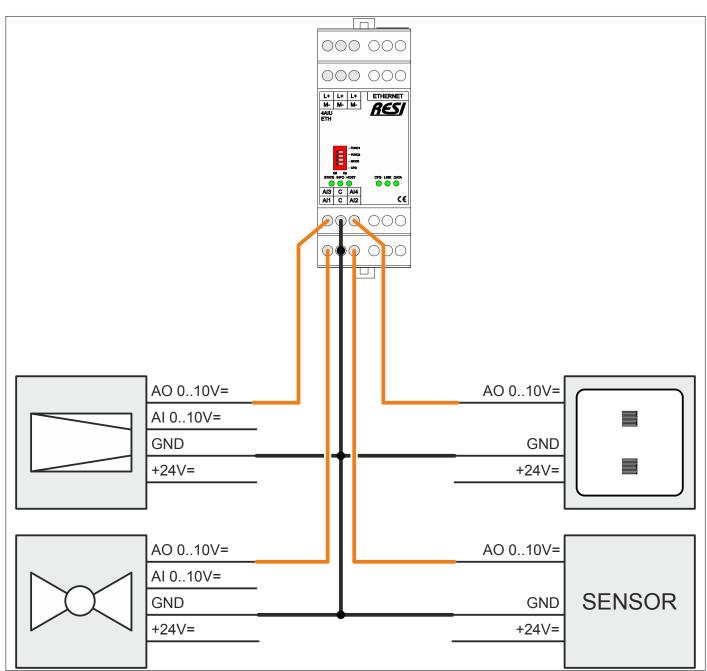


Figure: Wiring diagram for building automation devices



36.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-4AIU-SIO-ETH-MODBUS+ASCII-ENxx.pdf

36.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-4AIU-SIO-ETH-MODBUS+ASCII-ENxx.pdf



36.8 Additional MODBUSConverter software information



Click on the add to project button to open a dialog with all available IO modules. Then select the section SLIM-IO modules... and select RESI-4AIU-SIO or RESI-4AIU-ETH to add this device to your project. Or you search the connected module automatically.

Your screen should look like this if you activate the Test button.

b00004Dx0000,32769Current value of AH as value between -32769 and +32767. (-32769 or 0x0000: 0V, +32767 or 0x7FFF:+10.24V)b00005Dx0000,5296Current value of AH as percentage with 2 decimal places (percentage value - 1100) between -10000 and +10000. (-1024010.24V, 0.0V, +1024011b00007Dx0000,5296Current value of AH as percentage with 2 decimal places (percentage value - 100) between -10000 and +10000, (-1024010.24V, 0.0V, +1024011b00008Dx0000,55296Current value of AH as percentage with 2 decimal places (percentage value - 100) between -10000 and +10000, (-1024010.24V, 0.0V, +1024011b00009Dx0000,55296Current value of AH as voltage value with 3 decimal places (voltage value - 1000) between -10240mV and +10240mV, (-1024010.24V, 0.0V, +1024011b00010Dx000,55296Current value of AH as voltage value with 3 decimal places (voltage value - 1000) between -10240mV and +10240mV, (-1024010.24V, 0.0V, +1024011b00012Dx000,55296Current value of AH as voltage value with 3 decimal places (voltage value - 1000) between -10240mV and +10240mV, (-1024010.24V, 0.0V, +1024011b00101Dx000,55296Current value of AH as voltage value with 3 decimal places (voltage value - 1000) between -10000 and +10000, (-1024010.24V, 0.0V, +1024011b00101Dx0000,55296Current value of AH as percentage with 2 decimal places (percentage value - 1000) between -10000 and +10000, (-1024010.24V, 0.0V, +1024011b00101Dx0000,55296Current value of AH as percentage with 2 decimal places (percentage value - 10000 and +10000, (-1024010.24V, 0.0V, +1024011b00102Dx0000,55296Current value of AH as percentage with 2 decimal places (voltage value - 10000 bet		■ Baudrate: 57600 ■ Parity. NONE ■	Address: 255
Status Destitution Current value of AP as value between -32788 and +3275 (-32786 or ba8000-102 V/L or bubble. TV -32787 or bCFFFF-10.2 V/L or bubble. TV -3278 or bCFFF-10.2 V/L or V/L DV/L DV/L DV/L DV/L DV/L DV/L DV/L		Value	Register
bd0002 Dx8000.32768 Current value of A2 as value between -32768 and +3276 ² , 132768 or bd000-10, 1247, 0 or bd000.10, 1437277 or 0x7FFF-10.24V ² bd0003 Dx8000.32768 Current value of A1 as percentage with 2 docimal places (percentage value = 100) between -10000 and +10000, (12240-10.24V, 0.07, V0000 bd0005 Dx8000.55286 Current value of A1 as percentage with 2 docimal places (percentage value = 100) between -10000 and +10000, (12240-10.24V, 0.07, V1220-11 bd0006 Dx8000.55286 Current value of A1 as percentage with 2 docimal places (percentage value = 100) between -10000 and +10000, (12240-10.24V, 0.07, V1220-11 bd0008 Dx8000.55286 Current value of A1 as voltage value with 3 docimal places (voltage value = 100) between -10000 and +10000, (12240-10.24V, 0.07, V1220-11 bx80008 Dx8000.55286 Current value of A1 as voltage value with 3 docimal places (voltage value = 100) between -10000 and +10000, (12240-10.24V, 0.07, V1220-11 bx80008 Dx8000.55286 Current value of A1 as voltage value with 3 docimal places (voltage value = 100) between -10240mV (112240mV, (112240-10.24V, 0.07, V1220-11 bx80001 Dx8000.55286 Current value of A1 as voltage value with 3 docimal places (voltage value = 100) between -10000 and +10000, (112240-10.24V, 0.07, V1220-11 bx80011 Dx8000.55286 Current value of A1 as voltage value with 3 docimal places (voltage value = 100) between -10000 and +10000, (112240-10.24V, 0.07, V1220-11 <td></td> <td>0x8000.32768</td> <td>x00001</td>		0x8000.32768	x00001
bd0003 bd000,32768 Current value of Al3 as value between -32768 and +32767, (32768 or 0x6000-10.24/V,0 or bd000; 0V, 32767 or 0x7FFF-10.24/V bd0004 bd000,32768 Current value of Al4 as value between -32768 and 432767, (32768 or 0x6000-10.24/V,0 or bd000; 0V, 32767 or 0x7FFF-10.24/V,0 0V, 10240-11 bd0005 bxd800,55296 Current value of Al4 as percentage with 2 docimal places (percentage value * 100) between -10000 and 10000, (12240-10.24/V,01V, 112240-11 bd0006 bxd800,55296 Current value of Al4 as percentage with 2 docimal places (percentage value * 100) between -10000 and 10000, (12240-10.24/V,01V, 112240-11 bd0009 bxd800,55296 Current value of Al4 as percentage with 2 docimal places (value * 100) between -102400 value -10240/U and 12240/U,11224V,01V, 112240-11 bd0010 bxd800,55296 Current value of Al4 as value pervelue with 3 docimal places (value value * 100) between -102400 value 10240V,10240-110.24V,01V, 112240-110.24V,01V, 112240-110.24V,01V, 112240-110.24V,01V,112240-110.24V,0			
building Duddling Duddling Section 2400, 55296 Current value of A1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (10240-10.24V,0.0V,+10240-11 building Duddling Duddling<			
6x00006 Dxd800,55296 Current value of AI2 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (+1224-10.24V, 0.9V, +10240-11 6x00007 Dxd800,55296 Current value of AI3 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (+1224-0)-10.24V, 0.9V, +10240-11 6x00008 Dxd800,55296 Current value of AI1 as voltage value with 3 decimal places (percentage value * 100) between -10240mV and +10240mV, (+10240-110.24V, 0.9V, +10240-110.24V, 0.9V, +10240-110.24V, 0.9V, +10240-110.24V, 0.9V, +10240mV, (+10240-110.24V, 0.9V, +10240mV, (+10240mV, (0x8000,32768	4x00004
bk0007 Dxd000.55296 Current value of AJ3 as percentage with 2 decimal places (percentage value * 100) between -10000 and + 10000, (-10240-10.24V.0.0V,+10240-11 bk0008 Dxd000.55296 Current value of AJ4 as percentage with 2 decimal places (percentage value * 100) between -10240mV and + 10240mV, (-10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+102400-10.24V.0.0V,+102400-10.24V.0.0V,+1024000,55296 bk00011 Dxd000.55296 Current value of AJ4 as voltage value with 3 decimal places (voltage value * 100) between -10240mV and +10240mV, (-10240-10.24V.0.0V,+102400-10.24V.0.0V,+102400-10.24V.0.0V,+10240-10.24V	0V,+10240:+10.24V)	0xd800,55296	tx00005
building Dxd800.55296 Current value of Al4 as percentage with 2 decimal places (percentage value * 100) between -102000 and +10200. (-10240-10.24V.0.0V,+10240-11.04V.0.0V,+10240-10.24V.0.0V,+102400-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24V.0.0V,+10240-10.24	0V,+10240:+10.24V)	0xd800,55296	bx00006
bx00005 Dx4000.55295 Current value of All as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV. (10240-10.24V,0.0V,-10240.01	0V.+10240:+10.24V)	0xd800,55296	tx00007
bx00010 0xd000_55296 Current value of Al2 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-10240-10.24V,0.0V,+102 bx00111 bx00011 0xd000_55296 Current value of Al3 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-10240-10.24V,0.0V,+102 bx00110 bx00011 0xd000_55296 Current value of Al1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000 (-10240-10.24V,0.0V,+10240-11 bx00102 bx00101 0xd000_55296 Current value of Al3 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000 (-10240-10.24V,0.0V,+10240-11 bx00104 bx00104 0xd000_55296 Current value of Al4 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (-10240-10.24V,0.0V,+10240-11 bx00104 bx00201 0xd000_55296 Current value of Al4 as percentage with 2 decimal places (percentage value * 100) between -10240mV and +10240mV, (-10240-10.24V,0.0V,+10240-11 bx00203 bx00201 0xd000_55296 Current value of Al3 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (-10240-10.24V,0.0V,+	0V.+10240:+10.24V)	0xd800.55296	tx00008
bx00011 Dxd800_55296 Current value of A1 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-10240:-10.24V.0.0V.+102 bx00101 Dxd800_55296 Current value of A1 as percentage with 2 decimal places (percentage value * 1000) between -10000 and +10000 (-10240:-10.24V.0.0V.+10240:-11 bx00101 Dxd800_55296 Current value of A1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000 (-10240:-10.24V.0.0V.+10240:-11 bx00103 Dxd800_55296 Current value of A1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000 (-10240:-10.24V.0.0V.+10240:-11 bx00104 Dxd800_55296 Current value of A1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000 (-10240:-10.24V.0.0V.+10240:-11 bx00201 Dxd800_55296 Current value of A1 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-10240:-10.24V.0.0V.+10240:-10.			x00009
bx00012 Dxd800_55296 Current value of Al4 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (+10240:-10.24V,0:0V,+102400:-10.24V,0:0V,+102400:-10.24V,0:0V,+102400:-10			x00010
to01011 0x4800.55296 Current value of Al1 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000. (+10240-10.24V.0.0V.+10240-11.24V.0.0V.+10240-11.24V.0.0V.+10240-11.24V.0.0V.+10240-11.24V.0.0V.10020+11.24V.0.0V.100240-10.24V.0.0V.10240-11.24V.0.0V.10240-11.24V			4x00011
bd01102 Dxd800,55296 Current value of AI3 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (+10240-11.24V,0:V)+10240-11 bd0103 0xd000,55296 Current value of AI3 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (+10240-11.24V,0:V)+10240-11 bd0104 0xd000,55296 Current value of AI4 as percentage with 2 decimal places (percentage value * 100) between -10240mV and +10240mV, (-10240-11.024V,0:V)+10240-11 bd0201 0xd000,55296 Current value of AI as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (-10240-11.024V,0:V)+10240-11024V,0:V)+10240-11024V,0:V)+10240mV, (-10240-11.024V,0:V)+10240mV, (-10240mV, (-10240mV, (-10240mV, (-10240mV, -10240mV, (-10240mV, -10240mV, (-10240mV, -10240mV, -10240mV, -10240mV, (-10240mV, -10240mV, -10240mV, (-10240mV, -10240mV, -10240mV, -10240mV, (-10240mV, -10240mV, -	24V,0:0V,+10240:+10.24	0xd800,55296	4x00012
bx00103 0xd000_55296 Current value of AI as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (-10240-10_24V,0:0V+10240-11 bx00201 0xd000_55296 Current value of AI as percentage with 2 decimal places (percentage value * 100) between -10200 and +10000, (-10240-10_24V,0:0V+10240-11 bx00201 0xd000_55296 Current value of AI as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (10240-10_24V,0:0V+10240-10_24V,0:0V+10240-10_24V,0:0V+10240-10_24V,0:0V+10240-10_24V,0:0V+102400-10_24V,0:0V+10240-10_24V,0:0V+102400-10_24V,0:0V+10240-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+10240-10_24V,0:0V+10240-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+10240-10_24V,0:0V+10240-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24V,0:0V+102400-10_24U,0:10000-00-00-0000-00-0000-00-00-0000-00-0	0V.+10240:+10.24V)	0xd800.55296	tx00101
bx00104 0xd800,55296 Current value of Al4 as percentage with 2 decimal places (percentage value * 100) between -10000 and +10000, (-10240,-10.24V,0.0V,+10240,-11,0.24V,0.0V,+10240,-11,0.24V,0.0V,+10240,-11,0.24V,0.0V,+10240,-11,0.24V,0.0V,+10240,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,-10,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,0.0V,0.24V,	0V,+10240:+10.24V)	0xd800,55296	x00102
bx0201 0x4000.55296 Current value of All as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV. (-10240:-10.24V,0:0V,+102 bx00201 0x4000.55296 Current value of All as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV. (-102401:-10.24V,0:0V,+102 bx00203 0x4000.55296 Current value of All as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV. (-10240:-10.24V,0:0V,+102 bx00204 0x4000.55296 Current value of All as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV. (-10240:-10.24V,0:0V,+102 bx00201 0x4000.55296 Current value of All as percentage value * 10000) between -10240mV and +10240mV. (-102400:-10.24V,0:0V,+102 bx00201-302 0xft005[e1,-1024031,-102.4031 SINT32.Current value of All as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000:-10.24V,0:0V,+102 bx00307-306 0xft005[e1,-1024031,-102.4031 SINT32.Current value of All as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000:-10.24V,0:0V,+102 bx00401-402 0xft005[e1,-1024031,-102.4031 SINT32:Current value of All as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000:-10.24V,0:0V,+102 bx00401-402 0xft005[e1,-1024031,-102.4031 SINT32:Current value of All as percentage with 4 decimal places (percentage value	0V,+10240:+10.24V)	0xd800,55296	x00103
tot0212 Dxd000_55296 Current value of AI3 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV, d10240mV, (-10240n-10.24V, 0.0V, -102 tot0203 0xd800_55296 Current value of AI3 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (-10240n-10.24V, 0.0V, -102 tot0204 0xd800_55296 Current value of AI3 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV, (-10240n-10.24V, 0.0V, +102 tx00301-302 0xd100561,-1024031,-102.4031 SINT32-Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 tx00307-306 0xd100561,-1024031,-102.4031 SINT32-Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 tx00307-306 0xd100561,-1024031,-102.4031 SINT32-Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 tx00307-306 0xd100561,-1024031,-102.4031 SINT32-Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 tx00401-402 0xd10561,-1024031,-102.4031 SINT32-Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 tx00405-406 0xd10561,-1024031,-102.4031 SINT32-Cu	0V.+10240:+10.24V)	0xd800,55296	Ix00104
bdll203 Dxd800.55296 Current value of AI as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-1024010.24V.0.0V.+102 bcl0204 Dxd800.55296 Current value of AI as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and +10240mV (-1024010.24V.0.0V.+102 bcl0204 Dxd800.55296 Current value of AI as voltage value with 3 decimal places (percentage value * 1000) between -10240mV and +10240mV (-1024010.24V.0.0V.+102 bcl0303-304 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-102400010.24 bcl0305-305 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-102400010.24 bcl0307-306 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bcl0401-402 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bcl04045-406 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bcl04045-406 Dxffl05fe11024031102.4031 SINT32.Current value of AI as percentage with 4 deci			x00201
bx00204 0xd000,55296 Current value of Al4 as voltage value with 3 decimal places (voltage value * 1000) between -10240mV and ±10240mV, (±10240::10.24V,0:0V,±102 bx00301-302 0xd1005[e1,-1024031,-1024031 SINT32; Current value of Al1 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00301-302 0xd1005[e1,-1024031,-1024031 SINT32; Current value of Al1 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00305-306 0xd1005[e1,-1024031,-1024031 SINT32; Current value of Al1 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00307-306 0xd1005[e1,-1024031,-102,4031 SINT32; Current value of Al4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00401-402 0xd1005[e1,-1024031,-102,4031 SINT32; Current value of Al4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00403-404 0xd1005[e1,-1024031,-102,4031 SINT32; Current value of Al4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00405-405 0xd1005[e1,-1024031,-102,4031 SINT32; Current value of Al4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and ±1000000. (±1024000-10.24 bx00405-406 0xd1005[e			
build build <td< td=""><td></td><td></td><td></td></td<>			
tot0333-304 Dxtff05fe1_1024031_102.4031 SINT32:Current value of AI2 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and + 100000010.24 tot031-024 tot0	24V,0:0V,+10240:+10.24	0xd800,55296	tx00204
xx00305-306 Dxfff05fe1,1024031,102.4031 SINT32:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 xx00307-308 Dxfff05fe1,1024031,102.4031 SINT32:Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 xx00401-402 Dxfff05fe1,1024031,102.4031 SINT32:Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 xx00401-402 Dxfff05fe1,1024031,102.4031 SINT32F:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 xx00403-404 Dxfff05fe1,-1024031,-102.4031 SINT32F:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 xx00405-406 Dxfff05fe1,-1024031,-102.4031 SINT32F:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 1000000. (*1024000:-10.24 x00405-408 Dxfff05fe1,-1024031,-102.4031 SINT32F:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and * 10000000. (*1024000:-10.24 x00501-502 Dxfff05fe1,-1024031,-102.4031 SINT32:Current value of AI1 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000. (*1024000:-10.24 x00505-514			
bx00307-300 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00401-402 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00403-404 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI2 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00403-404 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00403-406 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00403-408 Dxff05[e1,-1024031,-102,4031 SINT32:Current value of AI4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.24 bx00503-504 Dxff105[e1,-1024031,-10.24031 SINT32:Current value of AI1 voltage value with 5 decimal places (voltage value * 10000) between -1024000 and +1024000.(-1024000-10.24 bx00503-504 Dxff105[e1,-1024031,-10.24031 SINT32:Current value of AI1 voltage value with 5 decimal places (voltage value * 10000) between -1024000 and +1024000.(-1024000-10.24 <td></td> <td></td> <td>1x00303-304</td>			1x00303-304
Story Sint 32P: Current value of All as percentage with 4 decimal places (percentage value * 10000) between - 1000000 and +1000000. (-1024000-10.2 k00403-404 bx00401-402 0xff005fe1,-1024031,-102.4031 SINt 32P: Current value of Al2 as percentage with 4 decimal places (percentage value * 10000) between - 1000000 and +1000000. (-1024000-10.2 k00405-406 bx00405-406 0xff005fe1,-1024031,-102.4031 SINt 32P: Current value of Al2 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.2 k00405-406 bx00405-406 0xff005fe1,-1024031,-102.4031 SINt 32P: Current value of Al3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000-10.2 k00-10.2 k00-10.			
bx000403-004 0xftt05fe1-1024031,-102.4031 SINT32R-Current value of Al2 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (+024000-10.2 bx00405-406 bx00405-406 0xftt05fe1-1024031,-102.4031 SINT32R-Current value of Al3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +10000000. (+024000-10.2 bx00407-408 0xftt05fe1-1024031,-102.4031 SINT32R-Current value of Al3 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +10000000. (+024000-10.2 bx00407-408 0xftt05fe1-1024031,-102.4031 SINT32R-Current value of Al4 as percentage with 5 decimal places (value * 100000) between -1024000 and +1024000. (+024000-10.2 4x00-10.2 4x00-1	024000:-10.24V,0:0V,+10	0xfff05fe1,-1024031,-102.4031	ix00307-308
xx0405-406 Dxff05611024031_102.4031 SINT32R. Current value of Al3 as percentage with 4 docime! places (percentage value * 10000) between - 1000000 and + 1000000. (-102400010.2 x0047-408 xx0407-408 0xff05611024031_102.4031 SINT32R. Current value of Al4 as percentage with 4 docime! places (percentage value * 10000) between - 1000000 and + 1000000. (-102400010.2 x00010.2 x00010.2 x00010.2 x00010.2 x00010.2 x00010.2 x00010.2 x00010.2 x00010.2 x0010.2			
bx00407-408 0xffl05le1,-1024031,-102.4031 SINT32R:Current value of Al4 as percentage with 4 decimal places (percentage value * 10000) between -1000000 and +1000000. (-1024000:-10.2 bx00501-502 0xffl05le1,-1024031,-10.24031 SINT32:Current value of Al1 voltage value with 5 decimal places (voltage value * 10000) between -1024000 and +1024000. (-1024000:-10.24V.0): bx00503-504 0xffl05le1,-1024031,-10.24031 SINT32:Current value of Al2 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000. (-1024000:-10.24V.0):			
xx00501-502 0x1105fe1,-1024031,-10.24031 SINT32:Current value of Al1 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000, (-1024000,-10.24V, 0; xx00503-504 0x1105fe1,-1024031,-10.24031 SINT32:Current value of Al2 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000, (-1024000,-10.24V, 0;			
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	-1024000:-10.24V,0:0V,+	0xfff05fe1,-1024031,-102.4031	x00407-408
Iv00505-506 Dvfff05fe1 -1024031 -10 24031 -10 24031 SINT32:Current value of Al3 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000 (-1024000 -10 24V 0:			
tx00507-500 0xtH05te1,-1024031,-10.24031 SINT32:Current value of Al4 voltage value with 5 decimal places (voltage value * 100000) between -1024000 and +1024000. (-1024000:-10.24V,0:	000:-10.24V,0:0V,+10240	0xfff05fe1,-1024031,-10.24031	ix00507-508



37 RESI-4AOU-SIO, RESI-4AOU-ETH

37.1 General information

This series of IO modules offer the following features:

- 4 high precision analog outputs for -10Vdc..+10Vdc signals
- ADC resolution 12 bit, accuracy +/-0.1%
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI	
International and the second s	
2 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	

Figure: Our Ethernet IO module



37.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-4AOU-SIO	<1.1W
RESI-4AOU-ETH	<1.5W
Product housing	
RESI-4AOU-SIO	CEM17
RESI-4AOU-ETH	CEM35
Product weight	
RESI-4AOU-SIO	62g
RESI-4AOU-ETH	96g
Analog outputs	
Number	4
Update speed	Every 100ms
Range	-10V+10V
ADC resolution	12 bit
Output voltage range	-10V+10V
Accuracy	+/-0.1%
Cable connection	via terminals
Galvanic isolation	Yes
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.52
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI



37.3 Additional terminals & LED states

ANALOG OUTPUTS	4 analog outputs for -10V0V+10V signals Two 3 pin terminal blocks		
	Terminal type:	USLIM	
	C:	Ground for all analog inputs	
	AO1-AO4:	Analog outputs	
Pin layout	AO1:	Signal output for analog output #1	
	AO2:	Signal output for analog output #2	
	AO3:	Signal output for analog output #3	
	AO4:	Signal output for analog output #4	
	C:	Signal ground for analog outputs #1-#4	
		Both signal grounds are internally bridged	
INFO	If everything is OK,	this LED is on. If there is an internal error at the analog outputs,	
	this LED flashes qu	ickly.	



37.4 RESI-4AOU-SIO,ETH: Schematic diagram

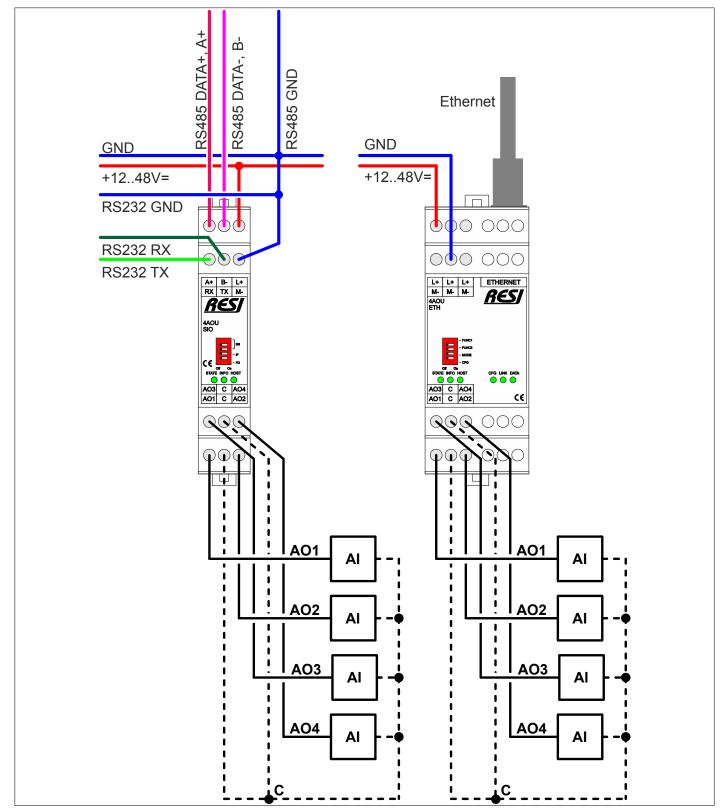


Figure: Schematics for the IO modules



37.5 RESI-4AOU-SIO,ETH: Wiring diagram

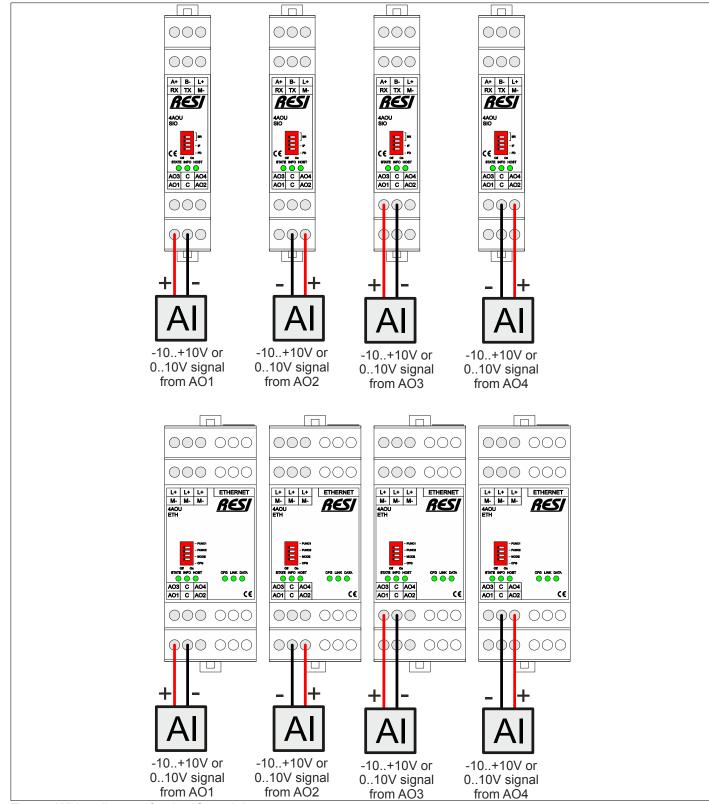


Figure: Wiring diagram for the IO modules



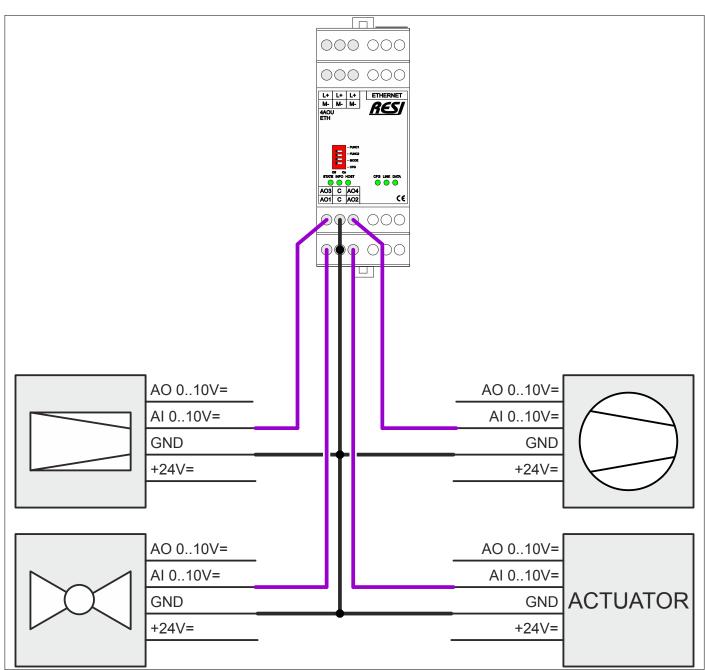


Figure: Wiring diagram for building automation devices



37.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-4AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf

37.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-4AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf



38 RESI-2AIU2AOU-SIO, RESI-2AIU2AOU-ETH

38.1 General information

This series of IO modules offer the following features:

- 2 analog inputs and 2 analog outputs for 0..+10Vdc signals
- ADC resolution 12 bit, accuracy +/-0.5%
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

BESI BESI L'-L'-L'-L'-L'-L'- BESI L'-L'-L'-L'-L'- BESI BESI	
The second secon	
333	

Figure: Our Ethernet IO module



38.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-2AIU2AOU-SIO	<1.0W
RESI-2AIU2AOU-ETH	<1.4W
Product housing	
RESI-2AIU2AOU-SIO	CEM17
RESI-2AIU2AOU-ETH	CEM35
Product weight	
RESI-2AIU2AOU-SIO	62g
RESI-2AIU2AOU-ETH	96g
Analog inputs	
Number	2
Update speed	Every 100ms
Range	0V+10V
ADC resolution	12 bit
Input voltage range	0V+10V
Accuracy	+/-0.5%
Cable connection	via terminals
Galvanic isolation	Yes, to rest of module, but not to other analog inputs and outputs
Analog outputs	
Number	2
Update speed	Every 100ms 0V+10V
Range	
ADC resolution	12 bit 0V+10V
Output voltage range	+/-0.5%
Accuracy Cable connection	via terminals
Galvanic isolation	Yes, to rest of module, but not to other analog inputs and outputs
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.53
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
	200
User	RESI
password	RESI



38.3 Additional terminals & LED states

ANALOG INPUTS	2 analog inputs for 0V+10V signals One 3 pin terminal block		
	Terminal type:	USLIM	
	C:	Ground for all analog inputs and outputs	
	AI1-AI2:	Analog inputs	
ANALOG OUTPUTS	2 analog outputs for 0V+10V signals		
	One 3 pin terminal bl	lock	
	Terminal type:	USLIM	
	C:	Ground for all analog inputs and outputs	
	A01-A02:	Analog outputs	
Pin layout	AO1:	Signal output for analog output #1	
	C:	Ground for all analog inputs and outputs	
	AO2:	Signal output for analog output #2	
	AI1:	Signal input for analog input #1	
	C:	Ground for all analog inputs and outputs	
	AI2:	Signal input for analog input #2	
		Both signal grounds are internally bridged	
INFO	If everything is OK, this LED is on. If there is an internal error on the		
	analog inputs or outputs, this LED flashes quickly.		



38.4 RESI-2AIU2AOU-SIO,ETH: Schematic diagram

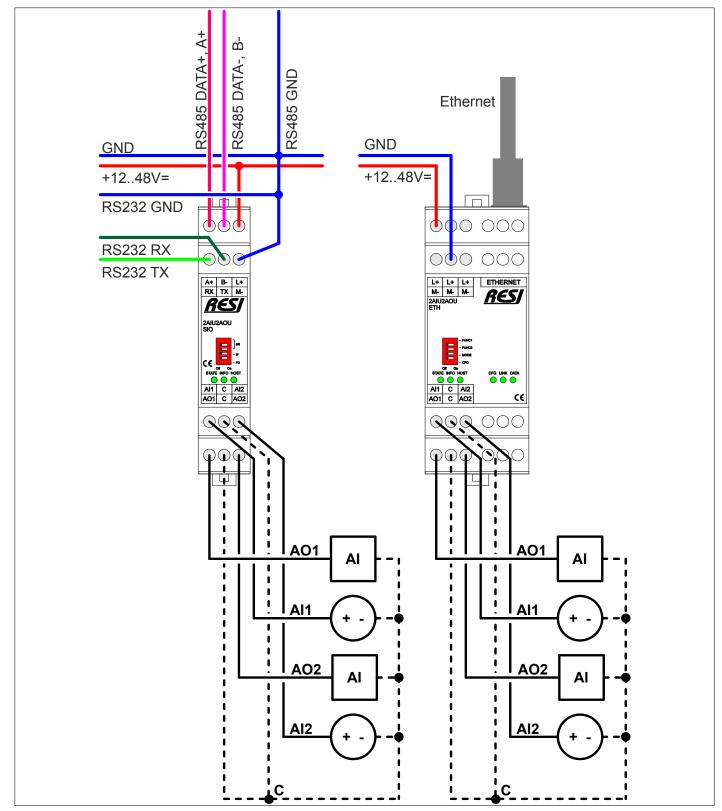


Figure: Schematics for the IO modules



38.5 RESI-2AIU2AOU-SIO,ETH: Wiring diagram

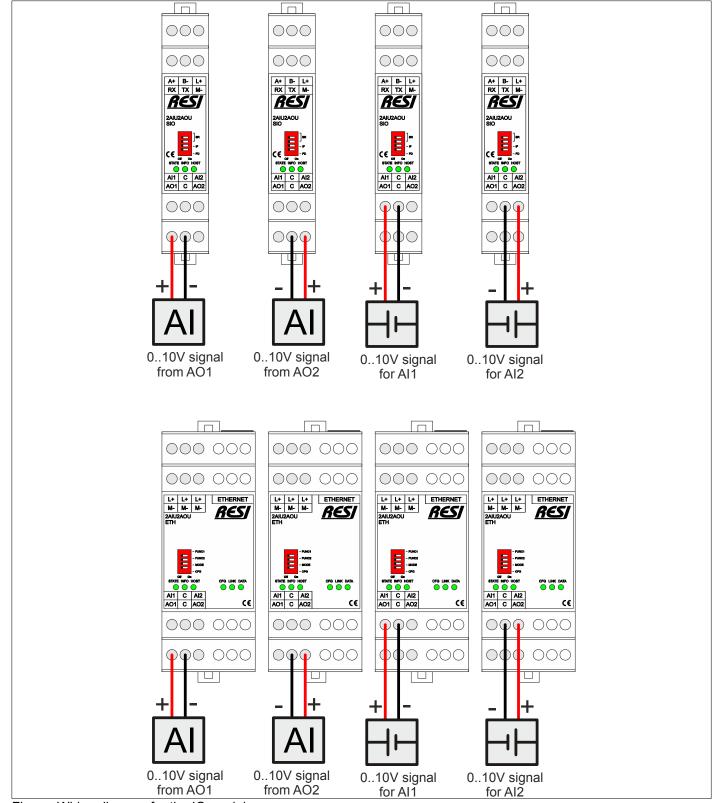


Figure: Wiring diagram for the IO modules



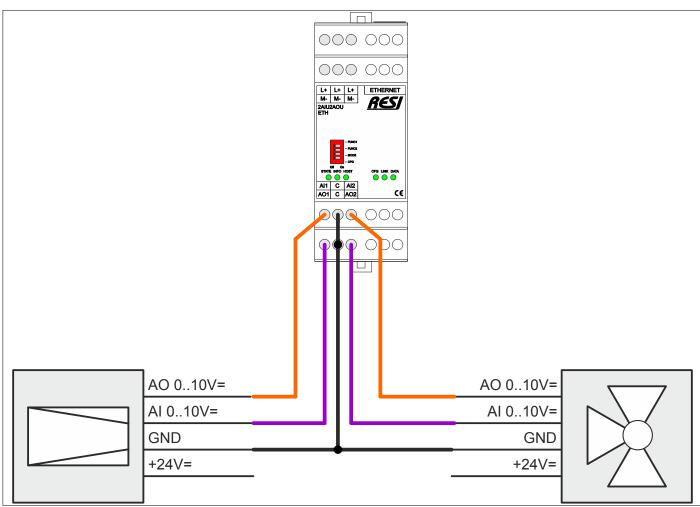


Figure: Wiring diagram for building automation devices



38.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-2AIU2AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf

38.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-2AIU2AOU-SIO-ETH-MODBUS+ASCII-ENxx.pdf



39 RESI-1LED-SIO, RESI-1LED-ETH

39.1 General information

This series of IO modules offer the following features:

- 3 dimmable PWM output channels for LED stripes, 0..48Vdc, max. 5A each channel
- Six selectable modes: OFF, ON, FLASHING, FADING, RANDOM, SEQUENCE
- External power supply for LED stripes, 0..48Vdc, max. 15A
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

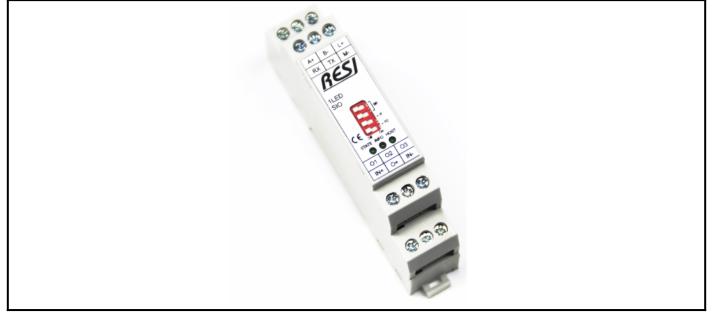


Figure: Our serial IO module

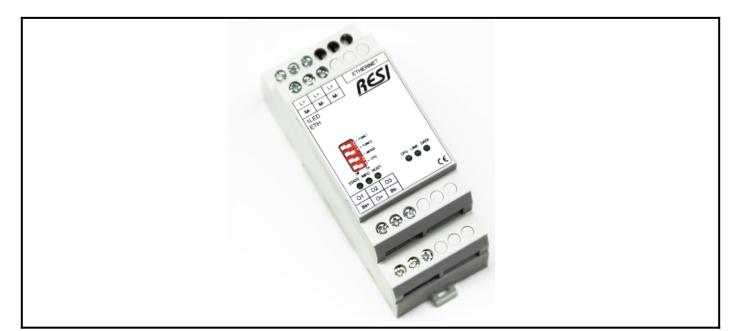


Figure: Our Ethernet IO module



39.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-1LED-SIO <0.8W RESI-1LED-ETH <1.2W Product housing RESI-2AU2AOU-SIO CEM17 RESI-2AU2AOU-ETH CEM35 Product weight RESI-2AU2AOU-ETH 60g RESI-2AU2AOU-ETH 94g LED stripe outputs Number 3 Type of outputs PWM with 400Hz LED outputs PWM with 400Hz LED outputs RGB, Dual white, Mono color LED output voltage 0.48Vdc LED Output voltage 0.48Vdc LED Output current Max. 5A per channel LED Power supply 0.48Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.0 UnitID 255 UnitID <td< th=""><th>Power consumption</th><th></th></td<>	Power consumption	
Product housing RESI-2AIU2AOU-STH RESI-2AIU2AOU-ETH CEM35 Product weight RESI-2AIU2AOU-ETH RESI-2AIU2AOU-ETH 94g LED stripe outputs Number 3 Type of outputs PVM with 400Hz LED stripes RGB, Dual white, Mono color LED outputs LED outputs Via common anode LED Output outge 0.48Vdc LED Output outge	RESI-1LED-SIO	<0.8W
RESI-2AIU2AOU-SIO CEM17 RESI-2AIU2AOU-ETH CEM35 Product weight RESI-2AIU2AOU-SIO RESI-2AIU2AOU-ETH 94g LED stripe outputs Number Number 3 Type of outputs PVVM with 400Hz LED stripe outputs RGB, Dual white, Mono color LED stripes RGB, Dual white, Mono color LED output voltage 048Vdc LED Output voltage 048Vdc LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings one Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.255.0 User RESI	RESI-1LED-ETH	<1.2W
RESI-2AIU2AOU-SIO CEM17 RESI-2AIU2AOU-ETH CEM35 Product weight RESI-2AIU2AOU-SIO RESI-2AIU2AOU-ETH 94g LED stripe outputs Number Number 3 Type of outputs PVVM with 400Hz LED stripe outputs RGB, Dual white, Mono color LED stripes RGB, Dual white, Mono color LED output voltage 048Vdc LED Output voltage 048Vdc LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings one Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.255.0 User RESI		
RESI-2AIU2AOU-ETH CEM35 Product weight RESI-2AIU2AOU-SIO RESI-2AIU2AOU-ETH 94g LED stripe outputs Number Number 3 Type of outputs PVM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED output voltage 048Vdc LED Output current Max. 5A per channel LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings one Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitD 255	Product housing	
Product weight RESI-2AIU2AOU-SIO 60g RESI-2AIU2AOU-ETH 94g LED stripe outputs	RESI-2AIU2AOU-SIO	CEM17
RESI-2AIU2AOU-SIO 60g RESI-2AIU2AOU-ETH 94g LED stripe outputs Number Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED output voltage 048Vdc LED output voltage 048Vdc LED Output voltage 048Vdc,max 15A LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate Via DIP switch Parity Parity none Stopbits one UnitD 255 Default Ethernet settings IP address IP address 192.168.0.60 IP mask 255.255.0 gateway 192.168.0.1 UnitD 255	RESI-2AIU2AOU-ETH	CEM35
RESI-2AIU2AOU-SIO 60g RESI-2AIU2AOU-ETH 94g LED stripe outputs Number Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED output voltage 048Vdc LED output voltage 048Vdc LED Output voltage 048Vdc,max 15A LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate Via DIP switch Parity Parity none Stopbits one UnitD 255 Default Ethernet settings IP address IP address 192.168.0.60 IP mask 255.255.0 gateway 192.168.0.1 UnitD 255		
RESI-2AIU2AOU-ETH 94g LED stripe outputs 3 Number 3 Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 048Vdc LED Output current Max.5A per channel LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitD 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitD 255 User RESI	Product weight	
LED stripe outputs Number 3 Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 048Vdc LED Output voltage 048Vdc LED Output voltage 048Vdc LED Output current Max. 5A per channel Cable connection Via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	RESI-2AIU2AOU-SIO	60g
Number 3 Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 0.48Vdc LED Output current Max. 5A per channel LED Power supply 0.48Vdc,max 15A 12D volupt current Max. 5A per channel LED Power supply 0.48Vdc,max 15A 12D volupt current Via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 UnitID 255 UnitID User RESI	RESI-2AIU2AOU-ETH	94g
Number 3 Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 0.48Vdc LED Output current Max. 5A per channel LED Power supply 0.48Vdc,max 15A 12D volupt current Max. 5A per channel LED Power supply 0.48Vdc,max 15A 12D volupt current Via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 UnitID 255 UnitID User RESI		
Type of outputs PWM with 400Hz LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 0.48Vdc LED Output current Max. 5A per channel IED Power supply 0.48Vdc,max 15A IED Power supply IED Power supply </td <td>LED stripe outputs</td> <td></td>	LED stripe outputs	
LED stripes RGB, Dual white, Mono color LED connection Via common anode LED Output voltage 048Vdc LED Output current Max. 5A per channel LED Power supply 048Vdc,max 15A LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	Number	3
LED connection Via common anode LED Output voltage 048Vdc LED Output current Max. 5A per channel LED Power supply 048Vdc,max 15A 180W@12V=, 360W@24V=, 720W@48V= Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings	Type of outputs	PWM with 400Hz
LED Output voltage 048Vdc LED Output current Max. 5A per channel LED Power supply 048Vdc,max 15A Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate Via DIP switch Parity Parity one UnitID 255 Default Ethernet settings 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 Exponention RESI	LED stripes	RGB, Dual white, Mono color
LED Output current Max. 5A per channel LED Power supply 048Vdc,max 15A 180W@12V=, 360W@24V=, 720W@48V= Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.0 gateway 192.168.0.1 UnitID 255	LED connection	Via common anode
LED Power supply 048Vdc,max 15A 180W@12V=, 360W@24V=, 720W@48V= Cable connection via terminals Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	LED Output voltage	048Vdc
180W@12V=, 360W@24V=, 720W@48V=Cable connectionvia terminalsGalvanic isolationYes, to rest of module, but not to other PWM outputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255	LED Output current	Max. 5A per channel
180W@12V=, 360W@24V=, 720W@48V=Cable connectionvia terminalsGalvanic isolationYes, to rest of module, but not to other PWM outputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255		
Cable connectionvia terminalsGalvanic isolationYes, to rest of module, but not to other PWM outputsDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255	LED Power supply	048Vdc,max 15A
Galvanic isolation Yes, to rest of module, but not to other PWM outputs Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255		180W@12V=, 360W@24V=, 720W@48V=
Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Cable connection	via terminals
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Galvanic isolation	Yes, to rest of module, but not to other PWM outputs
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI		
ParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Default serial settings	
StopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.60IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Baud rate	via DIP switch
UnitID 255 Default Ethernet settings 192.168.0.60 IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 UnitID 255	Parity	none
Default Ethernet settings IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Stopbits	one
IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI	UnitID	255
IP address 192.168.0.60 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI		
IP mask 255.255.0 gateway 192.168.0.1 UnitID 255 User RESI		
gateway 192.168.0.1 UnitID 255 User RESI	IP address	
UnitID 255 User RESI	IP mask	255.255.255.0
User RESI	gateway	192.168.0.1
	UnitID	255
password RESI		
	password	RESI

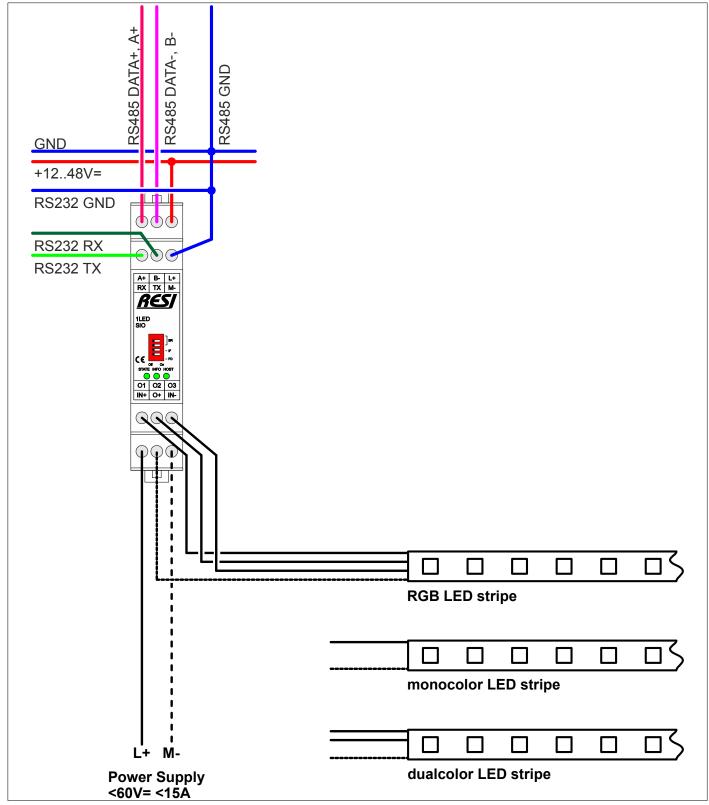


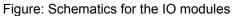
39.3 Additional terminals & LED states

LED OUTPUTS	3 LED outputs for PWM signals		
	Two 3 pin terminal blocks		
	Terminal type:	USLIM	
	IN+:	LED Power supply <48V, <15A	
	IN-:	LED Power supply ground signal	
	O+:	Common LED anode for all three PWM outputs	
	01,02,03:	PWM outputs to LED cathode	
Pin layout	IN+::	LED Power supply <48V, <15A	
	O+:	Common LED anode for all three PWM outputs	
	IN-:	LED Power supply ground signal	
	O1:	PWM output #1 to LED cathode group #1	
	O2:	PWM output #1 to LED cathode group #2	
	O3:	PWM output #1 to LED cathode group #3	
INFO	This LED shows the	e status of the three outputs. In mode OFF this LED is off.	
	In mode ON the LE	In mode ON the LED is on. The LED flashes if fading is active.	

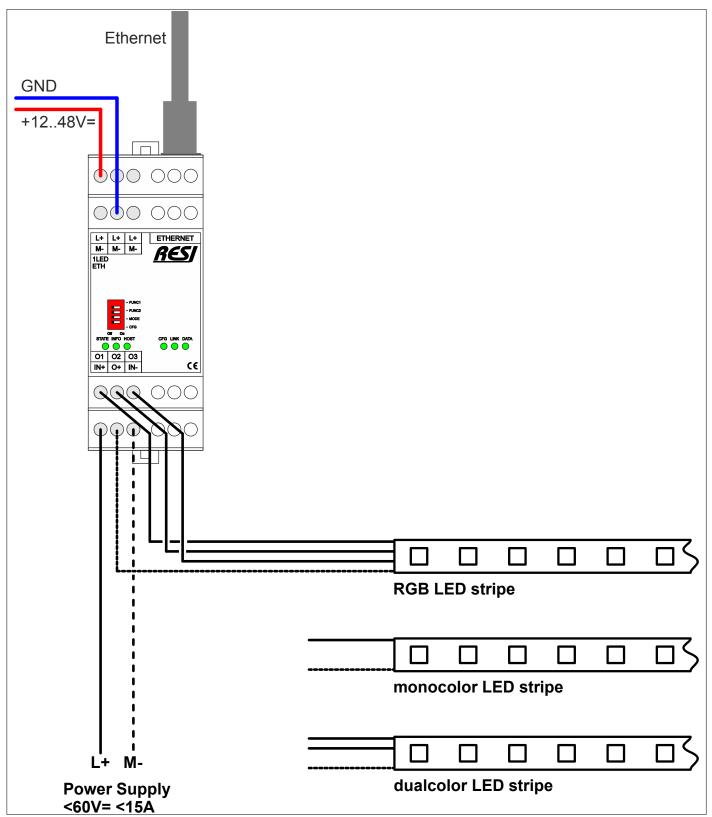


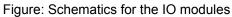
39.4 RESI-1LED-SIO,ETH: Schematic diagram













39.5 The modes of the LED module

The LED module offers six modes. You can switch the mode by setting a special register via MODBUS/RTU or by executing the #SMODE ASCII command. Be aware that the converter does not save a mode in remanent memory. After reset the module starts always in mode ON!

39.5.1 LED mode OFF

In this mode all three outputs are switched to 0. It doesn't matter, what values are in the set point registers LO1 4x00001, LO2 4x00002 or LO3 4x00003. The registers for the actual output values CLO1 4x00008, CLO2 4x00009 and CLO3 4x00010 return always the value 0.

39.5.2 LED mode ON

In this mode all three outputs are switched immediately to the current values in the registers LO1 4x00001, LO2 4x00002 or LO3 4x00003. The registers for the actual output values CLO1 4x00008, CLO2 4x00009 and CLO3 4x00010 delivers always the same value as the registers LO1 4x00001, LO2 4x00002 or LO3 4x00003 to indicate, that the values are really outputted to the three PWM channels.

39.5.3 LED mode FLASH

In this mode all three outputs are switched as a recycler relay between the three current values in the registers LO1 4x00001, LO2 4x00002 or LO3 4x00003 and 0. While ON time, the module outputs the three registers LO1 4x00001, LO2 4x00002 or LO3 4x00003 to the real outputs for a timespan defined in the register MINIMUM TIME 4x00006 in 1/10s. In this time the registers for the actual output values CLO1 4x00008, CLO2 4x00009 and CLO3 4x00010 delivers always the same value as the registers LO1 4x00001, LO2 4x00002 or LO3 4x00003 to indicate, that the values are really outputted to the three PWM channels. Then the converter switches all three channels to 0 for the OFF time span. This time span is defined with the value of the MAXIMUM TIME register 4x00007 in 1/10s. In this time the registers for the actual output values CLO2 4x00009 and CLO3 4x00010 delivers always the value 0. This ON/OFF cycle is repeated endlessly.

Steps for FLASH:

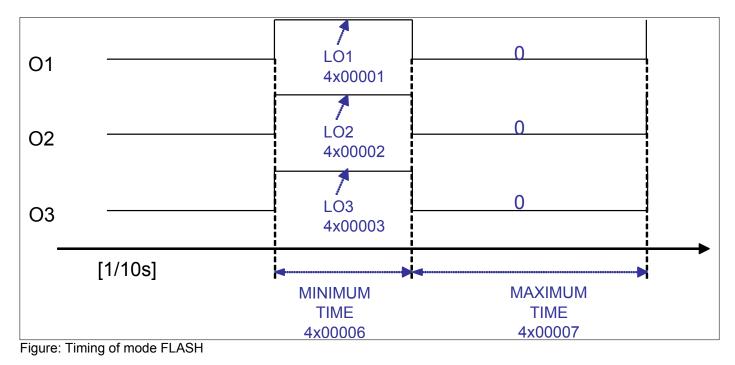
Step 1: Output of the three set point values LO1, LO2, and LO3 to the real PWM outputs

Step 2: Wait for MINIMUM TIME in 1/10s

Step 3: output of the values 0, 0, 0 to the real PWM outputs

Step 4: Wait for MAXIMUM TIME in 1/10s

Step 5: continue with step 1





39.5.4 LED mode FADE

In this mode the converter doesn't change the output values immediately. No, it uses a ramp to change slowly from the current value to the new value. This ramp is defined in the register FADE SPEED 4x00005. The setup is done in steps per 1/100s and is valid for all three channels. To set a new value write into the three registers LO1 4x00001, LO2 4x00002 or LO3 4x00003. The system fades from the current value to the new values. If you read the registers CLO1 4x00008, CLO2 4x00009 and CLO3 4x00010 while fading, you will get every value change from the old value to the new value. Also the register IS FADE ACTIVE 4x00014 will return a 1 while fading is running. When the module reaches the new values, reading of the registers CLO1 4x00008, CLO2 4x00009 and CLO3 4x00010 will return the same values as the registers LO1 4x00001, LO2 4x00002 and LO3 4x00003. Also the register value of IS FADE ACTIVE 4x00014 will be 0.

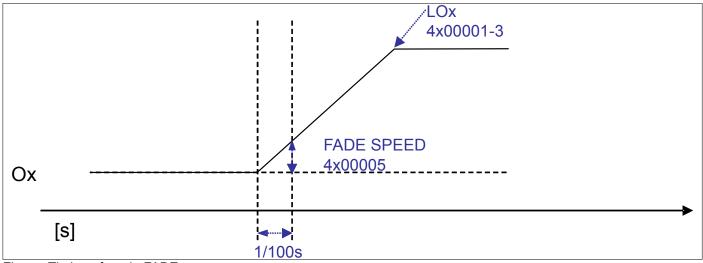


Figure: Timing of mode FADE

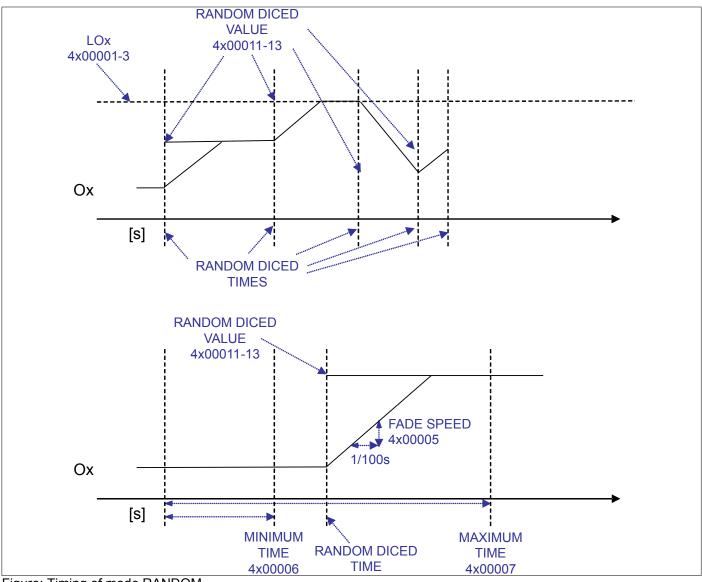


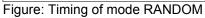
39.5.5 LED mode RANDOM

In this mode the converter generates random values for each output. For this you can setup a time interval. If this time interval expires the system dices new random values for the three outputs. The time interval is defined by the register MINIMUM TIME 4x00006 and the register MAXIMUM TIME 4x00007 in seconds. The system generates a random time interval between those two parameters. If the time expires, the system dices new random values for the three registers RLO1 4x00011, RLO2 4x00012 and RLO3 4x00013. Then the system fades the current values in the register FADE SPEED 4x00005. The setup is done in steps per 1/100s. If you read the registers CLO1 4x00008, CLO2 4x000010 while fading, you will get every value change from the old value to the new value. Also the register IS FADE ACTIVE 4x00014 will return a 1 while fading is running. When the module reaches the new values, reading of the registers CLO1 4x00008, CLO2 4x00009 and CLO3 4x00003. Also the register value of IS FADE ACTIVE 4x00014 will be 0. The diced values in the registers RLO1 4x00002 and RLO3 4x00011, RLO2 4x00003. Also the register value of IS FADE ACTIVE 4x00014 will be 0. The diced values in the registers RLO1 4x00003.

Steps for RANDOM:

Step 1: Dice three random numbers in the range of 0..LOx and store the values in RLOx Step 2: Dice a random wait period between MINIMUM TIME and MAXIMUM TIME in seconds Step 3: Fade up or down from the actual output values CLOx to the new end values RLOx Step 4: If the random wait period is over, continue with step 1







39.5.6 LED mode SEQUENCE

In this mode, the module creates a sequential flash light with the three PWM outputs. The outputs flashes between the three set points LO1, LO2 and LO3 and 0 in sequence. In the first ON phase the module sets the real output CLO1 to the set point LO1, the other two outputs are set to 0. This phase lasts for MINIMUM TIME in 1/10s. While this period of time, the current value register CLO1 delivers the same value as in LO1, and the other two current value registers CLO2 and CLO3 deliver the value 0. Then the module switches all three outputs to 0 for a time period defined with the register MAXIMUM TIME in 1/10s (OFF time period). While this period of time, all three output registers CLO2 deliver the value 0. Now the system repeats the ON phase with the next set point register LO2. The two registers CLO1 and CLO3 are 0 in this phase. Next the OFF time period is executed. The last phase is the ON phase with the register LO3. The two registers CLO1 and CLO2 are 0 in this phase. The last OFF time period is executed. This three times ON/OFF cycle is repeated endlessly.

Steps for SEQUENCE:

- Step 1: Output the three set points LO1, 0, 0 to the three PWM outputs
- Step 2: wait for MINIMUM TIME in 1/10s
- Step 3: Output the values 0, 0, 0 to the three PWM outputs
- Step 4: wait for MAXIMUM TIME in 1/10s
- Step 5: Output the three set points 0, LO2, 0 to the three PWM outputs
- Step 6: wait for MINIMUM TIME in 1/10s
- Step 7: Output the values 0, 0, 0 to the three PWM outputs
- Step 8: wait for MAXIMUM TIME in 1/10s
- Step 9: Output the three set points 0, 0, LO3 to the three PWM outputs
- Step 10: wait for MINIMUM TIME in 1/10s
- Step 11: Output the values 0, 0, 0 to the three PWM outputs
- Step 12: wait for MAXIMUM TIME in 1/10s
- Step 13: continue with step 1

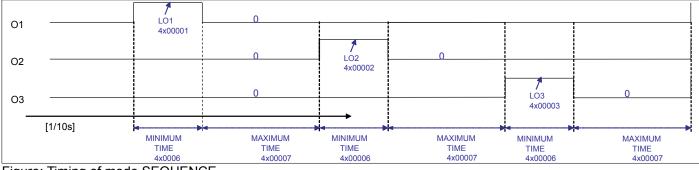


Figure: Timing of mode SEQUENCE



39.6 RESI-1LED-SIO,ETH: Wiring diagram

39.6.1 Cabling of the power supply for the LED stripes

The power supply for the LED stripes must be cabled externally. The module offers the two clamps IN+ and IN- to connect the power supply. Depending on the type of LED stripe you want to use, you can connect various types of power supplies. It is very important, that the used power supply does not exceed the maximum continuous current rating of 15A! The result is the following mandatory limits for supplying LED stripes with different voltage levels:

- LED stripes with 12Vdc power supply: 12Vdc*15A -> max. 180W mains adapter
- LED stripes with 24Vdc power supply: 24Vdc*15A -> max. 360W mains adapter
- LED stripes with 48Vdc power supply: 48Vdc*15A -> max. 720W mains adapter

But be aware, that every output can only drive a maximum current of 5A!

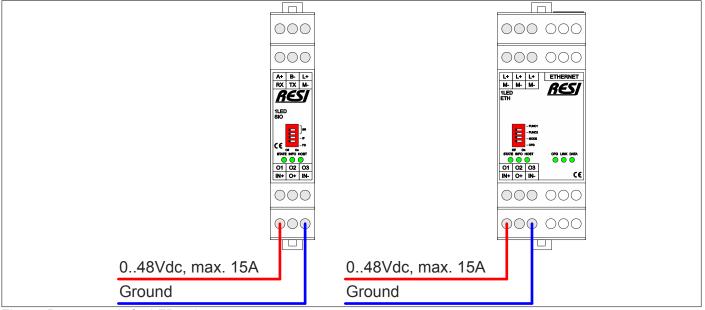


Figure: Power supply for LED stripes



39.6.2 HOWTO connect a 12V mono color LED stripe

Cabling of a 12Vdc LED stripe with 24W power consumption, luminous color 2700K. Due to the reason, that the LED strip consumes only 24W, we use also a 24W mains adapter. So there flows an input current of 2A. Via the output O1 flows also an output current of 2A. (<5A, so this is ok).

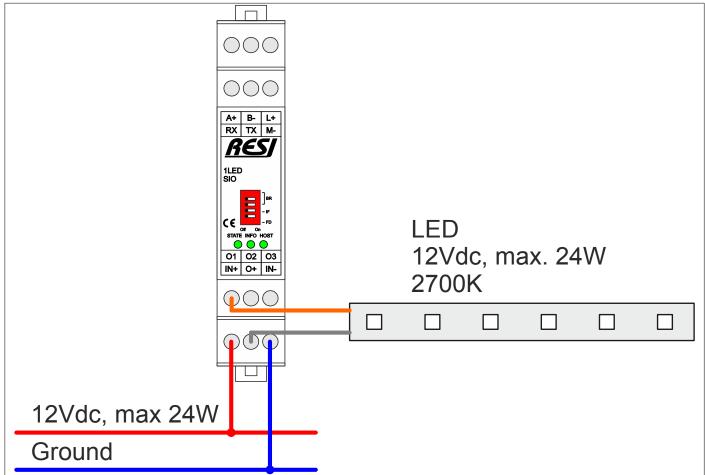


Figure: Cabling of a 12Vdc LED stripe with 24W power consumption



39.6.3 HOWTO connect three 24V mono color LED stripes

Cabling of three 24Vdc LED stripes with 48W each stripe. Each of the three LED stripes can be dimmed individually. The sample uses all three LED outputs to create three individual dimmable groups of LED stripes. Each LED stripe consumes 48W power. So we use a power supply with 3x48W -> 150W. The input current on the clamps IN+, IN- is max. 6.25A. This is less than the allowed 15A and ok. While we use on each output a LED stripe with 48W power, the output current per channel is max. 2A. This is lower than the maximum rating of 5A per output und therefore ok too.

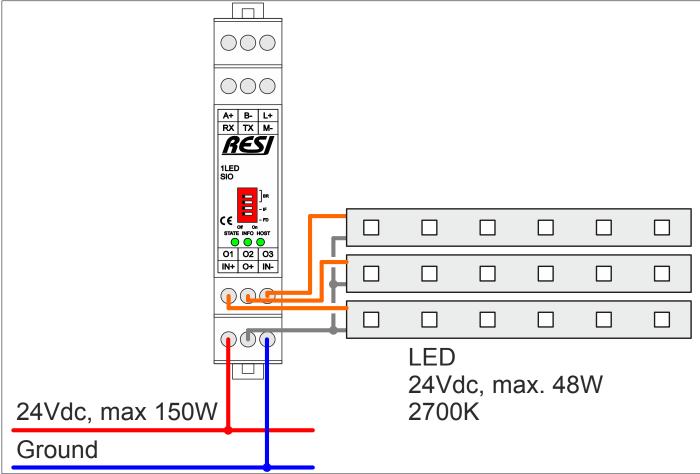


Figure: Cabling of three 24Vdc LED stripes with 48W each stripe



39.6.4 HOWTO connect two 24V mono color LED stripes

Cabling of two 24Vdc LED stripes with 48W power consumption each. Both LED stripes are only together dimmable. Only output O1 is used for both LED stripes. We use a 100W power supply. The primary input current is 4.17A. This is smaller than the allowed 15A and therefore ok. We operate with two LED stripes on one output. This output must drive 96W power. We choose a 24Vdc LED stripe. So the output current is 4A. This is again smaller than the allowed 5A and ok.

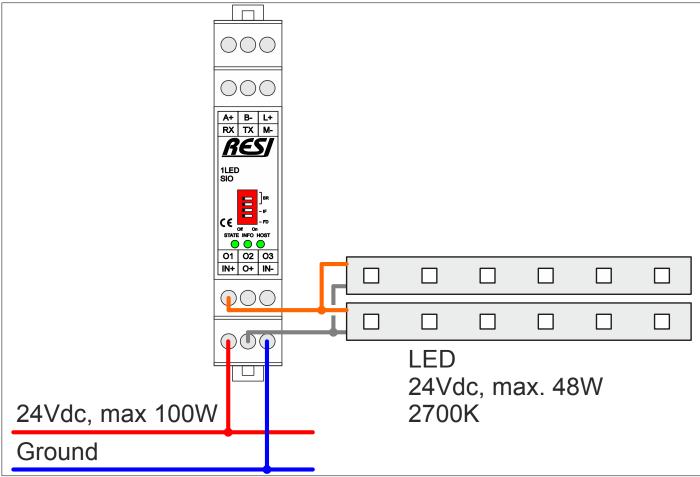


Figure: Cabling of two 24Vdc LED stripes with 48W power consumption each



39.6.5 HOWTO connect RGB LED stripes

In this sample we use RGB LED HD stripe. This stripe offers three dimmable channels for the three primary colors red, green and blue. The common anode is again connected to O+. The 80W power supply delivers a maximum current of 3,34A. So this current is far beyond the allowed 15A for the power input. The LED stripe consumes only 1/3rd of the total power of 72W on each channel. This is 24W, the current is 1A. Again the output current on all three outputs is much lower than the allowed 5A.

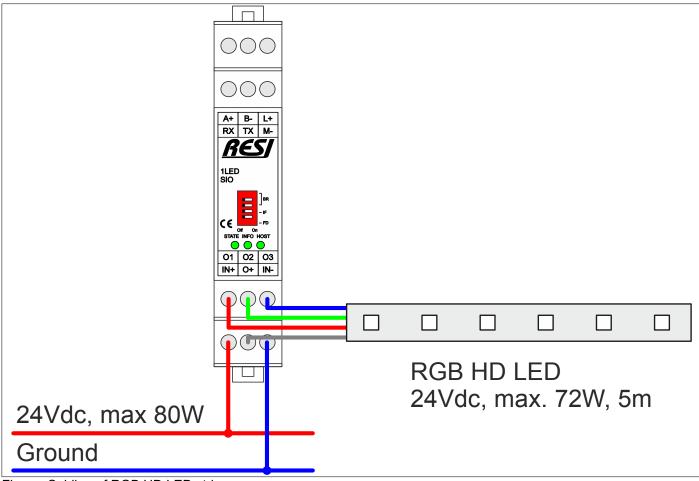


Figure: Cabling of RGB HD LED stripe



39.6.6 HOWTO connect dynamic white LED stripes

Cabling of a dynamic white LED stripe. This type of LED stripe combines two LED types with different luminous colors in one LED stripe. This LED stripe can mix a spectrum of white colors, mostly from warm white to cold white. We have to wire the four cables of the LED stripe to our module as shown in the above drawing. Each output must drive 48W. Again we have a maximum output current of 2A per channel. This is far beyond the allowed 5A and ok. The 100W power supply delivers an input current of max. 4.16A. Also this current is far beyond the allowed 15A and ok.

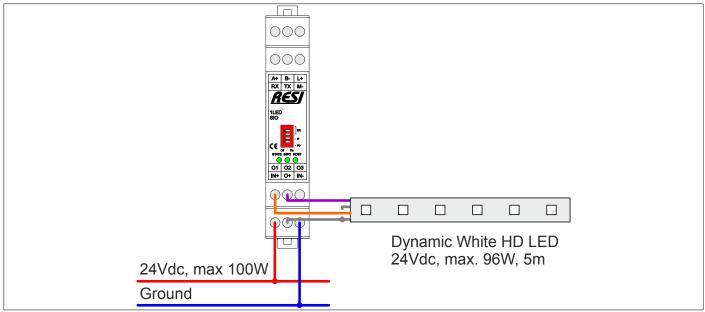


Figure: Cabling of dynamic white LED stripe



39.6.7 HOWTO connect RGBW LED stripes

In this sample we use RGBW LED HD stripe. This stripe offers four dimmable channels for the three primary colors red, green and blue and for white. The common anode is again connected to O+. We need a 100W power supply with 24Vdc, so we have 4,16A in total. This is far below the maximum of 15A. The LED stripe consumes only 1/4th of the total power of 100W on each channel. This is 25W, the current is 1,05A. Again the output current on all four outputs is much lower than the allowed 5A. But we need two modules to control all four LED channels.

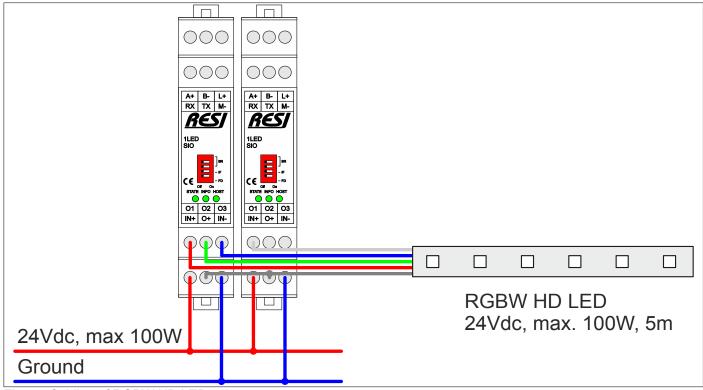


Figure: Cabling of RGBW HD LED stripe



39.7 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-1LED-SIO-ETH-MODBUS+ASCII-ENxx.pdf

39.8 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-1LED-SIO-ETH-MODBUS+ASCII-ENxx.pdf



40 RESI-1EGYDCS-SIO, RESI-1EGYDCS-ETH

40.1 General information

This series of IO modules offer the following features:

- DC smart meter with external shunt for DC current measurement
- DC voltage measurement <=100V</p>
- DC current measurement <=100mV for external DC shunt 1..255A
- Measures & calculates: Voltage, Current, Power and Energy
- Remanent memory for accumulated total energy consumption
- Especially for Telecom 48Vdc applications
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

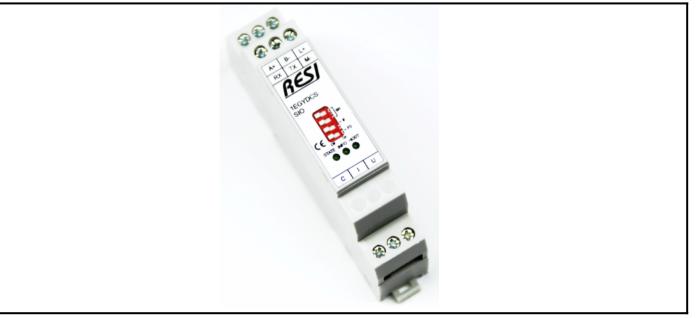


Figure: Our serial IO module



Figure: Our Ethernet IO module



40.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-1EGYDCS-SIO <0.9W RESI-1EGYDCS-ETH <1.3W Product housing RESI-1EGYDCS-SIO CEM17 RESI-1EGYDCS-SIO CEM35 Product weight RESI-1EGYDCS-SIO 57g RESI-1EGYDCS-ETH 91g DC smart meter DC voltage input range 0.100V= ACCrasolution 12 bit Accuracy +/-0.1%, if calibrated DC current input range 0.100W= ACC resolution 12 bit Accuracy +/-0.1% if calibrated DC current input range 0.100mV= ACC resolution 12 bit Accuracy +/-0.1% if calibrated DC current input range 0.100mV= Accuracy +/-0.1% if calibrated DC carrent is shunt configurable shunt size 1 to 255A Sternal shunt configurable shunt size 1 to 255A Cable connection via terminals Galvanic isolation Yes, to rest of module DE strings D Default ser	Power consumption	
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RESI-1EGYDCS-SIO 57g RESI-1EGYDCS-ETH 91g DC smart meter	RESI-1EGYDCS-ETH	CEM35
RESI-1EGYDCS-SIO 57g RESI-1EGYDCS-ETH 91g DC smart meter		
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UnitID 255 User RESI	IP mask	255.255.255.0
User RESI	gateway	192.168.0.1
	UnitID	255
password RESI	User	
	password	RESI



40.3 Additional terminals & LED states

DC SMART METER	Voltage and current inputs for DC smart metering		
	One 3 pin terminal	One 3 pin terminal block	
	Terminal type:	USLIM	
	C:	Ground for voltage and current measurement	
	U:	Voltage measurement input	
	l:	Current measurement input for external DC shunt	
Pin layout	C:	Ground for voltage and current measurement	
i in layout	0	Current measurement input for external DC shunt	
	U:	Voltage measurement input	
INFO	If everything is OK, this LED flashes every second.		
	If there is an interna	If there is an internal error, this LED is always ON or OFF.	



40.4 RESI-1EGYDCS-SIO,ETH: Schematic diagram

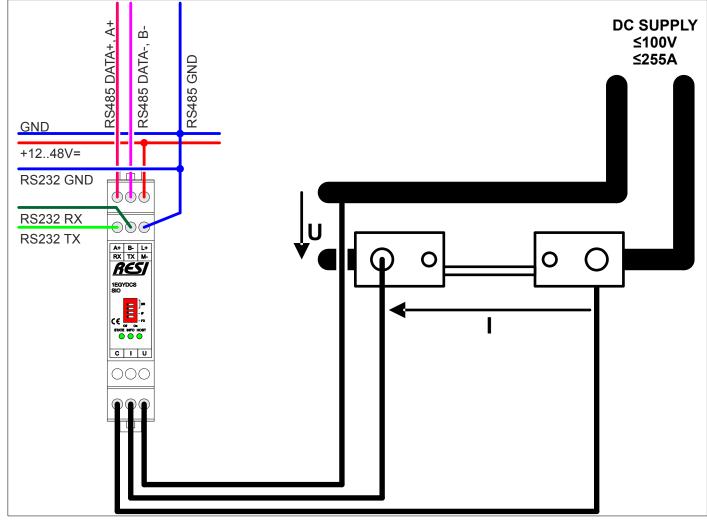


Figure: Schematics for the IO modules



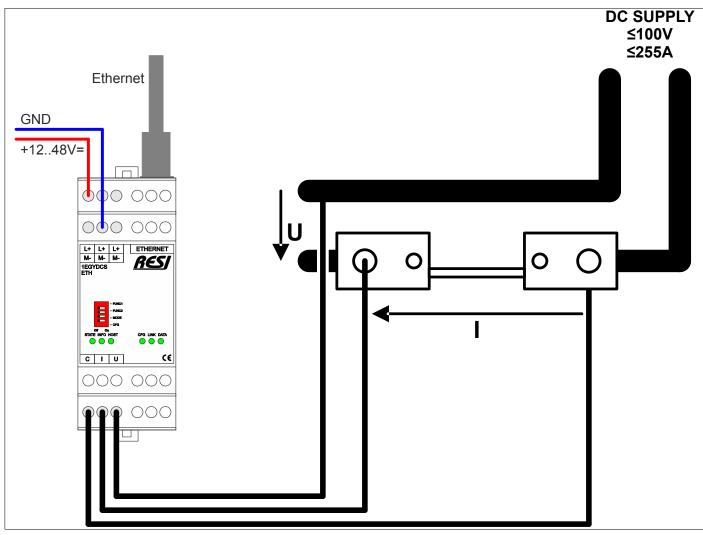


Figure: Schematics for the IO modules



40.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-1EGYDCS-SIO-ETH-MODBUS+ASCII-ENxx.pdf

40.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-1EGYDCS-SIO-ETH-MODBUS+ASCII-ENxx.pdf



41 RESI-1EGYDC-SIO, RESI-1EGYDC-ETH

41.1 General information

This series of IO modules offer the following features:

- DC smart meter with external Hall sensor for DC current measurement
- DC voltage measurement <=100V
- DC current measurement with external Hall sensor max. 255A
- Measures & calculates: Voltage, Current, Power and Energy
- Remanent memory for accumulated total energy consumption
- Especially for Telecom 48Vdc applications
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial IO module

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Figure: Our Ethernet IO module



41.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

RESI-LEGYDC-SIO ?W, tbd</td Product housing	Power consumption	
Product housing RESI-IEGYDC-SIO CEM17 RESI-IEGYDC-ETH CEM35 Product weight RESI-IEGYDC-ETH RESI-IEGYDC-ETH 96g DC smart meter DC DC voltage input range 0100V= ADC resolution 12 bit Accuracy +/-0.1% DC urrent input range 0255A DC Hall sensor interface ADC resolution ADC resolution 12 bit Accuracy +/-0.1% External Hall sensor configurable Hall sensor size 1 to 255A Cable connection via terminals Galvanic isolation Yes, to rest of module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192 168.0.23 IP mask 255 255 255.0 User RESI	RESI-1EGYDC-SIO	?W, tbd</td
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DC Hall sensor interface ADC resolution 12 bit Accuracy +/-0.1% External Hall sensor configurable Hall sensor size 1 to 255A Cable connection via terminals Galvanic isolation Yes, to rest of module Default serial settings Baud rate Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255		
ADC resolution12 bitAccuracy+/-0.1%External Hall sensorconfigurable Hall sensor size 1 to 255ACable connectionvia terminalsGalvanic isolationYes, to rest of moduleDefault serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.23IP mask255.255.0gateway192.168.0.1UnitID255UserRESI	· · · · · · · · · · · · · · · · · · ·	0255A
Accuracy +/-0.1% External Hall sensor configurable Hall sensor size 1 to 255A Cable connection via terminals Galvanic isolation Yes, to rest of module Default serial settings		
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Cable connection via terminals Galvanic isolation Yes, to rest of module Default serial settings Baud rate Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Evternel Hell concer	configurable Hall concerning 1 to 2554
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Galvanic isolation Yes, to rest of module Default serial settings Baud rate via DIP switch Parity none Stopbits one UnitID 255 Default Ethernet settings 192.168.0.23 IP address 192.168.0.1 UnitID 255	Cable connection	via terminals
Default serial settingsBaud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.23IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI		
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.23IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI		
Baud ratevia DIP switchParitynoneStopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.23IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI	Default serial settings	
StopbitsoneUnitID255Default Ethernet settingsIP address192.168.0.23IP mask255.255.255.0gateway192.168.0.1UnitID255UserRESI		via DIP switch
UnitID 255 Default Ethernet settings 192.168.0.23 IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255 User RESI	Parity	none
Default Ethernet settings IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Stopbits	one
IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	UnitID	255
IP address 192.168.0.23 IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255		
IP mask 255.255.255.0 gateway 192.168.0.1 UnitID 255	Default Ethernet settings	
gateway 192.168.0.1 UnitID 255 User RESI	IP address	192.168.0.23
UnitID 255 User RESI	IP mask	255.255.255.0
User RESI	gateway	192.168.0.1
	UnitID	255
password RESI	User	
	password	RESI



41.3 Additional terminals & LED states

DC SMART METER	Voltage and current inputs for DC smart metering Two 3 pin terminal blocks	
	Terminal type:	USLIM
	C:	Ground for voltage measurement
	U:	Voltage measurement input
	H+, H-:	Power supply of Hall sensor
	HI, HR:	Hall sensor signals
Pin layout	C:	Ground for voltage measurement
	HI:	Hall sensor signal
	U:	Voltage measurement input
	H+:	Power supply of Hall sensor
	HR:	Hall sensor signal
	H-:	Power supply of Hall sensor
		·
INFO	If everything is OK,	this LED flashes every second.
	If there is an internal error, this LED is always ON or OFF.	

<u>res</u>i

41.4 RESI-1EGYDC-SIO,ETH: Schematic diagram

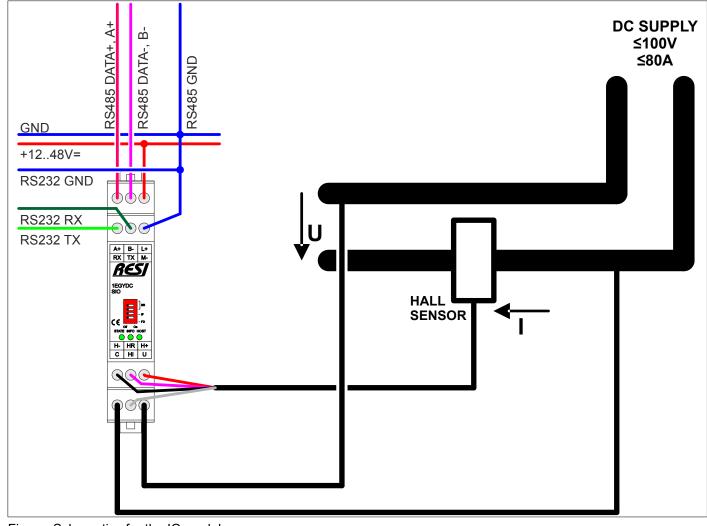


Figure: Schematics for the IO modules



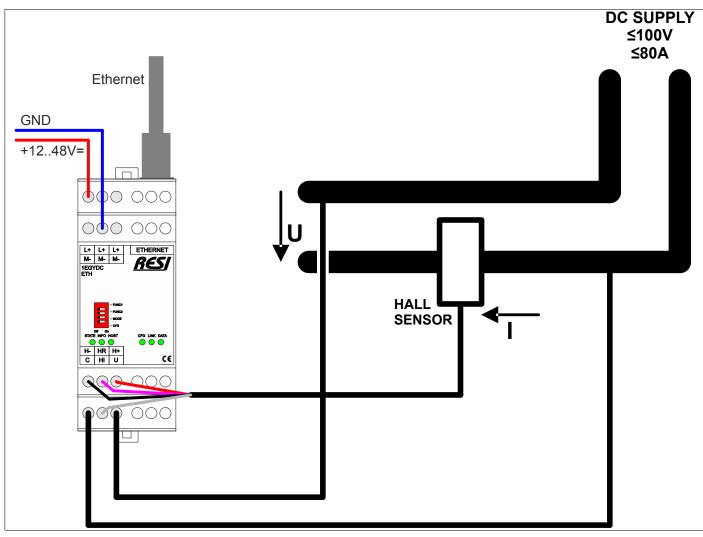


Figure: Schematics for the IO modules



41.5 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-1EGYDC-SIO-ETH-MODBUS+ASCII-ENxx.pdf

41.6 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-1EGYDC-SIO-ETH-MODBUS+ASCII-ENxx.pdf



42 RESI-DMX-SIO, RESI-DMX-ETH

42.1 General information

Our RESI-DMX-SIO, RESI-DMX-ETH converter are designed for controlling a DMX light system with a DMX universe of 512 DMX addresses. The control is done with simple ASCII commands or via MODBUS/RTU registers.

To control our DMX converter you need a host system with a serial interface (RS232 or RS485), which is able to send ASCII command strings and which can receive ASCII characters. This feature is implemented in almost any media control system like CRESTRON®, AMX® or CONTROL4®. But almost every standard PLC can handle serial ASCII interfaces. Therefore your converter can be integrated everywhere. If the host system offers a MODBUS/RTU master interface, our converter can be controlled via MODBUS holding registers.

This series of IO modules offer the following features:

- Connection of up to 512 DMX lamps (depending on the extension of the DMX network)
- Control of a complete DMX universe with 512 DMX registers
- Adjustable DMX refresh rate between 30ms and 60s.
- DMX interface: 250kBaud
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial DMX module





Figure: Our Ethernet IO module



42.2 Technical specification

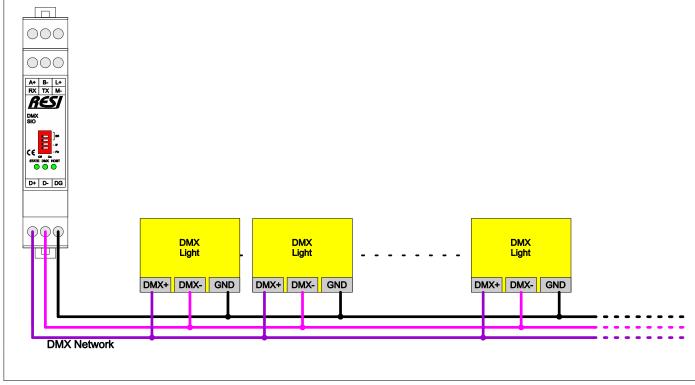
Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-DMX-SIO	<0.5W
RESI-DMX-ETH	<0.9W
Product housing	
RESI-DMX-SIO	CEM17
RESI-DMX-ETH	CEM35
Product weight	
RESI-DMX-SIO	55g
RESI-DMX-ETH	89g
DMX bus interface	
Protocol	DMX512
Baud rate	250kBit/s
Refresh rate	30ms-60s, configureable
	Standard: 100ms
Cable connection	via terminals
Galvanic isolation	Yes
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet estimate	
Default Ethernet settings IP address	192.168.0.190
IP address IP mask	255.255.255.0
	192.168.0.1
gateway UnitID	255
	200
User	RESI
password	RESI



42.3 Additional terminals & LED states

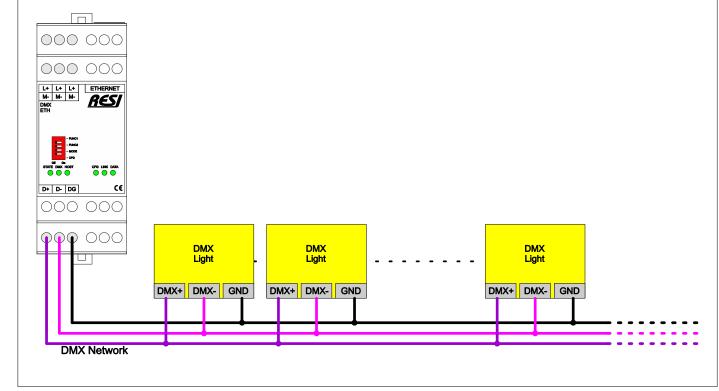
DMX INTERFACE	DMX512 master co	nnector			
	One 3 pin terminal	blocks			
	Terminal type:	USLIM			
	D+:	DATA+ Signal for DMX bus system			
	D-:	DATA- Signal for DMX bus system			
	DG: Ground for DMX bus system				
Pin layout	D+:	DATA+ Signal for DMX bus system			
	D-:	DATA- Signal for DMX bus system			
	DG:	Ground connector for DMX bus system			
DMX	DMX If the DMX master is activated and sends cyclically data to the DMX				
	If the DMX master i	If the DMX master is stopped and no DMX commands are send to the DMX bus, this			
	LEDs flashes fast (250ms cycle).				



42.4 RESI-DMX-SIO: Connection diagram

Figure: Connecting a DMX light system to the RESI-DMX-SIO gateway





42.5 RESI-DMX-ETH: Connection diagram

Figure: Connecting a DMX light system to the RESI-DMX-ETH gateway



42.6 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-DMX-SIO-ETH-MODBUS+ASCII-ENxx.pdf

42.7 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-DMX-SIO-ETH-MODBUS+ASCII-ENxx.pdf



42.8 Additional MODBUSConverter software information



Click on the add to project button to open a dialog with all available IO modules and gateways. Then select the section DMX modules... and select RESI-DMX-SIO or RESI-DMX-ETH to add this device to your project. Or you search the connected module automatically.

Your screen should look like this:

REST's MODBUS Configurator V1.10.5.0 - [Unna	med]				
	Local COM port set	ings			
EPRJ [_/PRJ [_/PRJ [_/PRJ	Modbus unit: 255	 Device: COM8 	 Stopbits 1 s 	topbit 💌 IP-Address:	
	Baudrate: 57600	 Parity: NONE 	-	Port	
	Device specific				
	↓ ↓ Download cont	ig	T <u>e</u> st		
E-D New Project	RESI-DMX-SIO			MODBUS/RTU module for up to 512 DMX lamps	
RESI-DMX-SIO - [RESI-DMX-SIO]	Software version:	1.1.0	20001210		
	State:	no error			
	Start DMX Stop DMX	Set DMXLength Write DMX registe	ers <u>R</u> ead DMX regi	sters	
	MODBUS				
	Address: 255	▼ Baudrate: 57600	Parity: NONE	▼ Stopbits: 1 stopbit ▼	
	Register	Value		Comment	
	4x00001	0x0000,0		Current value of DMX Register 1	
	4x00002	0x0000,0		Current value of DMX Register 2	
	4x00003	0x0000,0		Current value of DMX Register 3	
	4x00004 4x00005	0x0000,0 0x0000,0		Current value of DMX Register 4 Current value of DMX Register 5	
	4x00006	0x0000,0		Current value of DMX Register 6	
	4x00007	0x0000,0		Current value of DMX Register 7	
	4x00008	0x0000,0		Current value of DMX Register 8	
	4x00009	0x0000,0		Current value of DMX Register 9	
	4x00010 4x00011	0x0000,0 0x0000,0		Current value of DMX Register 10 Current value of DMX Register 11	
	4x00011	0x0000,0		Current value of DMX Register 11	
	4x00013	0x0000,0		Current value of DMX Register 13	
	4x00014	0x0000,0		Current value of DMX Register 14	
	4x00015	0×0000,0		Current value of DMX Register 15	
	4x00016 4x00017	0x0000,0		Current value of DMX Register 16	
	4x00017 4x00018	0x0000,0 0x0000,0		Current value of DMX Register 17 Current value of DMX Register 18	
	4x00019	0x0000,0		Current value of DMX Register 19	
	4x00020	0x0000,0		Current value of DMX Register 20	
	4x00021	0x0000,0		Current value of DMX Register 21	
	4x00022	0x0000,0		Current value of DMX Register 22	
	4x00023 4x00024	0x0000,0 0x0000,0		Current value of DMX Register 23 Current value of DMX Register 24	
	4x00025	0x0000,0		Current value of DMX Register 25	
	4x00026	0x0000,0		Current value of DMX Register 26	
	4x00027	0x0000,0		Current value of DMX Register 27	
	4x00028	0×0000.0		Current value of DMX Register 28	
	4x00029	0x0000,0		Current value of DMX Register 29	
	4x00030 4x00031	0x0000,0 0x0000,0		Current value of DMX Register 30 Current value of DMX Register 31	
	4x00032	0x0000,0		Current value of DMX Register 32	
	4x00033	0x0000,0		Current value of DMX Register 33	
	4x00034	0x0000,0		Current value of DMX Register 34	
	4x00035	0x0000,0		Current value of DMX Register 35	
	4x00036	0x0000,0		Current value of DMX Register 36	
	4x00037 4x00038	0x0000,0 0x0000,0		Current value of DMX Register 37 Current value of DMX Register 38	
	4x00038 4x00039	0x0000,0		Current value of DMX Register 38 Current value of DMX Register 39	
	4x00033	0x0000,0		Current value of DMX Register 33	
	A-000A1	n~nnn n		Current value of DMV Pedictor 41	
	·	and the fact and the			
rint project report	Finis	ned device scan!			

42.8.1 Start DMX

Click on this button to start the DMX master in the gateway. Normally after power on the DMX master is always activated. The DMX LED will be always ON to signal, that the gateway sends cyclic telegrams to the connected DMX lamps with the defined refresh rate.



42.8.2 Stop DMX

Click on this button to stop the DMX master in the gateway. The DMX LED will flash fast (~250ms cycle) to signal, that the gateway do not send cyclic telegrams to the connected DMX lamps anymore.

HINT: If the DMX lamps support a timeout function, after the defined timeout in the DMX lamp, the lamp will activate a certain brightness or color to signal the DMX bus failure.

42.8.3 Set DMX Length

Click on this button to open an input box for the DMX telegram length, which is used in the gateway to communicate with the DMX lamps. You can enter a number between 1 and 512. This value is stored in the internal FLASH memory, so the gateway will use this setting also after a power off/power on cycle.

You can reduce the amount of bytes transmitted on the DMX bus. But be aware that if you send less bytes than your DMX lamps need, some of the lamps do not react on the DMX telegrams!

SET DMX LENGTH	×
Enter a new length between 1 and 512 for the DMX frame	
32	
OK Abbrechen	

42.8.4 Edit DMX registers

Select one or more lines in the DMX register list and press the right mouse button. You will see the following popup menu. Select Change register value to define a new value for all selected registers in the range of 0 to 255 or select Change comment to enter a new comment for all selected DMX registers. If you double click on one line in the grid, the same menu will open. If you select Set all registers you can enter a new value for all 512 DMX registers between 0 and 255. Don't forget to click on Write DMX registers to download your changes to the DMX gateway, if you want to test the DMX lamps.

Register	Value	Comment				
4x00001	0x0000,0	Current value of DMX Register 1				
4x00002	0x0000,0	Current value of DMX Register 2				
4x00003	0x0000,0	Current value of DMX Register 3				
4x00004	0x0000,0	Current value of DMX Register 4				
4x00005	0x0000,0	Current value of DMX Register 5				
4x00006	0x000 <u>0 0</u>	Current value of DMX Register 6				
4x00007	0x000 Change register value	Current value of DMX Register 7				
4x00008	0x000 Change comment	Current value of DMX Register 8				
4x00009	0x000	Current value of DMX Register 9				
4x00010	0x000 Set all registers	Current value of DMX Register 10				
4x00011	0x000u,u	Current value of DMX Register 11				
4x00012	0x0000,0	Current value of DMX Register 12				
4x00013	0x0000,0	Current value of DMX Register 13				
4x00014	0x0000,0	Current value of DMX Register 14				
4x00015	0x0000,0	Current value of DMX Register 15				
4x00016	0x0000,0	Current value of DMX Register 16				
4x00017	0x0000,0	Current value of DMX Register 17				
4x00018	0x0000,0	Current value of DMX Register 18				
4x00019	0x0000,0	Current value of DMX Register 19				
4x00020	0x0000.0	Current value of DMX Register 20				

42.8.5 Write DMX registers

Click on this button to download all 512 DMX registers from the MODBUSConfigurator into the internal DMX register area of the DMX gateway. Your connected DMX lamps should react immediately to the new values in the DMX registers.



42.8.6 Read DMX registers

Click on this button to upload all 512 DMX registers from the internal DMX register area of the DMX gateway into the MODBUSConfigurator software. You can then save the project or generate a project report to save the current settings of the DMX lamps for documentation purposes.

42.8.7 Special DMX registers

At the end of the grid you will find some special registers shown in the below picture:

Register	Value	Comment	
4x00507	0x0000,0	Current value of DMX Register 507	
4x00508	0x0000,0	Current value of DMX Register 508	
4x00509	0x0000,0	Current value of DMX Register 509	
4x00510	0x0000,0	Current value of DMX Register 510	
4x00511	0x0000,0	Current value of DMX Register 511	
4x00512	0x0000,0	Current value of DMX Register 512	
4x10001	0x0200,512,512	Current DMX frame length (1512)	
4x10002	0x0000,0,0	Current DMX mode (0=DMX stopped,1=DMX runs)	
4x10003	0x0000,0,0	Fill all DMX registers	
4x10004	0x0064,100,100	Current DMX frame speed (3060000ms)	
4x10011	0×0000,0,0	Fill all RED DMX registers (1.,4.,7)	
4x10012	0x0000,0,0	Fill all GREEN DMX registers (2.,5.,8.,)	
4x10013	0x0000,0,0	Fill all BLUE DMX registers (3.,6.,9.,)	-

Current DMX frame length: This MODBUS register represents the current defined DMX frame length for a DMX telegram. Double click on this line to edit the frame length between 1 and 512.

Current DMX mode: This MODBUS register represents the current mode of the DMX gateway:

=0: The DMX gateway is stopped and no DMX telegrams are send to the bus.

=1: The DMX gateway runs and cyclic DMX telegrams are send by the gateway.

Use the buttons Start DMX and Stop DMX to change the DMX mode.

Fill all DMX registers: Double click on this register. Enter a new DMX register value between 0 and 255 for all 512 DMX registers in the gateway. Be aware, that you have to upload the new register values from the gateway to the MODBUSConfigurator with the button Read DMX registers.

Fill all RED DMX registers: Basically the same function like Fill all DMX registers, but it fills only every 3rd byte starting with byte 1. This is useful, when you use RGB spots which usually use 3 DMX registers to represent red, green and blue part of the color.

Fill all GREEN DMX registers: Basically the same function like Fill all DMX registers, but it fills only every 3rd byte starting with byte 2. This is useful, when you use RGB spots which usually use 3 DMX registers to represent red, green and blue part of the color.

Fill all BLUE DMX registers: Basically the same function like Fill all DMX registers, but it fills only every 3rd byte starting with byte 3. This is useful, when you use RGB spots which usually use 3 DMX registers to represent red, green and blue part of the color.

Current DMX frame speed: This register shows the current configured pause time between two DMX frames on the DMX bus. Usually 100ms. Double click on this line, enter a new pause time between 30 and 6000ms in the dialog to change this interval. Don't forget, that the gateway stores this information in the FLASH and uses the new values after a power off and power on cycle!



43.1 General information

This series of IO modules offer the following features:

- MBUS master interface to collect data from up to 64 smart meter with MBUS protocol
- Automatic conversion of MBUS data from MBUS data types to MODBUS register data types
- Status readout for each MBUS device
- Integrated MBUS power supply
- free PC based configuration tool for MBUS to MODBUS mapping of meter data
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

We offer the following different MBUS models:

- **RESI-MBUS2-SIO**: MBUS master gateway for readout of MBUS data from 2 MBUS smart meter, up to 40 MODBUS holding registers/20 mappings from MBUS to MODBUS, serial RS232 and RS485 interface → Former product RESI-MBUST-MODBUS
- **RESI-MBUS8-SIO**: MBUS master gateway for readout of MBUS data from 8 MBUS smart meter, up to 400 MODBUS holding registers/200 mappings from MBUS to MODBUS, serial RS232 and RS485 interface → Former product RESI-MBUS-MODBUS
- **RESI-MBUS24-SIO**: MBUS master gateway for readout of MBUS data from 24 MBUS smart meter, up to 1000 MODBUS holding registers/500 mappings from MBUS to MODBUS, serial RS232 and RS485 interface → Former product RESI-MBUS2-MODBUS
- **RESI-MBUS48-SIO**: MBUS master gateway for readout of MBUS data from 48 MBUS smart meter, up to 1200 MODBUS holding registers/600 mappings from MBUS to MODBUS, serial RS232 and RS485 interface → Former product RESI-MBUS3-MODBUS
- RESI-MBUS64-SIO: MBUS master gateway for readout of MBUS data from 64 MBUS smart meter, up to 1200 MODBUS holding registers/600 mappings from MBUS to MODBUS, serial RS232 and RS485 interface → New product
- RESI-MBUS2-ETH: MBUS master gateway for readout of MBUS data from 2 MBUS smart meter, up to 40 MODBUS holding registers/20 mappings from MBUS to MODBUS, Ethernet interface → Former product RESI-MBUST-ETH
- RESI-MBUS8-ETH: MBUS master gateway for readout of MBUS data from 8 MBUS smart meter, up to 400 MODBUS holding registers/200 mappings from MBUS to MODBUS, Ethernet interface → Former product RESI-MBUS-ETH
- RESI-MBUS24-ETH: MBUS master gateway for readout of MBUS data from 24 MBUS smart meter, up to 1000 MODBUS holding registers/500 mappings from MBUS to MODBUS, Ethernet interface → Former product RESI-MBUS2-ETH
- RESI-MBUS48-ETH: MBUS master gateway for readout of MBUS data from 48 MBUS smart meter, up to 1200 MODBUS holding registers/600 mappings from MBUS to MODBUS, Ethernet interface → Former product RESI-MBUS3-ETH
- RESI-MBUS64-ETH: MBUS master gateway for readout of MBUS data from 64 MBUS smart meter, up to 1200 MODBUS holding registers/600 mappings from MBUS to MODBUS, Ethernet interface → New product

The amount of meters are defined by the standard unit load of 1.5mA per meter. Please note that many meters need more current from the MBUS power supply, so the total number of meters may not recht the maximum of the used module.





Figure: Our serial IO module



Figure: Our Ethernet IO module



43.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

<0.6W no connected MBUS meter
<2.0W shortcut on MBUS line
<8.0W MBUS line overload for short time
<1.0W no connected MBUS meter
<2.4W shortcut on MBUS line
<8.4W MBUS line overload for short time
CEM17
CEM35
56g
90g
~34,2V
~174mA shortcut on MBUS line
~155mA MBUS line overload for short time
JYStY 2x0.8mm ² or
JYStY 0x1.5mm ²
75 Ohm/km
50nF/km
max. 7000m
max. 180nF

HINT: The real cable length is determined how many MBUS meters you will connect to the segment and how the segment is designed (star, tree, line) and how fast you will communicate over the bus line. Please refer to the internet for more details how to build a correct MBUS meter network!

Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255



Default Ethernet settings

IP address		
RESI-MBUS2-ETH	192.168.0.210	
RESI-MBUS8-ETH	192.168.0.211	
RESI-MBUS24-ETH	192.168.0.212	
RESI-MBUS48-ETH	192.168.0.213	
RESI-MBUS64-ETH	192.168.0.214	
IP mask	255.255.255.0	
gateway	192.168.0.1	
UnitID	255	
User	RESI	
password	RESI	



43.3 Additional terminals & LED states

MBUS system	MBUS master for connection of 2/8/24/48/64 smart meters with MBUS interface					
	One 3 pin terminal	One 3 pin terminal blocks				
	Terminal type:	USLIM				
	MB+:	Positive signal of MBUS bus system				
	MB-:	Negative signal of MBUS bus system				
	HINT: Swapping the	HINT: Swapping the two wires of the bus is also permitted and				
	does not generate a	any errors				
Pin layout	MB+:	Positive signal of MBUS bus system				
	N/C:	not connected				
	MB-:	Negative signal of MBUS bus system				
STATE	If no configuration is	s downloaded into the module, this LED blinks very quickly (~100ms)				
	If the configuration or the module has an error this LED blinks very fast (~50ms)					
	If everything is ok this LED blinks very slow (~1s)					
MBUS	If any data is send or received by the MBUS interface, this LED flashes					



43.4 RESI-MBUSx-SIO: Connection diagram

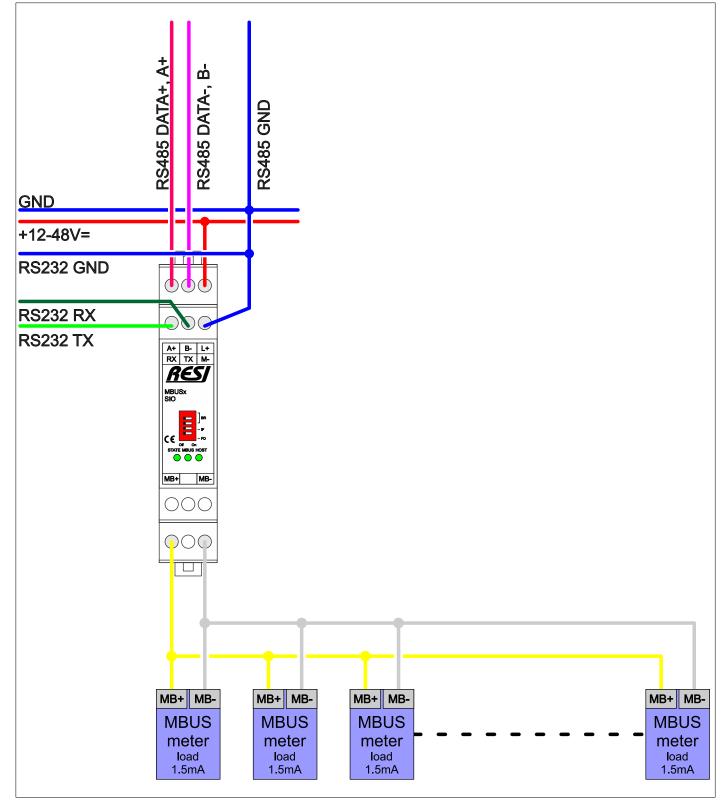


Figure: Connecting the MBUS bus system to the serial MBUSx converter



43.5 RESI-MBUSx-ETH: Connection diagram

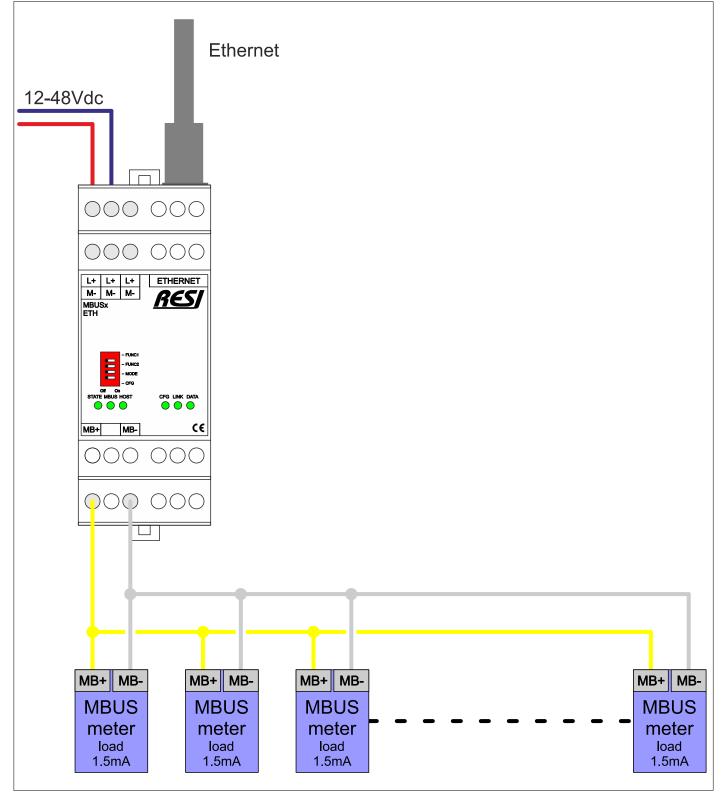


Figure: Connecting the MBUS bus system to the Ethernet MBUSx converter



43.6 MBUS bus topology

The MBUS bus topology is free. You can use star, line or tree bus topology. Only a ring topology is forbidden! The MBUS cable is a two wire cable, which connects the MBUS master (our gateway) with every connected MBUS slave (the meter). The M-Bus is polarity independent and needs no line termination resistors at the end of the cables. Any cable type may be used as long as the cable is suitable for >36V/500mA. Shielding is not necessary and not recommended since the capacity of the cable should be minimized.

In most cases a standard telephone cable is used which is a twisted pair wire with a diameter of 0.8mm each (2x0.8mm). This type of cable should be used for the main wiring. For the wiring to the meters from the main wiring (last one or two meters to the meter) a cable with smaller diameter may be used.

The maximum distance between a slave and the master is around 3km to 10km, depending on the individual network configuration. This distance applies for the standard configuration having Baud rates between 300 and 2400 Baud, and a maximum of 64 slaves. The maximum distance can be increased by limiting the Baud rate and using fewer slaves, but the bus voltage at no point in a segment fall below 24V, because of the remote powering of the slaves. In the standard configuration the total cable length should not exceed 3000 m, in order to meet the requirement of a maximum cable capacitance of 180nF.

Please refer to the internet for more details about the MBUS bus cabling and the theoretical and practical cable length.

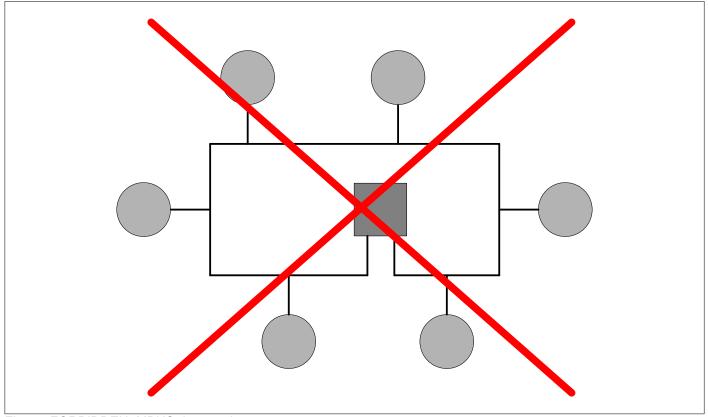


Figure: FORBIDDEN: MBUS ring topology



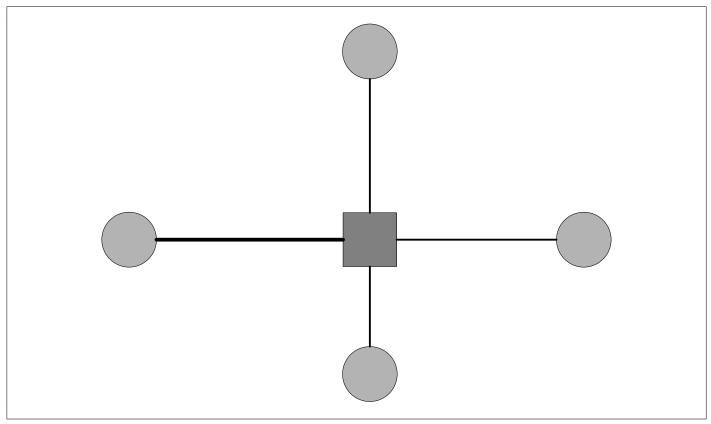


Figure: MBUS star topology

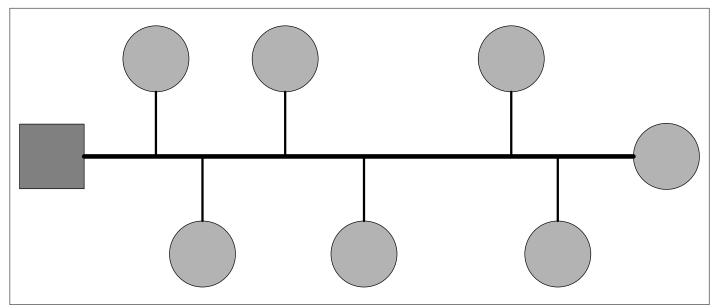


Figure: MBUS line topology



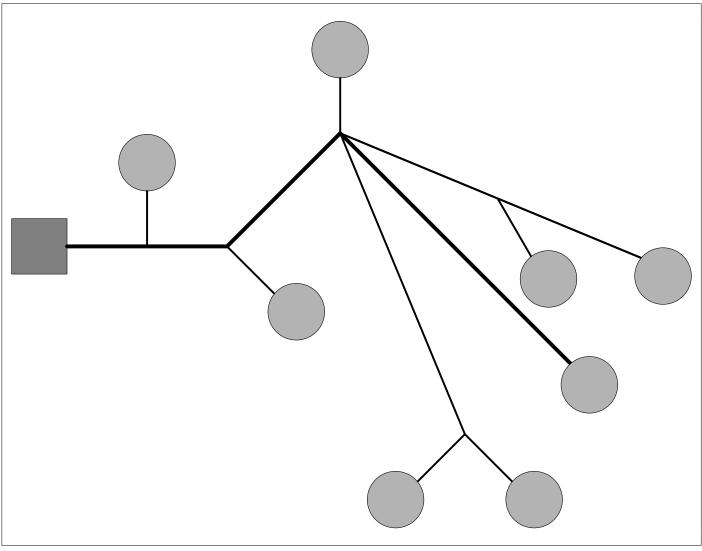


Figure: MBUS tree topology



43.7 MBUS bus recomendations

This are some recommendations for MBUS bus lines from literature out of the internet.

Don't forget: This is only a helpful hint. RESI or partners of RESI do not guarantee, that your bus system works in any case, if you follow this hints! You are responsible to plan and design your individual MBUS bus system correctly.

The resistive cable length defines the maximum length of a cable segment with in the bus structure. The cable segment length is the distance from the M-Bus Master to the M-Bus device furthest away. The capacitive cable length defines the maximum bus cable length in total.

43.7.1 Small inhouse installations

Description: small and medium-sizes residential buildings

- resistive cable length: max. 350m
- capacitive cable length: max. 1km
- cable cross section: min. 0.5mm²

Usage:

■ max. 64 devices with max 9600 baud

43.7.2 large inhouse installations

Description: medium-sizes and large residential buildings

- resistive cable length: max. 350m
- capacitive cable length: max. 3km
- cable cross section: min. 0.5mm²

Usage:

■ max. 64 devices with max 2400 baud

43.7.3 Small wide area installation

Description: small to medium-sized residential areas

- resistive cable length: max. 1km
- capacitive cable length: max. 4km
- cable cross section: min. 0.5mm²

Usage:

■ max. 64 devices with max 2400 baud

43.7.4 Big wide area installation

Description: medium-sized to large residential areas

- resistive cable length: max. 3km
- capacitive cable length: max. 5km
- cable cross section: min. 1.5mm²

Usage:

■ max. 64 devices with max 2400 baud



43.7.5 **Provider network installation**

Description: energy provider driven networks

- resistive cable length: max. 5km
- capacitive cable length: max. 7km min. 1.5mm²
- cable cross section:

Usage:

■ max. 16 devices with max 300 baud

Maximum segment installation 43.7.6

Description:

- linear topology cable length:
- max. 10km
- cable cross section: min. 1.5mm²

Usage:

■ max. 1 device with max 300 baud



43.8 Add RESI-MBUSx-xxx device to project tree

First, start the MODBUSConfigurator software. Click on the project tree title "New Project" and add a desired Ethernet gateway.

RESI's MODBUS Configu	urator V1.10.3.1 - [Unnam	ed]						
		Project	settings					
	MBUS modules DALI modules DMX modules KNX modules ENOCEAN modules Slim IO modules Big IO modules	Projector	RESI-MBUS2-SIO RESI-MBUS8-SIO RESI-MBUS24-SIO RESI-MBUS48-SIO RESI-MBUS64-SIO RESI-MBUS64-SIO RESI-MBUS2-ETH RESI-MBUS8-ETH RESI-MBUS24-ETH	· ·	ONDE		Scan for SLIM IOs (CEM17) Scan for BIG IOs (XT8+XT12) Fast Scan (Only 1) Fast Scan (1-15) Fast Scan (Only 255) Full Scan (Denze 1) 255)	
		₹ 2 2 2 2 2 2 2 2 2 2 2 2 2	RESI-MBUS-4-ETH RESI-MBUS-MODBUS RESI-MBUS-MODBUS RESI-MBUS2-MODBUS RESI-MBUS3-MODBUS RESI-MBUS3-ETH RESI-MBUS-ETH RESI-MBUS2-ETH RESI-MBUS3-ETH		1 STOPBIT 2 STOPBITS MODBUS unit ID range Start unit End unit 255	Full Scan (Range 1-255) Scan serial ports for devices		
					About			

You will notice, that you find the new MBUS converters on top of the list. But for compatibility reasons, you can also add and use older modules or older projects with the old MBUS modules form us.

After you have selected your device, don't forget to set the serial or Ethernet parameters correctly for communication with your module. Or you use the automatic search function of our software.

Your screen should look like this:

RESTS MODBUS Configurator VE10.3.1 - [Unna	aned]							
BRJ ORJ OPRJ OPRJ	Local COM port settings							
EPRJ L/PRJ L/PRJ L/PRJ	Modousuni: 255 v Device COM8 v Stoobis tappin v IP-Address:							
	Educations: 575EB • Permy NONE • Port							
É)	Пลงก่อя สถุษาย์ก็เว							
	🕴 _ Der-Head config _ = 00 Lest connection 🕰 _ Text							
B D New Project	RESHKEUS64-SI0 MBUS to MODBUS/RTU converter for 24 meters (120 registers)							
	5000ms vession: 5.0.0							
	State: no errer							
	Search/M-B.a slaves Sgarch/M-B.a slaves-vio-satial Sgarc/SV/He Epise configuration Agglication Resel Agrivate LEVEL converter Dead/vate LEVEL converter							
	MODBUS Addess: [25] ▼ Pent: NORE ▼							
	Add tes: 255 • Penty: NCAE • Stat 1 Be.class: 2-00 • Beuchare 5700 • Staptes: supplit • End 25 Overy timeout 65535 Polimerout: 65535							
	VB Recipter MBUS deatives ME datatives Centert MEUS next MD value Metername							
4 () +	10							
Frint project report	Finished device scant							



HOWTO setup MBUS communication parameters 43.9

First of all, you have to select the correct MBUS communication speed suitable for your meters. In the area MBUS you will find the following setup parameters:

- Baudrate: This is the current used MBUS baud rate on the MBUS. Usually you will see the currently configured baud rate of your converter.
- Start, End: This two fields define the primary address range, which will be used for an automatic search for connected MBUS slaves via primary addressing mode. You can enter a valid MBUS primary address in the range from 1 to 251. If you have connected only one meter, you can also use the primary broadcast address 254 for communication with this meter.
- Query timeout: This field defines the timeout between two query cycles in the gateway. Usually the gateway communicates with all configured meters sequentially. After finishing the data readout for the last meter, the gateway pauses for this defined interval in seconds. This values are used: Value 65535 or values 0..5 defines ~5s pause.

Values 6 to 65534: defines 6 to 65534 seconds of pause, before the next polling cycle will start.

Poll timeout: This field defines a general pause after the readout of a configured meter before the readout of the next meter starts. In the past we discovered that there are many meters out in the market, which need a special treatment in the timing. e.g. very old KAMSTRUP meters need often two readout cycles with a gap of at least 10-15 seconds. This is non standard to the MBUS. Or other meters have problems with secondary addressing, if there is a too small gap between the readout. So we introduced this new parameter: This timeout defines the pause after finishing reading of a meter and starting reading the next meter. In the previous firmware versions this timeout was fixed to 250ms gap, which was ok for 99% of the meter readout on the markets. But some meter fail to process this little gap. The values is interpreted as follows:

Value 1..30: Gap time 1 seconds to 30 seconds

Value 101..400: Gaptime=(Value-100)*0.1s \rightarrow 0.1s .. 30s e.g. 105 \rightarrow 0.5s

Value 65535: Gap time is 1 second

Value 65534: Gap time is 250ms

Value 65533: Gap time is 500ms

Value 65532: Gap time is7250ms

All other values: Gap time is 1000ms

Local COM port settings Modbus unit 255 V Device: COMB V Stapbits 1 stopbit V IP-Address:
Modbus unit 255 Device: COM8 Stopbits 1 stopbit HP-Address: Baudrate: 57600 Parity: NONE Port
Device specific
Download config To- Iest connection
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)
Software version: 5.0.0
State: no error
Search M-Bus slaves Search M-Bus slaves via serial Seve CSV file E tase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter
MODBUS Address: 255 • Parity: NONE • Start 1 Baudrate: 2400 • Baudrate: 57600 • Stopbits: 1 stopbit • End 251 Query timeout 65535 Poll timeout 65535
MB Register MBUS datatype MB datatype Content MB value HEX Current MB value

Change the MBUS baudrate and/or the poll & guery timeouts

Follow this steps to change to communication baud rate of the MBUS bus system:

- 1. Select a new baud rate from the drop down list Baudrate in the MBUS area.
 - 2. Change the query timeout to your needs
 - 3. Change the poll timeout to your needs
 - 4. Use the Download config button to download the new settings into your device
 - 5. Now your device will use the new settings of the baud rate and the timeouts on the MBUS side

You can achieve the same with writing the new MBUS baud rate and the timeouts to certain MODBUS registers. Please refer to the section of the MODBUS register description, how this function will work.



Here you will find a basic diagram, how the MBUS master request cycle is handled by our gateways. The two parameters can be configured like this:

Query timeout: This field defines the timeout between two query cycles in the gateway. Usually the gateway communicates with all configured meters sequentially. After finishing the data readout for the last meter, the gateway pauses for this defined interval in seconds. This values are used: Value 65535 or values 0..5 defines ~5s pause.
Value 65535 or values 0..5 defines ~5s pause.

Values 6 to 65534: defines 6 to 65534 seconds of pause, before the next polling cycle will start.

Poll timeout: This field defines a general pause after the readout of a configured meter before the readout of the next meter starts. In the past we discovered that there are many meters out in the market, which need a special treatment in the timing. e.g. very old KAMSTRUP meters need often two readout cycles with a gap of at least 10-15 seconds. This is non standard to the MBUS. Or other meters have problems with secondary addressing, if there is a too small gap between the readout. So we introduced this new parameter: This timeout defines the pause after finishing reading of a meter and starting reading the next meter. In the previous firmware versions this timeout was fixed to 250ms gap, which was ok for 99% of the meter readout on the markets. But some meter fail to process this little gap. The values is interpreted as follows:

Value 1..30: Gap time 1 seconds to 30 seconds Value 101..400: Gaptime=(Value-100)*0.1s \rightarrow 0.1s .. 30s e.g. 105 \rightarrow 0.5s Value 65535: Gap time is 1 second Value 65534: Gap time is 250ms Value 65533: Gap time is 500ms Value 65532: Gap time is 7250ms All other values: Gap time is 1000ms

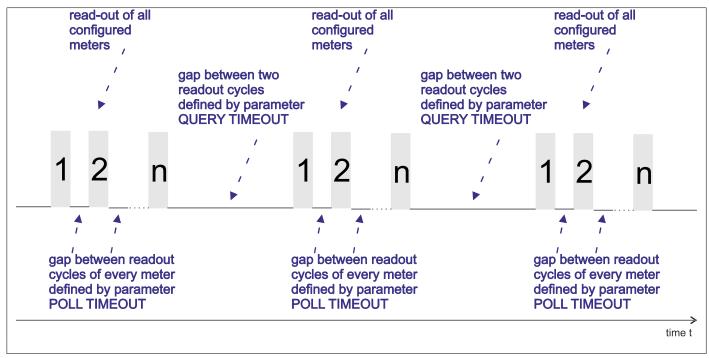


Figure: Basic timing of MBUS master read-out for MBUS slaves

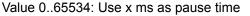
Now we go more into detail, how the MBUS gateway will handle the request process of one meter. Forst we define the parameters:

- Poll repeats 1: This field defines the amount of telegram repetitions for the addressing command to a meter, before the gateway declares the communication as not possible and resumes with the next meter. Value 65535 or 0: use 3 repeats as standard Value 1..n: Use n repeats
- Poll repeats 2: This field defines the amount of telegram repetitions for the data readout command to a meter, before the gateway declares the communication as not possible and resumes with the next meter. Value 65535 or 0: use 5 repeats as standard Value 1..n: Use n repeats
- Poll pre delay 1: This field defines the first pause time in Milliseconds before starting to send the first addressing command telegram to a meter.
 Value 65535: use 250ms as standard pause time
 Value 0..65534: Use x ms as pause time

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- Poll pre delay 2: This field defines the first pause time in Milliseconds before starting to send the first data request telegram to a meter.
 Value 65535: use 100ms as standard pause time
 Value 0..65534: Use x ms as pause time
- Poll post delay 1: This field defines a pause time in Milliseconds. If the gateway do not receive a correct answer to an addressing command telegram and the addressing command is repeated, then this pause time is inserted, before resending the addressing telegram to the meter. Value 65535: use 0ms as standard pause time Value 0..65534: Use x ms as pause time
- Poll post delay 2: This field defines a pause time in Milliseconds. If the gateway do not receive a correct answer to a readout data telegram and the readout data command is repeated, then this pause time is inserted, before resending the readout data telegram to the meter. Value 65535: use 100ms as standard pause time



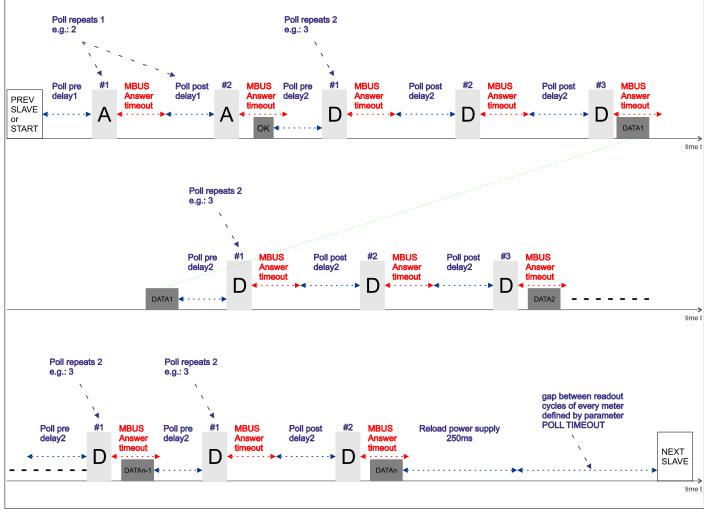


Figure: Basic timing of MBUS master read-out for MBUS slaves



43.10 HOWTO find connected MBUS meters

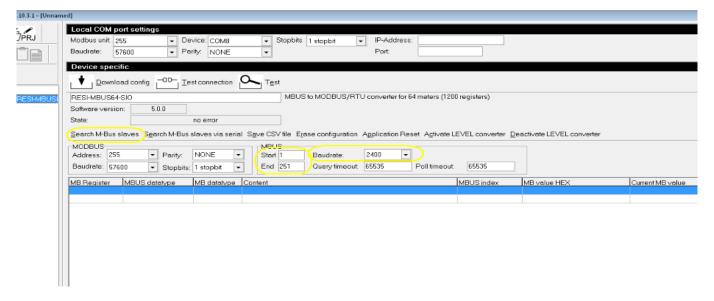
There are two ways for searching for connected MBUS meters.

- Search M-Bus slaves with primary address: With this function the MBUS network is scanned for new meters only by addressing the meters with the primary address. The address range is defined with the parameters Start and End in the MBUS area. Every found meter, which is not part of the configuration, will be added automatically to the project.
- Search M-Bus slaves with secondary address: With this function the MBUS network is scanned for new meters using secondary addressing mode with the unique serial number of the meters. Every found meter, which is not part of the configuration, will be added automatically to the project.

43.10.1 Search for new meters – primary addressing mode

HINT: Don't forget to setup the MBUS bus baud rate for your search before. If you have to change it, select a new one from the drop down list and don't forget to download the bus speed into your gateway!

First setup the address range for your search with defining Start end End parameter in the area MBUS. In our example we use the full range 1 to 251:



Click then on the button Search M-Bus slaves to start the automatic search. Be aware, that you will not find a connected meter if it has a different baud rate configured or if it has no primary address programmed or if there are two meters with the same primary address on the bus!

HINT: You can interrupt the automatic search process by pressing the ESC button. After a few seconds the search will be interrupted.



In our test case we have connected two meters to our test system with the primary address 2 and 4. The result will look like this:

Local COM	l port settings						
Modbus unit		levice: COMB	 Stopbils 1 stopbit IP-Address: 				
Baudrate:	5760D - F	Parity: NONE	 Port 				
Device spi	ecific						
			0				
L L Dow	micad contig	est connection	Test				
RESIMBUS			MBUS to MODEUS/BTU converter for 64 maters []	200 registers)			
1		1					
Software ver							
State:		c configuration					
Search M-Br	as sleves. Search M-Br	a sloves viz seri	al Save CSV file, Erase configuration, Application Reset, Activat	a LEVEL converter	Depotivate LEVEL converte	r	
MODEUS							
Address:	255 • Parity:	NONE					
				l			
Boudrate:	57600 • Stopbi	s: 1 stopbit	End 251 Quarytimeout 65535 Politimed	ut 65535			
MB Register	MBUS dototype	MB datatype	Costeel	MBUS index	MB volue HEX	Ourrent ME volue	Meternome
4-00001	NT32141	FLOAT 32	Volume:10°-3m ²	1	777	222	Meter 2 (P2)
4400003	INT 32[4]	FLOAT 32	Volume:10"-3 m*Accumulation of obs value only if negative cont	tribu 1	777	222	Meter 2 [F2]
4:00005	INT 32[4]	UINT32	Ontime hours	2	222	227	Meter 2 (P/2)
4400007	INT16[2]	FLOAT32	Volume flow10^-3 m9/h	3	222	222	Mater 2 [P:2]
4400009	INTE[1]	FLOAT32	External temperature:10°0.10	4	222	222	Motor 2 [P:2]
4:00011	INT18[2]	FLOAT32	Volume flow 10°-3 m ^o /h	5	222	222	Motor 2 [P:2]
4600013	NT18[2]	FLOAT32	Volume flow:10°-3 m²/h	6	222	222	Motor 2 [P:2]
4600015	INTB[1]	FLOAT32	External temperature:1010 10	7	777	223	Motor 2 [P:2]
4x00017	INT8[1]	FLOAT32	External temperature:1010 10	8	177	222	Meter 2 [P:2]
4x00013	INTB[1]	FLOAT32	External temperature 10°0 °C-Average media temperature	9	777	???	Meter 2 [P:2]
4x00021	INT32[4]	DATE_TIME_	Time&Date data type F	10	777	222	Meter 2 [P:2]
4x00023	INT3214]	FLOAT32	Volume:101-3 mf[U:0.T:0.S:1]	11	777	222	Meter 2 [P:2]
4:00025	NT15[2]	FLOAT32	Volume flow 10°-3 mVh[U.0.T.0.S:1]	12	777	222	Meter 2 [P:2]
4:00027	NT15[2]	FLOAT32	Volume flow 10°-3 migh[U.0.T.0.8:1]	13	777	222	Meter 2 [P2]
4:00029	INT8[1]	FLOAT32	External temperature 10°0 °C(U/0,T/0,S1)	14	727	297	Meter 2 [P:2]
4:00031	INT8[1]	FLOAT32	External temperature:10°0 °C[U:0,T:0,B1]	15	222	222	Mater 2 [P:2]
4:00033	INT8[1]	FLOAT32	External temperature:10°0 °C-Average media temperature[U:0,T		222	222	Motor 2 [P:2]
4-00035	NT16[2]		B Date data type G[Ut0,T:0,B:1]	17	222	222	Motor 2 [P:2]
4:00036	NT18[2]	UINT16	Info code	18	777	222	Mater 2 [P:2]
4x00037	INT46[8]	UINTEA	Config number	19	777	222	Meter 2 [P:2]
4x00041	NT18[2]	UINTIE	Metertype	20	777	???	Meter 2 [P:2]
4x00042	NT15[2]	UINTIG	Firmware version	21	777	222	Meter 2 [P 2]
4,00043	VAR LENGTH[18]	ASCI	Manufacturer	0	777	222	Meter 4 [P:4]
4x00053	VAR LENGTH[8]	ASCI	Model/version	1	999	222	Meter 4 [P:4]
4x00058	VAR LENGTH[7]	ASCI	Firmwore version	2	777	222	Meter 4 [P:4]
4500052	NT24[3]	LINT32 FLOAT32	Error flegs (binory)	3	772	222	Meter 4 [P:4]
400054	FLOAT32[4]	FLOAT 32	Current 1070A-L2 phase value Current 1070A-L2 phase value	4	222	222	Meter 4 (P:4) Meter 4 (P:4)
400055	FLOAT32[4] FLOAT32[4]	FLOAT 32	Current 10 UA-L2 phase value	6	222	222	Mater 4 (P:4)
400050	FLOAT32[4]	FLOAT 32	Current 10 0A-Current 10 0A-Average current	7	777	222	Mater 4 [P:4]
4:00070	FLOAT32[4]	FLOAT 32	Voltage 1010/4/14/2	8	777	222	Motor 4 [P:4]
4:00072	FLOAT32[4]	FLOAT32	Voltage 10104L14L2	9	977	222	Motor 4 [P:4]
4x00075	FLOAT32[4]	FLOAT 32	Voltage 1010V-L2-L3	10	977	222	Meter 4 [P:4]
4x00075	FLOAT32[4]	FLOAT32	Voltage 1010V-Voltage L-L average	11	777	222	Meter 4 [P:4]
	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1 phase value	12	777	???	Meter 4 [P.4]
	FLOAT32[4]	FLOAT32	Voltage 10°0VL2 phase value	13	722	222	Meter 4 [P:4]
4x00080							
4x00082	FLOAT32[4]	FLOAT32	Voltage 10°0V-L3 phase value	14	777	222	Meter 4 [P:4]

You notice, that now two meters are sown in the project tree. One with the number 2 and one with the number 4. Also the software has build an automatic mapping table between the MBUS data points and the MODBUS registers of the meter. This table is shown below the current settings. lets take a closer look into this table:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Meter name
4x00001	INT32[4]	FLOAT32	Volume:10^-3 mº	0	222	111	Meter 2 [P:2]
4x00003	INT32[4]	FLOAT32	Volume:10^-3 m ^a -Accumulation of abs value only if negative contrib	u1	???	777	Meter 2 [P:2]
4×00005	INT32[4]	UINT32	On time:hours	2	???	222	Meter 2 [P:2]
4x00007	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	3	???	777	Meter 2 [P:2]
4x00009	INT8[1]	FLOAT32	External temperature:10°0 °C	4	???	777	Meter 2 [P:2]
4x00011	INT16[2]	FLOAT32	Volume flow:10^-3 m²/h	5	???	777	Meter 2 [P:2]
4x00013	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	6	222	777	Meter 2 [P:2]
4x00015	INT8[1]	FLOAT32	External temperature:10°0 °C	7	???	777	Meter 2 [P:2]
4x00017	INT8[1]	FLOAT32	External temperature:10°0 °C	8	???	777	Meter 2 [P:2]
4x00019	INT8[1]	FLOAT32	External temperature:10°0 °C-Average media temperature	9	???	777	Meter 2 [P:2]
4x00021	INT32[4]	DATE_TIME_	Trime&Date data type F	10	???	777	Meter 2 [P:2]
4x00023	INT32[4]	FLOAT32	Volume:10^-3 mº[U:0,T:0,S:1]	11	???	222	Meter 2 [P:2]
4x00025	INT16[2]	FLOAT32	Volume flow:10^-3 m ^a /h[U:0,T:0,S:1]	12	???	777	Meter 2 [P:2]
4×00027	INT16[2]	FLOAT32	Volume flow:10^-3 m³/h[U:0,T:0,S:1]	13	???	777	Meter 2 [P:2]
4×00029	INT8[1]	FLOAT32	External temperature:10°0 °C[U:0,T:0,S:1]	14	???	777	Meter 2 [P:2]
b:00031	INT8[1]	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	15	???	777	Meter 2 [P:2]
4×00033	INT8[1]	FLOAT32	External temperature:10°0 °C-Average media temperature[U:0,T:0.)	\$16	???	777	Meter 2 [P:2]
tx00035	INT16[2]	DATE_TYP_0	G Date data type G[U:0.T:0.S:1]	17	???	777	Meter 2 [P:2]
4x00036	INT16[2]	UINT16	Info code	18	222	777	Meter 2 [P:2]
4x00037	INT48[6]	UINT64	Config number	19	???	777	Meter 2 [P:2]
4x00041	INT16[2]	UINT16	Metertype	20	???	222	Meter 2 [P:2]
4x00042	INT16[2]	UINT16	Firmware version	21	???	777	Meter 2 [P:2]
4x00043	VAR LENGTH[18]	ASCI	Manufacturer	0	???	777	Meter 4 [P:4]
4x00053	VAR LENGTH[8]	ASCII	Model/version	1	???	222	Meter 4 [P:4]
4x00058	VAR LENGTH[7]	ASCII	Firmware version	2	???	777	Meter 4 [P:4]
4×00062	INT24[3]	UINT32	Error flags (binary)	3	???	777	Meter 4 [P:4]
4x00064	FLOAT32[4]	FLOAT32	Current 10°0A-L1 phase value	4	???	777	Meter 4 [P:4]
4×00066	FLOAT32[4]	FLOAT32	Current 10 [°] 0A-L2 phase value	5	???	777	Meter 4 [P:4]
4×00068	FLOAT32[4]	FLOAT32	Current 10°0A-L3 phase value	6	???	222	Meter 4 [P:4]
4x00070	FL0AT32[4]	FLOAT32	Current 10°0A-Average current	7	???	222	Meter 4 [P:4]
4x00072	FLOAT32[4]	FLOAT32	Voltage 10 [°] 0V-L1-L2	8	???	777	Meter 4 [P:4]
tx00074	FLOAT32[4]	FLOAT32	Voltage 10 [°] 0V-L2-L3	9	???	222	Meter 4 [P:4]
bx00076	FLOAT32[4]	FLOAT32	Voltage 10°0V-L3-L1	10	???	222	Meter 4 [P:4]
tx00078	FLOAT32[4]	FLOAT32	Voltage 10°0V-Voltage L-L average	11	???	777	Meter 4 [P:4]
4×00080	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1 phase value	12	???	222	Meter 4 [P:4]
bx00082	FLOAT32[4]	FLOAT32	Voltage 10°0V-L2 phase value	13	???	222	Meter 4 [P:4]
4x00084	FLOAT32[4]	FLOAT32	Voltage 10°0V-L3 phase value	14	???	777	Meter 4 [P:4]
	THE REPORT OF	EL 0 1 2000			000	000	

You see, that the first meter is mapped to the MODBUS registers 4x00001 to 4x00041. The second meter is mapped to the MODBUS registers 4x00042 to 4x000232, because the meter offers has much more MBUS data points.



MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Metername
4x00203	INT24[3]	UINT32	Nominal frequency	61	225	???	Meter 4 [P:4]
4x00205	FLOAT32[4]	FLOAT32	Energy:10 [°] 0 Wh	62	???	???	Meter 4 [P:4]
4x00207	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-Export energy value	63	???	???	Meter 4 [P:4]
4x00209	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:1.T:0.S:0]	64	???	???	Meter 4 [P:4]
4x00211	FLOAT32[4]	FLOAT32	Energy:10 [°] 0 Wh-Export energy value[U:1,T:0,S:0]	65	225	???	Meter 4 [P:4]
4x00213	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-parital energy value	66	???	???	Meter 4 [P:4]
4x00215	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-parital energy value[U:1,T:0,S:0]	67	???	???	Meter 4 [P:4]
4x00217	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L1 phase value	68	???	???	Meter 4 [P:4]
4x00219	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L2 phase value	69	???	???	Meter 4 [P:4]
4x00221	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L3 phase value	70	???	???	Meter 4 [P:4]
4x00223	FLOAT32[4]	FLOAT32	Cumulation counter	71	???	???	Meter 4 [P:4]
4x00225	FLOAT32[4]	FLOAT32	Energy:10 [^] 0 Wh[U:0,T:1,S:0]	72	???	222	Meter 4 [P:4]
4x00227	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0.T:2.S:0]	73	???	???	Meter 4 [P:4]
4x00229	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0.T:3.S:0]	74	???	???	Meter 4 [P:4]
4x00231	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0,T:4,S:0]	75	222	222	Meter 4 (P:4)
4×09001	RESI	UINT16	Converter state for meter	STATE	777	???	Meter 2 [P:2]
4x09002	HEADER	UINT32R	Identification number of meter	ID	???	???	Meter 2 [P:2]
4x09004	RESI	UINT16	Converter state for meter	STATE	???	???	Meter 4 [P:4]
4x09005	HEADER	UINT32R	Identification number of meter	ID	???	???	Meter 4 [P:4]
4x10001	HEADER	UINT32	Identification number of meter	ID	777	???	Meter 2 [P:2]
4x10003	HEADER	UINT32->ASC	Manufacturer of meter	MANUFACTURER	???	???	Meter 2 [P:2]
4×10005	HEADER	UINT16	Version of meter	VERSION	???	???	Meter 2 [P:2]
4x10006	HEADER	UINT16	Medium of meter	MEDIUM	???	???	Meter 2 [P:2]
4x10007	HEADER	UINT16	Access of meter	ACCESS	???	???	Meter 2 [P:2]
4x10008	HEADER	UINT16	Status of meter	STATUS	???	???	Meter 2 [P:2]
4x10009	RESI	UINT16	Future value of meter	FUTURE	???	???	Meter 2 [P:2]
4x10010	RESI	UINT16	Communcation state with meter	COMM STATE	???	222	Meter 2 [P:2]
4×10011	HEADER	UINT32	Identification number of meter	ID	???	???	Meter 4 [P:4]
4x10013	HEADER	UINT32->ASC	Manufacturer of meter	MANUFACTURER	???	???	Meter 4 [P:4]
4x10015	HEADER	UINT16	Version of meter	VERSION	???	???	Meter 4 [P:4]
4x10016	HEADER		Medium of meter	MEDIUM	???	???	Meter 4 [P:4]
4x10017	HEADER	UINT16	Access of meter	ACCESS	???	???	Meter 4 [P:4]
4x10018	HEADER		Status of meter	STATUS	???	???	Meter 4 [P:4]
4x10019	RESI		Future value of meter	FUTURE	???	222	Meter 4 [P:4]
4×10020	RESI	UINT16	Communcation state with meter	COMM STATE	222	???	Meter 4 [P:4]

You can download the configuration and press the Test button. After a few seconds you will see the table filled with online values from the connected meter.

43.10.2 Status information for every meter

Behind the mapping from the MBUS data points to the MODBUS data points, you will see two areas of status information.

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Metername
4x00203	INT24[3]	UINT32	Nominal frequency	61	MSW:0000,0032:LSW	50,0x00000032	Meter 4 [P:4]
4x00205	FLOAT32[4]	FLOAT32	Energy:10 [°] 0 Wh	62	MSW:3CCC,CCCD:LSW	0.0250,2.50000003725290E-2	Meter 4 [P:4]
4x00207	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-Export energy value	63	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00209	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:1,T:0,S:0]	64	MSW:3C75,C28F:LSW	0.0150,1.49999996647239E-2	Meter 4 [P:4]
4x00211	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-Export energy value[U:1,T:0,S:0]	65	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00213	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-parital energy value	66	MSW:3CCC,CCCD:LSW	0.0250,2.50000003725290E-2	Meter 4 [P:4]
4x00215	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-parital energy value[U:1,T:0,S:0]	67	MSW:3C75,C28F:LSW	0.0150,1.49999996647239E-2	Meter 4 [P:4]
4x00217	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L1 phase value	68	MSW:3CCC,CCCD:LSW	0.0250,2.50000003725290E-2	Meter 4 [P:4]
4x00219	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L2 phase value	69	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00221	FLOAT32[4]	FLOAT32	Energy:10^0 Wh-L3 phase value	70	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00223	FLOAT32[4]	FLOAT32	Cumulation counter	71	MSW:0000,0000:LSW	0.0000,0.0000000000000000E+0	Meter 4 [P:4]
4x00225	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0,T:1,S:0]	72	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00227	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0,T:2,S:0]	73	MSW:0000.0000:LSW	0.0000.0.000000000000000E+0	Meter 4 [P:4]
4x00229	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0,T:3,S:0]	74	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x00231	FLOAT32[4]	FLOAT32	Energy:10^0 Wh[U:0,T:4,S:0]	75	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 4 [P:4]
4x09001	RESI	UINT16	Converter state for meter	STATE	WORD:0003	3,0x0003 -> Values are valid!	Meter 2 [P:2]
4x09002	HEADER	UINT32R	Identification number of meter	ID	LSW:6229,MSW:2071	544301609,0x20716229	Meter 2 [P:2]
4x09004	RESI	UINT16	Converter state for meter	STATE	WORD:0003	3,0x0003 -> Values are valid!	Meter 4 [P:4]
4x09005	HEADER	UINT32R	Identification number of meter	ID	LSW:4163,MSW:0636	104218979.0x06364163	Meter 4 [P:4]
4x10001	HEADER	UINT32	Identification number of meter	ID	MSW:2071,6229:LSW	544301609.0x20716229	Meter 2 [P:2]
4x10003	HEADER	UINT32->ASC	Manufacturer of meter	MANUFACTURER	MSW:004D,414B:LSW	KAM	Meter 2 [P:2]
4x10005	HEADER	UINT16	Version of meter	VERSION	WORD:001D	29.0x001D	Meter 2 [P:2]
4×10006	HEADER	UINT16	Medium of meter	MEDIUM	WORD:0016	22,0x0016 -> Cold Water	Meter 2 [P:2]
4x10007	HEADER	UINT16	Access of meter	ACCESS	WORD:0072	114.0x0072	Meter 2 [P:2]
4×10008	HEADER	UINT16	Status of meter	STATUS	WORD:0000	0,0×0000	Meter 2 [P:2]
4x10009	RESI	UINT16	Future value of meter	FUTURE	WORD:0000	0.0×0000	Meter 2 [P:2]
4x10010	RESI	UINT16	Communcation state with meter	COMM STATE	WORD:0003	3,0x0003 -> Values are valid!	Meter 2 [P:2]
4x10011	HEADER	UINT32	Identification number of meter	ID	MSW:0636,4163:LSW	104218979.0x06364163	Meter 4 [P:4]
4x10013	HEADER	UINT32->ASC	Manufacturer of meter	MANUFACTURER	MSW:0043,4553:LSW	SEC	Meter 4 [P:4]
4x10015	HEADER	UINT16	Version of meter	VERSION	WORD:0018	24.0x0018	Meter 4 [P:4]
4x10016	HEADER	UINT16	Medium of meter	MEDIUM	WORD:0002	2,0x0002 -> Electricity	Meter 4 [P:4]
4x10017	HEADER	UINT16	Access of meter	ACCESS	WORD:0014	20.0x0014	Meter 4 [P:4]
4x10018	HEADER	UINT16	Status of meter	STATUS	WORD:0000	0,0×0000	Meter 4 [P:4]
4x10019	RESI	UINT16	Future value of meter	FUTURE	WORD:0000	0.0×0000	Meter 4 [P:4]
4x10020	RESI	UINT16	Communcation state with meter	COMM STATE	WORD:0003	3.0x0003 -> Values are valid!	Meter 4 IP:41

Area 1 is compatible to our old MBUS converter modules, but it is located in a different area of the MBUS registers starting at 4x09001. For every configured meter two MODBUS entries are generated. One holds the communication state of the MBUS gateway with the meter with the following states:

- 0 Meter isn't configured!: This value shows, that this meter slot is currently not configured in the MBUS gateway.
- 1 Meter isn't normalized!: This value shows, that the configured meter doesn't answer to the addressing command. Either via primary addressing or via secondary addressing mode. This depends, how the meter was configured.
- 2 Meter isn't read!: This value shows, that the configured meter has answered to the addressing command but there are problems by reading all data from the meter. So the meter data is not valid any more.



3 - Values are valid!: This value shows, that the configured meter has answered to the addressing command and has answered correctly to the readout commands and the reading of all data from the meter was successful. So the meter data in the MODBUS register is valid.

The other entry holds the serial number of the configured meter in two consecutive holding registers.

Area 2 is new to the new series of gateways and represent the information of the MBUS fixed data header.

Ident. Nr.	Manufr.	Version	Medium	Access No.	Status	Signature
4 Byte	2 Byte	1 Byte	1 Byte	1 Byte	1 Byte	2 Byte

This header is sent by many answer frames of the MBUS meter to the master. Due to the fact, that is is not part of the variable data block of the meter, our old converters could not map this information to registers. Our new series map this information to the following register set starting at 4x10001. For each meter there are eight MODBUS entires:

ENTRY 1: Identification number of the meter Register <METERBASE>+0, <METERBASE>+1

Each meter offers a unique ID. In the MBUS protocol there are four bytes reserved for this number. In our gateway we need a UINT32 to represent this 4 bytes of the ID.

ENTRY 2: Manufacturer of the meter Register <METERBASE>+2, <METERBASE>+3

Each meter offers a manufacturer ID, represented in two bytes. But in this two bytes there are three ASCII digits encoded. Our gateway decode this ASCII digits and stores this digits into a UINT32 using ASCII encoding with 0x00 at the end representing a standard null terminated ASCII string of three letters.

ENTRY 3: Version of the meter

Register <METERBASE>+4

In this fixed data header, there is also a version number encoded into one byte. It represents the version of the meter. Our gateway stores this byte into a UINT16 holding register for easy readout.

ENTRY 4: Medium of the meter Register <METERBASE>+5

In this fixed data header, there is also a medium number encoded into one byte. it defines what type of medium the meter is measuring. Our gateway stores this byte into a UINT16 holding register for easy readout.

The following medium types are defined by the standard for meters with fixed+variable data structure:

- 0x00: OTHER
- 0x01: OIL
- 0x02: Electricity
- 0x03: Gas
- 0x04: Heat-Volume measured at return temperature outlet
- 0x05: Steam
- 0x06: Hot Water
- 0x07: Water
- 0x08: H.C.A.=Heat Cost Allocator
- 0x09: Compressed Air
- 0x0A: Cooling load meter Volume measured at return temperature outlet
- 0x0B: Cooling load meter Volume measured at flow temperature inlet
- 0x0C: Heat Volume measured at flow temperature inlet
- 0x0D: Heat/Cooling load meter
- 0x0E: Bus/System
- 0x0F: Unknown Medium
- 0x16: Cold Water
- 0x17: Dual Water
- Ox18: Pressure
- 0x19: A/D Converter

For meters with fixed data structure only, the 16 bit value must be interpreted in another way. Refer to the MBUS standard for this definition.



ENTRY 5: Access counter of the meter Register <METERBASE>+6

In this fixed data header, there is also an access counter encoded into one byte. It will be incremented by every access of the meter data. So each readout of the meter will increment this access counter by 1 in the range from 0 to 255. Our gateway stores this byte into a UINT16 holding register for easy readout.

ENTRY 6: Status of the meter

Register <METERBASE>+7

In this fixed data header, there is also a status field encoded into one byte. It shows the current meter status. Our gateway stores this byte into a UINT16 holding register for easy readout.

The byte has the following meaning:

- Bit 1+Bit 0: =00 (0) NO ERROR
- Bit 1+Bit 0: =10 (1) APPLICATION NOT READY
- Bit 1+Bit 0: =01 (2) APPLICATION ERROR
- Bit 1+Bit 0: =11 (3) RESERVED
- Bit 2: =1: POWER LOW, =0: POWER OK
- Bit 3: =1: PERMANENT ERROR, =0: NO PERMANENT ERROR
- Bit 4: =1: TEMPORARY ERROR, =0: NO TEMPORARY ERROR
- Bit 5: =1: MANUFACTURER SPECIFIC ERROR 1, =0: NO MANUFACTURER SPECIFIC ERROR 1
- Bit 6: =1: MANUFACTURER SPECIFIC ERROR 2, =0: NO MANUFACTURER SPECIFIC ERROR 2
- Bit 7: =1: MANUFACTURER SPECIFIC ERROR 3, =0: NO MANUFACTURER SPECIFIC ERROR 3

ENTRY 7: Future value of the meter

Register < METERBASE>+8

This UINT16 holding register is reserved for future use.

ENTRY 8: Communication state with meter Register <METERBASE>+9

This UINT16 holding register hold the current state of the communication between the MBUS gateway and the meter with the following states:

- 0 Meter isn't configured!: This value shows, that this meter slot is currently not configured in the MBUS gateway.
- 1 Meter isn't normalized!: This value shows, that the configured meter doesn't answer to the addressing command. Either via primary addressing or via secondary addressing mode. This depends, how the meter was configured.
- 2 Meter isn't read!: This value shows, that the configured meter has answered to the addressing command but there are problems by reading all data from the meter. So the meter data is not valid any more.
- 3 Values are valid!: This value shows, that the configured meter has answered to the addressing command and has answered correctly to the readout commands and the reading of all data from the meter was successful. So the meter data in the MODBUS register is valid.



43.10.3 Search for new meters – secondary addressing mode

HINT: Don't forget to setup the MBUS bus baud rate for your search before. If you have to change it, select a new one from the drop down list and don't forget to download the bus speed into your gateway!

Local COM port settings									
Modbus unit: 255 V Device: COM8 V Stopbits 1 stopbit V IP-Address:									
Baudrate: 57600 V Parity: NONE V Port:									
Device specific									
Download config Test connection Test									
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (120	0 registers)								
Software version: 5.0.0									
State: no error									
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate L	EVEL converter Deactivate LEVEL converter								
MODBUS Address: 255 V Parity NONE V Start 1 Baudrate: 2400 V									
Address: 255 💌 Parity: NONE 💌 Start 1 Baudrate: 🔵 2400 💌									
Baudrate: 57600 Stopbits: 1 stopbit End 251 Query timeout: 65535 Poll timeout:	65535								
MB Register MBUS datatype MB datatype Content	MBUS index MB value HEX								

Click on the button Search M-Bus slaves via serial to start the automatic search with secondary addressing mode for the meters. Now the software does a pattern search for new connected MBUS meters. The benefit with this method is, that you don't have to program any primary addresses into your meters.

HINT: You can interrupt the automatic search process by pressing the ESC button. After a few seconds the search will be interrupted.

In our test case the screen will look like this:

RESPS MODBUS Configurator VI. 10.3.1 - [C:\MBC	onfigurator 2028.	MBUS TEST.mcp]							- 6 - 2			
	Local COM p	art settings										
	Modbus unit 2		evice: COMB	 Stopbits stopbit IP-Address. 								
	-											
	Baudrate: 5	7800 💌 Pa	arity: NONE	 Port 								
	Device speci	ific										
De la companya de la	-			0								
	▼ Downio	Ed config Ie	est connection	Test Test								
B-D New Project B-D RESHMBUSE4-SIO - [RESHMBUSE]	RESI-MBUSS4			MBUS to MODBUS/RTU converter for 54 meters (120	Il registers)							
- HESPMBUSE4-SIO- RESPMBUSE - Meter 06364163 4CA3 18 02					o reducered							
- Meter 20716229_2C2D_1D_16	Software versio											
-	State	na	configuration									
	Search M-Bus staves Search M-Bus staves via serial Save CSV (in Erose contrauration Agricultur Reset Actives/LEVEL converter Deactivete LEVEL converter											
	-MODBUS			MEUS								
	Address: 255	Parity	NONE									
	Baudrate: 576				85535							
	Daucrase: 576	i00 💌 Stopbits	1 stopbit 🔹	Circl 251 Guery medur. 62555 Por smedur	00039	1						
	MBBagister	MEUS datatype	MB detetype	Content	MBUS index	MB value HEX	Current MB value	Meter name	*			
	4x00001	VAB LENGTH[18]	ASOL	Manufacturer	0	222	222	Meter 06364163_4CA3_18_02 [S:02184CA305364163]				
	4x00011	VAR LENGTH[0]	ABOI	Model/version	1	222	222	Meter 06364163 [4CA3 [19]02 [3:02184CA306064163]				
	4x00016	VAB LENGTH[7]	ASOI	Firmware version	2	222	222	Meter 06364163_4CA3_10_02 [S:02104CA306364163]				
	<x00020< td=""><td>INT24[3]</td><td>UINT32</td><td>Errortags (binary)</td><td>3</td><td>222</td><td>222</td><td>Meter 06364163_4CA3_18_02 [S:02184CA306364163]</td><td></td></x00020<>	INT24[3]	UINT32	Errortags (binary)	3	222	222	Meter 06364163_4CA3_18_02 [S:02184CA306364163]				
	4x00022 4x00024	FLOAT32[4] FLOAT32[4]	FLOAT32 FLOAT32	Current 10°0AL1 phase value Current 10°0AL2 phase value	5	777	222	Meter 06364163_4CA3_18_02 [S:02164CA306364163]				
	4x00024	FLOAT3214	FLOAT32	Current 10 0V-L2 phase value Current 10 0A-L3 phase value	6	777	122	Meter 06364183_4CA3_18_02 [S:02164CA306364163] Meter 06364183_4CA3_18_02 [S:02164CA306364163]				
	4x00028	FLOAT32[4]	FLOAT32	Carrent 10"0A-Average current	7	777	222	Meter 06364163_4CA3_18_02 [S:02164CA305364163]				
	4x00030	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1-L2	8	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4x00032	FLOAT32[4]	FLOAT32	Voltage 10°0V-L2-L3	9	222	222	Meter 06364163_4CA3_18_02 [S:02184CA305364163]				
	4x00034	FL0AT32[4]	FLOAT32	Voltage 10°0V4L3-L1	10	222	222	Meter 06364163_4CA3_18_02 [S:02184CA306364163]				
	4x00036	FLOAT32[4]	FLOAT32	Voltage 10°0V-Voltage L-L average	11	222	222	Meter 06364163_4CA3_18_02 [S.02184CA306364163]				
	4×00038	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1 phase value	12	225	225	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4×00040	FLOAT32[4]	FLOAT32	Yollage 10°0Y-L2 shase volue	13	777	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4×00042	FLOAT32[4]	FLOAT32	Yoltage 10°0Y-L3 phase volue	14	322	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4x00044 4x00046	FL0AT32[4] FL0AT32[4]	FLOAT32 FLOAT32	Voltage 10° 0V-L-N average Power;10° 3 W-L1 phase value	16	222	222	Meter 05354153_4CA3_18_02 [S:02184CA305354163] Meter 05354153_4CA3_18_02 [S:02184CA305354163]				
	4x00048	FLOAT32[4]	FLOAT32	Power1013 WL2 phose volue	17	999	999	Meter 06364163_4CA3_18_02_[S102184CA305364163]				
	4x00050	FL0AT32[4]	FLOAT32	Power1013 WH3 phose value	18	999	999	Meter 06364163 4CA3 18 02 (S:02184CA305364163)				
	4x00052	FLOAT32[4]	FLOAT32	Power1013 W	19	999	222	Meter 06364163 4CA3 18 02 [S:02184CA306364163]				
	4x00054	FLOAT32[4]	FLOAT32	Power1013 W[U1,T:0,S:0]	20	222	222	Meter 06364163_4CA3_19_02_[S:02184CA386364163]				
	4x00056	FLOAT32[4]	FLOAT32	Power1013 W[U2,T:0,S:0]	21	222	222	Meter 06364163_4CA3_10_02 [S:02104CA306364163]				
	<x00058< td=""><td>FLOAT32[4]</td><td>FLOAT32</td><td>Power Factor</td><td>22</td><td>222</td><td>222</td><td>Meter 06364163_4CA3_10_02 [S:02104CA306364163]</td><td></td></x00058<>	FLOAT32[4]	FLOAT32	Power Factor	22	222	222	Meter 06364163_4CA3_10_02 [S:02104CA306364163]				
	<x00060< td=""><td>FLOAT32[4]</td><td>FLOAT32</td><td>Frequency</td><td>23</td><td>222</td><td>222</td><td>Meter 06364163_4CA3_10_02 [S:02184CA306364163]</td><td></td></x00060<>	FLOAT32[4]	FLOAT32	Frequency	23	222	222	Meter 06364163_4CA3_10_02 [S:02184CA306364163]				
	<x00062< td=""><td>INTERIO</td><td>UINTEA</td><td>Energy:1010 Wh</td><td>24</td><td>777</td><td>222</td><td>Meter 06364163_4CA3_18_02 [S:02164CA306364163]</td><td></td></x00062<>	INTERIO	UINTEA	Energy:1010 Wh	24	777	222	Meter 06364163_4CA3_18_02 [S:02164CA306364163]				
	4x00066 4x00070	INTE4[6] INTE4[6]	UINT64 UINT64	Energy:1010 Wh-Export energy value Energy:1010 Wh/U:1.7:0.5 01	25 26	777 777	222	Meter 06364183_4CA3_18_02 [S:02164CA306364163] Meter 06364183_4CA3_18_02 [S:02164CA306364163]				
	4x00074	INTERIO	UINT64	Energy:1010 Whitecort energy value[U:1.T:0.S.0]	27	222	111	Meter 06364163_4CA3_18_02 [S:02164CA306364163]				
	4x00078	INT32[4]		Time&Date date type F-Energy reset date & fine	28	222	222	Meter 06364163_4CA3_18_02 [S:02184CA306364163]				
	4x00080	INTE4R1	UINT64	Energy 10°0 Wh-parital energy value	29	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4x00084	INTE4[8]	UINT64	Energy 10°0 Whegerital energy value[U.1.T.0.S.0]	30	222	222	Meter 06364163_4CA3_18_02 [S:02184CA305364163]				
	4x00088	INT64[8]	UINT64	Energy:10°0 Wh-L1 phase value	31	222	222	Meter 06364163_4CA3_18_02 [S:02184CA305364163]				
	4x00092	INT64[8]	UINT64	Energy:10°0 Wh-L2 phase value	32	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4×00096	INT64[8]	UINT64	Energy:10^0 Wh:L3 phose value	33	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4×00100	INT32[4]		Time&Date data type Finput metering reset date&time	34	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
	4×00102	INT64[8]	UINT64	Cumulation counter	35	222	222	Meter 06364153_4CA3_18_02 [S:02184CA305364163]				
4 III +	4x00106	INT24[3]	UINT32	Active tarif (Energy active rate)	35	222	277	Meter 06364163_4CA3_18_02_[S:02184CA305364163]	*			
		_										



Again you can now download the configuration and start a quick test by activating the test mode with the button Test. Now you will see values in the data grid after a few seconds:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Metername
4x00001	VAR LENGTH[18]	ASCII	Manufacturer	0	LSW:6353 6E68 6965 6564 2072 6C45 6	3 Schneider Electric, LSB:53 63 68 6E 65 69 64 65 72 20 45 6C 65 63 74 72 69 63 00:MSE	3 Meter 06364163
4x00011	VAR LENGTH[8]		Model/version		LSW:4569 334D 3331 2035 0000:MSW	iEM3135.LSB:69.45.4D.33.31.33.35.20.00:MSB	Meter 06364163
4x00016	VAR LENGTH[7]	ASCII	Firmware version	2	LSW:2E31 2E34 3030 0032:MSW	1.4.002,LSB:31 2E 34 2E 30 30 32 00:MSB	Meter 06364163_
4x00020	INT24[3]	UINT32	Error flags (binary)	3	MSW:0000,0000:LSW	0.0x00000000	Meter 06364163_
4x00022	FL0AT32[4]	FLOAT32	Current10°0A-L1 phase value	4	MSW:0000,0000:LSW	0.0000,0.0000000000000E+0	Meter 06364163_
4x00024	FL0AT32[4]	FLOAT32	Current 10°0A-L2 phase value	5	MSW:FFC0.0000:LSW	NANJNAN	Meter 06364163
4x00026	FLOAT32[4]	FLOAT32	Current 10 [°] 0A-L3 phase value	6	MSW:FFC0.0000:LSW	NANJNAN	Meter 06364163_
4x00028	FL0AT32[4]	FLOAT32	Current10°0A-Average current	7	MSW:0000.0000:LSW	0.0000,0.000000000000000E+0	Meter 06364163
4x00030	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1-L2	8	MSW:FFC0.0000:LSW	NANJNAN	Meter 06364163
4x00032	FLOAT32[4]	FLOAT32	Voltage 10°0V-L2-L3	9	MSW:FFC0.0000:LSW	NAN,NAN	Meter 06364163
4x00034	FL0AT32[4]	FLOAT32	Voltage 10°0V-L3-L1	10	MSW:FFC0.0000:LSW	NAN,NAN	Meter 06364163
4x00036	FLOAT32[4]	FLOAT32	Voltage 10°0V-Voltage L-L average	11	MSW:FFC0,0000:LSW	NAN,NAN	Meter 06364163
4x00038	FLOAT32[4]	FLOAT32	Voltage 10°0V-L1 phase value	12	MSW:4366,04AC:LSW	230.0182,2.30018249511719E+2	Meter 06364163
4x00040	FL0AT32[4]	FLOAT32	Voltage 10°0V-L2 phase value	13	MSW:FFC0,0000:LSW	NAN,NAN	Meter 06364163
4x00042	FLOAT32[4]	FLOAT32	Voltage 10°0V-L3 phase value	14	MSW:FFC0,0000:LSW	NAN,NAN	Meter 06364163_
4x00044	FL0AT32[4]	FLOAT32	Voltage 10^0V-L-N average	15	MSW:4366,04AC:LSW	230.0182,2.30018249511719E+2	Meter 06364163_
4x00046	FL0AT32[4]	FLOAT32	Power:10^3 W-L1 phase value	16	MSW:0000,0000:LSW	0.0000,0.000000000000E+0	Meter 06364163_
4x00048	FLOAT32[4]	FLOAT32	Power:10^3 W-L2 phase value	17	MSW:FFC0,0000:LSW	NAN,NAN	Meter 06364163_
4x00050	FL0AT32[4]	FLOAT32	Power:10^3 W-L3 phase value	18	MSW:FFC0.0000:LSW	NANJNAN	Meter 06364163_
4x00052	FLOAT32[4]	FLOAT32	Power:10*3W	19	MSW:0000,0000:LSW	0.0000,0.0000000000000E+0	Meter 06364163_
4x00054	FL0AT32[4]	FLOAT32	Power:10^3 W[U:1.T:0.S:0]	20	MSW:0000,0000:LSW	0.0000,0.000000000000E+0	Meter 0€ N▼ ×
4x00056	FLOAT32[4]	FLOAT32	Power:10^3 W[U:2.T:0.S:0]	21	MSW:0000.0000:LSW	0.0000,0.0000000000000E+0	Meter 06
4x00058	FLOAT32[4]	FLOAT32	Power Factor	22	MSW:FFC0.0000:LSW	NANJNAN	Meter 06
4x00060	FL0AT32[4]	FLOAT32	Frequency	23	MSW:4247.FDFD:LSW	49.9980.4.99980354309082E+1	Meter 06364163
4x00062	INT64[8]	UINT64	Energy:10 [°] 0 Wh	24	MSW:000000000000.0019:LSW	25.0×00000019	Meter 06364163
4x00066	INT64[8]	UINT64	Energy:10 [°] 0 Wh-Export energy value	25	MSW:000000000000.0000:LSW	0.0×00000000	Meter 06364163_
4x00070	INT64[8]	UINT64	Energy:10^0 Wh[U:1,T:0,S:0]	26	MSW:0000000000000.000F:LSW	15,0x0000000F	Meter 06364163
4x00074	INT64[8]	UINT64	Energy:1010 Wh-Export energy value[U:1,T:0,S:0]	27	MSW:000000000000,0000:LSW	0,0x00000000	Meter 06364163
4x00078	INT32[4]		Time&Date data type F-Energy reset date & time	28	MSW:0101,2080:LSW	00:00 D.M.Y:01.01.00 ST:0 M1,0x01012080	Meter 06364163_
4x00080	INT64[8]	UINT64	Energy:10°0 Wh-parital energy value	29	MSW:00000000000000019:LSW	25,0x00000019	Meter 06364163_
4x00084	INT64[8]	UINT64	Energy:10°0 Wh-parital energy value[U:1,T:0,S:0]	30	MSW:000000000000,000F:LSW	15,0x000000F	Meter 06364163_
4x00088	INT64[8]	UINT64	Energy:10°0 Wh-L1 phase value	31	MSW:00000000000000019:LSW	25,0x00000019	Meter 06364163_
4x00092	INT64[8]	UINT64	Energy:10^0 Wh-L2 phase value	32	MSW:0000000000000.0000:LSW	0,0x00000000	Meter 06364163_
4x00096	INT64[8]	UINT64	Energy:10 [°] 0 Wh-L3 phase value	33	MSW:000000000000,0000:LSW	0,0x00000000	Meter 06364163_
4x00100	INT32[4]	DATE_TIME_	Time&Date data type F-nput metering reset date&time	34	MSW:0101,2080:LSW	00:00 D.M.Y:01.01.00 ST:0 IV:1,0x01012080	Meter 06364163_
4x00102	INT64[8]	UINT64	Cumulation counter	35	MSW:000000000000.0000:LSW	0,0x00000000	Meter 06364163_
4.00100	in case where	LUN PERM	La provident de la seconda de la compañía de la com	-	NUMBER OF A DESCRIPTION	0.0.0000000	LL CONSCIENCE

43.10.4 Save to CSV file

With the action Save to CSV file you can store the current data of the data grind into a CSV file for processing in Libre Office® or Microsoft Office® calculation software.

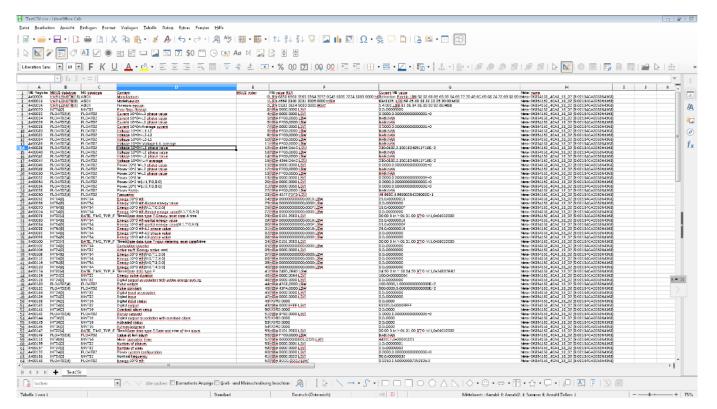
Local COM port settings									
Modbus unit: 255 🗸 🗸 Dev	vice: COM8	 Stopbits 1 stopbit 	- IP-Address:						
Baudrate: 57600 💌 Par	ity: NONE ·	•	Port						
Device specific									
RESI-MBUS64-SIO		MBUS to MODBUS/RT	U converter for 64 me	eters (1200 regis	sters)				
Software version: 5.0.0									
State:	no error								
Search M-Bus slaves Search M-Bus s	laves via serial S <u>a</u> ve	CSV file Erase configuration	Application Reset	A <u>c</u> tivate LEVEL	converter <u>D</u> eactivat	e LEVEL converter			
MODBUS		IBUS-							
Address: 255 💌 Parity:	NONE 🔻 S	tart 1 Baudrate:	2400 💌						
Baudrate: 57600 💌 Stopbits:	1 stopbit 👻 E	nd 251 Query timeout:	65535 Po	ll timeout: 65	535				
MB Register MBUS datatype	MB datatype Conten	t		MBUS index	MB value HEX	Curr	rrent		
4x00001 VAR LENGTH[18]	ASCII Manufa	acturer		0	LSW:6353 6E68 6965	5 6564 2072 6C45 63 Sch	nneic		
	ASCII Model,	Version		1	LSW:4569 334D 3331	1 2035 0000:MSW iEM			

Click on the button Save CSV file. A dialog for entering the name of the CSV file will be opened. After you defined the name, the CSV file is on your file system. Take a calculation software to open the CSV file (in our case Libre office), select Semicolon as a separator and open the CSV file.



Textimport - [Test(CSV.csv]			3
Importieren				
Z <u>e</u> ichensatz:	Unicode (UTF-8)			
<u>S</u> prache:	Standard - Deutsch (Ös	terreich)	•	
Ab <u>Z</u> eile:	1			
Trennoptionen				
<u> Feste Breite</u>		۲	<u>G</u> etrennt	
<u>Tabulator</u>	🔲 <u>K</u> omma	<mark>▼ <u>S</u>emikolon</mark>	Leerzeichen <u>A</u> ndere	
E Fel <u>d</u> trenne	er zusammenfassen	📃 Leerräume <u>k</u>	eschneiden Zei <u>c</u> henketten-Trenner: "	•
Weitere Optionen				
Werte in Hoo	chkomma als Text form	atieren	Erweiterte Zahlenerkennung	
– Feldbefeble				
Spaltentyp:	v			
Standard	Standard	Standard	Standard	٦.
1 MB Regist	er MBUS datatype	MB datatype	Content	1
2 4×00001	VAR LENGTH[18]		Manuracturer	
3 4×00011	VAR LENGTH[8]	ASCII	Model/version	
4 4×00016	VAR LENGTH[7]	ASCII	Firmware version	
5 4×00020	INT24[3]	UINT32	Error flags (binary)	
6 4×00022	FLOAT32[4]	FL0AT32	Current 10^0A-L1 phase value	
7 4×00024	FLOAT32[4]	FL0AT32	Current 10^0A-L2 phase value	
8 4×00026	FLOAT32[4]	FL0AT32	Current 10^0A-L3 phase value	-
A 4×00028	FI 04T32F47	EL DAT32	Current 10004-Average current	
			, F	-
Hilfe			OK Abbrechen	J

You will see the complete data grid in your calc software for your own purposes:





43.10.5 Erase configuration

With the action Erase configuration you can delete the complete configuration of the gateway and restore factory settings for all parameters.

Local COM port settings	
Modbus unit: 255 V Device: COM8 V Stopbits 1 stopbit	IP-Address:
Baudrate: 57600 Parity: NONE	Port:
Device specific	
Download config Test connection Test	
RESI-MBUS64-SIO MBUS to MODBUS/RTU (converter for 64 meters (1200 registers)
Software version: 5.0.0	
State: no error	
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration A	pplication Reset Activate LEVEL converter Deactivate LEVEL converter
	2400
here is hereastic hereastic last i	lucionaria dalla rivera dalla

Click on the button Erase configuration. A question will pop up. If you answer with YES, the gateway will be restored to factory defaults and the meter configuration will be erased.



43.10.6 Application reset

With the action Application reset you can send the special MBUS command "Application reset" to a defined MBUS meter.

Local COM port settings
Modbus unit: 255 Device: COM8 Stopbits 1 stopbit IP-Address:
Baudrate: 57600 Parity: NONE Port:
Device specific
Download config Test connection Test
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)
Software version: 5.0.0
State: no error
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter
MODBUS Address: 255 Parity: NONE Start 1 Baudrate: 2400
Baudrate: 57600 Stopbits: 1 stopbit End 251 Query timeout: 65535 Poll timeout: 65535

Select the desired primary address for this action with the filed Start in the MBUS area. Then click on the button Application reset. A question will pop up. If you answer with YES, the gateway will send the special MBUS command Application reset to the selected meter.

This is helpful, because some of the meters have trouble to resynchronize to the start of data readout when do a lot of connection /disconnection or other electrical stuff on the MBUS line. There it helps to send this command before trying to search for the connected meter.



43.10.7 Activate/Deactivate LEVEL converter

With the two actions Activate/deactivate LEVEL converter you cans witch the MBUS gateway to a transparent mode, where every incoming MBUS data is directly send to the host and every incoming characters from the host are send to the MBUS line directly. Also a baud rate conversion will be done. The serial line will use the settings for the serial interface and the MBUS line will use the settings for the MBUS interface.

The integrated LEVEL converter is designed to configure meters with individual software form manufacturers over a standard level converter. Usually you have to have another MBUS level converter module either from RESI or from other suppliers like RELAY ® to configure your meters. Now you can do this over our gateway.

Local COM port settings
Modbus unit: 255 🔹 Device: COM8 🔹 Stopbits 1 stopbit 🔹 IP-Address:
Baudrate: 57600 Parity: NONE Port:
Device specific
Download config Test connection Test
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)
Software version: 5.0.0
State: no error
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter
MODBUS
Address: 255 V Parity: NONE V Start 1 Baudrate: 2400 V
Baudrate: 57600 Stopbits: 1 stopbit End 251 Query timeout: 65535 Poll timeout: 65535

In our test szenario, we want to connect to a Schneider Electric meter with the original Schneider Electric configuration software. So when we start the software, we get the following screen:

M-bus logi	in		
Sc	the CEL	ectr	er ric
Port	COM1 -	Address	0
Baudrate	2400 👻	Mode	Monitor(Automatic) 👻
Test CO	М		OK Cancel
			*
			<u></u>

So first of all we have to change the speed settings for our gateway to parameters which are suitable to most of the MBUS tools on the market. Since the MBUS standard defines 2400bd, even parity and one stop bit as common on the MBUS side and many MBUS gateways are simple electrical converters, the tools assume a gateway with 2400bd, EVEN parity and one stop bit.

Select 2400bd, even parity and 1 stopbit in the area MODBUS and download this configuration with the button Download config.

Local COM port settings	
Modbus unit: 255 Device: COM8 Stopbits 1 stopbit IP-Address:	
Baudrate: 57600 Parity: NONE Port	
Device specific	
Download config Det Iest connection Test	
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (120	10 registers)
Software version: 5.0.0	
State: no configuration	
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate L	EVEL converter Deactivate LEVEL converter
Address: 255 V Parity: EVEN V Start 1 Baudrate: 2400 V	
	65535
Baudrate: 2400 Stopbits: 1 stopbit Dend 251 Query timeout: 65535 Poll timeout:	
MB Register MBUS datatype MB datatype Content	MBUS index MB value HEX Curre

The adopt your local COM settings for this new settings in the converter. Check the connection with the button Test connection.

Cocal COM port settings
Modbus unit: 255 Device: COM8 Stopbits 1 stopbit IP-Address: Port: Port:
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)
Software version: 5.0.0
State: no configuration
Search M-Bus slaves Search M-Bus slaves via serial Save CSV file Erase configuration Application Reset Activate LEVEL converter Deactivate LEVEL converter
MODBUS Address: 255 Parity: EVEN MBUS Baudrate: 2400 Start Baudrate: 2400 End Baudrate: 2400 Start End 251 Query timeout: 65535

After that activate the integrated LEVEL converter by pressing the button Activate LEVEL converter.

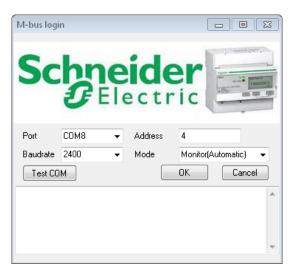
Local COM port settings
Modbus unit: 255 V Device: COM8 V Stopbits 1 stopbit V IP-Address:
Baudrate: 2400 Parity: EVEN Port:
Device specific
Download config Test connection Test
RESI-MBUS64-SIO MBUS to MODBUS/RTU converter for 64 meters (1200 registers)
Software version: 5.0.0
State: no configuration
Search M-Bus slaves Search M-Bus slaves via serial Seve CSV file Erase configuration Application Reser Activate LEVEL converter Deactivate LEVEL converter
MODBUS MBUS Address: 255 Parity: EVEN Start I Reudrate: 2400 Stopbits: 1 stopbit ACTIVATE LEVEL COPNVERTER X X
MB Register MBUS datatype MB datatype Converter for other MBUS tools ?
Ja Nein

if everything is ok, the converter LED state will flash extraordinary fast to show, that the LEVEL converter is active.

11



Now we activate the SCHNEIDER software by selecting the correct COM port and the correct primary address and the desired mode:



Press the button Test COM first, then press the OK button. The software will now scan automatically the meter and show the result on the screen:

Schneider Electric M	-bus Energy Meter				Schneider Electric	c M-bus Energy Meter	r		- • •
File Setup H	elp				File Setup	Help			
Meter Info Energy M	teasure(Int64) Energy(F	loat32) RMS Meas	sure Meter Status		Meter Info Energ	gy Measure(Int64) Ene	rgy(Float32) RMS M	feasure Meter Status	
Total Energy	Part Energy				Basic Informatio	'n			
Active E Import	Partial Energy	_							
0,025	Partial Active E		tial Reactive E		Model:	iEM3135	Manufacture:	Schneider Electric	
kWh Active E Export	0,02	5 kWh	0,015 kVARH		Serial Number:	06364163	Firmware Version:	1.4.002	
0	Phase Energy				o chartenber.	00004100	r inimare version.	1.4.002	
k₩h	Phase 1 Active E	Phase 2 Active I			Errors Report				
Reactive E Import 0,015	0,025 kW	/h 0	kWh	0 kWh	Ellois hepoit				*
kVABh	⊂ Tariff								
Reactive E Export	1 dill	Tariff A	Tariff B						
0	Current Rate	0	kWh	0 kWh					
kVARh	0	Tariff C	Tariřf D						Ŧ
		0	kWh	0 kWh					Clear
	Reset Date Time: 0	1.01.2000 00:00							
Input Meter Accumu	lation								
Count	0 Pulse/Unit								
Reset Date Tim	e: 01.01.2000 00:00								
1									
	0	0 05 03 CD CC CC 3	IC 05 83 FF 09 00 00	00 00 85 40 03 8F 🔺			00 05 03 CD CC 0	CC 3C 05 83 FF 09 00 00	00 00 85 40 03 8F 🔺
Baudrate 2400		2 75 3C 85 40 83 FF	09 00 00 00 00 00 05 8 0 8F C2 75 3C 05 83 F	3 FF OD CD CC	Baudrate 2400	Req_UD2	C2 75 3C 85 40 8	3 FF 09 00 00 00 00 05 8 F 0D 8F C2 75 3C 05 83	3 FF OD CD CC
Address 4	3	C 05 83 FF 02 00 00	00 00 05 83 FF 03 0	0 00 00 00 05 FD	Address 4		J 3C 05 83 FF 02 0	0 00 00 00 05 83 FF 03 0	0 00 00 00 05 FD
Interval 5s 🗸	- 4 Sec 8	1 00 00 00 00 85 10 5 30 03 00 00 00 00 00	03 00 00 00 00 00 85 20 85 80 10 03 00 00 00	0 03 00 00 00 00 00 00 00 00 00 00 00 00	Interval 5s	•		5 10 03 00 00 00 00 00 85 2 0 00 85 80 10 03 00 00 0	



If you start the MBUS configuration software in mode CONFIG

M-bus logi	in				- • 💌
Sc	hn J		ide	er	
Port	COM8	-	Address	4	
Baudrate	2400	-	Mode	Config	•
Close Cl	М			OK	Cancel
					^
					Ŧ

Click again first on Test COM button then on OK button. You will get the following screen:

Schneider Electric M-bus Energy Meter	
File Setup Help	
Meter Config	
Set Wiring	
Power System Configuration: 1Ph2W L-N 1Ph2W L-L 1Ph2W L-N 1Ph3W L-N 1Ph4W H-L-N 1Ph4W multi L with N 3Ph3W 3Ph4W	
Set Digital Input	Set Digital Output Mode: Disable v Cond
Mode: Normal(Input Status) - Send	Mode: Disable 🔻 Send
Pulse Const:	Pulse weight: 100 v pulse/kWh Send Pulse duration:
Set Multi-Tariff	100 v ms Send
Control Mode: Disable Multi-tariff 🛛 🗸 Send	
Active Bate: Tariff A Send	Set Power Alarm Alarm: Disable V Send
Active Rate: Tariff A 🛛 👻 Send	Pickup Setpoint:
	1 kW Send
Reset	Acknowledge Alarm: AckAlarm
Set Date Time	
Date: 13.04.2020 - Time: 15:32:00 🚔	Send System Sync
Set Baudrate Send	dress 4 Send
Baudrate 2400 ▼ Req_UD2 C2 75 3C Address 4 3C 05 83 6 3C 05 83 6 3C 00 00 0	CD CC CC 3C 05 83 FF 09 00 00 00 00 85 40 03 8F 35 40 83 FF 09 00 00 00 00 05 83 FF 0D CD CC 40 83 FF 0D 8F C2 75 3C 05 83 FF 01 CD CC CC F0 2 00 00 00 00 05 83 FF 03 00 00 00 05 FD 10 00 85 10 03 00 00 00 085 20 03 00 00 00 10 00 08 51 0 03 00 10 03 00 00 00 00 05 FE

After you have exited the SCHNEIDER software you can deactivate the LEVEL function either by disconnecting/reconnecting the power supply from the gateway (hard reset) or by pressing the button Deactivate LEVEL converter in the software. This will do a software reset and the STATE LED will flash normally again.



43.10.8 MBUS meter configuration

In the project tree you will find under the MBUS gateway for every configured meter a unique node. Click on this node. You will get the following result:

	mon M-Bus slav	e settings						
Chen	Change primary address Bead meter data							
	Slove name: Meter 2 Addressing mode Primary meter address: 2 Current meter stat							
PRJ CAde								
			tatus:					
	Secondary address	Secondary m	eter address (hex): 20716229 2C2D 1D 16 No error					
w Project	C Secondary address Meter status: 16.0x10 Temporary error							
RESI-MBUS64-SIO - [RESI-MBUS6		Manufacturer	name: KAM					
Meter 2	re delav 1: 65535							
E Metera .								
Poll p	re delay 2: 65535	Poll rep	beats 2: 65535					
Poll p	ost delay 1: 65535							
Poll	ost delay 2: 65535							
101	00000 E. 00000							
Date	points							
			database Add to database					
	MBUS dataty	//	Content	MBUS data	MBUS size	MBUS exponent	MB expone	
0	INT32	FLOAT32	Volume:10 ⁻³ m ⁸	1-2	4	-3	0	
1	INT32	FLOAT32	Volume:10^-3 m ⁸ -Accumulation of abs value only if negative cont	1-9	4	-3	0	
2	INT32	UINT32	On time:hours	1-15	4	0	0	
3 4	INT16 INT8	FLOAT32 FLOAT32	Volume flow:10^-3 m³/h	1-21	2	-3	0	
4	INT8 INT16	FLOAT 32	External temperature:10°0 °C Volume flow:10°-3 m²/h	1-25	2	-3	0	
6	INT16	FLOAT 32	Volume flow:10 -3 m²/h	1-20	2	-3	0	
7	INT8	FLOAT32	External temperature:10 [°] 0 °C	1-36	1	0	0	
, 8	INT8	FLOAT32	External temperature:10°0 °C	1-39	1	0	0	
9	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature	1-44	1	ů.	Ŭ.	
10	INT32	DATE_TIME_T	Time&Date data type F	1-47	4	0	0	
11	INT32	FLOAT32	Volume:10^-3 mº[U:0,T:0,S:1]	1-53	4	-3	0	
12	INT16	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1]	1-59	2	-3	0	
13	INT16	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1]	1-63	2	-3	0	
14	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-67	1	0	0	
15	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-70	1	0	0	
16	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature[U:0,T	1-75	1	0	0	
17	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-78	2	0	0	
18	INT16 INT48	UINT16 UINT64	Info code	1-83 1-88	2	0	0	
	INT48 INT16	UINT16	Config number Meter type	1-88	2	0	0	
19		UNTIB		1-102	2	0	0	
20		LUNT16	Firmwere version		2	0	0	
	INT16	UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmwere version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				
20		UINT16	Firmware version	1-102				



43.10.8.1 WHAT is displayed in the Common M-Bus slave settings

In this area you will find the following information:

Common M-Bus slave s	ettings							
Change primary address Read meter data								
Slave name:	Meter 2							
Addressing mode	Primary meter address:	2 🗸	Current meter status:					
 Primary address Secondary address 	Secondary meter address (hex):	20716229 2C2D 1D 16						
	Meter status:	16,0x10	Temporary error					
	Manufacturer name:	KAM						
Poll pre delay 1: 65535	Poll repeats 1:	65535						
Poll pre delay 2: 65535	Poll repeats 2:	65535						
Poll post delay 1: 65535								
Poll post delay 2: 65535								

- Button Change primary address: With this function you can program a new primary address in the selected meter, as long as the meter supports the standard MBUS command for setting a new primary address.
- Button Read meter data: With this function you can read out all MBUS datapoints from the connected meter again in the below data grid. This is useful, if you have erroneous deleted some datapoints of the meter and you want to restore the original datapoints of the meter.
- **Slave name**: Here you can define the name of the meter for the tree view and the documentation.
- Addressing mode radio button: This radio button selects the addressing mode for this meter. Either primary addressing mode in combination with the selected primary address in the field Primary meter address or Secondary addressing mode in combination with the first of the four fields in the row Secondary meter address. this is the field serial number of the meter.
- Primary meter address: This drop down defines the primary address for the meter either for readout or for programming a new primary address. Use 1 to 251 for slave address or if you have connected only one meter use 254 (Broadcast address), if you don't know the correct primary address.
- Secondary meter address (hex): This four fields represents the following information:
 - Serial number: The first field is the current serial number of the meter. Or you enter a desired serial number for secondary addressing mode for a specific meter.
 - Manufacturer ID: The second field represents the two bytes of the manufacturer ID from the fixed data structure at the beginning of a variable data frame of the meter. The manufacturer is defined by three ASCII uppercase characters encoded with the following formula (In our example 2C2D stands for KAM=KAMSTRUP):

IEC 870 Man.ID=[ASCII(1st letter)-64]•32•32+[ASCII(2nd letter)-64]•32+[ASCII(3rd letter)-64]

- Version: The third field represents one byte from the fixed data structure at the beginning of a variable data frame of the meter defining the version of the meter.
- Medium: The fourth field represents one byte from the fixed data structure at the beginning of a variable data frame of the meter defining the medium of the meter.
- Meter status: This field represents one byte from the fixed data structure at the beginning of a variable data frame of the meter defining the status of the meter. Beside this field you will see under the caption current meter status the interpretation of the bits of this status byte as text.
- **Manufacturer name**: This field shows the three ASCII letters from the two byte manufacturer ID from the fixed data structure at the beginning of a variable data frame of the meter. In our case KAM for KAMSTRUP.
- Poll pre delay 1: This is a pause time in ms, before the gateway will send a primary or secondary address telegram to the meter to initiate the data readout process with this meter.
- Poll pre delay 2: This is a pause time in ms, before the gateway will send a request for data telegram to the meter to readout more data from this meter.
- Poll post delay 1: This is a pause time in ms, after the gateway will send a primary or secondary address telegram to the meter to initiate the data readout process with this meter.
- Poll post delay 2: This is a pause time in ms, after the gateway will send a request for data telegram to the meter to readout more data from this meter.
- **Poll repeats 1**: This is a repeat count, how often the MBUS gateway will send a primary or secondary address telegram to the meter, in the case the meter do not answer correctly.
- **Poll repeats 2**: This is a repeat count, how often the MBUS gateway will send a request for data telegram to the meter, in the case the meter do not answer correctly.

All this setup parameters for the meter will be downloaded with the button Download configuration.



43.10.8.2 HOWTO set up individual poll parameters for one meter

In the basic setup of the gateway you will find the two parameters Query timeout and Poll timeout for general timing of the sequential process of requesting data from the connected meters. The two parameters can be configured like this:

- Query timeout: This field defines the timeout between two query cycles in the gateway. Usually the gateway communicates with all configured meters sequentially. After finishing the data readout for the last meter, the gateway pauses for this defined interval in seconds. This values are used: Value 65535 or values 0..5 defines ~5s pause. Values 6 to 65534; defines 6 to 65534 seconds of pause, before the next polling cycle will start.
- Poll timeout: This field defines a general pause after the readout of a configured meter before the readout of the next meter starts. In the past we discovered that there are many meters out in the market, which need a special treatment in the timing. e.g. very old KAMSTRUP meters need often two readout cycles with a gap of at least 10-15 seconds. This is non standard to the MBUS. Or other meters have problems with secondary addressing, if there is a too small gap between the readout. So we introduced this new parameter: This timeout defines the pause after finishing reading of a meter and starting reading the next meter. In the previous firmware versions this timeout was fixed to 250ms gap, which was ok for 99% of the meter readout on the markets. But some meter fail

to process this little gap. The values is interpreted as follows: Value 1..30: Gap time 1 seconds to 30 seconds Value 101..400: Gaptime=(Value-100)*0.1s \rightarrow 0.1s .. 30s e.g. 105 \rightarrow 0.5s Value 65535: Gap time is 1 second Value 65534: Gap time is 250ms Value 65533: Gap time is 500ms Value 65532: Gap time is 7250ms All other values: Gap time is 1000ms

Here you will find a basic diagram, how the MBUS master request cycle is handled by our gateways.

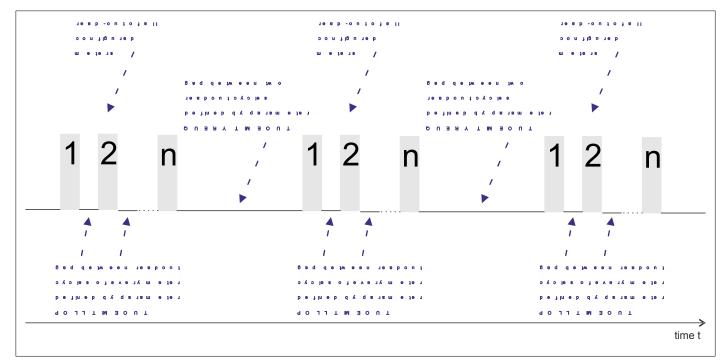


Figure: Basic timing of MBUS master read-out for MBUS slaves



Now we go more into detail, how the MBUS gateway will handle the request process of one meter. Forst we define the parameters:

- Poll repeats 1: This field defines the amount of telegram repetitions for the addressing command to a meter, before the gateway declares the communication as not possible and resumes with the next meter. Value 65535 or 0: use 3 repeats as standard Value 1..n: Use n repeats
- Poll repeats 2: This field defines the amount of telegram repetitions for the data readout command to a meter, before the gateway declares the communication as not possible and resumes with the next meter. Value 65535 or 0: use 5 repeats as standard Value 1..n: Use n repeats
- Poll pre delay 1: This field defines the first pause time in Milliseconds before starting to send the first addressing command telegram to a meter.
 Value 65535: use 250ms as standard pause time
 Value 0..65534: Use x ms as pause time
- Poll pre delay 2: This field defines the first pause time in Milliseconds before starting to send the first data request telegram to a meter.
 Value 65535: use 100ms as standard pause time
 Value 0..65534: Use x ms as pause time
- Poll post delay 1: This field defines a pause time in Milliseconds. If the gateway do not receive a correct answer to an addressing command telegram and the addressing command is repeated, then this pause time is inserted, before resending the addressing telegram to the meter. Value 65535: use 0ms as standard pause time Value 0..65534: Use x ms as pause time
- Poll post delay 2: This field defines a pause time in Milliseconds. If the gateway do not receive a correct answer to a readout data telegram and the readout data command is repeated, then this pause time is inserted, before resending the readout data telegram to the meter. Value 65535: use 100ms as standard pause time Value 0..65534: Use x ms as pause time

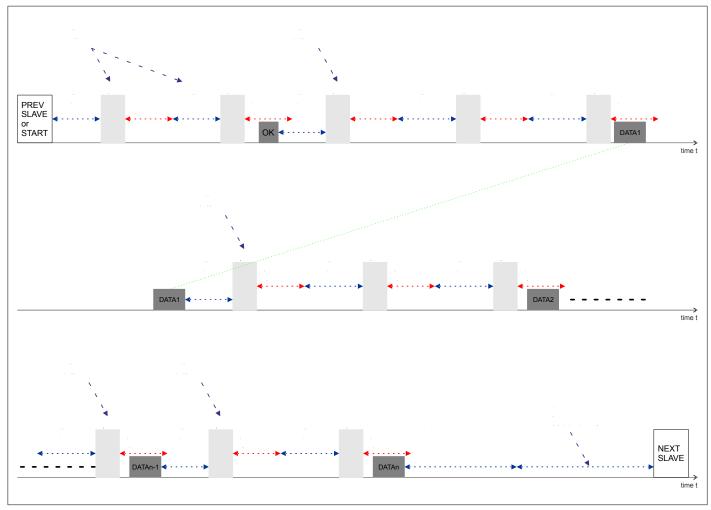


Figure: Basic timing of MBUS master read-out for MBUS slaves



43.10.8.3 HOWTO select primary addressing mode

To select primary addressing mode, you have to define a primary address for the meter in the range from 1 to 151. and you have to select in the Addressing mode radio button the mode Primary address. After you have successfully downloaded the configuration into the gateway, this meter will be addressed by the meter by using primary addressing mode with the given primary address.

Don't forget, that the meter will only answer to the request, if the meter is programmed for the defined primary address, the meter uses the same MBUS baud rate and there is not another meter on the MBUS with the same primary address.

Common M-Bus slave settings							
Change primary address Read meter data							
Slave name:	Meter 2						
 Primary address C Secondary address 	Primary meter address: Secondary meter address (hex): Meter status:	2 Current meter status: 20/16229 2C2D 16,0x10 Temporary error					
	Manufacturer name:	KAM					
Poll pre delay 1: 65535	Poll repeats 1:	65535					
Poll pre delay 2: 65535	Poll repeats 2:	65535					
Poll post delay 1: 65535 Poll post delay 2: 65535							

43.10.8.4 HOWTO select secondary addressing mode

To select secondary addressing mode, you have to define the unique meter ID (serial number) for the meter in the field Secondary meter address (hex). Then you have to select in the Addressing mode radio button the mode Secondary address. After you have successfully downloaded the configuration into the gateway, this meter will be addressed by the meter by using secondary addressing mode with the given Meter serial number.

Common M-Bus slave s	ettings						
Change primary address Read meter data							
Slave name:	Meter 2						
Addressing mode	Primary meter address:	2	Current meter status:				
C Primary address Secondary address	Secondary meter address (hex):	20716229 2C2D 1D 16	No error				
Contraity address	Meter status:	16,0x10	Temporary error				
	Manufacturer name:	KAM					
Poll pre delay 1: 65535	Poll repeats 1:	65535					
Poll pre delay 2: 65535	Poll repeats 2:	65535					
Poll post delay 1: 65535							
Poll post delay 2: 65535							

43.10.8.5 HOWTO change the primary MBUS address in meter

When you want to change the primary address of the meter, first you have to select a new primary address form the drop down list Primary meter address. Take a unique address between 1 and 251 from the list and make sure, that you don't have another meter on the network with the same address you want to use in the future. Then click on the button Change primary address. Don't forget to change the Slave name. The standard is, that the slave name contains the primary address ant the end of the name.

Common M-Bus slave settings						
Change primary address R	ead meter data.					
Slave name:	Meter 2					
Addressing mode	Primary meter address:	2	-	Current meter status:		
 Primary address Secondary address 	Secondary meter address (hex):	2		No error		
o secondary address	Meter status:	3		Temporary error		
	Manufacturer name:	5				
Poll pre delay 1: 65535	Poll repeats 1:	6 7				
Poll pre delay 2: 65535	Poll repeats 2:	68				
Poll post delay 1: 65535		9	/			
Poll post delay 2: 65535						



43.10.8.6 WHAT is displayed in the Datapoints data grid

In this area you will find the following information:

Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponen
0	INT32	FLOAT32	Volume:10^-3 m ^a	1-2	4	-3	0
	INT32	FLOAT32	Volume:10^-3 m ^e -Accumulation of abs value only if negative cont	1-9	4	-3	0
2	INT32	UINT32	On time:hours	1-15	4	0	0
3	INT16	FLOAT32	Volume flow:10^-3 mº/h	1-21	2	-3	0
4	INT8	FLOAT32	External temperature:10^0 °C	1-25	1	0	0
5	INT16	FLOAT32	Volume flow:10^-3 m³/h	1-28	2	-3	0
6	INT16	FLOAT32	Volume flow:10^-3 m ^o /h	1-32	2	-3	0
7	INT8	FLOAT32	External temperature:10^0 °C	1-36	1	0	0
8	INT8	FLOAT32	External temperature:10^0 °C	1-39	1	0	0
9	INT8	FLOAT32	External temperature:10^0 °C-Average media temperature	1-44	1	0	0
10	INT32	DATE_TIME_T	Time&Date data type F	1-47	4	0	0
11	INT32	FLOAT32	Volume:10^-3 m ^a [U:0,T:0,S:1]	1-53	4	-3	0
12	INT16	FLOAT32	Volume flow:10^-3 m³/h[U:0,T:0,S:1]	1-59	2	-3	0
13	INT16	FLOAT32	Volume flow:10^-3 m ^s /h[U:0,T:0,S:1]	1-63	2	-3	0
14	INT8	FLOAT32	External temperature:10 ⁰ °C[U:0,T:0,S:1]	1-67	1	0	0
15	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-70	1	0	0
16	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature[U:0,T	1-75	1	0	0
17	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-78	2	0	0
18	INT16	UINT16	Info code	1-83	2	0	0
19	INT48	UINT64	Config number	1-88	6	0	0
20	INT16	UINT16	Meter type	1-97	2	0	0
21	INT16	UINT16	Firmware version	1-102	2	0	0

In this grid you will find all datapoints regarding the selected meter. The grid has the following columns:

- Index: This is a running index starting with 0 to see how many datapoints you have defined. This is important, because the amount of datapoint mappings between MBUS and MODBUS is limited like the amount of MODBUS registers. e.g. The RESI-MBUS64-SIO can handle 1200 MODBUS registers but only 600 MBUS datapoints in total.
- **MBUS datatype**: Here you will see the used data type in the MBUS frame.
- MB datatype: Here you will find the MODBUS data type to map the MBUS data type to MODBUS register.
- Content: here you will see the name of the datapoint. This name will be build automatically with the additional information in the MBUS data (DIF+VIF fields). But it can be changed manually to user data.
- MBUS data: Here you can see in which record and on which offset within this record the MBUS data was found. The writing is <record>-<offset> in Bytes. This describes the location in the variable data structure of the MBUS data frame.
- MBUS size: This column shows the current size of the MBUS data in bytes.
- MBUS exponent: This column shows the exponent of the MBUS value, how it is defined in the MBUS data due to the DIF+VIF fields.
- **MB exponent**: This column shows the user defined exponent to shift the value in MODBUS registers.



43.10.8.7 HOWTO delete datapoints for a meter configuration

Since every MBUS datapoint needs mapping space in the MODBUS registers and the MODBUS registers are limited in the gateway, it makes sense to configure only those datapoints, which are necessary for your application. IN our example we don't want to read the storage values defined by storage number S:1. So we select all lines with this items (Use the pressed Control key and the mouse to do a multiselect on the grid), and the we delet the selected datapoints from the list by pressing the button Delete datapoint.

Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent
)	INT32	FLOAT32	Volume:10^-3 m ^e	1-2	4	-3	0
	INT32	FLOAT32	Volume:10^-3 ms-Accumulation of abs value only if negative cont	1-9	4	-3	0
)	INT32	UINT32	On time:hours	1-15	4	0	0
	INT16	FLOAT32	Volume flow:10^-3 m ^o /h	1-21	2	-3	0
	INT8	FLOAT32	External temperature:10^0 *C	1-25	1	0	0
5	INT16	FLOAT32	Volume flow:10^-3 m³/h	1-28	2	-3	0
6	INT16	FLOAT32	Volume flow:10^-3 mº/h	1-32	2	-3	0
,	INT8	FLOAT32	External temperature:10^0 °C	1-36	1	0	0
}	INT8	FLOAT32	External temperature:10^0 *C	1-39	1	0	0
3	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature	1-44	1	0	0
0	INT32	DATE_TIME_T	Time&Date data type F	1-47	4	0	0
1	INT32	FLOAT32	Volume:10^-3 m*[U:0,T:0,S:1]	1-53	4	-3	0
2	INT16	FLOAT32	Volume flow:10^-3 m ^e /h[U:0,T:0,S:1]	1-59	2	-3	0
3	INT16	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1]	1-63	2	-3	0
4	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-67	1	0	0
5	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-70	1	0	0
6	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature[U:0,T	1-75	1	0	0
7	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-78	2	0	0
8	IN 1 16	UINTIB	Into code	1-83	2	U	U
9	INT48	UINT64	Config number	1-88	6	0	0
20	INT16	UINT16	Meter type	1-97	2	0	0
21	INT16	UINT16	Firmware version	1-102	2	0	0

Your new list will look like this. If you download this configuration, only the desired datapoints are mapped to the MODBUS registers. The gateway requests only as much MBUS frames as necessary for mapping all values to the MODBUS registers.

Index MBUS dataty MB datatype Content MBUS data MBUS size MBUS exponent MB e							
Index					MBUS size		MB exponent
0	INT32	FLOAT32	Volume:10^-3 m ^e	1-2	4	-3	0
1	INT32	FLOAT32	Volume:10^-3 ma-Accumulation of abs value only if negative cont	1-9	4	-3	0
2	INT32	UINT32	On time:hours	1-15	4	0	0
3	INT16	FLOAT32	Volume flow:10^-3 m ^s /h	1-21	2	-3	0
4	INT8	FLOAT32	External temperature:10^0 °C	1-25	1	0	0
5	INT16	FLOAT32	Volume flow:10^-3 m [*] /h	1-28	2	-3	0
6	INT16	FLOAT32	Volume flow:10^-3 mº/h	1-32	2	-3	0
7	INT8	FLOAT32	External temperature:10^0 °C	1-36	1	0	0
8	INT8	FLOAT32	External temperature:10^0 °C	1-39	1	0	0
3	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature	1-44	1	0	0
10	INT32	DATE_TIME_T	Time&Date data type F	1-47	4	0	0
18	INT16	UINT16	Info code	1-83	2	0	0
19	INT48	UINT64	Config number	1-88	6	0	0
20	INT16	UINT16	Meter type	1-97	2	0	0
21	INT16	UINT16	Firmware version	1-102	2	0	0



But be aware, that you have changed your MODBUS register list also with this action:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	CL
4x00001	INT32[4]	FLOAT32	Volume:10^-3 m°	0	???	??
4x00003	INT32[4]	FLOAT32	Volume:10^-3 m ^e -Accumulation of abs value only if negative contri	bi 1	???	??
4x00005	INT32[4]	UINT32	On time:hours	2	???	??
4x00007	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	3	???	??
4x00009	INT8[1]	FLOAT32	External temperature:10^0 °C	4	???	??
4x00011	INT16[2]	FLOAT32	Volume flow:10^-3 m ^o /h	5	???	??
4x00013	INT16[2]	FLOAT32	Volume flow:10^-3 m ^o /h	6	???	??
4x00015	INT8[1]	FLOAT32	External temperature:10^0 °C	7	???	??
4x00017	INT8[1]	FLOAT32	External temperature:10^0 *C	8	???	??
4x00019	INT8[1]	FLOAT32	External temperature:10^0 *C-Average media temperature	9	???	??
4x00021	INT32[4]	DATE_TIME_	Time&Date data type F	10	???	??
4x00023	INT16[2]	UINT16	Info code	18	???	??
4x00024	INT48[6]	UINT64	Config number	19	???	??
4x00028	INT16[2]	UINT16	Meter type	20	???	??
4x00029	INT16[2]	UINT16	Firmware version	21	???	??
4x00030	VAR LENGTH[18]	ASCII	Manufacturer	0	???	??
4x00040	VAR LENGTH[8]	ASCII	Model/version	1	???	??
4x00045	VAR LENGTH[7]	ASCII	Firmware version	2	???	??
4x00049	INT24[3]	UINT32	Error flags (binary)	3	???	??
4x00051	FLOAT32[4]	FLOAT32	Current 10^0A-L1 phase value	4	???	??
4x00053	FLOAT32[4]	FLOAT32	Current 10 ⁰ 0A-L2 phase value	5	???	??
4x00055	FLOAT32[4]	FLOAT32	Current 10^0A-L3 phase value	6	???	??
4x00057	FLOAT32[4]	FLOAT32	Current 10 ⁰ 0A-Average current	7	???	??
4x00059	FLOAT32[4]	FLOAT32	Voltage 10 [°] 0V-L1-L2	8	???	??
4x00061	FLOAT32[4]	FLOAT32	Voltage 10 [°] 0V-L2-L3	9	???	??
4x00063	FLOAT32[4]	FLOAT32	Voltage 10 [°] 0V-L3-L1	10	???	??
4x00065	FLOAT32[4]	FLOAT32	Voltage 10^0V-Voltage L-L average	11	???	??
4x00067	FLOAT32[4]	FLOAT32	Voltage 10^0V-L1 phase value	12	???	??
4x00069	FLOAT32[4]	FLOAT32	Voltage 10^0V-L2 phase value	13	???	??
4x00071	FLOAT32[4]	FLOAT32	Voltage 10^0V-L3 phase value	14	???	??

43.10.8.8 HOWTO refresh datapoints for a meter configuration

So if you have deleted some datapoints for one meter and you want to restore the original mapping from the meter, you can simple press the button "Read meter data". It will scan all MBUS datapoints of the selected meter again and refresh the list:

Comm	non M-Bus slav	e settings							
<u>C</u> hange	e primary addres:	<u>R</u> ead meter data							
Slave name: Meter 2		Meter 2							
Priman/address			address: 2 Current meter status: er address (hex): 20716229 2C2D 1D 16 No error 16,0x10 Temporary error						
		Manufacturer r	ame: KAM						
Poll pre	e delay 1: 65535	Poll rep	eats 1: 65535						
Poll pre	e delay 2: 65535	Poll rep	eats 2: 65535						
	st delay 1: 65535								
Poll po	st delay 2: 65535								
Datap	ninto								
Datap	JUIIIIIS								
Add dat	tapoint <u>D</u> elete da	atapoint Add <u>f</u> rom c	atabase Add to database						
Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent		
0	INT32	FLOAT32	Volume:10^-3 m ^e	1-2	4	-3	0		
1	INT32	FLOAT32	Volume:10^-3 m ^a -Accumulation of abs value only if negative cont	1-9	4	-3	0		
2	INT32	UINT32	On time:hours	1-15	4	0	0		
3	INT16	FLOAT32	Volume flow:10^-3 m³/h	1-21	2	-3	0		
4	INT8	FLOAT32	External temperature:10^0 °C	1-25	1	0	0		
5	INT16	FLOAT32	Volume flow:10^-3 m²/h	1-28	2	-3	0		
6	INT16	FLOAT32	Volume flow:10^-3 mº/h	1-32	2	-3	0		
7	INT8	FLOAT32	External temperature:10^0 °C	1-36	1	0	0		
8	INT8	FLOAT32	External temperature:10^0 *C	1-39	1	0	0		
9	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature	1-44	1	0	0		
10	INT32	DATE TIME T	Time&Date data type F	1-47	4	0	0		
11	INT32	FLOAT32	Volume:10^-3 mº[U:0,T:0,S:1]	1-53	4	-3	0		
12	INT16	FLOAT32	Volume flow:10^-3 m³/h[U:0,T:0,S:1]	1-59	2	-3	0		
13	INT16	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1]	1-63	2	-3	0		
14	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-67	1	0	0		
15	INT8	FLOAT32	External temperature:10^0 *C[U:0,T:0,S:1]	1-70	1	0	0		
16	INT8	FLOAT32	External temperature:10^0 *C-Average media temperature[U:0,T	1-75	1	0	0		
17	INT16	DATE TYP G	Date data type G[U:0,T:0,S:1]	1-78	2	0	0		
18	INT16	UINT16	Info code	1-83	2	0	0		
19	INT48	UINT64	Config number	1-88	6	0	0		
20	INT16	UINT16	Meter type	1-97	2	0	0		
21	INT16	UINT16	Firmware version	1-102	2	0	0		



43.10.8.9 HOWTO modify MBUS datapoint mapping manually

The MODBUSConfigurator software will try to map the MBUS data types automatically to correct MODBUS data types and MODBUS registers. But you can also modify this mapping. Double click onto an item in the data grid, you will see the following dialog:

Edit M-Bus datapoint			— X
Index:	3	MBUS record:	1
MBUS Datatype:	INT16	MBUS data index:	21
MODBUS Datatype:	FLOAT32	MBUS size:	2
Content:	Volume flow:10^-3 mº/h		
MBUS Exponent:	10*-3		
MODBUS Exponent:	10*0		
🗸 ок			X Cancel

Basically it is the data grid line in an editable version. You can change the content description here. Or you can change the MODBUS data type here. If you really add MBUS data frames manually you can also edit the MBUS data type, the MBUS exponent, the MBUS record number, the MBUS data index and the MBUS size in here to define the exact location of the MBUS data within the MBUS data frame.

Usually you will change the MODBUS exponent and or the MODBUS data type. Lets do a sample configuration change:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Metername
4x00001	INT32[4]	FLOAT32	Volume:10^-3 mº	0	MSW:0000.0000:LSW	0.0000.0.000000000000000E+0	Meter 2 [P:2]
4x00003	INT32[4]	FLOAT32	Volume:10^-3 mº-Accumulation of abs value only if negative contribution	1	MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Meter 2 [P:2]
4×00005	INT32[4]	UINT32	On time:hours	2	MSW:0000,1183:LSW	4483,0x00001183	Meter 2 [P:2]
4x00007	INT16[2]	FLOAT32	Volume flow:10 ⁻³ m [*] /h	3	MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Meter 2 [P:2]
4x00009	INT8[1]	FLOAT32	External temperature:1010 °C	4	MSW:41E0,0000.LSW	28.0000,2.8000000000000E+1	Meter 2 [P.2]
4x00011	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	5	MSW:0000.0000:LSW	0.0000.0.000000000000000E+0	Meter 2 [P:2]
4x00013	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	6	MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Meter 2 [P:2]
4x00015	INT8[1]	FLOAT32	External temperature:10°0 °C	7	MSW:41B8,0000:LSW	23.0000,2.30000000000000E+1	Meter 2 [P:2]
4-00017	IK FTOF13	E 04T22	Esternal immediate 1000 to	0	MENT 41ED 00001 BIM	38 0000 2 000000000000000 . 1	Makar 9 (D-9)

As you can see from the live data, the external temperature is currently 28°C. Our automatic mapping algorithm maps the MBUS data type INT8 (8 bit SIGNED INTEGER) to a FLOAT32 using two consecutive MODBUS registers, because we try to show on the MODBUS side the correct value with the correct exponent. But in this special case a standard Holding register will be enough.

Edit M-Bus datapoint			—
Index:	4	MBUS record:	1
MBUS Datatype:	INT8	✓ MBUS data index:	25
MODBUS Datatype:	FLOAT32	▼ MBUS size:	1
Content:	External temperature:10^0 °C		
MBUS Exponent:	10*0		
MODBUS Exponent:	10*0		
🗸 ОК			X Cancel



So we change the configuration from FLOAT32 to SINT16 to map the value into a single holding register. This saves register space and it also increases the conversion accuracy to 100%, because INT8 to SINT16 is as loss free conversation in comparison to INT8 to FLOAT32 is not a loss free conversation, because the FLOAT32 format is too inaccurate to show in all cases the real INT8 value.

So we do the following changes, then we download the configuration and test it:

Edit M-Bus datapoint			×
Index:	4	MBUS record:	1
MBUS Datatype:	INT8	MBUS data index:	25
MODBUS Datatype:	SINT16	MBUS size:	1
Content:	External temperature:10^0 °C		
MBUS Exponent:	10*0		
MODBUS Exponent:	10*0		
• ОК			X Cancel

The result will be like this:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Meter name
4x00001	INT32[4]	FLOAT32	Yolume:10^-3 m ²	0	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4x00003	INT32[4]	FLOAT32	Volume:10^-3 mº-Accumulation of abs value only if negative contribution	.1	MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Meter 2 [P:2]
4x00005	INT32[4]	UINT32	On time:hours	2	MSW:0000,1183:LSW	4483,0x00001183	Meter 2 [P:2]
4x00007	INT16[2]	FLOAT32	Yolume flow:10 ⁻³ m ⁹ /h	3	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4x00009	INT8[1]	SINT16	External temperature:10°0 °C	4	W0RD:0018	28.0x001C	Meter 2 [P:2]
4x00010	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	5	MSW:0000.0000:LSW	0.0000.0.00000000000000E+0	Meter 2 [P:2]
4x00012	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	6	MSW:0000.0000:LSW	0.0000.0.000000000000000E+0	Meter 2 [P:2]
4x00014	INT8[1]	FLOAT32	External temperature:10°0 °C	7	MSW:41B8.0000:LSW	23.0000,2.3000000000000E+1	Meter 2 [P:2]

Please note also, that the next MBUS datapoint starts not longer in the register 4x00011, It starts now in the register 4x00010. So we saved really one register.

Now we define, that your host can handle only temperatures with one comma. This means the 28°C should be stored as 280 in the holding register. For that we change the MODBUS exponent field to -1 to shift the result by 10:

Edit M-Bus datapoint			
Index:	4	MBUS record:	1
MBUS Datatype:	INT8	 MBUS data index: 	25
MODBUS Datatype:	SINT16	 MBUS size: 	1
Content:	External temperature:10^0 °C		
MBUS Exponent:	10*0		
MODBUS Exponent:	10*-1		
ОК			X Cancel



Now we get this result in test mode:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Meter name
4x00001	INT32[4]	FLOAT32	Volume:10 ⁻³ m ^o	0	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4×00003	INT32[4]	FLOAT32	Volume:10^-3 m ² -Accumulation of abs value only if negative contribu-	1	MSW:0000.0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4x00005	INT32[4]	UINT32	On time:hours	2	MSW:0000,1184:LSW	4484.0x00001184	Meter 2 [P:2]
4x00007	INT16[2]	FLOAT32	Volume flow:10^-3 m*/h	3	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4x00009	INT8[1]	SINT16	External temperature:10^0 *C->*10^-1	4	WORD:0018	280,0x0118	Meter 2 [P:2]
4x00010	INT16[2]	FLOAT32	Volume flow:10^-3 m*/h	5	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Meter 2 [P:2]
4x00012	INT16[2]	FLOAT32	Volume flow:10^-3 mº/h	6	MSW:0000,0000:LSW	0.0000.0.000000000000000E+0	Meter 2 [P:2]
4x00014	INT8[1]	FLOAT32	External temperature:10^0 *C	7	MSW:41B8,0000:LSW	23.0000,2.3000000000000E+1	Meter 2 [P:2]

43.11 HOWTO save datapoints to user specific meter database

Our software offers the possibility to save a current meter setup to a user database for future use. Therefore select the desired meter in the project tree and click on the button Add to database...

Comr	non M-Bus slav	e settings						
<u>C</u> hange	e primary address	<u>R</u> ead meter dat	ta					
Slave	name: essing mode	Meter 0636 Primary me	4163_4CA3_18_02	253 Current n				
C Primany addroses				neter status:				
	econdary address	Secondary	meter address (hex):	06364163 4CA3 18 02 No error				
	contactly address	Meter status	3;	0,0x00				
		Manufacture	ar name:	SEC				
D-11								
	e delay 1: 65535		epeats 1:	65535				
Poll pr	e delay 2: 65535	Poll r	epeats 2:	65535				
Poll po	st delay 1: 65535							
	ost delay 2: 65535							
. on pe								
Data	points							
Add da	ttapoint <u>D</u> elete d	atapoint Add fror	n database. Add to d	atabase				
Index	MBUS dataty	MB datatype	Content		MBUS data	MBUS size	MBUS exponent	MB exponent
0	LVAR:ASCII	ASCII	Manufacturer		1-4	18	0	0
1	LVAR:ASCII	ASCII	Model/version		1-26	8	0	0
2	LVAR:ASCII	ASCII	Firmware version		1-38	7	0	0
3	INT24	UINT32	Error flags (binary)		1-48	3	0	0
4	FLOAT32	FLOAT32	Current10^0A-L1 p		1-56	4	0	0
5	FLOAT32	FLOAT32	Current 10 ⁰ A-L2 p		1-65	4	0	0
6	FLOAT32	FLOAT32	Current 10 ⁰ A-L3 p	hase value	1-74	4	0	0
7	FLOAT32	FLOAT32	Current 10 [^] 0A-Ave		1-83	4	0	0
8	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-		1-92	4	0	0
9	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-	_3	1-101	4	0	0
10	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3-	_1	1-110	4	0	0
11	FLOAT32	FLOAT32	Voltage 10 [^] 0V-Vol	tage L-L average	1-119	4	0	0
12	FLOAT32	FLOAT32	Voltage 10 [^] 0V-L1	phase value	1-128	4	0	0
13	FLOAT32	FLOAT32	Voltage 10 [^] 0V-L2	phase value	1-137	4	0	0
14	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3	phase value	1-146	4	0	0
15	FLOAT32	FLOAT32	Voltage 10 [^] 0V-L-N	average	1-155	4	0	0
16	FLOAT32	FLOAT32	Power:10^3 W-L1 p	hase value	1-163	4	3	0
17	FLOAT32	FLOAT32	Power:10^3 W-L2 p	hase value	1-171	4	3	0
18	FLOAT32	FLOAT32	Power:10^3 W-L3 p	hase value	1-179	4	3	0
19	FLOAT32	FLOAT32	Power:10 [^] 3 W		1-185	4	3	0
20	FLOAT32	FLOAT32	Power:10^3 W[U:1,	T:0,S:0]	1-192	4	3	0
21	FLOAT32	FLOAT32	Power:10^3 W[U:2,		1-200	4	3	0
22	FLOAT32	FLOAT32	Power Factor		1-207	4	0	0
23	FLOAT32	FLOAT32	Frequency		1-214	4	0	0
24	INT64	UINT64	Energy:10 [°] 0 Wh		1-220	8	0	0
						-	-	

You will see the following dialog:

🤐 Choose manufacturer	
Choose existing manufacturer:	_
C Add new manufacturer:	MY MANUFACTURER
Meter caption:	Meter 06364163_4CA3_18_02
	✓ OK X Cancel



Either choose an existing manufacturer from the drop down list or set the radio button to the Add new manufacturer section and enter a new manufacturer name. In our example we choose the name MY MANUFACTURER and the meter name MY METER and we press the OK button. All your defined datapoints for this meter are stored in the user specific database and the meter is added to the user specific database for meter templates.

🚧 Choose manufacturer	
C Choose existing manufacturer:	v
 Add new manufacturer: 	MY MANUFACTURER
Meter caption:	MY METER
	🗸 OK 🔀 Cancel

43.12 HOWTO add a complete meter from the database

You can add meter mappings manually to your gateway from previous saved own meters or form our general meter database. First you need a MBUS gateway in your project. Click on the project tree to select the MBUS gateway:

RESI'S MODBUS Configurator VI.10.3.1 - [Unnam	Local COM port settings
	Modbus unit: 255 Device: COM8 Stopbits 1 stopbit IP-Address:
	Baudrate: 57600 Parity: NONE Port:
 ⊕_{PRJ} ⊖_{PRJ} □ □ □ New Project □ □ □ P RESI-MBUS64-SIO - [RESI-MBUS6 	Baudrate: 57600 Parity: NONE Port: Device specific
Now click on the button Add	to project: A dialog will open and show all meters from the general me

Bus slave	Avai	lable datapoin	ts				
RESI database	Index	MBUS datatype	MB datatype	Content	MBUS data	MBUS exponent	MB exponent
- SCHNEIDER ELECTRIC	V 0	LVAR:ASCII	ASCII	Manufacturer	1-4	18	0
E iEM3135	I 1	LVAR:ASCII	ASCII	Model/version	1-26	8	0
User database	2	LVAR:ASCII	ASCII	Firmware version	1-38	7	0
SCHNEIDER ELECTRIC	∀ 3	INT24	UINT32	Error flags (binary)	1-48	3	0
- E TEST	✓ 4	FLOAT32	FLOAT32	Current 10^0A-L1 phase value	1-56	4	0
🖬 iEM3135		FLOAT32	FLOAT32	Current 10^0A-L2 phase value	1-65	4	0
E iEM3135	✓ 6	FLOAT32	FLOAT32	Current 10^0A-L3 phase value	1-74	4	0
E iEM3135	7	FLOAT32	FLOAT32	Current 10^0A-Average current	1-83	4	0
	8	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2	1-92	4	0
MULTICAL 66W2		FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3	1-101	4	0
E flowIQ 3100	1 0	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3-L1	1-110	4	0
-	1 1	FLOAT32	FLOAT32	Voltage 10^0V-Voltage L-L av	1-119	4	0
AQUA METRO	12	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1 phase value	1-128	4	0
CALEC MB	✓ 13	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2 phase value	1-137	4	0
CALEC MB	☑ 14	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3 phase value	1-146	4	0
SONTEX	I 15	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L-N average	1-155	4	0
- E Supercal 539	1 6	FLOAT32	FLOAT32	Power:10^3 W-L1 phase value	1-163	4	3
- E Supercal 539	17	FLOAT32	FLOAT32	Power:10^3 W-L2 phase value	1-171	4	3
Supercal 539	✓ 18	FLOAT32	FLOAT32	Power:10^3 W-L3 phase value	1-179	4	3
- E Supercal 539	☑ 19	FLOAT32	FLOAT32	Power:10 ³ W	1-185	4	3
Supercal 739	20	FLOAT32	FLOAT32	Power:10^3 W[U:1,T:0,S:0]	1-192	4	3
- E Supercal 739	21	FLOAT32	FLOAT32	Power:10^3 W[U:2,T:0,S:0]	1-200	4	3
- E MULTICAL 739	22	FLOAT32	FLOAT32	Power Factor	1-207	4	0
SUPERCAL 531	23	FLOAT32	FLOAT32	Frequency	1-214	4	0
SUPERCAL 531	24	INT64	UINT64	Energy:10 ⁰ Wh	1-220	8	0
D HAGER							
ECM310D							

Select the meter MY MANUFACTURER/MY METER like shown above. Note the checkbox beside the datapoint index: Only the datapoints selected in this list are added to the gateway. You can change the selection status by clickin onto the checkbox for each datapoint. If you do a right click in the area of the data grind with the MBUS datapoints you will see a drop down menu with the two options Select all and Deselect all for fast selection/deselection of all datapoints.

In our sample we deselect two datapoints:

RESI database	Index	MBUS datatype	MB datatype	Content	MBUS data	MBUS exponent	MB exponent
SCHNEIDER ELECTRIC	V 0	LVAR:ASCII	ASCII	Manufacturer	1-4	18	0
iEM3135	I 1	LVAR:ASCII	ASCII	Model/version	1-26	8	0
User database	2	LVAR:ASCII	ASCII	Firmware version	1-38	7	0
SCHNEIDER ELECTRIC	✓ 3	INT24	UINT32	Error flags (binary)	1-48	3	0
- E TEST	☑ 4	FLOAT32	FLOAT32	Current 10^0A-L1 phase value	1-56	4	0
🖬 iEM3135	. 5	FLOAT32	FLOAT32	Current 10^0A-L2 phase value	1-65	4	0
- E iEM3135	✓ 6	FLOAT32	FLOAT32	Current 10^0A-L3 phase value	1-74	4	0
E iEM3135	₹7	FLOAT32	FLOAT32	Current 10^0A-Average current	1-83	4	0
	₩ 8	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2	1-92	4	0
MULTICAL 66W2	9	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3	1-101	4	0
I flowIQ 3100	✓ 10	FLOAT32	FLOAT32	Voltage 10 ⁰ V-L3-L1	1-110	4	0
	✓ 11	FLOAT32	FLOAT32	Voltage 10^0V-Voltage L-L av	1-119	4	0
	✓ 12	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1 phase value	1-128	4	0
	✓ 13	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2 phase value	1-137	4	0
	✓ 14	FLOAT32	FLOAT32	Voltage 10^0V-L3 phase value	1-146	4	0
	✓ 15	FLOAT32	FLOAT32	Voltage 10^0V-L-N average	1-155	4	0
Supercal 539	✓ 16	FLOAT32	FLOAT32	Power:10^3 W-L1 phase value	1-163	4	3
E Supercal 539	✓ 17	FLOAT32	FLOAT32	Power:10^3 W-L2 phase value	1-171	4	3
 Supercal 539 	✓ 18	FLOAT32	FLOAT32	Power:10^3 W-L3 phase value	1-179	4	3
- E Supercal 539	✓ 19	FLOAT32	FLOAT32	Power:10 ³ W	1-185	4	3
E Supercal 739	20	FLOAT32	FLOAT32	Power:10^3 W[U:1,T:0,S:0]	1-192	4	3
- E Supercal 739	21	FLOAT32	FLOAT32	Power:10^3 W[U:2,T:0,S:0]	1-200	4	3
E MULTICAL 739	22	FLOAT32	FLOAT32	Power Factor	1-207	4	0
SUPERCAL 531	23	FLOAT32	FLOAT32	Frequency	1-214	4	0
SUPERCAL 531	24	INT64	UINT64	Energy:10 [°] 0 Wh	1-220	8	0
D HAGER							
ECM310D							
- ECM310D							
MY MANUFACTURER							
MYMETER							



Now we click on the OK button. You should see the following result:

Device spe	ecific						
Dow							
	nioad corrig	est connection	O Test				
RESIMBUS	54.510		MBUS to MODBUS/RTU converter for 54 me	otore (1200 remistere)			
		1		sona (recorregiedere)			
Software ver	aon: 5.0.0						
State		no error					
Search M-B.	is slaves. Sgarch M-Bu	is eleves via serie	Seve CSV file Epsse configuration Application Reset A	Agtivate LEVEL converter De	activate LEVEL converte	r	
-MODBUS-			MEUS		_		
Address: 2	255 V Parity.	NONE -					
Baudrate: 0	(7600 x Stoot)	Is 1 stopbit 💌	End 251 Query imegut 65535 Pol	l śmeout 85535			
MBBagister		MB detetype		MBUS index	MB value HEX	Current MB value	Metername
4x00001 4x00011	LVAR ASCI[19] LVAR ASCI[19]		Manufacturer	0	222	222	MY METER (S:02184CA30636 Avail JETER (S:02184CA30636
4x00016	LVAR ASCI[7]		Model/version Firmware version		777	222	MY METER [S:02104CA30636 MY METER [S:02104CA30636
4x00020	INT24[3]		Error flags (binary)	3	777	222	MY METER [5:02104CA30636 MY METER [5:02104CA30636
4x00022	FLOAT32[4]		Current 10°0A-L1 phase value	4	777	222	MY METER [5:02104CA30636
4x00024	FLOAT32M		Carrent 10"0AL2 phase value	5	777	222	MY METER [\$:02104CA30636
4x00026	FLOAT32141		Carrent 10"0A-L3 phase value	0	777	222	MY METER [5:02164CA30636 MY METER [5:02164CA30636
4x00028	FLOAT32[4]		Carrent 10 OV-L3 priese value Carrent 10 OA-Average current	7	777	222	MY METER [5:02104CA30632 MY METER [5:02104CA30632
4x00030	FLOAT32[4]		Voltage 10°0V-L1-L2	8	222	177	MY METER [S:02184CA30636 MY METER [S:02184CA30636
4x00032	FLOAT32[4]		Voltage 10°0V-L2-L3	3	777	222	MY METER (\$102184CA30636
4x00032			Voltage 10 0V-L2-L3 Voltage 10 0V-L3-L1	10	777	222	
	FLOAT32[4]			11	777	222	MY METER [5.02184CA30635
4×00036	FLOAT32[4]		Voltage 10°0V-Voltage L-Laverage	12	777	202	MY METER [S:02184CA30638
4×00038 4×00040	FL0AT32[4] FL0AT32[4]		Voltage 10°0V-L1 phase value	13	799	322	MY METER [S:02184CA30638
4x00040			Voltage 10°0V-L2 phase volue	14	797	322	MY METER [S:02184CA30638
4x00042	FLOAT32[4] FLOAT32[4]		Voltage 10°0V-L3 phase volue Voltage 10°0V-L-N overage	15	222	328	MY METER [S:02184CA30638 MY METER [S:02184CA30638
4x00046	FLOAT32[4]				224	333	
4x00046			Power1013 W-L1 phose volue		222	202	MY METER [S:02184CA3063]
	FLOAT32[4]		Power10"3 WH2 phose volue		299	202	MY METER [S:02184CA30639
4x00050 4x00052	FLOAT32[4] FLOAT32[4]		Power1013 W4.3 phose volue Power1013 W		299	202	MY METER [S:02184CA3063 MY METER [S:02184CA3063
4x00054			PowerTura w PowerFector		222	222	
4x00056	FLOAT32[4]		Power-Factor Fracuency	22	222	229	MY METER [S:02184CA30638
4x00056	FLOAT32[4] INTE4[6]		Energy:1010 Wh	24	777	222	MY METER [S:02104CA3063 MY METER [S:02104CA3063
<xuusid< td=""><td>Inf 164[0]</td><td>UINT 64</td><td>Energy: e .e.vn</td><td>24</td><td></td><td>m</td><td>MY METER [2:02104CA3063</td></xuusid<>	Inf 164[0]	UINT 64	Energy: e .e.vn	24		m	MY METER [2:02104CA3063
4x09001	RESI	UINT16	Converter state for meter	STATE	777	222	MY METER [S:02104CA3063]
4x09002	HEADER		Identification number of mater	D	222	222	MY METER [5:0210/CG0038
Absodz.	- nevern	Sinn sen	nan na anna an ann an an an an an an an				A THE PERIOD PROVIDED BY
4x10001	HEADER	UINT32	Identification number of meter	D	222	111	MY METER [S:02184CA30638
4x10003	HEADER		Manufacturer of meter	MANUFACTURER		111	MY METER IS:02184CA30638
4x10005	HEADER		Version of meter	VERSION	222	111	MY METER [S:02184CA30638
4x10006	HEADER		Medium of meter	MEDIUM	222	222	MY METER [S:02184CA30635
4x10007	HEADER		Access of meter	ACCESS	777	222	MY METER [S:02184CA30635
4×10008	HEADER		Status of meter	STATUS	777	222	MY METER [S:02184CA30635
	RESI		Future volue of meter	FUTURE	222	333	MY METER IS:02184CA30638
4x10009							

Click in the project tree on the meter MY METER to change the individual parameters for the selected meter. Adopt the addressing mode, the meter name and the other parameters of the meter, so that your gateway can communicate with this meter.

Comm	non M-Bus slav	e settings								
Change	e primary address	s <u>R</u> ead meter data								
Addre Pri C Se Poll pre Poll po Poll po Poll po Datap	Slave name: My first meter Addressing mode Primary meter address: 1 Primary address Secondary meter address (hex): 06364163 4CA3 18 02 Meter status: 0.0x00 Manufacturer name: SEC No error Poll pre delay 1: 65535 Poll repeats 1: 2 Poll post delay 2: 65535 Poll repeats 2: 3									
<u>A</u> dd dat	. –		database Add to dat	abase						
Index	MBUS dataty	MB datatype	Content		MBUS dat		MBUS exponent	MB exponent		
0	LVAR:ASCII	ASCII	Manufacturer		1-4	18	0	0		
1	LVAR:ASCII	ASCII	Model/version		1-26	8	0	0		
2	LVAR:ASCII	ASCII	Firmware version		1-38	7	0	0		
3	INT24	UINT32	Error flags (binary)		1-48	3	0	0		
4	FLOAT32	FLOAT32	Current 10 ⁰ A-L1 pha		1-56	4	0	0		
5	FLOAT32	FLOAT32	Current 10 ⁰ A-L2 pho	ase value	1-65	4	0	0		
6	FLOAT32	FLOAT32	Current 10 [^] 0A-L3 pha	ase value	1-74	4	0	0		
7	FLOAT32	FLOAT32	Current 10 [^] 0A-Avera	ge current	1-83	4	0	0		
8	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2		1-92	4	0	0		
9	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3		1-101	4	0	0		
10	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3-L1		1-110	4	0	0		
11	FLOAT32	FLOAT32	Voltage 10 [°] 0V-Volta	ge L-L average	1-119	4	0	0		
12	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1 ph	ase value	1-128	4	0	0		
13	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2 ph	ase value	1-137	4	0	0		
14	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3 ph	ase value	1-146	4	0	0		
15	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L-N a	verage	1-155	4	0	0		
16	FLOAT32	FLOAT32	Power:10^3 W-L1 ph		1-163	4	3	0		
17	FLOAT32	FLOAT32	Power:10 [^] 3 W-L2 ph		1-171	4	3	0		
18	FLOAT32	FLOAT32	Power:10^3 W-L3 ph		1-179	4	3	0		
19	FLOAT32	FLOAT32	Power:10^3 W		1-185	4	3	0		
22	FLOAT32	FLOAT32	Power Factor		1-207	4	0	0		
23	FLOAT32	FLOAT32	Frequency		1-214	4	0	0		
24	INT64	UINT64	Energy:10 [°] 0 Wh		1-220	8	0	0		



43.13 HOWTO add meter datapoints to an existing meter

You can add individual datapoints to an existing meter in your configuration. First select the meter in your project tree, where you want to add a datapoint. Then click on the button Add from database and select a meter template with the desired datapoints. In our case we select the meter MY METER. Then we deselect all datapoint by doing a right click on the data grid and choose the menu Deselect all. Then we select the two datapoints and click the OK button.

	e primary addres	s <u>B</u> ead meter data							
Slave name: My first meter									
Addressing mode Primary address Secondary address Meter status: Manufacturer name;		1 Current meter status: 06364163 4CA3 18 02 0.0x00 SEC SEC							
Pall p	e delay 1: 65539		2						
	e delay 1: 6553: e delay 2: 6553:		3						
	e delay 2: 6553: st delay 1: 6553:	·	3						
	ist delay 1: 6553: ist delay 2: 6553:								
Poli pi	ist delay 2: 6553:	>							
Data	points								
dd da	tannint. Delete r	datapoin Add from database Add to d	atahasa						
-		M-Bus meter database	0.000000						
D	LVAR:ASCI	vi-bus meter tratabase							
	LVAR:ASCII	M-Bus slave	Avai	able datapoint	\$				
1	LVAR:ASCII INT24				La conces	-			
4	FLOAT32	RESI database SCHNEIDER ELECTRIC	Index	MBUS datatype	MB datatype ASCII	Content	MBUS data 1-4	MBUS exponent 18	MB exponent
	FLOAT32	■ iEM3135		LVAR:ASCII	ASCII	Manufacturer Model/version	1-4	8	0
	FLOAT32	User database	2	LVAR:ASCII	ASCII	Firmware version	1-38	7	0
	FLOAT32 FLOAT32	B-D SCHNEIDER ELECTRIC		INT24	UINT32	Error flags (binary)	1-48	3	0
	FLOAT32 FLOAT32	E TEST	4	FLOAT32	FLOAT32	Current 10 [°] 0A-L1 phase value	1-56	4	0
0	FLOAT32	E iEM3135		FLOAT32	FLOAT32	Current 10^0A-L2 phase value	1-65	4	0
1	FLOAT32	- E iEM3135		FLOAT32	FLOAT32	Current 10^0A-L3 phase value	1-74	4	0
2	FLOAT32	E iEM3135	□ 7	FLOAT32	FLOAT32	Current 10 [^] 0A-Average current	1-83	4	0
3	FLOAT32		8	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2	1-92	4	0
4	FLOAT32	MULTICAL 66W2	9	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3	1-101	4	0
5	FLOAT32	E flowIQ 3100	10	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L3-L1	1-110	4	0
6	FLOAT32		11	FLOAT32	FLOAT32	Voltage 10 [°] 0V-Voltage L-L av	1-119	4	0
7	FLOAT32		12	FLOAT32	FLOAT32	Voltage 10^0V-L1 phase value	1-128	4	0
8	FLOAT32		13	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2 phase value	1-137	4	0
9	FLOAT32		14	FLOAT32	FLOAT32	Voltage 10^0V-L3 phase value	1-146	4	0
2	FLOAT32	Supercal 539	15	FLOAT32	FLOAT32	Voltage 10 [°] 0V-L-N average	1-155	4	0
3	FLOAT32	Supercal 539	16	FLOAT32	FLOAT32	Power:10^3 W-L1 phase value	1-163	4	3
4	INT64	Supercal 539	017	FLOAT32 FLOAT32	FLOAT32 FLOAT32	Power:10^3 W-L2 phase value Power:10^3 W-L3 phase value	1-171 1-179	4	3
		Supercal 539	□ 18 □ 19	FLOAT32	FLOAT 32	Power10^3 W	1-1/9	4	3
		Supercal 739	20	FLOAT32	FLOAT32	Power:10^3 W[U:1,T:0,S:0]	1-192	4	3
		Supercal 739	21	FLOAT32	FLOAT32	Power:10^3 W[U:2,T:0,S:0]	1-200	4	3
		MULTICAL 739	122	FLUAT 32	FLUAT 32	Fower Factor	1-207	4	U
		E SUPERCAL 531	23	FLOAT32	FLOAT32	Frequency	1-214	4	0
		SUPERCAL 531	24	INT64	UINT64	Energy:10^0 Wh	1-220	8	0
		HAGER							
		E ECM310D							
		ECM310D							
		B-D MY MANUFACTURER							
		I MY METER							



You will get the following result:

mmon M-Bus sla	ve settings					
nge primary addre:	s <u>R</u> ead meter dat	ta				
/e name:	My first met	er				
ldressing mode Primary address Secondary addre:	Primary met Secondary Meter status Manufacture	meter address (hex): 06364163 4CA3 18 02 1	Current meter status: No error			
pre delay 1: 6553		epeats 1: 2				
pre delay 2: 6553		epeats 2: 3				
		εμεαιο <u>2</u>				
post delay 1: 6553						
post delay 2: 6553 tapoints						
datapoint <u>D</u> elete	datapoint Add <u>f</u> ron	n database Add to database				
x MBUS dataty.	. MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent
LVAR:ASCII	ASCII	Manufacturer	1-4	18	0	0
LVAR:ASCII	ASCII	Model/version	1-26	8	0	0
LVAR:ASCII	ASCII	Firmware version	1-38	7	0	0
INT24	UINT32	Error flags (binary)	1-48	3	0	0
FLOAT32	FLOAT32	Current 10^0A-L1 phase value	1-56	4	0	0
FLOAT32	FLOAT32	Current 10^0A-L2 phase value	1-65	4	0	0
FLOAT32	FLOAT32	Current 10^0A-L3 phase value	1-74	4	0	0
FLOAT32	FLOAT32	Current 10^0A-Average current	1-83	4	0	0
FLOAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2	1-92	4	0	0
FLOAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3	1-101	4	0	0
FLOAT32	FLOAT32	Voltage 10 ⁰ V-L3-L1	1-110	4	0	0
FLOAT32	FLOAT32	Voltage 10^0V-Voltage L-L average	1-119	4	0	0
FLOAT32	FLOAT32	Voltage 10^0V-L1 phase value	1-128	4	0	0
FLOAT32	FLOAT32	Voltage 10 ⁰ V-L2 phase value	1-137	4	0	0
FLOAT32	FLOAT32	Voltage 10 ⁰ V-L3 phase value	1-146	4	0	0
FLOAT32	FLOAT32	Voltage 10 ⁰ V-L-N average	1-155	4	0	0
FLOAT32	FLOAT32	Power:10^3 W-L1 phase value	1-163	4	3	0
FLOAT32	FLOAT32	Power:10^3 W-L2 phase value	1-171	4	3	0
FLOAT32	FLOAT32	Power:10^3 W-L3 phase value	1-179	4	3	0
FLOAT32	FLOAT32	Power:10^3 W	1-185	4	3	0
FLOAT32	FLOAT32	Power Factor	1-207	4	0	0
FLOAT32	FLOAT32	Frequency	1-214	4	0	0
INT64	UINT64	Energy:10^0 Wh	1-220	8	0	0
FLOAT32	FLOAT32	Power:10^3 W[U:1,T:0,S:0]	1-192	4	3	0
FLOAT32	FLOAT32	Power:10^3 W[U:2,T:0,S:0]	1-200	4	3	0
FLOAT32 FLOAT32 INT64 FLOAT32	FLC FLC UIN FLC	DAT32 DAT32 IT64 DAT32	DAT32 Power Factor DAT32 Frequency IT64 Energy:10^0 Wh DAT32 Power:10^3 W[U:1,T:0,S:0]	DAT32 Power Factor 1-207 DAT32 Frequency 1-214 IT64 Energy:10°0 Wh 1-220 DAT32 Power:10°3 W[U:1,T:0,S:0] 1-192	DAT32 Power Factor 1-207 4 DAT32 Frequency 1-214 4 IT64 Energy:10^0 Wh 1-220 8 DAT32 Power:10^3 W[U:1,T:0,S:0] 1-192 4	DAT32 Power Factor 1-207 4 0 DAT32 Frequency 1-214 4 0 IT64 Energy:10^0 Wh 1-220 8 0 DAT32 Power:10^3 W[U:1,T:0,S:0] 1-192 4 3

Then we select the datapoints 22-24 and delete then from the meter setup, by clicking on the button Delete datapoints. Now our new setup is finished and can be downloaded into the gateway.

/AR:ASCII /AR:ASCII /AR:ASCII T24	ASCII ASCII ASCII	Manufacturer Model/version	1-4	18	0	0
/AR:ASCII		Model/version			U	0
	ASCIL		1-26	8	0	0
T24		Firmware version	1-38	7	0	0
	UINT32	Error flags (binary)	1-48	3	0	0
.OAT32	FLOAT32	Current 10 ⁰ 0A-L1 phase value	1-56	4	0	0
.OAT32	FLOAT32	Current 10 ⁰ A-L2 phase value	1-65	4	0	0
.OAT32	FLOAT32	Current 10 ⁰ A-L3 phase value	1-74	4	0	0
.OAT32	FLOAT32	Current 10 ⁰ A-Average current	1-83	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L1-L2	1-92	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L2-L3	1-101	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L3-L1	1-110	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-Voltage L-L average	1-119	4	0	0
.OAT32	FLOAT32	Voltage 10^0V-L1 phase value	1-128	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L2 phase value	1-137	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L3 phase value	1-146	4	0	0
.OAT32	FLOAT32	Voltage 10 [°] 0V-L-N average	1-155	4	0	0
.OAT32	FLOAT32	Power:10^3 W-L1 phase value	1-163	4	3	0
.OAT32	FLOAT32	Power:10^3 W-L2 phase value	1-171	4	3	0
.OAT32	FLOAT32	Power:10^3 W-L3 phase value	1-179	4	3	0
.OAT32	FLOAT32	Power:10^3 W	1-185	4	3	0
.OAT32	FLOAT32	Power:10^3 W[U:1,T:0,S:0]	1-192	4	3	0
.OAT32	FLOAT32	Power:10^3 W[U:2,T:0,S:0]	1-200	4	3	0
	OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32 OAT32	OAT32 FLOAT32 OAT32 FLOAT32	OAT32 FLOAT32 Current 10°0A-L2 phase value OAT32 FLOAT32 Current 10°0A-L3 phase value OAT32 FLOAT32 Current 10°0A-A3 phase value OAT32 FLOAT32 Current 10°0A-A phase value OAT32 FLOAT32 Current 10°0A-Average current OAT32 FLOAT32 Voltage 10°0V-L1-L2 OAT32 FLOAT32 Voltage 10°0V-L2-L3 OAT32 FLOAT32 Voltage 10°0V-L2 phase value OAT32 FLOAT32 Voltage 10°0V-L3 phase value OAT32 FLOAT32 Power:10°3 W-L2 phase value OAT32 FLOAT32 Power:10°3 W-L3 phase value OAT32 FLOAT32 <	OAT32 FLOAT32 Current 10*0A-L2 phase value 1-65 OAT32 FLOAT32 Current 10*0A-L3 phase value 1-74 OAT32 FLOAT32 Current 10*0A-Average current 1-83 OAT32 FLOAT32 Voltage 10*0V-L1-L2 1-92 OAT32 FLOAT32 Voltage 10*0V-L2-L3 1-101 OAT32 FLOAT32 Voltage 10*0V-L3-L1 1-110 OAT32 FLOAT32 Voltage 10*0V-L3-L1 1-119 OAT32 FLOAT32 Voltage 10*0V-L3-L1 1-119 OAT32 FLOAT32 Voltage 10*0V-L3-L3 1-119 OAT32 FLOAT32 Voltage 10*0V-L3 phase value 1-128 OAT32 FLOAT32 Voltage 10*0V-L3 phase value 1-128 OAT32 FLOAT32 Voltage 10*0V-L3 phase value 1-146 OAT32 FLOAT32 Voltage 10*0V-L3 phase value 1-146 OAT32 FLOAT32 Voltage 10*0V-L3 phase value 1-155 OAT32 FLOAT32 Power.10*3 W-L1 phase value 1-163 OAT32 FLOAT32	DAT32 FLOAT32 Current 10°0A-L2 phase value 1-65 4 OAT32 FLOAT32 Current 10°0A-L3 phase value 1-74 4 OAT32 FLOAT32 Current 10°0A-L3 phase value 1-74 4 OAT32 FLOAT32 Current 10°0A-Average current 1-83 4 OAT32 FLOAT32 Voltage 10°0V-L1-L2 1-92 4 OAT32 FLOAT32 Voltage 10°0V-L2-L3 1-101 4 OAT32 FLOAT32 Voltage 10°0V-L3-L1 1-110 4 OAT32 FLOAT32 Voltage 10°0V-L3 phase value 1-137 4 OAT32 FLOAT32 Voltage 10°0V-L3 phase value 1-146 4 OAT32 FLOAT32 Voltage 10°0V-L3 phase value 1-146 4 OAT32 FLOAT32 Power:10°3 W-L2 ph	DAT32 FLOAT32 Current 10°0A-L2 phase value 1-65 4 0 OAT32 FLOAT32 Current 10°0A-L3 phase value 1-74 4 0 OAT32 FLOAT32 Current 10°0A-L3 phase value 1-74 4 0 OAT32 FLOAT32 Current 10°0A-Average current 1-83 4 0 OAT32 FLOAT32 Voltage 10°0V-L1-L2 1-92 4 0 OAT32 FLOAT32 Voltage 10°0V-L2-L3 1-101 4 0 OAT32 FLOAT32 Voltage 10°0V-L3-L1 1-110 4 0 OAT32 FLOAT32 Voltage 10°0V-L3-L1 1-119 4 0 OAT32 FLOAT32 Voltage 10°0V-L3-L1 1-119 4 0 OAT32 FLOAT32 Voltage 10°0V-L3-L1 1-119 4 0 OAT32 FLOAT32 Voltage 10°0V-L3 phase value 1-137 4 0 OAT32 FLOAT32 Voltage 10°0V-L3 phase value 1-146 4 0



43.14 Table of MBUS data types

The following table shows, which MBUS data types are used and how they are processed by the gateway:

MBUS DATATYPE	SIZE	BYTE ORDER	DESCRIPTION
BCD2	8 bits 1 byte	Decimal digits HL → 0xHL	Defines an 8 bit unsigned integer value in the range of 0 to 99 stored as BCD number with encoding: Byte 0xHL: Bits 7-4: H: UPPER DIGIT as hex value 0x0 to 0x9 Bits 3-0: L: LOWER DIGIT as hex value 0x0 to 0x9
			So hex value 0x12 means decimal value 1*10+2=12 in decimal
numbers as 4 bit h representation. The the BCD number e	IBUS standard not lexadecimal charac erefore the hexade encodes a 0xF, this	cters for each digit, only t ccimal digits 0xA to 0xF a stands for a negative sig	ers are handled by our gateway. Due to the encoding of BCD he hexadecimal numbers 0x0 to 0x9 are used for the decimal re not used to represent a BCD number. If the leading digit of Jn. -123, the number 0xF123 means the decimal representation
BCD4	16 bits 2 byte	Decimal digits ABCD → 0xCD 0xAB	Defines a 16 bit unsigned integer value in the range of 0 to 9999 stored as BCD number with encoding: First byte 00xCD: Bits 7-4: C: DIGIT*10 as hex value 0x0 to 0x9 Bits 3-0: D: DIGIT*1 as hex value 0x0 to 0x9 Second byte 00xAB: Bits 7-4: A: DIGIT*1000 as hex value 0x0 to 0x9 Bits 3-0: B: DIGIT*100 as hex value 0x0 to 0x9 So hex value 0x1234 means decimal value
BCD6	24 bits 3 byte	Decimal digits ABCDEF → 0xEF 0xCD 0xAB	1*1000+2*100+3*10+4=1234 in decimal Defines a 24 bit unsigned integer value in the range of 0 to 999999 stored as BCD number with encoding: First byte 00xEF: Bits 7-4: F: DIGIT*10 as hex value 0x0 to 0x9 Bits 3-0: E: DIGIT*1 as hex value 0x0 to 0x9 Second byte 00xCD: Bits 7-4: C: DIGIT*1000 as hex value 0x0 to 0x9 Bits 3-0: D: DIGIT*100 as hex value 0x0 to 0x9 Third byte 00xAB: Bits 7-4: A: DIGIT*100000 as hex value 0x0 to 0x9 Bits 3-0: B: DIGIT*10000 as hex value 0x0 to 0x9 So hex value 0x123456 means decimal value 1*100000+2*10000+3*1000+4*100+5*10+6=123456 in
BCD8	32 bits 4 byte	Decimal digits ABCDEFGH → 0xGH 0xEF 0xCD 0xAB	decimalDefines a 32 bit unsigned integer value in the range of 0 to9999999 stored as BCD number with encoding:First byte 00xGH:Bits 7-4: G: DIGIT*10 as hex value 0x0 to 0x9Bits 3-0: H: DIGIT*11 as hex value 0x0 to 0x9Second byte 00xEF:Bits 3-0: F: DIGIT*100 as hex value 0x0 to 0x9Bits 3-0: F: DIGIT*100 as hex value 0x0 to 0x9Bits 3-0: F: DIGIT*1000 as hex value 0x0 to 0x9Bits 3-0: F: DIGIT*1000 as hex value 0x0 to 0x9Bits 7-4: C: DIGIT*10000 as hex value 0x0 to 0x9Bits 3-0: D: DIGIT*100000 as hex value 0x0 to 0x9Bits 3-0: D: DIGIT*1000000 as hex value 0x0 to 0x9Bits 7-4: A: DIGIT*1000000 as hex value 0x0 to 0x9Bits 3-0: B: DIGIT*1000000 as hex value 0x0 to 0x9So hex value 0x12345678 means decimal value1*1000000+2*100000+3*10000+4*10000+5*1000+6*100+7*10+8=12345678 in decimal

BCD12	48 bits 6 byte	Decimal digits ABCDEFGHIJKL → 0xKL 0xIJ 0xGH 0xEF 0xCD 0xAB	Defines a 48 bit unsigned integer value in the range of 0 to 999999999999999999999999999999999999
SINT8	8 bits 1 byte	none	Defines a 8 bit signed integer value in the range of -128 to +127 or 0x80 to 0x7F First byte: Bit 7: Sign Bits 6-0: integer value
SINT16	16 bits 2 byte	0x1234 → 0x34 0x12	Defines a 16 bit signed integer value in the range of -32768 to +32767 or 0x8000 to 0x7FFF First byte: Bits 7-0 Second byte: Bit 15: Sign Bits 15-8
SINT24	24 bits 3 byte	0x123456 → 0x56 0x34 0x12	Defines a 24 bit signed integer value in the range of -8.388.608 to +8.388.608 or 0x80.0000 to 0x7F.FFFF First byte: Bits 7-0 Second byte: Bits 15-8 Third byte: Bit 23: Sign Bits 22-16
SINT32	32 bits 4 byte	0x12345678 → 0x78 0x56 0x34 0x12	Defines a 32 bit signed integer value in the range of -4.294.967.296 to 4.294.967.295 or 0x8000.0000 to 0x7FFF.FFF First byte: Bits 7-0 Second byte: Bits 15-8 Third byte: Bits 23-16 Fourth byte: Bit 31: Sign Bits 30-24
SINT48	48 bits 6 byte	0x1234567890 → 0x90 0x78 0x56 0x34 0x12	Defines a 32 bit signed integer value in the range of -140.737.488.355.328 to +140.737.488.355.327 or 0x8000.0000 to 0x7FFF.FFFFF First byte: Bits 7-0 Second byte: Bits 15-8 Third byte: Bits 23-16 Fourth byte: Bits 31-24 Fifth byte: Bits 39-32 Sixth byte: Bit 47: Sign Bits 46-40
SINT64	64 bits 8 byte	0x12345678 90ABCDEF → 0xEF 0xCD 0xAB 0x90 0x78 0x56 0x34 0x12	Defines a 32 bit signed integer value in the range of -9.223.372.036.854.775.808 to +9.223.372.036.854.775.807 or 0x8000.0000.0000 to 0x7FFF.FFFF.FFFF.FFFF First byte: Bits 7-0 Second byte: Bits 15-8 Third byte: Bits 23-16 Fourth byte: Bits 31-24 Fifth byte: Bits 39-32 Sixth byte: Bits 47-40 Seventh byte: Bits 55-48 Eight byte: Bit 63: Sign Bits 62-56

MBUS

DATATYPE

SIZE

BYTE ORDER

DESCRIPTION

RES



MBUS	SIZE	BYTE ORDER	DESCRIPTION
DATATYPE			
FLOAT32	32 bits 4 byte	0x40490FDA → 0xDA 0x0F 0x49 0x40	Defines a 32 bit float value in the range of ±1.4·10 ⁻⁴⁵ to ±3.403·10 ³⁸ . A mantissa of 23 bits and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma. Fraction F:=Bits 022 Exponent E:=Bits 3023 Sigh S::= Bit 31 First byte: Fraction F Bits 7-0 Second byte: Fraction F Bits 15-8 Third byte: Exponent E Bit 23 Fraction F Bits 22-16 Fourth byte: Sign S Bit 31 Exponent Bits 30-24
DATE & TIME TYPE F	32 bits 4 byte	0x12345678 → 0x78 0x56 0x34 0x12	Defines a 32 bit value interpreted as date & time Minutes: Bits $5-0 \rightarrow 059$ Hour: Bits $12-8 \rightarrow 023$ Day: Bits $20-16 \rightarrow 131$ Month: Bits $27-23 \rightarrow 112$ Year: Bits $31-28,23-21 \rightarrow 099$ Invalid: Bit 7: =0 valid, =1: invalid Summertime Bit 15 = 0 standard time, =1 summer time Reserved Bit 15 = 0 Reserved Bit 13 = 0 Reserved Bit 15 = 0
DATE TYPE G	16 bits 2 byte	0x1234 → 0x34 0x12	Defines a 16 bit value interpreted as date Day: Bits 4-0 \rightarrow 131 Month: Bits 11-8 \rightarrow 112 Year: Bits 15-12,7-5 \rightarrow 099
VARIABLE LENGTH	n*8 bits n bytes	Byte n-1 Byte n-2 Byte 2 Byte 1 Byte 0	Defines a variable length field with n bytes of data. First byte: data[n-1] Second byte: data[n-2] n-1. byte: data[1] n. byte (last byte): data[0] The length byte defines the representation of the variable length data field: LEN=0x000xBF: ASCII string LEN=0xC00xCF: positive BCD number with (LEN-0xC0)*2 digits LEN=0xD00xDF: negative BCD number with (LEN-0xD0)*2 digits LEN=0xE00xEF: integer number with (LEN-0xE0) bytes LEN=0xF00xFA: float number with (LEN-0xF0) bytes LEN=0xFB0xFF: reserved



43.15 Table of MODBUS data types

The following table shows, which MODBUS data types are used and how they are processed by the gateway:

MODBUS DATATYPE	SIZE	WORD ORDER	DESCRIPTION
UINT16	16 bits 1 register	none	Defines a 16 bit unsigned integer value in the range of 0 to 65535 or 0x0000 to 0xFFFF
SINT16	16 bits 1 register	none	Defines a 16 bit signed integer value in the range of -32768 to +32767 or 0x8000 to 0x7FFF
UINT32	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit unsigned integer value in the range of 0 to 4.294.967.295 or 0x00000000 to 0xFFFFFFF
SINT32 32 bits 2 register		0:High Word 1:Low Word	Defines a 32 bit signed integer value in the range of -2.147.483.648 to +2.147.483.647 or 0x80000000 to 0x7FFFFFFF
UINT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit unsigned integer value in the range of 0 to 4.294.967.295 or 0x00000000 to 0xFFFFFFF with reverse word order
SINT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit signed integer value in the range of -2.147.483.648 to +2.147.483.647 or 0x80000000 to 0x7FFFFFFF with reverse word order
FLOAT32	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit float value in the range of $\pm 1.4 \cdot 10^{-45}$ to $\pm 3.403 \cdot 10^{38}$. A mantissa of 23 bits and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma.
FLOAT32R	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit float value in the range of $\pm 1.4 \cdot 10^{-45}$ to $\pm 3.403 \cdot 10^{38}$ A mantissa of 23 bits and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma. The two 16 bit words are stored in reverse order.
DOUBLE64	64 bits 4 register	0:Highest Word 1:Higher Word 2:Lower Word 3:Lowest Word	Defines a 64 bit float value in the range of $\pm 4.24 \cdot 10^{-324}$ to $\pm 1,798 \cdot 10^{308}$. A mantissa of 52 bits and an exponent of 11 bits are used. The value can store 15 to 16 digits after the comma.
DOUBLE64R	64 bits 4 register	0:Lowest Word 1:Lower Word 2:Higher Word 3:Highest Word	Defines a 64 bit float value in the range of $\pm 4.24 \cdot 10^{-324}$ to $\pm 1,798 \cdot 10^{308}$. A mantissa of 52 bits and an exponent of 11 bits are used. The value can store 15 to 16 digits after the comma. The four 16 bit words are stored in reverse order.
ASCII	2*n*8 bits n register	0:Highest Word 1:Higher Word n-1:Lower Word n: Lowest Word	Defines a byte array with ASCII characters stored in 16 bit words. The ASCII string is terminated with a trailing 0x00 byte. To achieve word alignment a second 0x00 character can be stuffed at the end of the string. The low byte of the first word holds the first ASCII character, The high byte of the first word holds the second ASCII character and so on.
ASCIIR	2*n*8 bits n register	0:Lowest Word 1:Lower Word n-1:Higher Word n: HIghest Word	Defines a byte array with ASCII characters stored in 16 bit words. The ASCII string is terminated with a trailing 0x00 byte. To achieve word alignment a second 0x00 character can be stuffed at the end of the string. The low byte of the last word holds the first ASCII character, The high byte of the last word holds the second ASCII character and so on.
DATE TIME TYPE F	32 bits 2 register	0:High Word 1:Low Word	Defines a 32 bit value interpreted as date & time Minutes: Bits $5-0 \rightarrow 059$ Hour: Bits $12-8 \rightarrow 023$ Day: Bits $20-16 \rightarrow 131$ Month: Bits $27-23 \rightarrow 112$ Year: Bits $31-28,23-21 \rightarrow 099$ Invalid: Bit 7: =0 valid, =1: invalid Summertime Bit 15 =0 standard time, =1 summer time Reserved Bit 15 =0 Reserved Bit 13 =0 Reserved Bit 15 =0
DATE TIME TYPE FR	32 bits 2 register	0:Low Word 1:High Word	Defines a 32 bit value interpreted as date & time Minutes: Bits $5-0 \rightarrow 059$ Hour: Bits $12-8 \rightarrow 023$ Day: Bits $20-16 \rightarrow 131$ Month: Bits $27-23 \rightarrow 112$ Year: Bits $31-28,23-21 \rightarrow 099$ Invalid: Bit $7:=0$ valid, =1: invalid Summertime Bit $15=0$ standard time, =1 summer time Reserved Bit $15=0$ Reserved Bit $13=0$ Reserved Bit $15=0$
DATE TYP G	16 bits 1 register	none	Defines a 16 bit value interpreted as date Day: Bits 4-0 \rightarrow 131 Month: Bits 11-8 \rightarrow 112 Year: Bits 15-12,7-5 \rightarrow 099



MODBUS DATATYPE	SIZE	WORD ORDER	DESCRIPTION
BUFFER	2*n*8 bits n register	0:Highest Word 1:Higher Word n-1:Lower Word n: Lowest Word	Defines a byte array stored in 16 bit words. To achieve word alignment an additional 0x00 byte can be stuffed at the end of the byte array. The low byte of the first word holds the first byte, The high byte of the first word holds the second byte and so on.
BUFFERR	2*n*8 bits n register	0:Lowest Word 1:Lower Word n-1:Higher Word n: HIghest Word	Defines a byte array stored in 16 bit words. To achieve word alignment an additional 0x00 byte can be stuffed at the end of the byte array. The low byte of the last word holds the first byte, The high byte of the last word holds the second byte and so on.



43.16 HOW the MBUS to MODBUS mapping works

The following section describes, how the internal process of mapping MBUS to MODBUS datapoints in done by the gateway. For that we take a SCHNEIDER electrical meter (primary address 4) as a sample to describe the main principle of the conversion process.

In this case, the meter answers with only one data frame to the MBUS request of the gateway (All bytes in hexadecimal):

GATEWAY to METER: Send slave init to primary address 4 10 40 04 44 16 METER to GATEWAY: Send OK E5 GATEWAY to METER: Send REQ_UD2 frame to metering 10 7B 04 7F 16 METER TO GATEWAY: Send variable data frame as answered 68 F4 F4 68 08 04 72 63 41 36 06 A3 4C 18 02 C8 00 00 0D FD 0A 12 63 69 72 74 63 65 6C 45 20 72 65 64 69 65 6E 68 63 53 0D FD 0C 08 20 35 33 31 33 4D 45 69 0D FD 0E 07 32 30 30 2E 34 2E 31 03 FD 17 00 00 00 05 FD DC FF 01 00 00 00 05 FD DC FF 02 00 00 C0 FF 05 FD DC FF 03 00 00 C0 FF 05 FD DC FF 00 00 00 00 05 FD C9 FF 05 00 00 C0 FF 05 FD C9 FF 06 00 00 C0 FF 05 FD C9 FF 07 00 00 C0 FF 05 FD C9 FF 08 00 00 C0 FF 05 FD C9 FF 01 8E 8B 64 43 05 FD C9 FF 02 00 00 C0 FF 05 FD C9 FF 03 00 00 C0 FF 05 FD C9 FF 04 8E 8B 64 43 05 AE FF 01 00 00 00 00 05 FF 0A 00 00 C0 FF 05 FF 0B 29 F1 47 42 07 03 19 00 00 00 00 00 00 1F 1D 16

What data is in the MBUS frame? This is the interpretation of the complete received MBUS frame by our software:

MBUS:FRAME TYPE:0x72:12 BYTE HEADER+VARIABLE DATA MBUS:HEADER12:ID:104218979,0x06364163 MBUS:HEADER12:MANUFACTURER:19619,0x4CA3,SEC MBUS:HEADER12:VERSION:24,0x18 MBUS: HEADER12: MEDIUM: 2,0x02 MBUS:HEADER12:MEDIUM:Electricity MBUS:HEADER12:ACCESS:200,0xC8 MBUS:HEADER12:STATUS:0,0x00 MBUS:HEADER12:STATUS:NO ERROR MBUS:HEADER12:SIGNATURE:0,0x0000 _____ MBUS:VARIABLE DATA -----MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:0 MBUS:VARIABLE DATA: [0]DIF:0D MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:D:1101:variable length MBUS: VARIABLE DATA: [1]VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [2] VIFE: 0A MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0A:SECONDARY VIF (8.4.4) a. SUB VIF: MANUFACTURER (as in fixed header) MBUS:VARIABLE DATA:ASCII:18 MBUS:VARIABLE DATA: [3] - [21] DATABLOCK:LENGTH: 12, 18 MBUS:VARIABLE DATA:DATA BLOCK:DATA:[63][69][72][74][63][65][66][45][20][72][65][64][69][65][68][63][53] MBUS:VARIABLE DATA:DATA BLOCK:DATA:ASCII:Schneider Electric DIFFUNCTIONTEXT · INSTANTANEUS VALUE DIFTEXT:LVAR:ASCII(18 bytes) VIFTEXT:Manufacturer MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:1 MBUS: VARIABLE DATA: [22] DIF:0D MBUS: VARIABLE DATA: DIF: BIT 7: EXTENSION BIT: 0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:D:D:1101:variable length MBUS:VARIABLE DATA: [23] VIF:FD MBUS: VARIABLE DATA: VIF: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [24] VIFE: 0C MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0C:SECONDARY VIF (8.4.4) a. SUB VIF:MODEL/VERSION



MBUS:VARIABLE DATA:ASCII:8 MBUS:VARIABLE DATA: [25] - [33] DATABLOCK:LENGTH:08,8 MBUS:VARIABLE DATA:DATA BLOCK:DATA:[20][35][33][31][33][4D][45][69] MBUS:VARIABLE DATA:DATA BLOCK:DATA:ASCII:iEM3135 DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT:LVAR:ASCII(8 bytes) VIFTEXT:Model/version MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:2 MBUS: VARIABLE DATA: [34] DIF:0D MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS: VARIABLE DATA: DIF: BIT 5-4: FUNCTION FIELD: 0:00: Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:D:D:1101:variable length MBUS:VARIABLE DATA:[35]VIF:FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS: VARIABLE DATA: VIF: BIT 6-0: UNIT+MULTIPLIER: 7D: LINEAR VIF EXTENSION MBUS:VARIABLE DATA:[36]VIFE:0E MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0E:SECONDARY VIF (8.4.4) a. SUB VIF: FIRMWARE VERSION MBUS: VARIABLE DATA: ASCII: 7 MBUS:VARIABLE DATA:[37]-[44]DATABLOCK:LENGTH:07,7 MBUS:VARIABLE DATA:DATA BLOCK:DATA:[32][30][30][2E][34][2E][31] MBUS: VARIABLE DATA: DATA BLOCK: DATA: ASCII: 1.4.002 DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT:LVAR:ASCII(7 bvtes) VIFTEXT: Firmware version MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:3 MBUS:VARIABLE DATA: [45] DIF:03 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:3:3:0011:24 Bit Integer MBUS:VARIABLE DATA: [46] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [47] VIFE: 17 MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:17:SECONDARY VIF (8.4.4) a. SUB VIF: ERROR FLAGS (BINARY) MBUS:FIX DATA:[48]-[50]DATABLOCK:LENGTH:03,3 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT:24BIT INT(3 bytes) VIFTEXT:Error flags (binary) MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:4 MBUS:VARIABLE DATA: [51] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[52]VIF:FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS: VARIABLE DATA: VIF: BIT 6-0: UNIT+MULTIPLIER: 7D: LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [53] VIFE: DC MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:5C:SECONDARY VIF (8.4.4) a. SUB VIF:Current 10^0A MBUS:VARIABLE DATA: [54] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [55] VIFE:01:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:01:MANUFACTURER SPECIFIC:SEC VIF SEC:L1 phase value MBUS:FIX DATA:[56]-[59]DATABLOCK:LENGTH:04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Current 10^0A-L1 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:5 MBUS:VARIABLE DATA: [60] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [61] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [62] VIFE: DC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:5C:SECONDARY VIF (8.4.4) a. SUB VIF:Current 10^0A

MBUS:VARIABLE DATA:[63]VIFE:FF:MANUFACTURER SPECIFIC VIFE



MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [64] VIFE:02:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:02:MANUFACTURER SPECIFIC:SEC VIF SEC:L2 phase value MBUS:FIX DATA: [65] - [68] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Current 10^0A-L2 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:6 MBUS:VARIABLE DATA:[69]DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [70] VIF:FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA:[71]VIFE:DC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:5C:SECONDARY VIF (8.4.4) a. SUB VIF:Current 10^0A MBUS:VARIABLE DATA: [72] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [73] VIFE:03:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:03:MANUFACTURER SPECIFIC:SEC VIF SEC:L3 phase value MBUS:FIX DATA:[74]-[77]DATABLOCK:LENGTH:04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Current 10^0A-L3 phase value MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 7 MBUS: VARIABLE DATA: [78] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [79] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA:[80]VIFE:DC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:5C:SECONDARY VIF (8.4.4) a. SUB VIF:Current 10^0A MBUS:VARIABLE DATA: [81] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:[82]VIFE:00:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:00:MANUFACTURER SPECIFIC:SEC VIF SEC:Average current MBUS:FIX DATA: [83] - [86] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Current 10^0A-Average current MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:8 MBUS: VARIABLE DATA: [87] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS: VARIABLE DATA: DIF: BIT 6: LSB STORAGE NUMBER: 0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[88]VIF:FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA: [89] VIFE: C9 MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS:VARIABLE DATA: [90] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [91] VIFE:05:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:05:MANUFACTURER SPECIFIC:SEC VIF SEC:L1-L2 MBUS:FIX DATA: [92] - [95] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-L1-L2

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MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:9 MBUS:VARIABLE DATA: [96] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[97]VIF:FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA: [98] VIFE: C9 MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS: VARIABLE DATA: [99] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [100]VIFE:06:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:06:MANUFACTURER SPECIFIC:SEC VIF SEC:L2-L3 MBUS:FIX DATA: [101] - [104] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT:Voltage 10^0V-L2-L3 MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 10 MBUS: VARIABLE DATA: [105] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [106] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS: VARIABLE DATA: VIF: BIT 6-0: UNIT+MULTIPLIER: 7D: LINEAR VIF EXTENSION MBUS:VARIABLE DATA: [107]VIFE:C9 MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF: Voltage 10^0V MBUS:VARIABLE DATA: [108] VIFE:FF:MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [109]VIFE:07:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:07:MANUFACTURER SPECIFIC:SEC VIF SEC:L3-L1 MBUS:FIX DATA: [110] - [113] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT:Voltage 10^0V-L3-L1 MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:11 MBUS:VARIABLE DATA: [114] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[115]VIF:FD MBUS: VARIABLE DATA: VIF: BIT 7: EXTENSION BIT: 1 MBUS: VARIABLE DATA: VIF: BIT 6-0: UNIT+MULTIPLIER: 7D: LINEAR VIF EXTENSION MBUS:VARIABLE DATA: [116] VIFE: C9 MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS:VARIABLE DATA:[117]VIFE:FF:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [118]VIFE:08:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:08:MANUFACTURER SPECIFIC:SEC VIF SEC:Voltage L-L average
MBUS:FIX DATA:[119]-[122]DATABLOCK:LENGTH:04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-Voltage L-L average MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 12 MBUS:VARIABLE DATA: [123] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [124] VIF: FD MBUS: VARIABLE DATA: VIF: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION



MBUS:VARIABLE DATA: [125] VIFE: C9 MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS:VARIABLE DATA:[126]VIFE:FF:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [127] VIFE:01:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:01:MANUFACTURER SPECIFIC:SEC VIF SEC:L1 phase value MBUS:FIX DATA: [128] - [131] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[8E][8B][64][43] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT:32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-L1 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:13 MBUS:VARIABLE DATA: [132] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[133]VIF:FD MBUS: VARIABLE DATA: VIF: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS: VARIABLE DATA: [134] VIFE: C9 MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF: Voltage 10^0V MBUS:VARIABLE DATA: [135] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:[136]VIFE:02:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:02:MANUFACTURER SPECIFIC:SEC VIF SEC:L2 phase value MBUS:FIX DATA: [137] - [140] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-L2 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:14 MBUS:VARIABLE DATA: [141]DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [142] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA: [143] VIFE: C9 MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS: VARIABLE DATA: [144] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [145] VIFE:03:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:03:MANUFACTURER SPECIFIC:SEC VIF SEC:L3 phase value MBUS:FIX DATA: [146] - [149] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-L3 phase value MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 15 MBUS: VARIABLE DATA: [150] DIF: 05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [151] VIF: FD MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION MBUS:VARIABLE DATA:[152]VIFE:C9 MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:49:SECONDARY VIF (8.4.4) a. SUB VIF:Voltage 10^0V MBUS:VARIABLE DATA: [153] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [154] VIFE: 04: MANUFACTURER SPECIFIC: SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:04:MANUFACTURER SPECIFIC:SEC VIF SEC:L-N average



MBUS:FIX DATA: [155] - [158] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[8E][8B][64][43] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT:Voltage 10^0V-L-N average MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 16 MBUS:VARIABLE DATA: [159] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MEUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [160] VIF: AE MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIF POWER:10^3 W MBUS:VARIABLE DATA: [161] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [162] VIFE:01:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:01:MANUFACTURER SPECIFIC:SEC VIF SEC:L1 phase value MBUS:FIX DATA: [163] - [166] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT: Power: 10^3 W-L1 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:17 MBUS:VARIABLE DATA: [167] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [168] VIF:AE MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIF POWER:10^3 W MBUS:VARIABLE DATA: [169] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:1:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:[170]VIFE:02:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:02:MANUFACTURER SPECIFIC:SEC VIF SEC:L2 phase value MBUS:FIX DATA: [171] - [174] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT:32BIT FLOAT(4 bytes) VIFTEXT: Power: 10^3 W-L2 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:18 MBUS:VARIABLE DATA: [175] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MEUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [176] VIF: AE MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIF POWER:10^3 W MBUS:VARIABLE DATA: [177] VIFE: FF: MANUFACTURER SPECIFIC VIFE MBUS: VARIABLE DATA: VIFE: BIT 7: EXTENSION BIT: 1: MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIFE MBUS:VARIABLE DATA: [178] VIFE:03:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:03:MANUFACTURER SPECIFIC:SEC VIF SEC:L3 phase value MBUS:FIX DATA: [179] - [182] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT: Power: 10^3 W-L3 phase value MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:19 MBUS:VARIABLE DATA: [183] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [184]VIF:2E MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIF POWER:10^3 W MBUS:FIX DATA: [185] - [188] DATABLOCK: LENGTH: 04, 4

MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00][00] DIFFUNCTIONTEXT:INSTANTANEUS VALUE



DIFTEXT:32BIT FLOAT(4 bytes) VIFTEXT:Power:10^3 W

MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 20 MBUS: VARIABLE DATA: [189] DIF: 85 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [190] DIFE: 40 MBUS: VARIABLE DATA: DIFE: BIT 7: EXTENSION BIT: 0 MBUS:VARIABLE DATA:DIFE:BIT 6:DEVICE UNIT:1 MBUS:VARIABLE DATA:DIFE:BIT 5-4:TARIFF:0 MBUS:VARIABLE DATA:DIFE:BIT 3-0:STORAGE NUMBER:0 MBUS:VARIABLE DATA:[191]VIF:2E MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIF POWER:10^3 W MBUS:FIX DATA: [192] - [195] DATABLOCK: LENGTH: 04, 4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT: Power: 10^3 W MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:21 MBUS:VARIABLE DATA: [196] DIF:85 MBUS: VARIABLE DATA: DIF: BIT 7: EXTENSION BIT: 1 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA:[197]DIFE:80 MBUS:VARIABLE DATA:DIFE:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:DIFE:BIT 6:DEVICE UNIT:0 MBUS:VARIABLE DATA:DIFE:BIT 5-4:TARIFF:0 MBUS:VARIABLE DATA:DIFE:BIT 3-0:STORAGE NUMBER:0 MBUS:VARIABLE DATA: [198] DIFE:40 MBUS:VARIABLE DATA:DIFE:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIFE:BIT 6:DEVICE UNIT:1 MBUS:VARIABLE DATA:DIFE:BIT 5-4:TARIFF:0 MBUS:VARIABLE DATA:DIFE:BIT 3-0:STORAGE NUMBER:0 MBUS:VARIABLE DATA:[199]VIF:2E MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:2E:PRIMARY VIF 8.4.3 VIE POWER:10^3 W MBUS: FIX DATA: [200] - [203] DATABLOCK: LENGTH: 04.4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][00] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT: Power: 10^3 W MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 22 MBUS: VARIABLE DATA: [204] DIF:05 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS: VARIABLE DATA: [205] VIF: FF MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIF MBUS:VARIABLE DATA: [206]VIFE:0A:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0A:MANUFACTURER SPECIFIC:SEC VIF SEC:Power Factor MBUS:FIX DATA: [207] - [210] DATABLOCK: LENGTH: 04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[00][00][C0][FF] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT (4 bytes) VIFTEXT: Power Factor MBUS: VARIABLE DATA: DATARECORD: 1: DATABLOCK: 23 MBUS:VARIABLE DATA: [211]DIF:05 MBUS: VARIABLE DATA: DIF: BIT 7: EXTENSION BIT: 0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:5:5:0101:32 Bit Real MBUS:VARIABLE DATA: [212] VIF:FF MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7F:MANUFACTURER SPECIFIC VIF MBUS:VARIABLE DATA:[213]VIFE:0B:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0:MANUFACTURER SPECIFIC:SEC MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0B:MANUFACTURER SPECIFIC:SEC VIF SEC:Frequency MBUS:FIX DATA:[214]-[217]DATABLOCK:LENGTH:04,4 MBUS:FIX DATA:DATA BLOCK:DATA:[29][F1][47][42] DIFFUNCTIONTEXT: INSTANTANEUS VALUE DIFTEXT: 32BIT FLOAT(4 bytes) VIFTEXT: Frequency



<pre>MBUS:VARIABLE DATA:[218]DIF:07 MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:7:7:0111:64 Bit Integer MBUS:VARIABLE DATA:[219]VIF:03 MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:03:PRIMARY VIF 8.4.3 VIF ENERGY:10^0 Wh MBUS:FIX DATA:[220]-[227]DATABLOCK:LENGTH:08,8 MBUS:FIX DATA:BLOCK:DATA:[19][00][00][00][00][00][00] DIFFUNCTIONTEXT:INSTANTANEUS VALUE DIFFEXT:64BIT INT(8 bytes) VIFTEXT:Energy:10^0 Wh</pre>
MBUS:VARIABLE DATA:[228]DIF:1F MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0 MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0 MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:1:01:Maximum value MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:F:F:1111:Special Functions MBUS:VARIABLE DATA:DIF:MORE RECORDS
MBUS:END VARIABLE DATA

You will notice, that the MBUS answer starts with a fixed header. This information is interpreted by our gateway and stored in a fixed MODBUS mapping structure starting at 4x10001. See the MODBUS register definition for more details.

4×10001	HEADER	UINT32	Identification number of meter	ID	MSW:0636,4163:LSW	104218979,0x06364163	Meter 4 [P:4]
4x10003	HEADER	UINT32->ASCI	Manufacturer of meter	MANUFACTURER	MSW:0043,4553:LSW	SEC	Meter 4 [P:4]
4x10005	HEADER	UINT16	Version of meter	VERSION	W0RD:0018	24.0×0018	Meter 4 [P:4]
4x10006	HEADER	UINT16	Medium of meter	MEDIUM	WORD:0002	2,0x0002 -> Electricity	Meter 4 [P:4]
4x10007	HEADER	UINT16	Access of meter	ACCESS	WORD:0056	86,0×0056	Meter 4 [P:4]
4×10008	HEADER	UINT16	Status of meter	STATUS	W0RD:0000	0,0x0000	Meter 4 [P:4]
4x10009	RESI	UINT16	Future value of meter	FUTURE	WORD:0000	0,0x0000	Meter 4 [P:4]
4x10010	RESI	UINT16	Communcation state with meter	COMM STATE	WORD:0003	3.0x0003 -> Values are valid!	Meter 4 [P:4]

After the fixed data header, there come one or more data records. The gateway will read this records sequentially and map one datapoint to another to MODBUS registers. So the configured mapping datapoints must be sequentially defined according to the data in the MBUS frame.

The first entry is:

```
MBUS:VARIABLE DATA:DATARECORD:1:DATABLOCK:0
MBUS: VARIABLE DATA: [0]DIF:0D
MBUS:VARIABLE DATA:DIF:BIT 7:EXTENSION BIT:0
MBUS:VARIABLE DATA:DIF:BIT 6:LSB STORAGE NUMBER:0
MBUS:VARIABLE DATA:DIF:BIT 5-4:FUNCTION FIELD:0:00:Instantaneous value
MBUS:VARIABLE DATA:DIF:BIT 3-0:DATA FIELD:D:D:1101:variable length
MBUS:VARIABLE DATA:[1]VIF:FD
MBUS:VARIABLE DATA:VIF:BIT 7:EXTENSION BIT:1
MBUS:VARIABLE DATA:VIF:BIT 6-0:UNIT+MULTIPLIER:7D:LINEAR VIF EXTENSION
MBUS: VARIABLE DATA: [2] VIFE: 0A
MBUS:VARIABLE DATA:VIFE:BIT 7:EXTENSION BIT:0
MBUS:VARIABLE DATA:VIFE:BIT 6-0:UNIT+MULTIPLIER:0A:SECONDARY VIF (8.4.4) a.
SUB VIF:MANUFACTURER (as in fixed header)
MBUS:VARIABLE DATA:ASCII:18
MBUS:VARIABLE DATA:[3]-[21]DATABLOCK:LENGTH:12,18
MBUS:VARIABLE DATA:DATA BLOCK:DATA:[63][69][72][74][63][65][6C][45][20][72][65][64][69][65][68][63][53]
MBUS:VARIABLE DATA:DATA BLOCK:DATA:ASCII:Schneider Electric
DIFFUNCTIONTEXT: INSTANTANEUS VALUE
DIFTEXT:LVAR:ASCII(18 bytes)
VIFTEXT:Manufacturer
```

The first entry in our configuration matches this MBUS data. It is an ASCII string which defines the manufacturer of the meter. The Name starts at byte index 4 in the first received data frame from the meter and it needs 18 bytes. So now the gateway knows exactly, that it has to copy the 18 bytes starting form index 4 to the first 9 MODBUS 16-Bit registers starting at 4x00001. But also the byte order is mirrored for the ASCII string and there is no trailing 0x00 character at the end of the string, so our software maps this string to 10 16-bit registers and adds the trailing 0x00 character.



Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent
0	LVAR:ASCII	ASCII	Manufacturer	1-4	18	0	0
1	LVAR:ASCII	ASCII	Model/version	1-26	8	0	0
2	LVAR:ASCII	ASCII	Firmware version	1-38	7	0	0
3	INT24	UINT32	Error flags (binary)	1-48	3	0	0
1	FLOAT32	FLOAT32	Current 10 ⁰ A-L1 phase value	1-56	4	0	0
5	FLOAT32	FLOAT32	Current 10 ⁰ A-L2 phase value	1-65	4	0	0
i	FLOAT32	FLOAT32	Current 10 ⁰ A-L3 phase value	1-74	4	0	0
,	FLOAT32	FLOAT32	Current 10 ⁰ A-Average current	1-83	4	0	0
3	FLOAT32	FLOAT32	Voltage 10 ⁰ V-L1-L2	1-92	4	0	0
}	FLOAT32	FLOAT32	Voltage 10 ⁰ V-L2-L3	1-101	4	0	0
10	FLOAT32	FLOAT32	Voltage 10^0V-L3-L1	1-110	4	0	0



43.16.1 HOW the exponents affect the result

In the MBUS protocol not only the MBUS data for a data point is transmitted, also also the meaning of the data and the dimension of the value is transmitted. For example we take a KAMSTRUP flowIQ meter. Our software generates the following mapping:

Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent
0	BCD8	SINT32	Fabrication number	1-2	4	0	0
1	INT32	UINT32	Energy:10 ⁴ Wh	1-8	4	4	0
2	INT32	FLOAT32	Volume:10^-1 m ^a	1-14	4	-1	0
3	INT32	UINT32	On time:hours	1-20	4	0	0
4	INT32	FLOAT32	Flow temperature:10^-2 °C	1-26	4	-2	0
5	INT32	FLOAT32	Return temperature:10^-2 °C	1-32	4	-2	0
6	INT32	FLOAT32	Temperature difference:10^-2 K	1-38	4	-2	0
7	INT32	FLOAT32	Power:10 ² W	1-44	4	2	0
8	INT32	FLOAT32	Power:10 ² W	1-50	4	2	0
9	INT32	FLOAT32	Volume flow:10^-3 m ^o /h	1-56	4	-3	0
10	INT32	FLOAT32	Volume flow:10^-3 m³/h	1-62	4	-3	0
11	INT32	FLOAT32	Volume:10^-1 m ^a [U:1,T:0,S:0]	1-69	4	-1	0
12	INT32	FLOAT32	Volume:10^0 mº[U:2,T:0,S:0]	1-77	4	0	0
13	INT32	DATE_TIME_T	Time&Date data type F	1-83	4	0	0
14	INT32	UINT32	Energy:10^4 Wh[U:0,T:0,S:1]	1-89	4	4	0
15	INT32	FLOAT32	Volume:10^-1 m ^a [U:0,T:0,S:1]	1-95	4	-1	0
16	INT32	FLOAT32	Power:10^2 W[U:0,T:0,S:1]	1-101	4	2	0
17	INT32	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1]	1-107	4	-3	0
18	INT32	FLOAT32	Volume:10^-1 m ^a [U:1,T:0,S:1]	1-114	4	-1	0
19	INT32	FLOAT32	Volume:10^0 m8[U:2,T:0,S:1]	1-122	4	0	0
20	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-128	2	0	0
21	SPCL FUNCT	BUFFER	Manufacturer specific data	1-131	44	0	0

You notice in the column MBUS exponent different exponents for different values and in the column Content those exponents are added with 10^{xx}.

When	vou download	and test this	configuration.	we get the	following online data:

MB Register	MBUS datatype	MB datatype	Content MB	3US index	MB value HEX	Current MB value	Me
4x00001	BCD8[4]	SINT32	Fabrication number 0		MSW:0026,D1D2:LSW	2544082,0x0026D1D2	Me
4x00003	INT32[4]	UINT32	Energy:10 ⁴ Wh 1		MSW:000A,1ED0:LSW	663248,0x000A1ED0	Me
4x00005	INT32[4]	FLOAT32	Volume:10^-1 m* 2		MSW:45AC,6E66:LSW	5517.7998,5.51779980468750E+3	Me
4x00007	INT32[4]	UINT32	On time:hours 3		MSW:0000,B64B:LSW	46667,0x0000B64B	Me
4x00009	INT32[4]	FLOAT32	Flow temperature:10^-2 °C 4		MSW:41F6,147B:LSW	30.7600,3.07600002288818E+1	Me
4x00011	INT32[4]	FLOAT32	Return temperature:10 ⁻² *C 5		MSW:4081,EB85:LSW	4.0600,4.05999994277954E+0	Me
4x00013	INT32[4]	FLOAT32	Temperature difference:10^-2 K 6		MSW:41D5,999A:LSW	26.7000,2.67000007629395E+1	Me
4x00015	INT32[4]	FLOAT32	Power:10^2 W 7		MSW:0000,0000:LSW	0.0000.0.00000000000000E+0	Me
4x00017	INT32[4]	FLOAT32	Power:10^2 W 8		MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Me
4x00019	INT32[4]	FLOAT32	Volume flow:10^-3 m³/h 9		MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Me
4x00021	INT32[4]	FLOAT32	Volume flow:10^-3 m²/h 10		MSW:0000,0000:LSW	0.0000.0.00000000000000E+0	Me
4x00023	INT32[4]	FLOAT32	Volume:10^-1 m ^a [U:1,T:0,S:0] 11		MSW:44A1,0CCD:LSW	1288.4000,1.28840002441406E+3	Me
4x00025	INT32[4]	FLOAT32	Volume:10^0 mº[U:2,T:0,S:0] 12		MSW:46CB,1000:LSW	25992.0000.2.5992000000000E+4	Me
4x00027	INT32[4]	DATE_TIME_	TTime&Date data type F 13		MSW:1234,2602:LSW	06:02 D.M.Y:20.02.09 ST:0 IV:0,0x123426	02 Me
4x00029	INT32[4]	UINT32	Energy:10^4 Wh[U:0,T:0,S:1] 14		MSW:000A.1ED0:LSW	663248.0x000A1ED0	Me
4x00031	INT32[4]	FLOAT32	Volume:10^-1 mº[U:0,T:0,S:1] 15		MSW:45AC,6E66:LSW	5517.7998,5.51779980468750E+3	Me
4x00033	INT32[4]	FLOAT32	Power:10^2 W[U:0,T:0,S:1] 16		MSW:0000,0000:LSW	0.0000,0.00000000000000E+0	Me
4x00035	INT32[4]	FLOAT32	Volume flow:10^-3 mº/h[U:0,T:0,S:1] 17		MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	Me
4x00037	INT32[4]	FLOAT32	Volume:10^-1 m*[U:1,T:0,S:1] 18		MSW:474D,6680:LSW	52582.5000,5.2582500000000E+4	Me
4x00039	INT32[4]	FLOAT32	Volume:10^0 m²[U:2,T:0,S:1] 19		MSW:4900,6010:LSW	525825.0000,5.25825000000000E+5	Me
4x00041	INT16[2]	DATE_TYP_0	G Date data type G[U:0,T:0,S:1] 20		WORD:1601	D.M.Y:01.06.08,0x1601	Me
4x00042	SPCL FUNCT[44]	BUFFER	Manufacturer specific data 21		LSW:010B 0070 0C01 0141 2300 4	LSB:0B 01 70 00 01 0C 41 01 00 23 1B 44	0(Me
4x09001	RESI	UINT16	Converter state for meter ST/	ATE	WORD:0003	3,0x0003 -> Values are valid!	Me
4x09002	HEADER	UINT32R	Identification number of meter ID		LSW:4082,MSW:0254	39075970,0x02544082	Me
4x10001	HEADER	UINT32	Identification number of meter ID		MSW:0254,4082:LSW	39075970,0x02544082	Me
4x10003	HEADER	UINT32->ASC	Manufacturer of meter MA	NUFACTURER	MSW:004D,414B:LSW	KAM	Me
4x10005	HEADER	UINT16	Version of meter VE	RSION	WORD:0002	2.0x0002	Me
4x10006	HEADER	UINT16	Medium of meter ME	DIUM	WORD:0004	4,0x0004 -> Heat-Volume measured at re	ati Me
4x10007	HEADER	UINT16	Access of meter AC	CESS	WORD:0012	18,0x0012	Me
4x10008	HEADER	UINT16	Status of meter ST/	ATUS	WORD:0000	0,0x0000	Me
4x10009	RESI	UINT16	Future value of meter FU	TURE	WORD:0000	0,0×0000	Me
4x10010	BESI	UINT16	Communcation state with meter CO	IMM STATE	WORD:0003	3.0x0003 -> Values are valid!	Me

Look at registers 4x00009 to 4x00013, three temperature values. In the MBUS frame, the temperatures are transmitted as INT32 values with the exponent 10⁻². So in fact this are integer values with two commas: 2812 will mean 28,12°C. Our converter maps this values to FLOAT32 values and automatically shifts the MBUS exponents to display the value based to 10⁻⁰. But in some cases you don't want to shift. So we double click on the desired datapoint in the meter configuration and modify the MODBUS exponent in entering the number -2. This means, that we want to multiply the MBUS value by 10⁻².

<u>RES</u>J

Edit M-Bus datapoint			—
Index:	4	MBUS record:	1
MBUS Datatype:	INT32	MBUS data index:	26
MODBUS Datatype:	FLOAT32	MBUS size:	4
Content:	Flow temperature:10^-2 °C		
MBUS Exponent: 10	*-2		
MODBUS Exponent: (10	•-2		
ОК			X Cancel

The result in the MODBUS registers will be a temperature value multiplied by 100 to represent 1/100°C:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	Meter name
4x00001	BCD8[4]	SINT32	Fabrication number	0	MSW:0026.D1D2:LSW	2544082,0x0026D1D2	Meter 0254
4x00003	INT32[4]	UINT32	Energy:10 ⁴ Wh	1	MSW:000A,1ED0:LSW	663248,0×000A1ED0	Meter 02544
4x00005	INT32[4]	FLOAT32	Volume:10^-1 m ^a	2	MSW:45AC.6E66:LSW	5517.7998.5.51779980468750E+3	Meter 02544
4x00007	INT32[4]	UINT32	On time:hours	3	MSW:0000.B64B:LSW	46667.0x0000B64B	Meter 02544
4x00009	INT32[4]	FLOAT32	Flow temperature:10^-2 *C->*10^-2	4	MSW:4540.3000:LSW	3075.0000.3.0750000000000E+3	Meter 02544
4x00011	INT32[4]	FLOAT32	Return temperature:10^-2 *C->*10^-2	5	MSW:43CA,8000:LSW	405.0000,4.0500000000000E+2	Meter 02544
4x00013	INT32[4]	FLOAT32	Temperature difference:10^-2 K->*10^-1	6	MSW:4385,8000:LSW	267.0000,2.6700000000000E+2	Meter 0254
4x00015	INT32[4]	FLOAT32	Power:10^2 W	7	MSW:0000.0000:LSW	0.0000,0.000000000000000E+0	Meter 02544

If we change now the MODBUS data type to SINT16 we use only one MODBUS register for every temperature, but because the original MBUS value is based to 10⁻², we have to set the MODBUS exponent to 0. This is different to a FLOAT32 or DOUBLE64 MODBUS register, where the gateway always normalize the MBUS value to 10⁻⁰.

Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponent
0	BCD8	SINT32	Fabrication number	1-2	4	0	0
1	INT32	UINT32	Energy:10 ⁴ Wh	1-8	4	4	0
2	INT32	FLOAT32	Volume:10^-1 m*	1-14	4	-1	0
3	INT32	UINT32	On time:hours	1-20	4	0	0
4	INT32	SINT16	Flow temperature:10^-2 *C	1-26	4	-2	0
5	INT32	SINT16	Return temperature:10^-2 °C	1-32	4	-2	0
6	INT32	SINT16	Temperature difference:10^-2 K	1-38	4	-2	0
7	INT32	FLOAT32	Power:10 ² W	1-44	4	2	0
3	INT32	FLOAT32	Power:10 ² W	1-50	4	2	0
3	INT32	FLOAT32	Volume flow:10^-3 mº/h	1-56	4	-3	0
0	INT32	FLOAT32	Volume flow:10^-3 m ^s /h	1-62	4	-3	0
1	INT32	FLOAT32	Volume:10^-1 mº[U:1,T:0,S:0]	1-69	4	-1	0
2	INT32	FLOAT32	Volume:10^0 m ^e [U:2,T:0,S:0]	1-77	4	0	0
3	INT32	DATE_TIME_T	Time&Date data type F	1-83	4	0	0
4	INT32	UINT32	Energy:10^4 Wh[U:0,T:0,S:1]	1-89	4	4	0
5	INT32	FLOAT32	Volume:10^-1 m ^s [U:0,T:0,S:1]	1-95	4	-1	0
6	INT32	FLOAT32	Power:10^2 W[U:0,T:0,S:1]	1-101	4	2	0
7	INT32	FLOAT32	Volume flow:10^-3 m³/h[U:0,T:0,S:1]	1-107	4	-3	0
8	INT32	FLOAT32	Volume:10^-1 mº[U:1,T:0,S:1]	1-114	4	-1	0
9	INT32	FLOAT32	Volume:10^0 mº[U:2,T:0,S:1]	1-122	4	0	0
20	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-128	2	0	0
21	SPCL FUNCT	BUFFER	Manufacturer specific data	1-131	44	0	0



Download and test the new configuration, you will see the difference:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value	N
4x00001	BCD8[4]	SINT32	Fabrication number	0	MSW:0026,D1D2:LSW	2544082,0x0026D1D2	Ν
4x00003	INT32[4]	UINT32	Energy:10 ⁴ Wh	1	MSW:000A,1ED0:LSW	663248,0x000A1ED0	N
4x00005	INT32[4]	FLOAT32	Volume:10^-1 m ^e	2	MSW:45AC;6E66:LSW	5517.7998,5.51779980468750E+3	M
4x00007	INT32[4]	UINT32	On time:hours	3	MSW:0000,B64B:LSW	46667,0x0000B64B	N
4x00009	INT32[4]	SINT16	Flow temperature:10^-2 °C	4	W0RD:0C04	3076,0x0C04	M
4x00010	INT32[4]	SINT16	Return temperature:10 ⁻² °C	5	WORD:0196	406,0x0196	N
4x00011	INT32[4]	SINT16	Temperature difference:10^-2 K	6	WORD:0A6E	2670,0x0A6E	Ν
4x00012	INT32[4]	FLOAT32	Power:10 ² W	7	MSW:0000.0000:LSW	0.0000.0.000000000000000E+0	N
4x00014	INT32[4]	FLOAT32	Power:10 ² W	8	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0	N

Now we want to store the temperatures only with one comma in the 16 bit holding registers. Therefore we use the MODBUS exponent to divide the values by 10. So we enter an exponent of 1 for all tree temperatures:

Index	MBUS dataty	MB datatype	Content	MBUS data	MBUS size	MBUS exponent	MB exponen
)	BCD8	SINT32	Fabrication number	1-2	4	0	0
1	INT32	UINT32	Energy:10 ⁴ Wh	1-8	4	4	0
2	INT32	FLOAT32	Volume:10 ⁻¹ m ^e	1-14	4	-1	0
3	INT32	UINT32	On time:hours	1-20	4	0	0
4	INT32	SINT16	Flow temperature:10^-2 °C	1-26	4	-2	1
5	INT32	SINT16	Return temperature:10^-2 °C	1-32	4	-2	1
6	INT32	SINT16	Temperature difference:10^-2 K	1-38	4	-2	1
7	INT32	FLOAT32	Power:10 ² W	1-44	4	2	0
8	INT32	FLOAT32	Power:10 ² W	1-50	4	2	0
3	INT32	FLOAT32	Volume flow:10^-3 mº/h	1-56	4	-3	0
10	INT32	FLOAT32	Volume flow:10^-3 m ^s /h	1-62	4	-3	0
11	INT32	FLOAT32	Volume:10^-1 mº[U:1,T:0,S:0]	1-69	4	-1	0
12	INT32	FLOAT32	Volume:10^0 mº[U:2,T:0,S:0]	1-77	4	0	0
13	INT32	DATE_TIME_T	Time&Date data type F	1-83	4	0	0
4	INT32	UINT32	Energy:10^4 Wh[U:0,T:0,S:1]	1-89	4	4	0
15	INT32	FLOAT32	Volume:10^-1 m ^s [U:0,T:0,S:1]	1-95	4	-1	0
16	INT32	FLOAT32	Power:10^2 W[U:0,T:0,S:1]	1-101	4	2	0
17	INT32	FLOAT32	Volume flow:10^-3 m ^{\$} /h[U:0,T:0,S:1]	1-107	4	-3	0
18	INT32	FLOAT32	Volume:10^-1 mº[U:1,T:0,S:1]	1-114	4	-1	0
19	INT32	FLOAT32	Volume:10^0 mº[U:2,T:0,S:1]	1-122	4	0	0
20	INT16	DATE_TYP_G	Date data type G[U:0,T:0,S:1]	1-128	2	0	0
21	SPCL FUNCT	BUFFER	Manufacturer specific data	1-131	44	0	0

Download and test again, the result will look like this:

MB Register	MBUS datatype	MB datatype	Content	MBUS index	MB value HEX	Current MB value
4×00001	BCD8[4]	SINT32	Fabrication number	0	MSW:0026,D1D2:LSW	2544082,0x0026D1D2
4x00003	INT32[4]	UINT32	Energy:10 ⁴ Wh	1	MSW:000A,1ED0:LSW	663248,0x000A1ED0
4×00005	INT32[4]	FLOAT32	Volume:10^-1 m*	2	MSW:45AC;6E66:LSW	5517.7998,5.51779980468750E+3
4x00007	INT32[4]	UINT32	On time:hours	3	MSW:0000,B64B:LSW	46667,0x0000B64B
4×00009	INT32[4]	SINT16	Flow temperature:10^-2 "C->/10^1	4	W0RD:0133	307,0×0133
4x00010	INT32[4]	SINT16	Return temperature:10^-2 *C->/10^1	5	WORD:0028	40,0x0028
4×00011	INT32[4]	SINT16	Temperature difference:10^-2 K->/10^1	6	WORD:010B	267,0x010B
4x00012	INT32[4]	FLOAT32	Power:10 ² W	7	MSW:0000.0000:LSW	0.0000,0.000000000000000E+0
4x00014	INT32[4]	FLOAT32	Power:10 ² W	8	MSW:0000,0000:LSW	0.0000,0.000000000000000E+0

So in general note the following mapping rules:

- 1. Using FLOAT32, FLOAT32R, DOUBLE64, DOUBLE64R as a MODBUS register type for a MBUS value always forces a normalization of the original MBUS value to base 10^{^0} to represent a value according to the defined unit of the MBUS value, to which we are used (°C or Wh or m³, etc.)
- 2. You can now multiply or divide this normalized value by entering a MBUS exponent. A negative exponent will divide the value be the factor 10[^]exponent, a positive exponent will multiply the value by the factor 10[^]exponent before the data is written to the MODBUS register.
- 3. Using other MODBUS data types, the original MBUS data is taken without normalization. Then the MBUS exponent only informs you, what the basis for your value is.
- 4. But again you can multiply or divide the values by entering an exponent into the MODBUS exponent field manually, before the value is written to the MODBUS register. Enter a positive exponent to multiply the original value by 10[^] exponent, enter a negative exponent to divide the value by 10[^] exponent.



43.17 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-MBUSx-SIO-ETH-MODBUS+ASCII-ENxx.pdf

43.17.1 MODBUS register for meter data

This registers are compatible to our old versions of the product (RESI-MBUSx-MODBUS and RESI-MBUSx-ETH). For the mapped MBUS data the converter uses the MODBUS holding registers starting at 4x00001.

Register	Description
4x00001 3x00001 I:0 R/O MODBUS MAPPING	First holding register of MBUS data mapping for first configured MBUS meter
 4x00040 3x00040 I:39 R/O MODBUS MAPPING	Last holding register of MBUS data mapping for last configured MBUS meter for products RESI-MBUS2-SIO RESI-MBUS2-ETH
 4x00400 3x00400 I:399 R/O MODBUS MAPPING	Last holding register of MBUS data mapping for last configured MBUS meter for products RESI-MBUS8-SIO RESI-MBUS8-ETH
 4x01000 3x01000 I:999 R/O MODBUS MAPPING	Last holding register of MBUS data mapping for last configured MBUS meter for products RESI-MBUS24-SIO RESI-MBUS24-ETH
 4x01200 3x01200 I:1199 R/O MODBUS MAPPING	Last holding register of MBUS data mapping for last configured MBUS meter for products RESI-MBUS48-SIO RESI-MBUS48-ETH
 4x01200 3x01200 I:1199 R/O MODBUS MAPPING	Last holding register of MBUS data mapping for last configured MBUS meter for products RESI-MBUS64-SIO RESI-MBUS64-ETH



43.17.2 MODBUS status register for meters

This status registers are compatible to our old versions of the product (RESI-MBUSx-MODBUS and RESI-MBUSx-ETH), but the position is shifted to the MODBUS range starting at 4x09001.

Register	Description
4x09001	Returns the current state of the communication with the meter #1
3x09001	=0: Meter isn't configured
1:9000	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 1	
4x09002-3	UINT32R: Returns the current serial number of the meter #1 as a 32 bit unsigned integer
3x09002-3	value
I:9001-2	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	Ŭ
METER 1	
4x09004	UINT16: Returns the current state of the communication with the meter #2
3x09004	=0: Meter isn't configured
1:9003	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 2	
4x09005-6	UINT32R: Returns the current serial number of the meter #2 as a 32 bit unsigned integer
3x09005-6	value
1:9004-5	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	5 .
METER 2	
4x09022	UINT16: Returns the current state of the communication with the meter #8
3x09022	=0: Meter isn't configured
1:9021	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 8	
4x09023-24	UINT32R: Returns the current serial number of the meter #8 as a 32 bit unsigned integer
3x09024-24	value
1:9022-23	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	
METER 8	
	1



Register	Description
4x09070	UINT16: Returns the current state of the communication with the meter #24
3x09070	=0: Meter isn't configured
1:9069	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 24	
4x09071-72	UINT32R: Returns the current serial number of the meter #24 as a 32 bit unsigned integer
3x09071-72	value
1:9070-71	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	5 1 1 1 1 1 1 1 1 1 1
METER 24	
4x09142	UINT16: Returns the current state of the communication with the meter #48
3x09142	=0: Meter isn't configured
I:9141	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 48	
4x09143-144	UINT32R: Returns the current serial number of the meter #48 as a 32 bit unsigned integer
3x09143-144	value
1:9142-143	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	5 1 1 1 1 1 1 1 1 1 1
METER 48	
4x09190	UINT16: Returns the current state of the communication with the meter #64
3x09190	=0: Meter isn't configured
I:9189	=1: Meter isn't normalized
R/O	=2: Meter isn't read
STATE	=3: Values are valid
METER 64	
4x09191-92	UINT32R: Returns the current serial number of the meter #64 as a 32 bit unsigned integer
3x09191-92	value
I:9190-91	1st.WORD: lower 16 bit of the serial number
R/O	2nd.WORD: higher 16 bit of the serial number
SERIAL NUMBER	
METER 64	
-	1



43.17.3 MODBUS extended status register for meters

This extended status registers are new to our new version of the product (RESI-MBUSx-SIO and RESI-MBUSx-ETH). For every meter there is a set of 10 MODBUS holding registers starting with 4x10001. Mainly this registers represent the information of the MBUS fixed data header:

Ident. Nr.	Manufr.	Version	Medium	Access No.	Status	Signature
4 Byte	2 Byte	1 Byte	1 Byte	1 Byte	1 Byte	2 Byte

This header is sent by many answer frames of the MBUS meter to the master. Due to the fact, that is is not part of the variable data block of the meter, our old converters could not map this information to registers. Our new series map this information to the following register set starting at 4x10001. For each meter there are eight MODBUS entries:

Register	Description
4x10001-2	UINT32: Returns the current serial number of the meter #1 as a 32 bit unsigned integer value
3x10001-2	1st.WORD: higher 16 bit of the serial number
I:10000-1	2nd.WORD: lower 16 bit of the serial number
R/O	
ID NUMBER	Each meter offers a unique ID. In the MBUS protocol there are four bytes reserved for this
METER 1	number. In our gateway we need a UINT32 to represent this 4 bytes of the ID.
4x10003-4	UINT32->ASCII: Returns the current manufacturer of the meter #1 as a 32 bit unsigned
3x10003-4	integer value
I:10002-3	1st.WORD: higher 16 bit of the manufacturer name as ASCII text
R/O	2nd.WORD: lower 16 bit of of the manufacturer name as ASCII text
MANUFACTURER	Each meter offers a manufacturer ID, represented in two bytes. But in this two bytes there are
METER 1	three ASCII digits encoded. Our gateway decode this ASCII digits and stores this digits into a
	UINT32 using ASCII encoding with 0x00 at the end representing a standard null terminated
	ASCII string of three letters. For example the manufacturer KAMSTRUM uses KAM with the
	bytes 0x4B 0x41 0x4D. This will be represented by 32 bit value : 0x004D414B, so the higher
	WORD will be 0x004D and the lower word will be 0x414B.
4x10005	UINT16: Returns the current version of the meter #1
3x10005	In the fixed data header, there is also a version number encoded into one byte. It represents
I:10004	the version of the meter. Our gateway stores this byte into a UINT16 holding register for easy
R/O	readout.
VERSION METER 1	
4x10006	UINT16: Returns the current medium of the meter #1
3x10006	In the fixed data header, there is also a medium number encoded into one byte. it defines
l:10005	what type of medium the meter is measuring. Our gateway stores this byte into a UINT16
R/O	holding register for easy readout.
MEDIUM METER 1	
	The following medium types are defined by the standard for meters with fixed+variable data
	structure:
	0x00: OTHER, 0x01: OIL, 0x02: Electricity, 0x03: Gas, 0x04: Heat-Volume measured at
	return temperature outlet, 0x05: Steam, 0x06: Hot Water, 0x07: Water,
	0x08: H.C.A.=Heat Cost Allocator, 0x09: Compressed Air, 0x0A: Cooling load meter Volume
	measured at return temperature outlet, 0x0B: Cooling load meter Volume measured at flow
	temperature inlet, 0x0C: Heat Volume measured at flow temperature inlet,
	0x0D: Heat/Cooling load meter, 0x0E: Bus/System, 0x0F: Unknown Medium,
	0x16: Cold Water, 0x17: Dual Water, 0x18: Pressure, 0x19: A/D Converter
	For meters with fixed data structure only, the 16 bit value must be interpreted in another way.
	Refer to the MBUS standard for this definition.



Register	Description
4x10007	UINT16: Returns the current access counter of the meter #1
3x10007	In the fixed data header, there is also an access counter encoded into one byte. It will be
1:10006	incremented by every access of the meter data. So each readout of the meter will increment
R/O	this access counter by 1 in the range from 0 to 255. Our gateway stores this byte into a
ACCESS COUNTER	
	UINT16 holding register for easy readout.
METER 1	LUNITAD Determs the summer tester of the mester that
4x10008	UINT16: Returns the current status of the meter #1
3x10008	In the fixed data header, there is also a status field encoded into one byte. It shows the
I:10007	current meter status. Our gateway stores this byte into a UINT16 holding register for easy
R/O	readout.
STATUS	
METER 1	The byte has the following meaning:
	Bit 1+Bit 0: =00 (0) NO ERROR
	Bit 1+Bit 0: =10 (1) APPLICATION NOT READY
	Bit 1+Bit 0: =01 (2) APPLICATION ERROR
	Bit 1+Bit 0: =11 (3) RESERVED
	Bit 2: =1: POWER LOW, =0: POWER OK
	Bit 3: =1: PERMANENT ERROR, =0: NO PERMANENT ERROR
	Bit 4: =1: TEMPORARY ERROR, =0: NO TEMPORARY ERROR
	Bit 5: =1: MANUFACTURER SPECIFIC ERROR 1, =0: NO MANUFACTURER SPECIFIC
	ERROR 1
	Bit 6: =1: MANUFACTURER SPECIFIC ERROR 2, =0: NO MANUFACTURER SPECIFIC
	Bit 7: =1: MANUFACTURER SPECIFIC ERROR 3, =0: NO MANUFACTURER SPECIFIC
	ERROR 3
4x10009	UINT16: Returns a future value of the meter #1
3x10009	This UINT16 holding register is reserved for future use.
l:10008	
R/O	
FUTURE VALUE	
METER 1	
4x10010	UINT16: Returns the current state of the communication with the meter #1
3x10010	This UINT16 holding register hold the current state of the communication between the MBUS
1:10009	gateway and the meter with the following states:
R/O	=0 - Meter isn't configured!: This value shows, that this meter slot is currently not configured
COMMUNICATION	in the MBUS gateway
STATE	=1 - Meter isn't normalized!: This value shows, that the configured meter doesn't answer to
METER 1	the addressing command. Either via primary addressing or via secondary addressing mode.
	This depends, how the meter was configured
	=2 - Meter isn't read!: This value shows, that the configured meter has answered to the
	addressing command but there are problems by reading all data from the meter. So the meter
	data is not valid any more
	=3 - Values are valid!: This value shows, that the configured meter has answered to the
	addressing command and has answered correctly to the readout commands and the reading
	of all data from the meter was successful. So the meter data in the MODBUS register is valid
	=100065535 – meter readout is asynchron!: If the mapping of the received MBUS frame
	differ to the mapping from the configuration, this value shows the position of the first
	asynchron received data: Value=1000+MBUS record*1000+MBUS byte Index within record. If
	MBUS record number >=64, the received value is always 1000+64*1000+MBUS byte index.



Register	Description
4x10011-12	UINT32: Returns the current serial number of the meter #2 as a 32 bit unsigned integer value
3x10011-12	
I:10010-11	Refer to meter #1 description
R/O	
ID NUMBER	
METER 2	
4x10013-14	UINT32->ASCII: Returns the current manufacturer of the meter #2 as a 32 bit unsigned
3x10013-14	integer value
I:10012-13	
R/O	Refer to meter #1 description
MANUFACTURER	
METER 2	
4x10015	UINT16: Returns the current version of the meter #2
3x10015	
1:10014	Refer to meter #1 description
R/O	
VERSION METER 2	
4x10016	UINT16: Returns the current medium of the meter #2
3x10016	
1:10015	Refer to meter #1 description
R/O	
MEDIUM METER 2	
4x10017	UINT16: Returns the current access counter of the meter #2
3x10017	
1:10016	Defer to mater #1 department
R/O	Refer to meter #1 description
ACCESS COUNTER	
METER 2	
	UINT16: Returns the current status of the meter #2
4x10018	OINT 16. Returns the current status of the meter #2
3x10018	Defente meter #4 description
I:10017	Refer to meter #1 description
R/O	
STATUS METER 2	LUNITAC: Detune a future value of the meter #0
4x10019	UINT16: Returns a future value of the meter #2
3x10019	Defende meter #4 description
I:10018	Refer to meter #1 description
FUTURE VALUE	
METER 2	
4x10020	UINT16: Returns the current state of the communication with the meter #2
3x10020	
I:10019	Refer to meter #1 description
R/O	
COMMUNICATION	
STATE	
METER 2	



Register	Description
	•
4x10071-72	UINT32: Returns the current serial number of the meter #8 as a 32 bit unsigned integer value
3x10071-72	
I:10070-71	Refer to meter #1 description
R/O	
ID NUMBER	
METER 8	
4x10073-74	UINT32->ASCII: Returns the current manufacturer of the meter #8 as a 32 bit unsigned
3x10073-74	integer value
1:10072-73	
R/O	Refer to meter #1 description
MANUFACTURER	
METER 8	
4x10075	UINT16: Returns the current version of the meter #8
3x10075	
1:10074	Refer to meter #1 description
R/O	
VERSION METER 8	
4x10076	UINT16: Returns the current medium of the meter #8
3x10076	
1:10075	Refer to meter #1 description
R/O	
MEDIUM METER 8	
4x10077	UINT16: Returns the current access counter of the meter #8
3x10077	
1:10076	Refer to meter #1 description
R/O	
ACCESS COUNTER	
METER 8	
4x10078	UINT16: Returns the current status of the meter #8
3x10078	
1:10077	Refer to meter #1 description
R/O	
STATUS METER 8	
4x10079	UINT16: Returns a future value of the meter #8
3x10079	
1:10078	Refer to meter #1 description
R/O	
FUTURE VALUE	
METER 8	
4x10080	UINT16: Returns the current state of the communication with the meter #8
3x10080	
1:10079	Refer to meter #1 description
R/O	
COMMUNICATION	
STATE	
METER 8	
•••	1



Register	Description
4x10231-232	UINT32: Returns the current serial number of the meter #24 as a 32 bit unsigned integer
3x10231-232	value
I:10230-231	
R/O	Refer to meter #1 description
ID NUMBER	
METER 24	
4x10233-234	UINT32->ASCII: Returns the current manufacturer of the meter #24 as a 32 bit unsigned
3x10233-234	integer value
1:10232-233	
R/O	Refer to meter #1 description
MANUFACTURER	
METER 24	
4x10235	UINT16: Returns the current version of the meter #24
3x10235	
1:10234	Refer to meter #1 description
R/O	
VERSION METER	
24	
4x10236	UINT16: Returns the current medium of the meter #24
3x10236	OINT TO. Returns the current medium of the meter #24
	Defer to mater #1 description
1:10235	Refer to meter #1 description
MEDIUM METER 24	
4x10237	UINT16: Returns the current access counter of the meter #24
3x10237	
1:10236	Refer to meter #1 description
R/O	
ACCESS COUNTER	
METER 24	
4x10238	UINT16: Returns the current status of the meter #24
3x10238	
I:10237	Refer to meter #1 description
R/O	
STATUS METER 24	
4x10239	UINT16: Returns a future value of the meter #24
3x10239	
I:10238	Refer to meter #1 description
R/O	
FUTURE VALUE	
METER 24	
4x10240	UINT16: Returns the current state of the communication with the meter #24
3x10240	
1:10239	Refer to meter #1 description
R/O	
COMMUNICATION	
STATE	
METER 24	
·····	



Register	Description
4x10471-472	UINT32: Returns the current serial number of the meter #48 as a 32 bit unsigned integer
3x10471-472	value
I:10470-471	
R/O	Refer to meter #1 description
ID NUMBER	
METER 48	
4x10473-474	UINT32->ASCII: Returns the current manufacturer of the meter #48 as a 32 bit unsigned
3x10473-474	integer value
I:10472-473	
R/O	Refer to meter #1 description
MANUFACTURER	
METER 48	
4x10475	UINT16: Returns the current version of the meter #48
3x10475	
I:10474	Refer to meter #1 description
R/O	
VERSION METER	
48	
4x10476	UINT16: Returns the current medium of the meter #48
3x10476	
I:10475	Refer to meter #1 description
R/O	
MEDIUM METER 48	
4x10477	UINT16: Returns the current access counter of the meter #48
3x10477	
I:10476	Refer to meter #1 description
R/O	
ACCESS COUNTER	
METER 48	
4x10478	UINT16: Returns the current status of the meter #48
3x10478	
I:10477	Refer to meter #1 description
R/O	
STATUS METER 48	
4x10479	UINT16: Returns a future value of the meter #48
3x10479	
I:10478	Refer to meter #1 description
R/O	
FUTURE VALUE	
METER 48	
4x10480	UINT16: Returns the current state of the communication with the meter #48
3x10480	
I:10479	Refer to meter #1 description
R/O	
COMMUNICATION	
STATE	
METER 48	



Register	Description
	·
4x10631-632	UINT32: Returns the current serial number of the meter #64 as a 32 bit unsigned integer
3x10631-632	value
I:10630-631	
R/0	Refer to meter #1 description
ID NUMBER	
METER 64	
	UINT32->ASCII: Returns the current manufacturer of the meter #64 as a 32 bit unsigned
	integer value
1:10632-633	
	Refer to meter #1 description
MANUFACTURER	
METER 64	
	UINT16: Returns the current version of the meter #64
3x10635	
	Refer to meter #1 description
R/O	
VERSION METER	
64	
-	UINT16: Returns the current medium of the meter #64
3x10636	O(11) O(11
	Refer to meter #1 description
R/O	
MEDIUM METER 64	
	UINT16: Returns the current access counter of the meter #64
4x10637 3x10637	UNITIO. Returns the current access counter of the meter #04
	Defer to motor #1 description
R/O	Refer to meter #1 description
ACCESS COUNTER	
METER 64	
	UINT16: Returns the current status of the meter #64
	UNITIO. Returns the current status of the meter #64
3x10638 I:10637	Defer to motor #1 description
	Refer to meter #1 description
R/O	
STATUS METER 64 4x10639	LUNT16: Deturne a future value of the motor #64
	UINT16: Returns a future value of the meter #64
3x10639 I:10638	Refer to meter #1 description
R/O	
FUTURE VALUE	
METER 64	UINT16: Returns the current state of the communication with the meter #64
	UNIT TO. Returns the current state of the communication with the meter #64
3x10640	Defer to motor #1 description
	Refer to meter #1 description
R/O	
STATE	
METER 64	



43.17.4 MODBUS registers for special configuration

This registers hold special information for the converter:

RegisterDescription4x65231UINT16: The baud rate for the MBUS interface. Parity is always EVEN, ONE stop bit3x65231The following baud rates are available:1:65230300,600,900,1200,2400,4800,9600,19200,38400,57600R/WAll other values are interpreted as 2400 baud.MBUS BAUDRATEHINT: After writing a new value to this register a reboot is necessary to activate the necessary to activat	
I:65230 R/W MBUS BAUDRATE300,600,900,1200,2400,4800,9600,19200,38400,57600 All other values are interpreted as 2400 baud.HINT: After writing a new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register activate the new value to the new value to this register a reboot is necessary to activate the new value to this register activate the new value to the new valu	èw
R/W MBUS BAUDRATEAll other values are interpreted as 2400 baud.HINT: After writing a new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to this register a reboot is necessary to activate the new value to th	2W
MBUS BAUDRATE HINT: After writing a new value to this register a reboot is necessary to activate the ne	ew
HINT: After writing a new value to this register a reboot is necessary to activate the ne	ew
	ew 🛛
4x65232 UINT16: The query timeout for the MBUS polling process.	
3x65232 This value defines the timeout between two query cycles in the gateway. Usually the	
I:65231 communicates with all configured meters sequentially. After finishing the data readout	for the
R/W last meter, the gateway pauses for this defined interval in seconds.	
MBUS QUERY This values are used:	
TIMEOUT Value 65535 or values 05 defines ~5s pause.	
Values 6 to 65534: defines 6 to 65534 seconds of pause, before the next polling cycle	e will
start.	
LUNT. After uniting a new value to this register a reheat is reasonable to estimate the re-	
HINT: After writing a new value to this register a reboot is necessary to activate the ne	ew
settings 4x65233 UINT16: The poll delay for the MBUS polling process.	
3x65233 This value defines a general pause after the readout of a configured meter before the	roodout
1:65232 If the next meter starts. In the past we discovered that there are many meters out in t	
R/W market, which need a special treatment in the timing. e.g. very old KAMSTRUP meter	
MBUS POLL DELAY often two readout cycles with a gap of at least 10-15 seconds. This is non standard to	
MBUS. Or other meters have problems with secondary addressing, if there is a too sr	
between the readout. So we introduced this new parameter: This timeout defines the	
after finishing reading of a meter and starting reading the next meter. In the previous	
versions this timeout was fixed to 250ms gap, which was ok for 99% of the meter read	
the markets. But some meter fail to process this little gap.	
The values is interpreted as follows:	
Value 130: Gap time 1 seconds to 30 seconds	
Value 101400: Gaptime=(Value-100)*0.1s \rightarrow 0.1s 30s e.g. 105 \rightarrow 0.5s	
Value 65535: Gap time is 1 second	
Value 65534: Gap time is 250ms	
Value 65533: Gap time is 500ms	
Value 65532: Gap time is7250ms	
All other values: Gap time is 1000ms	
HINT: After writing a new value to this register a reboot is necessary to activate the ne	ew
settings	



43.18 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-MBUSx-SIO-ETH-MODBUS+ASCII-ENxx.pdf



44 RESI-KNX-SIO, RESI-KNX-ETH

44.1 General information

With the RESI-KNX-SIO gateway, the KNX can be integrated in almost every system with a RS232 or RS485 interface and a MODBUS/RTU master protocol or serial ASCII text based protocol. The RESI-KNX-ETH gateway offers an integration with MODBUS/TCP server protocol over Ethernet.

The gateway is a serial interface for connection to the KNX with an integrated 2 wire KNX bus-coupler. The timecritical KNX communication is done from the gateway itself. The gateway is configured with our MODBUSConfigurator software and maps the incoming KNX telegrams to MODBUS holding registers. When the host writes to a MODBUS holding register, the gateway generates the corresponding KNX telegram. When the gateway receives a KNX telegram, it maps and converts the incoming data to the specific MODBUS holding registers for readout through a host.

To control our KNX converters you need a host system with a serial interface (RS232 or RS485), which is able to send ASCII command strings and which can receive ASCII characters. This feature is implemented in almost any media control system like CRESTRON®, AMX® or CONTROL4®. But almost every standard PLC can handle serial ASCII interfaces. Therefore our converter can be integrated everywhere. If the host system offers a MODBUS/RTU master or MODBUS/TCP client interface, our converter can be controlled via MODBUS holding registers.

This series of IO modules offer the following features:

- Easy integration of a complete KNX bus system
- MODBUS/RTU slave or MODBUS/TCP server protocol
- Additional commands with plain ASCII texts
- KNX and host interface are galvanically isolated
- Supports all 65535 KNX group addresses
- Supports all KNX DPT types
- Integrated KNX bus-coupler
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system

BESI BESI

Figure: Our serial KNX module





Figure: Our Ethernet IO module



44.2 Technical specification

Beside the basic technical data, which fulfil all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-KNX-SIO	<0.6W
RESI-KNX-ETH	<0.9W
Product housing	
RESI-KNX-SIO	CEM17
RESI-KNX-ETH	CEM35
Product weight	
RESI-KNX-SIO	57g
RESI-KNX-ETH	91g
KNX bus interface	
Protocol	KNX
Baud rate	9600kBit/s
Cable connection	via terminals
Galvanic isolation	Yes
LED indicator	Yes
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stopbits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.220
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI



44.3 Additional terminals & LED states

KNX INTERFACE	KNX bus connector	
	One 3 pin terminal	blocks
	Terminal type:	USLIM
	K+:	KNX+ bus wire (red)
	K-:	KNX- bus wire (black)
Pin layout	K+:	KNX+ bus wire (red)
	N/C:	not connected
	К-:	KNX- bus wire (black)
KNX	If there is bus comn	nunication on the KNX, this LED is on
	Otherwise this LED	is OFF



44.4 RESI-KNX-SIO: Connection diagram

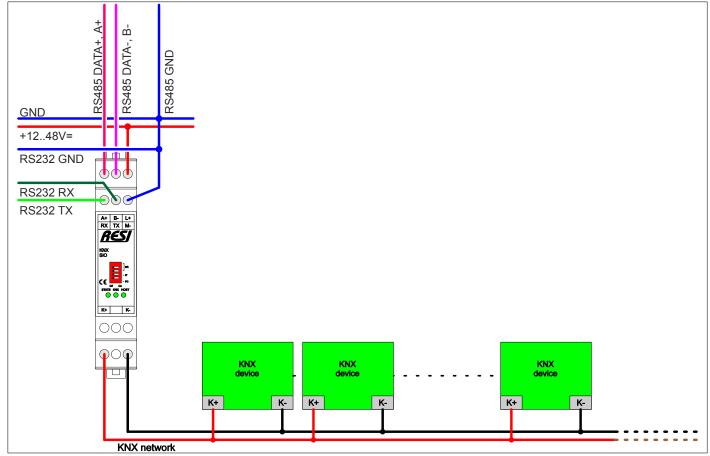


Figure: Connecting a KNX bus system to the RESI-KNX-SIO gateway



44.5 RESI-KNX-ETH: Connection diagram

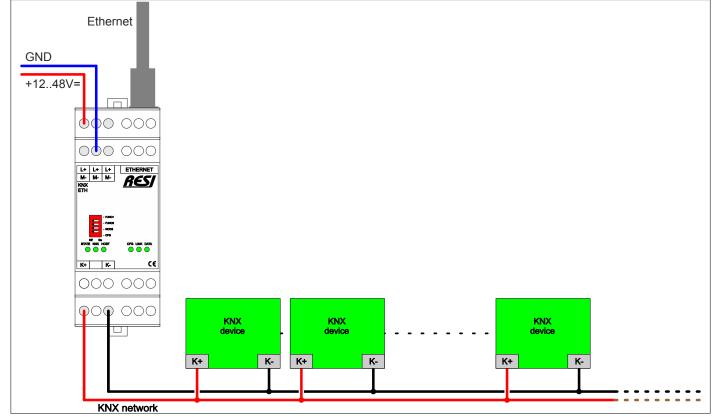


Figure: Connecting a KNX bus system to the RESI-KNX-ETH gateway



44.6 Configuration with MODBUSConfigurator software

Download our free software from our homepage www.RESI.cc and install it on your computer. After you have successfully established a connection, you will see the following picture for the RESI-KNX-SIO or RESI-KNX-ETH gateways:

	Local COM port s	ettings								
	Modbus unit 255	Device: C	0M4 💌 S)	pabits Tetopbit	 IP-Address. 					
	Baudrate: 57800				Port]			
	Device specific									
		onigTest.com	ection A Test							
□-□ New Project □ ⊕ BESEKNX/SIO - [BESEKNX/SID]	RESHINK-SIO			KNKto MODEUS/R	EU+ASCI module					
- TP RESPARATO - [RESPARATO]	Software version:	1.1.0								
	State	no erro	r							
	Upland conig									
	MODBUS					NNN -		7		
	Address: 255	 Baudrote: 5760 				Address: [15.]				
	MCDBUS register	MODBUS dototype	MODBUS interval	KNX group	KNK datatype	KNK cirection	Factor	Value	Comment	

In the section device specific you will find the following functions:

Local COM	port settings										
Modbus unit:	255 🔹	Device:	COM4	-	Stopbits	1 stopbit	-	IP-Address:			
Baudrate:	57600 🔹	Parity:	NONE	-				Port:			
Device spe	cific										
	nload config	_ <u>T</u> est cor	nection		st						
RESI-KNX-SI	0				KNX to	MODBUS/F	RTU+AS	SCII module			
Software vers	sion: 1.1.0										
State:		no e	rror								
Upload config	g										
MODBUS Address: 2	55 – Bai	udrate: 57	600	▼ Parity:	NONE	▼ St	opbits:	1 stopbit 💌	KNX Address:	15.15.255	

- Button "Download config": If you change the MODBUS/RTU slave address, or the serial parameters or KNX address or if you change the KNX mapping, you have to download the new configuration to the gateway to activate the changes.
- Button "Upload config": With this button you can upload the complete mapping of the converter into the software. But remember, the comments are not stored into the gateway, so this information is lost, if you upload the mapping from a gateway!
- Button "Test connection": This button tests, if the software can communicate with the gateway or not.
- Button "Test": This button activates/deactivates a test function, which will show all current contents of the configured MODBUS registers in the converter. In this test mode, you can also write to MODBUS/RTU holding registers and generate a KNX telegram on the KNX bus. The software polls every 5 seconds all configured MODBUS registers.



44.6.1 The configuration table

In the device specific region you will see a table with the current configuration of the MODBUS/KNX mapping:

Local COM port se	ettings								
fodbus unit 255	 Device: C 	OM4 👻 St	opbits 1 stopbit	 IP-Address 	e -				
audrate: 57600		ONE 🔹		Port:					
evice specific									
Download co	-OD- Testano	ection C. Test							
	I Lest conni								
ESH(NX-SI0			KNX to MODBUS	/RTU+ASCII module					
oftware version:	1.1.0								
tate:	no erro	r							
pload config									
(ODBUS ddress: 255	▼ Baudrate: 5760	0 🔻 Parity:	NONE -	Stophits: 1 stophit	KNK Address: 15	5.15.255			
IODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment	
1	SINT16	0	1.1.3	FLOAT16	READ	10	2222	F1.03 VL-Pelletskessel	
2	SINT16	0	1.1.4	FLOAT16	READ	10	2225	F1.04 RL-Pelletskessel	
3	SINT16	U	1.1.7	FLOAT16	READ	10	2222	F1.07 VL-Pelletskessel	
4	SINT16	U	1.1.8	FLOAT16	READ	10	7777	F1.08 RL-Pelletskessel	
5	SINT16	0	1.1.9	FLOAT16	READ	10	7777	F1.09 Aussentemperatur	
6	SINT16	D	1.2.1	FLOAT16	READ	10	7777	F2.01 Pufferspeicher 1	
7	SINT16	0	1.2.6	FLOAT16	READ	10	2222	F2.06 Pufferspeicher 2	
8	SINT16	0	1.2.11	FLOAT16	READ	10	7777	F2.11 Pufferspeicher 3	
9	SINT16	0	1.2.17	FLOAT16	READ	10	7777	F2.17 Pufferspeicher 4	
10	SINT16	0	1.2.22	FLOAT16	READ	10	7777	F2.18 Pufferspeicher 5	
d1	SINT16	0	1.3.1	FLOAT16	READ	10	7777	F3.01 VL-Solarsystem	
x12	SINT16	0	1.3.2	FLOAT16	READ	10	7777	F3.02 RL-Solarsystem	
x13	SINT16	0	1.4.1	FLOAT16	READ	10	2222	F4.01 VL-Heizsystem	
x14	SINT16	0	1.4.2	FLOAT16	READ	10	7777	F4.02 VL-Heizsystem	
x15	SINT16	0	1.4.3	FLOAT16	READ	10	2222	F4.03 RL-Heizsystem	
x16	SINT16	0	1.4.4	FLOAT16	READ	10	7777	F4.04 RL-Zirkulation	
x17	UINT16	0	10.3.5	BIT	READ	1	????	V3.01 Ventil unterer WT	
<18	UINT16	0	10.3.6	BIT	READ	1	7777	V3.02 Ventil unterer WT	
c19	SINT32	0	9.3.4	UINT32	READ	0.001	????	Z3.01.01 WMZ RL-Solar Q	
<21	SINT32	0	9.3.6	UINT32	READ	0.001	2222	Z3.01.02 WMZ RL-Solar V	
c23	SINT16	0	1.3.1	FLOAT16	READ	10	????	Z3.01.03 WMZ T-VL	
c24	SINT16	0	1.3.2	FLOAT16	READ	10	2222	23.01.04 WMZ T-RL	
c25	SINT32	0	9.3.2	UINT32	READ	0.001	2222	Z3.01.05 WMZ RL-Solar P	
@7	SINT32	0	9.3.5	UINT32	READ	0.001	2222	Z3.01.06 WMZ RL-Solar dV	
k29	SINT32	0	9.4.29	UINT32	READ	0.001	2222	Z4.01.01 WMZ RL-Heizsystem Q	
c31	SINT32	0	9.4.30	UINT32	READ	0.001	2225	Z4.01.02 WMZ RL-Heizsystem V	
c33	SINT16	0	1.4.2	FLOAT16	READ	10	2222	24.01.03 WMZ T-VL	
(34	SINT16	U	1.4.3	FLOAT16	READ	10	2555	24.01.04 WMZ T-RL	
(35	SINT32	U	9.4.21	UINT32	READ	0.001	????	24.01.05 WMZ RL-Heizsystem P	
37	SINT32	U	9.4.31	UINT32	READ	0.001	2222	Z4.01.06 WMZ RL-Heizsystem dV	
39	SINT32	U	9.4.32	UINT32	READ	0.001	2222	24.02.01 WMZ VL-Zirkulation Q	
41	SINT32	U	9.4.34	UINT32	READ	0.001	2222	Z4.02.02 WMZ VL-Zirkulation V	
(43	SINT16	U	1.4.1	FLOAT16	READ	10	2222	24.02.03 WMZ T-VL	
x44	SINT16	U	1.4.4	FLOAT16	READ	10	2222	24.02.04 WMZ T-RL	
x45	SINT32	U	9.4.27	UINT32	READ	0.001	7777	24.02.05 WMZ VL-Zirkulation P	
x47	SINT32	U	9.4.33	UINT32	READ	0.001	7777	Z4.02.06 WMZ VL-Zirkulation dV	
x49	SINT16	U	1.3.4	FLOAT16	READ	10	7777	F3.04 T-Kollektoren 1	
x50	SINT16	U	1.3.5	FLOAT16	READ	10	7777	F3.05 T-Kollektoren 2	
x51	SINT32	U	9.4.35	UINT32	READ	0.001	7777	Z4.04.01 WMZ RL-Heizsystem Haus A Q	
x53	SINT32	U	9.4.37	UINT32	READ	0.001	7777	Z4.04.02 WMZ RL-Heizsystem Haus A V	
x55	SINT16	U	1.4.25	FLOAT16	READ	10	2222	Z4.04.03 WMZ T-VL	

A mapping entry consists out of the following entries:

- MODBUS register: The number of the single holding register or the start index of the holding registers, if more than one register is used, into which the incoming KNX data is stored or from which the outgoing KNX value is read before sending KNX data.
- MODBUS datatype: The data type for the MODBUS registers. It defines how the gateway converts KNX data into MODBUS data and how many MODBUS registers are used to store the KNX data.
- MODBUS interval: This is for future use and defines the time interval in seconds to request KNX data from the KNX bus automatically. At the moment this feature is not used.
- KNX group: this defines the KNX group address, which is used to send/receive KNX data for this MODBUS registers.
- KNX datatype: This defines the KNX datatype, which is used to send/receive data with the specific KNX group on the KNX bus.
- KNX direction: This defines in which direction the communication is done: You can read, write or read/write data from/to the KNX bus.
- Factor: This defines a factor which is used to multiply incoming KNX data before the data is stored into the MODBUS registers. For outgoing KNX telegrams the data of the MODBUS registers is divided by this factor, before sending to the KNX bus. A zero value defines unused.
- Value: If Test mode is active, here you will find the current received value for this mapping entry or you can write onto this value to send aKNX value to the KNX system.
- Comment: This defines a user specific comment for this mapping line. This is only for documentation reasons and is not stored into the gateway. It is only stored on the PC if you save your project. If you upload a configuration from a gateway into the software, this comment is lost!



44.6.2 The context menu

If you right click into the table, a local context menu will appear with the following entries:

Edit entry
Add entry
Insert entry
Copy entry
Delete selected entries
Clear complete list
Renumber MODBUS registers
Renumber KNX groups
Sort MODBUS register
Sort KNX group
Find MODBUS register
Find KNX Group
Find comment
Copy to clipboard
Paste from clipboard

44.6.2.1 Context menu: Add entry

Entry "Add entry...": If you select this item, a new empty configuration line is added to the configuration list.

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	0.0.0	BIT	READ-WRITE	1.00	2222	no comment
4x2	UINT16	0	0.0.1	BIT	READ-WRITE	1.00	????	no comment

44.6.2.2 Context menu: Delete selected lines

Entry "Delete selected lines...": First select one or more lines in your configuration table. To select more than one line press and hold the STRG key or the SHIFT key, and then select other lines.

MODBUS register	MODBUS datatype	MODBUS interval	KNX grou	p KNX datatype	KNX direction		Factor	Value	Comment
4x1	UINT16	0	0.0.0	BIT	READ-WRIT	E	1.00	2222	no comment
4x2	UINT16	0	0.0.1	BIT	READ-WRIT		1.00	????	no comment
4x3	UINT16	0	0.0.2	ОГТ		_	1.00	????	no comment
4x4	UINT16	0	010	Edit entry	n	E	1.00	????	no comment
				Add entry	-				
				Insert entry					
				Copy entry					
				Delete selected entries					
				Clear complete list					
				Renumber MODBUS re	gisters				
				Renumber KNX groups					
				Sort MODBUS register					
				Sort KNX group					
				Find MODBUS register	-				
				Find KNX Group					
				Find comment					
				Copy to clipboard					
				Paste from clipboard					

Then open the context menu and select the function "Delete selected lines...". The system will delete the selected lines from the configuration list. The result will be like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	0.0.0	BIT	READ-WRITE	1.00	2225	no comment
4x4	UINT16	0	0.0.3	BIT	READ-WRITE	1.00	????	no comment



44.6.2.3 Context menu: Insert entry

Entry "Insert entry...": First select one or more lines. Then choose this function from the local context menu. The system now inserts a new configuration line directly after each selected line in the configuration.

MODBUS register	r MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
lx1	LUNTTE	0	0.0.0	BIT	READ-WRITE	1	????	no comment
lx4	Edit entry		0.0.3	BIT	READ-WRITE	1	2222	no comment
	Add entry							
	Insert entry							
	Copy entry							
	Delete selected entries							
	Clear complete list							
Renumber MODBUS registe	ers							
	Renumber KNX groups							
	Sort MODBUS register							
	Sort KNX group							
	Find MODBUS register							
	Find KNX Group							
	Find comment							
	Copy to clipboard							
	Paste from clipboard							

The result will be like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	0.0.3	BIT	READ-WRITE	1	????	no comment

44.6.2.4 Context menu: Copy entry

Entry "Copy entry...": First select one or more lines. Then choose this function from the local context menu:

10DBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
d	LUNTTO		0.0.0	BIT	READ-WRITE	1	????	no comment
	Edit entry							
	Add entry							
	Insert entry							
	Copy entry							
	Delete selected entries							
	Clear complete list							
Renum	Renumber MODBUS reg	gisters						
	Renumber KNX groups							
	Sort MODBUS register							
	Sort KNX group							
	Find MODBUS register							
	Find KNX Group							
	Find comment							
	Copy to clipboard							
	Paste from clipboard							

The system copies all selected lines and adds for each selected line a new entry to the configuration. The result looks like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment

As you will notice, the system auto increments the MODBUS/RTU register index depending to the configured MODBUS datatype. The same increment is done with the KNX group address.



44.6.2.5 Context menu: Clear complete list

Entry "Clear complete list": After selecting this function the system asks the following question:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment			
lx1	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment			
4x2	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment			
)							
	DELETE COMPLETE	CONFIGURATION		8							
	Po you r ?	really want to delete the c	omplete KNX config								
	Ja Nein										

If you answer with YES, all entries of your configuration will be deleted forever! The answer NO cancels this function.

44.6.2.6 Context menu: Renumber MODBUS registers

Entry "Renumber MODBUS registers": First select the lines you want to renumber, then select this function from the local context menu:

10DBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
2	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment
đ	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment
<12	E dia antara		0.0.2	BIT	READ-WRITE	1	????	no comment
x7	Edit entry		0.0.3	BIT	READ-WRITE	1	????	no comment
	Add entry							
	Insert entry							
	Copy entry							
	Delete selected entries							
	Clear complete list							
	Renumber MODBUS regist	ers						
	Renumber KNX groups							
	Sort MODBUS register							
	Sort KNX group							
	Find MODBUS register							
	Find KNX Group							
	Find comment							
	Copy to clipboard							
	Paste from clipboard							

The starting index of the MODBUS register of the first selected line is used for the first entry. The next lines are renumbered depending on the MODBUS datatype of each line. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x2	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	0.0.2	BIT	READ-WRITE	1	????	no comment
4x5	UINT16	0	0.0.3	BIT	READ-WRITE	1	????	no comment



44.6.2.7 Context menu: Renumber KNX groups

Entry "Renumber KNX groups": First select the lines you want to renumber. Then select this function from the local context menu.

ODBUS r	egister	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
×2		UINT16	0	1.3.4	BIT	READ-WRITE	1	????	no comment
. 3		LIINT16	<u>0</u>	0.0.1	BIT	READ-WRITE	1	????	no comment
K4	Edit entr	y)	0.0.2	BIT	READ-WRITE	1	????	no comment
c5	Add entr	ry		0.0.3	BIT	READ-WRITE	1	????	no comment
_	Insert en	try							
_	Copy en	try							
	Delete se	elected entries							
_	Clear co	mplete list							
_	Renumb	er MODBUS registers							
	Renumb	er KNX groups							
	Sort MO	DBUS register							
_	Sort KND	(group							
	Find MO	DBUS register							
	Find KN0	K Group							
	Find con	nment							
_	Copy to	clipboard							
	Paste fro	m clipboard							

The KNX group address of the first selected line is used for the first entry. All selected lines are now renumbered with an ascending KNX group address. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x2	UINT16	0	1.3.4	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	1.3.5	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	1.3.6	BIT	READ-WRITE	1	????	no comment
4x5	UINT16	0	1.3.7	BIT	READ-WRITE	1	????	no comment

44.6.2.8 Context menu: Sort MODBUS register

Entry "Sort MODBUS register": First select one or more lines you want to sort. Then select this function from the local context menu.

ODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
:10	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment
:5	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment
7	UINT16	0	0.0.2	BIT	READ-WRITE	1	????	no comment
8	UINT16	0	0.0.3	BIT	READ-WRITE	1	????	no comment
1	UINT16	0	0.0.4	BIT	READ-WRITE	1	????	no comment
1	LINTIC	0	0.0.5	BIT	READ-WRITE	1	????	no comment
Edit entry								
Add entry								
Insert entry								
Copy entry								
Delete select	ed entries							
Clear compl	ete list							
Renumber M	10DBUS registers							
Renumber K	NX groups							
Sort MODBU	IS register							
Sort KNX gro	oup							
Find MODBU	JS register							
Find KNX Gr	oup							
Find comme	ent							
Copy to clip	board							
Paste from c	lipboard							



MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x10 4x5 4x7 4x8 4x1 4x1 4x4	UINT16 UINT16 UINT16 UINT16 UINT16 UINT16	0 0 0 0 0	0.0.0 0.0.1 0.0.2 0.0.3 0.0.4 0.0.5	BIT BIT BIT BIT BIT BIT	READ-WRITE READ-WRITE READ-WRITE READ-WRITE READ-WRITE READ-WRITE	1 1 1 1 1	7777 7777 7777 7777 7777 7777 7777	no comment no comment no comment no comment no comment
	SORT LI	IST MODBUS REGISTERS	sort the list with M	DDBUS Registers as sort i	ndex ?			
				Ja	Nein			

If you answer the above question with YES, the system sorts the select line using the MODBUS address as a sort key in ascending order. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	0.0.4	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	0.0.5	BIT	READ-WRITE	1	????	no comment
4x5	UINT16	0	0.0.1	BIT	READ-WRITE	1	????	no comment
4x7	UINT16	0	0.0.2	BIT	READ-WRITE	1	????	no comment
4x8	UINT16	0	0.0.3	BIT	READ-WRITE	1	????	no comment
4x10	UINT16	0	0.0.0	BIT	READ-WRITE	1	????	no comment

44.6.2.9 Context menu: Sort KNX group

Entry "Sort KNX group": After selecting one or more lines for sorting, choose this function from the local context menu:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
1x1	UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
lx2	UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment
lx3	UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
Edit ent	try		7.5.45	BIT	READ-WRITE	1	????	no comment
Add en	try							
Insert e	ntry							
Сору е	ntry							
Delete	selected entries							
Clear c	omplete list							
Renum	ber MODBUS registers							
Renum	ber KNX groups							
Sort M	ODBUS register							
Sort KN	IX group							
Find M	ODBUS register							
Find KN	IX Group							
Find co	mment							
Copy to	o clipboard							
Paste fr	om clipboard							

MODBUS register	MODBUS	datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1 4x2 4x3 4x4	UINT16 UINT16 UINT16 UINT16		0 0 0	1.5.57 7.5.255 1.5.68 7.5.45	BIT BIT BIT BIT	READ-WRITE READ-WRITE READ-WRITE READ-WRITE	1 1 1 1	???? ???? ???? ????	no comment no comment no comment no comment
	SORT	SORT LIST KN	GROUPS		8				
		<u>À</u> Do	you really want to sort th	he list with KNX groups	as sort index ?				
				Ja	Nein				

If you answer the above question with YES, the system sorts the selected lines using the KNX group address as a sort index in ascending order. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	7.5.45	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment



44.6.2.10 Context menu: Find MODBUS register

Entry "Find MODBUS register": After selecting this function from the local context menu, an input window will appear. Enter a valid MODBUS register index and press the OK button.

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	7.5.45	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment
	(ก				
	Search for M	ODBUS register	×	1				
		ODBUS register betwe	en 1 and 65536					
	(base=1)							
	3							
	,							
	Г							
		OK Abbre	echen					

The system will now select all lines, in which the MODBUS register matches the entered number. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	7.5.45	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment

44.6.2.11 Context menu: Find KNX group

Entry "Find KNX group": After selecting this function from the local context menu, an input window will appear:

MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
UINT16	0	7.5.45	BIT	READ-WRITE	1	????	no comment
UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment
Search for KNX group		×					
Enter a KNX group betwe 7.5.45	een 0.0.0 and 31.7.255						
	UINT16 UINT16 UINT16 UINT16 Search for KNX group Enter a KNX group betwee [7.5.45]	UINT16 0 UINT16 0 UINT16 0 UINT16 0 UINT16 0 Search for KNX group Enter a KNX group between 0.0.0 and 31.7.255 [7.5.45]	UINT16 0 1.5.57 UINT16 0 1.5.68 UINT16 0 7.5.45 UINT16 0 7.5.255	UINT16 0 1.5.57 BIT UINT16 0 1.5.68 BIT UINT16 0 7.5.45 BIT UINT16 0 7.5.255 BIT Search for KNX group Enter a KNX group between 0.0.0 and 31.7.255 [7.5.45]	UINT16 0 1.5.57 BIT READ-WRITE UINT16 0 1.5.68 BIT READ-WRITE UINT16 0 7.5.45 BIT READ-WRITE UINT16 0 7.5.255 BIT READ-WRITE Search for KNX group Image: Comparison of the second secon	UINT16 0 1.5.57 BIT READ-WRITE 1 UINT16 0 1.5.68 BIT READ-WRITE 1 UINT16 0 7.5.45 BIT READ-WRITE 1 UINT16 0 7.5.255 BIT READ-WRITE 1 Search for KNX group Image: Comparison of the second	UINT16 0 1.5.57 BIT READ-WRITE 1 ???? UINT16 0 1.5.68 BIT READ-WRITE 1 ???? UINT16 0 7.5.45 BIT READ-WRITE 1 ???? UINT16 0 7.5.255 BIT READ-WRITE 1 ???? Search for KNX group Image: Comparison of the state o

Enter a valid KNX group address. The system now selects all lines in the list, which matches with the entered KNX group address. The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
<mark>4x1</mark>	UINT16	0	1.5.57	BIT	READ-WRITE	1	????	no comment
4x3	UINT16	0	1.5.68	BIT	READ-WRITE	1	????	no comment
4x4	UINT16	0	7.5.45	BIT	READ-WRITE	1	????	no comment
4x2	UINT16	0	7.5.255	BIT	READ-WRITE	1	????	no comment

44.6.2.12 Context menu: Find comment

Entry "Find comment": After selecting this function from the local context menu, an input window will appear. Enter a text part of the desired comment and select the OK button. The system will mark all lines, in which a text part of the comment matches to the entered text.

MODBUS register	MODBUS dat	atype MODBUS inter	val KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.0.1	BIT	READ-WRITE	1	????	A first comment
4x2	UINT16	0	1.0.2	BIT	READ-WRITE	1	????	A second comment
4x3	UINT16	0	1.0.3	BIT	READ-WRITE	1	????	A third comment
4x4	UINT16	0	1.0.4	BIT	READ-WRITE	1	????	A fourth comment
				_				
		Search for comment		×				
		Enter a part of the com	Abbrechen					



The result will look like this:

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.0.1	BIT	READ-WRITE	1	????	A first comment
4x2	UINT16	0	1.0.2	BIT	READ-WRITE	1	????	A second comment
4x3	UINT16	0	1.0.3	BIT	READ-WRITE	1	????	A third comment
4x4	UINT16	0	1.0.4	BIT	READ-WRITE	1	????	A fourth comment
141	ONTITO	0	1.0.4	BIT	TREAD WHITE	•		Alburar comment

Another example:

MODBUS register	MODBUS data	ype MODBUS interva	al KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.0.1	BIT	READ-WRITE	1	????	A first comment
4x2	UINT16	0	1.0.2	BIT	READ-WRITE	1	????	A second comment
4x3	UINT16	0	1.0.3	BIT	READ-WRITE	1	????	A third comment
4x4	UINT16	0	1.0.4	BIT	READ-WRITE	1	????	A fourth comment
		Search for comment						
		Search for comment						
	Enter a pa		ent					
		d comm						
		·						
		OK	Abbrechen					

MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	1.0.1	BIT	READ-WRITE	1	????	A first comment
4x2	UINT16	0	1.0.2	BIT	READ-WRITE	1	????	A second comment
4x3	UINT16	0	1.0.3	BIT	READ-WRITE	1	????	A third comment
4x4	UINT16	0	1.0.4	BIT	READ-WRITE	1	????	A fourth comment

44.6.2.13 Context menu: Copy to/Paste from clipboard

Select some entries in your table and select Copy to Clipboard in your popup menu.

RESE's MODBUS Configurator V1.10.7.1 - [Unnamed]						×
EPRJ ØPRJ ØPRJ ØPRJ	ocal COM port settings odbus unit 255 Device: COM		IP-Address:			
	evice specific	NE 💌	Port:			
	♥ _ Download config					-
	ESHKNX-SIO	KNX to MODBUS	S/RTU+ASCII module			
St	ate: no error					
-M	pload config IODBUS		KM	K		
	ddress: 255 💌 Baudrate: 57600	Parity: NONE MODBUS interval KNX group		Idress: 15.15.255	Value Comment	
4		1.0.1	BIT REAL	D-WRITE 1	???? A first comment ???? A second comment	\Box
40 40		1.0.3 1.0.4		D-WRITE 1 D-WRITE 1	???? A third comment ???? A fourth comment	
	Copy entry Delete selected entries					
	Clear complete list Renumber MODBUS registers					
	Renumber KNX groups Sort MODBUS register					
	Sort KNX group Find MODBUS register					
	Find KNX Group Find comment					
	Copy to clipboard Paste from clipboard	0				
		1				_
	Canceled device scan!					



The select another KNX gateway in your project and choose Paste from Clipboard. Now the selected lines from the first gateway are inserted into the second gateway:

ESE's MODBUS Configurator V1.10.7.1 - [Unnam									- • •
	Local COM port s Modbus unit 255	ettings Device: CC	M4 St	opbits 1 stopbit	✓ IP-Address				
	Baudrate: 57600				Port:				
	Device specific		-						
B-D New Project	Download c	config Iest conne	ction C Test						
 RESI-KNX-SIO - [RESI-KNX-SIO] RESI-KNX-SIO - [RESI-KNX-SIO] 	RESI-KNX-SIO Software version:	1.1.0		KNK to MODBUS/P	TU+ASCII module				
	State:	no error							
	Upload config								
	MODBUS Address: 255	▼ Baudrate: 57600	▼ Parity:	NONE 🔻 Sta	opbits: 1 stopbit	KNX Address: 15	15.255		
	MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
		Edit entry							
		Add entry Insert entry							
		Copy entry Delete selected entries							
		Clear complete list							
		Renumber MODBUS register Renumber KNX groups	5						
		Sort MODBUS register							
		Sort KNX group Find MODBUS register							
		Find KNX Group							
		Find comment Copy to clipboard							
		Paste from clipboard							
		anceled device scan!							li.
The result will look like	this:	anceled device scan!							li.
REST's MODBUS Configurator V1.10.7.1 - [Unnam	this: ^{ed]}								
REST's MODBUS Configurator V1.10.7.1 - [Unname	this:		oma 🔹 St	opbits 1 stopbit	▼ IP-Address				
REST's MODBUS Configurator V1.10.7.1 - [Unname	this: ^{ed]} Local COM port s	rettings	Laure 1	opbits 1 stopbit	IP-Address Port:	: [
EST: MODBUS Configurator VI 197.1 - [Unname PRJ PRJ PRJ PRJ PRJ PRJ PPRJ PRJ	this: Local COM port s Modbus unit 255 Baudrate: 57600 Device specific	ettings	DNE 💌	opbits 1 stopbit					
EES: MODBUS Configurator V1:107.1 - [Unname Pr.J	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific	tettings	ction C Test		Port:				
REST: MODBUS Configurator VI 107.1 - [Unname PRJ	this: edj Local COM port st Modbus unit 255 Baudrate: 57600 Device specific Device specific RESHKNX-SIO	ettings	ction C Test	opbits 1 stopbit KN≺to MODBUS/R	Port:				
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific	ettings	ction C Test		Port:	2			
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Pownload co RESI-KNX-SIO Software version: State: Upload config	ettings	ction C Test		Port:				
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific RESI-KNX-SIO Software version: State:	ettings	ction C Test	KNK to MODBUS/P	Port:	KNX Address: 15	15.255		
ET: MODBUS Configurator VI 107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific Software version: State: Uploed config MODBUS Address: 255 MODBUS register	ettings Device: CC Parity: NC config Test conne 1.1.0 no error Baudrate: 57600 MODBUS datatype	ction Tgst	KNX to MODBUS/P	Port: ITU+ASCII module	KNX Address: 15 KNX direction	Factor	Value	Comment
ET: MODBUS Configurator VI.107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific Software version: State: Uploed config MODBUS Address: 255	ettings Parity: No Parity: No config Test conne 1.1.0 no error Baudrate: \$7600	ction Test	KNX to MODBUS/F	Port: TU+ASCII module opbits: 1 stopbit	KNX Address: 15		Value 7777 7777	
ET: MODBUS Configurator VI.107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI.107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI.107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI.107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI 107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI 107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI 107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ PRJ PRJ	this: edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific Device specific State: Uploed config MODBUS Address: 255 MODBUS register 4x1		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
ET: MODBUS Configurator VI 107.1 - [Unnam PRJ PRJ PRJ PRJ PRJ PRJ PRJ PRJ	edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment
EET: MODBUS Configurator VI 107.1 - [Unname Praj	edj Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific		ction Tgst	KNX to MODBUS/R NONE Str KNX group 1.0.1	Port:	KNX Address: 15 KNX direction READ-WRITE	Factor	????	Comment A first comment



Of course you can also paste the selected lines into the first gateway:

REST's MODBUS Configurator V1.10.7.1 - [Unname	ed]								
PRJ PRJ PPRJ PPRJ ●PRJ ●PRJ ● ● ●PRJ ● ● ● ● New Project ● ● ● PESI-KNX-SIO - [RESI-KNX-SIO] ● ● RESI-KNX-SIO - [RESI-KNX-SIO] ●	Local COM port s Modbus unit 255 Baudrate: 57600 Device specific Device specific RESI-KNX-SIO Software version: State:	Device: 0	ection	NNX to MODBUS	IP-Address: Port //RTU+ASCII module				
	Upload config MODBUS Address: 255	Baudrate: 5760		NONE -	Stopbits: 1 stopbit	KNX Address: 15.	15.255		
	MODBUS register 4x1 4x2 4x3 4x4 4x6 	MODBUS datatype UINT16 UINT16 UINT16 UINT16 UINT16 UINT16	MODBUS interval 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	KNX group 1.0.1 1.0.2 1.0.3 1.0.4 1.0.1 1.0.2	KNK datatype BIT BIT BIT BIT BIT BIT BIT	KNX direction READ-WRITE READ-WRITE READ-WRITE READ-WRITE READ-WRITE	Factor 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Value 7777 7777 7777 7777 7777 7777 7777	Comment A first comment A second comment A third comment A forst comment A first comment A second comment
Print project report		nceled device scan!							



44.6.2.14 Context menu: Edit entry

Entry "Edit entry...": After selecting a line and choosing this function from the local context menu or after a double click onto a line in the table, the below screen will appear. In the upper region an edit area is displayed with the current contents of the selected line.

- Button "Cancel": Selecting this function will close the edit operation, and no changes will be done in the configuration line. The edit area will disappear.
- Button "OK": Selecting this function will update the selected configuration line with the altered data and close the edit function. The edit areas will disappear.

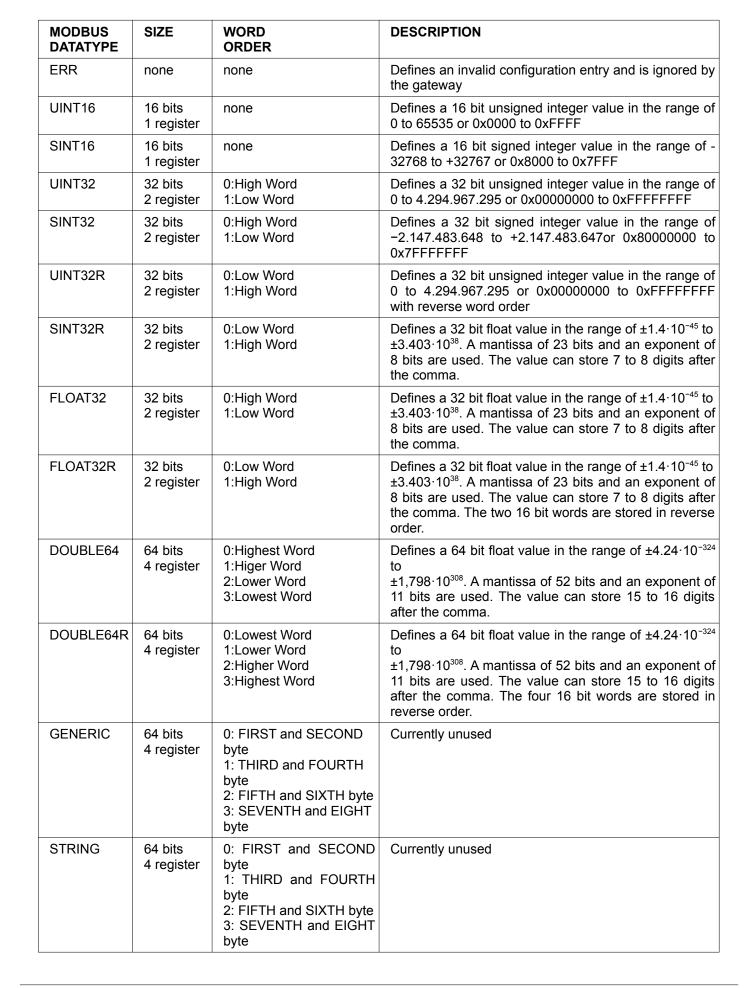
HINT: Don't forget, that you must download the new configuration to the gateway, before the changes are used by the converter!

egister	Datatype SINT16	Interval	Factor					OK	
	Joint 10		10					Cancel	
oup Datatype		Comment							
1.9 FLOAT1	16 • READ	 F1.09 Auss 	entemperatur						
DBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment	
	SINT16	0	1.1.3	FLOAT16	READ	10	7777	F1.03 VL-Pelletskessel	
	SINT16	0	1.1.4	FLOAT16	READ	10	7777	F1.04 RL-Pelletskessel	
	SINT16	0	1.1.7	FLOAT16	READ	10	????	F1.07 VL-Pelletskessel	
	SINT16	0	1.1.8	FLOAT16	READ	10	2222	F1.08 RL-Pelletskessel	
	SINT16	0	1.1.9	FLOAT16	READ	10	7777	F1.09 Aussentemperatur	
	SINT16	0	1.2.1	FLOAT16	READ	10	????	F2.01 Pufferspeicher 1	
	SINT16	0	1.2.6	FLOAT16	READ	10	????	F2.06 Pufferspeicher 2	
	SINT16	0	1.2.11	FLOAT16	READ	10	7777	F2.11 Pufferspeicher 3	
	SINT16	0	1.2.17	FLOAT16	READ	10	7777	F2.17 Pufferspeicher 4	
	SINT16	0	1.2.22	FLOAT16	READ	10	????	F2.18 Pufferspeicher 5	
	SINT16	0	1.3.1	FLOAT16	READ	10	7777	F3.01 VL-Solarsystem	
	SINT16	0	1.3.2	FLOAT16	READ	10	????	F3.02 RL-Solarsystem	
	SINT16	0	1.4.1	FLOAT16	READ	10	????	F4.01 VL-Heizsystem	
	SINT16	0	1.4.2 1.4.3	FLOAT16 FLOAT16	READ READ	10	7777 7777	F4.02 VL-Heizsystem	
	SINT16 SINT16	0	1.4.4	FLOAT16	READ	10	2222	F4.03 RL-Heizsystem F4.04 RL-Zirkulation	
	UINT16	0	10.3.5	BIT	READ	1	7777	V3.01 Ventil unterer WT	
	UINT16	0	10.3.6	BIT	READ	1	2222	V3.02 Ventil unterer WT	
	SINT32	0	9.3.4	UINT32	READ	0.001	7777	Z3.01.01 WMZ RL-Solar Q	
	SINT32	0	9.3.6	UINT32	READ	0.001	7777	Z3.01.02 WMZ RL-Solar V	
	SINT16	0	1.3.1	FLOAT16	READ	10	7777	Z3.01.03 WMZ T-VL	
	SINT16	0	1.3.2	FLOAT16	READ	10	2222	Z3.01.04 WMZ T-RL	
	SINT32	0	9.3.2	UINT32	READ	0.001	7777	Z3.01.05 WMZ RL-Solar P	
5	SINT32	0	9.3.5	UINT32	READ	0.001	7777	Z3.01.06 WMZ RL-Solar dV	
5	SINT32	0	9.4.29	UINT32	READ	0.001	????	Z4.01.01 WMZ RL-Heizsystem Q	
5	SINT32	0	9.4.30	UINT32	READ	0.001	7777	Z4.01.02 WMZ RL-Heizsystem V	
	SINT16	0	1.4.2	FLOAT16	READ	10	7777	Z4.01.03 WMZ T-VL	
	SINT16	0	1.4.3	FLOAT16	READ	10	????	Z4.01.04 WMZ T-RL	
	SINT32	0	9.4.21	UINT32	READ	0.001	2555	Z4.01.05 WMZ RL-Heizsystem P	
	SINT32	0	9.4.31	UINT32	READ	0.001	7777	Z4.01.06 WMZ RL-Heizsystem dV	
	SINT32	0	9.4.32	UINT32	READ	0.001	????	Z4.02.01 WMZ VL-Zirkulation Q	
	SINT32	0	9.4.34	UINT32 FLOAT16	READ	0.001	???? ????	Z4.02.02 WMZ VL-Zirkulation V Z4.02.03 WMZ T-VI	

The edit area is divided into two areas:

Area "MODBUS/RTU": Here you will find all edit fields corresponding to the MODBUS/RTU holding register setup.

- Field "**Register**": Enter a valid MODBUS holding register start index in the range of 1 to 65535. How many MODBUS holding registers are used for this configuration entry is defined by the configured MODBUS/RTU datatype.
- Field "Datatype": Choose one of the possible datatypes from the drop down list. This datatype defines one the one side, how many MODBUS registers are used for the mapping (e.g. datatype UINT16 needs one register, datatype FLOAT32 needs two consecutive MODBUS registers). And on the other hand this data type defines the data representation in this holding registers (e.g. datatype FLOAT32 stores the upper 16 bits of the 32 bit float value in the first holding register and the lower 16 bits are stored in the next consecutive holding register. FLOAT32R stores the two 16 bit words of the 32 bit value in reverse order: The low word in the first register, the high word in the next register).





- Field "Interval": This field has no function at the moment. The intention is in future releases to define the time in seconds for an automatic polling for the configured KNX group on the KNX bus.
- Field "Factor": This field defines a float value which is used to convert the KNX and MODBUS values after receiving from and before sending to the KNX bus.

In case of receiving a KNX group the formula is: MODBUS value= KNX value multiplied by Factor

In case of sending a KNX group to the KNX bus, the formula is: KNX value=MODBUS value divided by Factor

In case the KNX data type is GENERIC or STRING, this factor defines the start index, from which the data bytesare readout of the KNX telegram. A KNX telegram can hold up to 14 data bytes.

A Factor of 0 is ignored from the gateway.

Area "KNX": Here you will find all edit fields corresponding to the KNX group address mapping.

- Field "Group": Here you can define the KNX group address for this configuration entry in the range of 0.0.0 to 31.7.255.
- Field "Datatype": Here you can define the KNX datatype of the incoming or outgoing KNX telegram.

KNX DATATYPE	SIZE	DESCRIPTION						
ERR	none	Defines an invalid configuration entry and is ignored by the gateway						
BIT	1 bit	Defines a bit value in the range from 0 to 1 or 0x0 to 0x1. Often interpreted as OFF and ON. Defines an integer value consisting out of two bits in the range from 0 to 3 or 0x0 to 0x3.						
TWOBITS	2 bits	Defines an integer value consisting out of two bits in the range from 0 to 3 or 0x0 to 0x3.						
FOURBITS	4 bits	Defines an integer value consisting out of four bits in the range from 0 to 15 or 0x0 to 0xF.						
SIXBITS	6 bits	Defines an integer value consisting out of six bits in the range from 0 to 63 or 0x00 to 0x3F.						
CHARACTER	8 bits	Defines one text character consisting out of eight bits in the range from 0 to 255 or 0x00 to 0xFF. Please refer to the KNX documentation, how the encoding of the text character is done by the KNX standard. The encoding can be done for ASCII characters or for ISO 8859.1 characters.						
UINT8	8 bits	Defines an 8 bit unsigned integer value in the range of 0 to 255 or 0x00 to 0xFF.						
SINT8	8 bits	Defines an 8 bit signed integer value in the range of -128 to +127 or 0x80 to 0x7F.						
UINT16	16 bits	Defines a 16 bit unsigned integer value in the range of 0 to 65535 or 0x0000 to 0xFFFF.						
SINT16	16 bits	Defines a 16 bit signed integer value in the range of -32768 to +32767 or 0x8000 to 0x7FFF.						
UINT32	32 bits	Defines a 32 bit unsigned integer value in the range of 0 to 4.294.967.295 or 0x00000000 to 0xFFFFFFFF.						
SINT32	32 bits	Defines a 32 bit signed integer value in the range of −2.147.483.648 to +2.147.483.647or 0x80000000 to 0x7FFFFFF.						
FLOAT16	16 bits	Defines a 16 bit float value with a 4 bit exponent and a 12 bit mantissa. 2 octets: F_{16} 2 _{MSB} 1 _{LSB} FloatValue MEEEEMMM MMMMMMM FloatValue = (0,01*M)*2 ^(E) E = [0 15] M = [-2 048 2 047], two's complement notation For all Datapoint Types 9.xxx, the encoded value 7FFFh shall always be used to denote invalid data. [-671 088,64 670 760,96]						
FLOAT32	32 bits	Defines a 32 bit float value in the range of $\pm 1.4 \cdot 10^{-45}$ to $\pm 3.403 \cdot 10^{38}$. A mantissa of 23 bits, and an exponent of 8 bits are used. The value can store 7 to 8 digits after the comma. 4 octets: F ₃₂ 4 _{MSB} 3 2 1 _{LSB} S Exponent Fraction FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF						

RES

KNX DATATYPE	SIZE	DESCRIPTION					
TIME	24 bits	Defines a 24 bit value encoded a time information in the following way: 3 octets: N ₃ U ₅ r ₂ U ₆ r ₂ U ₆ 3 _{MSB} 2 1 _{LSB} Day Hour 0 Minutes 0 0 Seconds NNNUUUUU r r UUUUU r r UUUUU binary encoded					y:
		Field:	Encoding:	Range:	Unit:	Resol.:	
		Day 1 = Monday 7 = Sunday 0 = no day		[07]	none	none	
		Hour	binary encoded	[023]	hours	h	
		Minutes	binary encoded	[059]	minutes	min	
		Seconds	binary encoded	[059]	[059] seconds s		
DATE	24 bits	Defines a 2 3 octets: r 3 _{MSI} 0 0 0 D r r r UU	4 bit value encoded 3U ₅ r ₄ U ₄ r ₁ U ₇ 3 2 Pay 0 0 0 0 Mor UUU r r r r UUU binary encoded. Range: [131] [112]	a date informa 1 Ls	ition in the f	illowing way	y:

<u>RES</u>J

KNX DATATYPE	SIZE	DESCRIP	TION								
DATETIME	64 bits	8 octets: U8[4 bit value enco r ₄ U ₄][r ₃ U ₅][U ₃ U ₅][r;	ded a date and time information in the following way: ${}_{2}U_{6}][r_{2}U_{6}]B_{16}$ 7 6 5							
		8 _{MSB}			avOf-		7				
		Year	0 0 0 0		lonth 0 0 0 DayOfMonth DayOf- Week HourOfDay						
		บบบบบ	UUUrrrr		บบบบ	บบบ	J				
		4 3 2 1 _{LSB}									
		0 0 Minu	utes 0 0 S		0000	0 0 0					
		r r U U U			r r r r	r r r					
		Field	Description	Encoding	Range	Unit	Resol.:				
		Year	Year	Value binary encoded, offset 1900 0 = 1900 255 = 2155	[0255]	year	1 year				
		Month	Month	Value binary encoded 1 = January 	[112]	Month	1 month				
		DayOfMonth	D	12 = December Value binary encoded 1 = 1 = 1st day 31 = 31st day	[131]	none	none				
		DayOfWeek	Day of week	Value binary encoded 0 = any day 1 = Monday	[07]	none	none				
		Lisur Of Day	l laura af daur	7 = Sunday	10 041		4.5				
		HourOfDay Minutes	Hour of day Minutes	Value binary encoded. Value binary encoded.	[024]	h min	1 h 1 min	-			
		Seconds	Seconds	Value binary encoded.	[059]	s	1 s				
		F	Fault	0 = Normal (No fault) 1 = Fault	{0,1}	none	none				
		WD	Working Day	0 = Bank day (No working day) 1 = Working day	{0,1}	none	none				
		NWD	No WD	0 = WD field valid 1 = WD field not valid	{0,1}	none	none				
		NY	No Year	0 = Year field valid 1 = Year field not valid	{0,1}	none	none				
		ND	No Date	0 = Month and Day of Month fields valid 1 = Month and Day of Month fields	{0,1}	none	none				
STRING	may	Defines un t	o 14 bytes of te	not valid							
STRING	max. 14 bytes	14 _M	-	1 _{LSB}							
		Charac	ter 1	Character 14							
		These Datapoint Types are used to transmit strings of textual characters. The length is fixed to 14 octets. The contents are filled starting from the most significant octet. Each octet shall be encoded as specified for the chosen character set, as defined in clause 0. If the string to be transmitted is smaller then 14 octets, unused trailing octets in the character string shall be set to NULL (00h). Example: 'KNX is OK' is encoded as follows : 4B 4E 58 20 69 73 20 4F 4B 00 00 00 00 00									
		Due to the f for the 8 by register in th	act, that a gene tes in the rang ne low 8 bits. T	ch represents up to 8 bytes fro pric KNX frame can hold up to e from 0 to 13. The system s he next byte is stored in the s he next Modbus register in the I	14 bytes, tores the ame regis	the fie first b ster, bu	eld factor d yte in the t ut in the up	efines the start index first 16 bit MODBUS			
GENERIC	max. 14 bytes	Due to the f for the 8 by register in th	act, that a gene tes in the rang ne low 8 bits. T	th represents up to 8 bytes fro eric KNX frame can hold up to e from 0 to 13. The system si he next byte is stored in the si he next Modbus register in the I	14 bytes, tores the ame regis	the fie first b ster, bu	eld factor d yte in the ut in the up	efines the start index first 16 bit MODBUS			

<u>RES</u>J



- Field "Direction": Select the communication direction of the KNX group address on the KNX bus. Choose READ for only incoming KNX messages, WRITE for only outgoing KNX messages and READ_WRITE for incoming and outgoing messages. ERR defines an invalid configuration data and is ignored by the gateway.
- Field "**Comment**": Enter a comment to explain your KNX MODBUS mapping for documentation purpose. Note that the comment in only stored onto the PC, not in the gateway. So if you upload a configuration from the gateway, you will lose all comments.



44.7 Testing the configuration

After you download your new configuration into the converter and start the test mode with the button "Test", you will see the following screen. The system automatically updates all MODBUS registers every 5 seconds.

Local COM port Modbus unit: 255	 Device: 	0014	Stopbits 1 stopbit	 IP-Address 					
		COM4 -	Stopbits 1 stopbit		5.				
Baudrate: 5760	0 Parity:	NONE -		Port					
Device specific									
Download	config Test con	nection 📐 T <u>e</u> s	t						
RESHKNX-SIO			KNX to MODBU	IS/RTU+ASCII module					
Software version:	1.1.0								
State:	no e	ror							
State: Upload config	no e	ror							
_pload config MODBUS	no e		NONE	Stopbits: 1 stopbit	KNX Address: 15	15.255			
Jpload config MODBUS Address: 255	Baudrate: 57			Stopbits: 1 stopbit KNX datatype		15.255 Factor	Value	Comment	
_pload config MODBUS Address: 255 MODBUS register	Baudrate: 57	00 • Parity:			Address: 15		Value 0x02D4,724	Comment F1.03 VL-Pelletskessel	
Upload config MODBUS Address: 255 MODBUS register 4x1	Baudrate: 57 MODBUS datatype	00 Parity: MODBUS interva	I KNX group	KNX datatype	Address: 15 KNX direction	Factor			
Upload config MODBUS Address: 255 MODBUS register 4x1 4x2	Baudrate: 571 MODBUS datatype SINT16	00 Parity: MODBUS interva 0	I KNX group 1.1.3	KNX datatype FLOAT16	Address: 15 KNX direction READ	Factor	0x02D4,724	F1.03 VL-Pelletskessel	
Upload config MODBUS Address: 255 MODBUS register 4x1 4x2 4x3 4x4	Baudrate: 571 MODBUS datatype SINT16 SINT16 SINT16 SINT16 SINT15	00 Parity: MODBUS interva 0 0 0	KNX group 1.1.3 1.1.4 1.1.7 1.1.8	KNX datatype FLOAT16 FLOAT16	Address: 15 KNX direction READ READ READ READ READ	Factor 10 10 10 10	0x02D4,724 0x024B,587	F1.03 VL-Pelletskessel F1.04 RL-Pelletskessel	
Upload config MODBUS Address: 255 MODBUS register 4x1 4x2 4x3 4x4	Baudrate: 571 MODBUS datatype SINT16 SINT16 SINT16 SINT16 SINT15	00 Parity: MODBUS interva 0	KNX group 1.1.3 1.1.4 1.1.7 1.1.8	KNX datatype FLOAT16 FLOAT16 FLOAT16	Address: 15 KNX direction READ READ READ READ READ	Factor 10 10 10	0x02D4,724 0x024B,587 0x02F6,758	F1.03 VL-Pelletskessel F1.04 RL-Pelletskessel F1.07 VL-Pelletskessel	
	Baudrate: 571 MODBUS datatype SINT16 SINT16 SINT16 SINT16 SINT16	00 Parity: MODBUS interva 0 0 0	KNX group 1.1.3 1.1.4 1.1.7 1.1.8	KNX datatype FLOAT16 FLOAT16 FLOAT16 FLOAT16 FLOAT16	Address: 15 KNX direction READ READ READ READ READ	Factor 10 10 10 10 10	0x02D4,724 0x024B,587 0x02F6,758 0x0228,552	F1.03 VL-Pelletskessel F1.04 RL-Pelletskessel F1.07 VL-Pelletskessel F1.08 RL-Pelletskessel	

To set a new value for a configuration line simple double click onto a configuration line. A window will open, in which you can enter the new value for the selected configuration line. The software will automatically create the correct MODBUS write command for all necessary registers, depending on the configured MODBUS datatype of the line.

MODBUS register MODBUS datatype MODBUS interval KNX group KNX direction Factor Value Comment 4x1 SINT16 0 1.1.3 FLOAT16 READ 10 0x02D4,724 F1.03 VL-Pelletskessel 4 4x2 SINT16 0 1.1.4 FLOAT16 READ 10 0x02D4,724 F1.03 VL-Pelletskessel 4 4x3 SINT16 0 1.1.4 FLOAT16 READ 10 0x02F6,758 F1.07 VL-Pelletskessel 4 4x4 SINT16 0 1.1.8 FLOAT16 READ 10 0x02F6,758 F1.07 VL-Pelletskessel 4 4x6 SINT16 0 1.1.8 FLOAT16 READ 10 0x007E,126 F1.08 Ausentemperatur 4x6 4x6 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000.0 F2.06 Pufferspeicher 1 Pumpe 4x7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000.0 F2.06 Pufferspeicher 2 Pumpe									
tx2 SINT16 0 1.1.4 FL0AT16 READ 10 0x0248,587 F1.04 RL-Pelletskessel tx3 SINT16 0 1.1.7 FL0AT16 READ 10 0x0276,758 F1.04 RL-Pelletskessel tx4 SINT16 0 1.1.8 FL0AT16 READ 10 0x0276,758 F1.04 RL-Pelletskessel tx4 SINT16 0 1.1.8 FL0AT16 READ 10 0x007E,125 F1.09 Aussentemperatur tx5 SINT16 0 1.2.1 BIT READ-WRITE 1 0x0001.1 F2.01 Pufferspeicher 1 Pumpe tx7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x000.0 F2.06 Pufferspeicher 2 Pumpe	MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
tx3 SINT16 0 1.1.7 FLOAT16 READ 10 0x0226,758 F1.07 VL-Polletskessel tx4 SINT16 0 1.1.8 FLOAT16 READ 10 0x0226,758 F1.07 VL-Polletskessel tx5 SINT16 0 1.1.8 FLOAT16 READ 10 0x0226,552 F1.08 RL-Pelletskessel tx5 SINT16 0 1.2.1 BIT READ 10 0x0001,1 F2.01 Pulferspeicher 1 Pumpe tx6 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000,0 F2.06 Pulferspeicher 2 Pumpe tx7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x000,0 F2.06 Pulferspeicher 2 Pumpe	tx1	SINT16	0	1.1.3	FLOAT16	READ	10	0x02D4,724	F1.03 VL-Pelletskessel
4x4 SINT16 0 1.1.8 FLOAT16 READ 10 0x0228,552 F1.08 RL-Pelletskessel 4x5 SINT16 0 1.1.9 FLOAT16 READ 10 0x007E,126 F1.09 Aussentemperatur 4x6 SINT16 0 1.2.1 BIT READ-WRITE 1 0x0000.1 F2.01 Pulferspeicher 1 Pumpe 4x7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000.0 F2.06 Pufferspeicher 2 Pumpe	1x2	SINT16	0	1.1.4	FLOAT16	READ	10	0x024B,587	F1.04 RL-Pelletskessel
4x5 SINT16 0 1.1.9 FLOAT16 READ 10 0x007E,126 F1.09 Aussentemperatur 4x6 SINT16 0 1.2.1 BIT READ-WRITE 1 0x0001,1 F2.01 Pufferspeicher 1 Pumpe 4x7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x000,0 F2.06 Pufferspeicher 2 Pumpe Enter a new volue to set this modbus registers 0	tx3	SINT16	0	1.1.7	FLOAT16	READ	10	0x02F6,758	F1.07 VL-Pelletskessel
4x6 SINT16 0 1.2.1 BIT READ-WRITE 1 0x0001,1 F2.01 Pufferspeicher 1 Pumpe 4x7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000,0 F2.06 Pufferspeicher 2 Pumpe	1x4	SINT16	0	1.1.8	FLOAT16	READ	10	0x0228,552	F1.08 RL-Pelletskessel
4x7 SINT16 0 1.2.6 BIT READ-WRITE 1 0x0000.0 F2.06 Pufferspeicher 2 Pumpe SET NEW VALUES Enter a new value to set this modbus registers 0 1 0x0000.0 F2.06 Pufferspeicher 2 Pumpe	bx5	SINT16	0	1.1.9	FLOAT16	READ	10	0x007E,126	F1.09 Aussentemperatur
SET NEW VALUES	1x6	SINT16	0	1.2.1	BIT	READ-WRITE	1	0x0001,1	
Enter a new value to set this modbus registers	1x7	SINT16	0	1.2.6	BIT	READ-WRITE	1	0x0000,0	F2.06 Pufferspeicher 2 Pumpe
				alue to set this mo	dbus registers				

mediately after receiving all MODBUS registers, the converter will send out the corresponding KNX telegram onto the KNX bus, if KNX write is allowed.

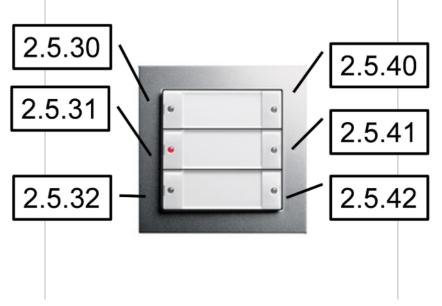


44.8 Sample configurations

Here you will find some sample configurations to explain the configuration principles of our gateway.

44.8.1 Reading the status of a KNX switch

Assuming the following setup: 1 KNX switch e.g. GIRA with six switches, programmed with KNX group addresses in the following way:



All six KNX groups send as KNX data a BIT value defining the current state of the switch (0=OFF, 1=ON). If you press the left, top switch, the KNX device sends the KNX telegram 2.5.30=1 or 2.5.30=0 depending on the stored switch state in the KNX device.

So the configuration will look like this:

Upload config								
MODBUS Address: 255	Baudrate: 57600	▼ Parity:	NONE 💌 Stop	obits: 1 stopbit	Address: 15.1	5.255		
MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	UINT16	0	2.5.30	BIT	READ	1	0x0001.1	KNX device #1 switch #1
4x2	UINT16	0	2.5.31	BIT	READ	1	0x0000,0	KNX device #1 switch #2
4x3	UINT16	0	2.5.32	BIT	READ	1	0x0000,0	KNX device #1 switch #3
4x4	UINT16	0	2.5.40	BIT	READ	1	0x0000.0	KNX device #1 switch #4
4x5	UINT16	0	2.5.41	BIT	READ	1	0x0000,0	KNX device #1 switch #5
4x6	UINT16	0	2.5.42	BIT	READ	1	0x0001,1	KNX device #1 switch #6

As you can see in the test mode, the switch state of Switch #1 and #6 is ON, all other switches are OFF. Press the six buttons and see, how the MODBUS registers are changed by the incoming KNX telegrams.



44.8.2 Writing to a KNX actuator

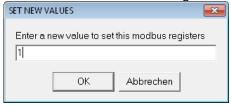
Using a KNX actuator with four outputs, e.g. an ABB KNX actuator, is also very simple. Assuming the following KNX group addresses for the four outputs. All of them expect a KNX telegram with bit data.



The correct configuration will look like this:

Upload config MODBUS Address: 255	▼ Baudrate: 57600	Parity:	NONE 🔻 s	Stopbits: 1 stopbit	KNX Address: 1	5.15.255			
MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment	
4x1	UINT16	0	1.7.10	BIT	WRITE	1	0x0000,0	KNX actuator #1 output #1	
4x2	UINT16	0	1.7.11	BIT	WRITE	1	0x0000,0	KNX actuator #1 output #2	
4x3	UINT16	0	1.7.12	BIT	WRITE	1	0x0000,0	KNX actuator #1 output #3	
4x4	UINT16	0	1.7.13	BIT	WRITE	1	0x0000.0	KNX actuator #1 output #4	
		vew values ter a new value to set	this modbus regist Abbrechen	lers					

Download this configuration into the gateway and start the test mode. To change the state of the output #1, simple <u>double click onto the first configuration</u> line. The following window will be opened:



Enter a new value for the digital output, e.g. 1, and hit the OK button. Immediately the actuator on the KNX bus will be switched on. Double click again and enter the value 0, the output will be switched off. Try this for the remaining three outputs.



44.8.3 Reading analogue KNX values

More complicated is the mapping of analogue values from the KNX bus to MODBUS registers. We start with a simple KNX device, e.g. a room controller. We assume, that this device cyclically sends the current room temperature on the KNX group address 3.5.10. The set point can be send/received on the KNX group address 3.5.11. Both values are encoded with KNX datatype 9.001 temperature (°C).



Use the following configuration as a sample:

Baudrate: 576 MODBUS datatype FLOAT32	00 Parity: MODBUS interval	NONE 💌 Sta	pbits: 1 stopbit	KNX Address: 15.			
FLOAT32	MODBUS interval	KNX group	KhIV datat as a				
	0		KNX datatype	KNX direction	Factor	Value	Comment
	U	3.5.10	FLOAT16	READ	1	0x41A9999A,21.2000007629395	Actual temperature
FLOAT32	0	3.5.11	FLOAT16	READ-WRITE	1	0x41B40000,22.5	New setpoint
SET NEV	W VALUES						
		modbus registers					
	OK A	bbrechen	_				
	Enter	22.5	Enter a new value to set this modbus registers [22.5]	Enter a new volue to set this modbus registers [22.5]	Enter a new value to set this modbus registers [22.5]	Enter a new value to set this modbus registers [22.5]	Enter a new value to set this modbus registers [22.5]

As you can see, we map the float value FLOAT16 (This is the KNX representation of KNX Datatype 9.0001) from the KNX bus to FLOAT32 values in the MODBUS registers. A FLOAT32 value uses 2 consecutive registers. That's the reason, why the first value uses the index 4x1 and the second index uses the index 4x3. So this configurations uses four MODBUS registers with the indices 4x1, 4x2, 4x3 and 4x4.



But you can also map a float value from the KNX bus to an integer value on the MODBUS side. We change the existing configuration to the following lines:

Upload config								
MODBUS Address: 255	▼ Baudrate: 57600	D 💌 Parity:	NONE 💌 s	Stopbits: 1 stopbit	KNX Address: 15.	15.255		
MODBUS register	MODBUS datatype	MODBUS interval	KNX group	KNX datatype	KNX direction	Factor	Value	Comment
4x1	SINT16	0	3.5.10	FLOAT16	READ	10	0x00D4,212	Actual temperature
4x2	SINT16	0	3.5.11	FLOAT16	READ-WRITE	10	0x00E1,225	New setpoint
	225	ue to set this modbus						

As you will notice, we use now UINT16 for the MODBUS datatype and a factor of 10 to preserve the first digit after the comma. So the MODBUS register 4x1 stores the value 212 if the current temperature 22.2 °C is received from the KNX bus.



44.9 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-KNX-SIO-ETH-MODBUS+ASCII-ENxx.pdf

Don't forget, that there are some standard MODBUS registers for this device, which you cannot overwrite with your configuration!

44.10 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-KNX-SIO-ETH-MODBUS+ASCII-ENxx.pdf

44.10.1 The configuration line

The two ASCII commands READ CONFIG and GET CONFIG return all data for one configuration line. Here is a detailed description of each field of this line.

The common syntax for the line is the following:

#<BusAdr>,KNX:I:<Index>=<MBRegister>,<MBDataType>,<MBRegisterCount>,<Interval>, <KNXGroup>,<KNXDataType>,<KNXDirection>,<Factor>

<BusAdr> stands for the current MODBUS bus address of the module as a decimal number e.g. 255

<Index> stands for the Index in the configuration table starting with 1 and ending with n according to the actual size of the configuration table size as a decimal number.

<MBRegister> stands for the starting index of the holding registers, starting with 1 for the first holding register 4x00001 and ending by 65535 for the last holding register 4x65535 as a decimal number.

<MBDataType> defines a datatype for the MODBUS registers. This is an ASCII text string in capital letters. Choose one of the following strings: UINT16, SINT16, UINT32, SINT32, UINT32R, SINT32R, FLOAT32, FLOAT32R, DOUBLE64, DOUBLE64R, GENERIC, ASCII or ERR. See the explanation of the MODBUS datatypes for more details about this strings.

<MBRegisterCount> defines the amount of MODBUS holding registers, which are used by this configuration entry as a decimal number. For example a UINT16 needs 1 register, a UINT32 or a FLOAT32 needs 2 registers.

<Interval> stands for a time interval in seconds as a decimal number for an automatic polling request on the KNX bus for this KNX group address. This is for future use and not used now!

<KNXGroup> defines the KNX group address with the format <Hi>.<Medium>.<Low>. KNX group addresses in the range from 0.0.0 to 31.7.255 are valid here.

<KNXDataType> is a string defining the data type of the incoming or outgoing KNX data. The system uses the following ASCII strings in capital letters: ERR, BIT, TWOBITS, FOURBITS, SIXBITS, CHARACTER, UINT8, SINT8, UNIT16, SINT16, FLOAT16, TIME, DATE, UINT32, SINT32, FLOAT32, STRING, GENERIC and DATETIME. See the explanation of the KNX datatypes for more details about this strings.

<KNXDirection> is an ASCII text string defining the communication direction for this entry on the KNX bus. The following ASCII string in capital letters are valid: ERR, R, W, RW. See the explanation for KNX directions for more details about this string.



<Factor> is a float value defining the multiplication factor for incoming KNX telegrams and the division factor for outgoing KNX telegrams. Use the float format 1234.567. Don't use a comma as a comma sign!

Here is a cut-out of a real configuration from a terminal program:

Here is a cut-out of a real configuration from a terminal program:	
1 5 10 15 20 25 30 35 40 45 50 55	5
#VERSION:1.0.1 /#	
TYPE: RESI-KNX-MODBUS	
#KNX:I:1=1,SINT16,1,0,1.1.3,FL0AT16,R,10.000000w	
#KNX:I:2=2,SINT16,1,0,1.1.4,FL0AT16,R,10.000000w	
#KNX:I:3=3,SINT16,1,0,1.1.7,FL0AT16,R,10.0000000	
#KNX:I:4=4,SINT16,1,0,1.1.8,FL0AT16,R,10.000000w	
#KNX:I:5=5,SINT16,1,0,1.1.9,FL0AT16,R,10.000000w	
#KNX:I:6=6,SINT16,1,0,1.2.1,FLOAT16,R,10.000000	
#KNX:I:7=7,SINT16,1,0,1.2.6,FL0AT16,R,10.000000w	
#KNX:I:8=8,SINT16,1,0,1.2.11,FL0AT16,R,10.000000	
#KNX:I:9=9,SINT16,1,0,1.2.17,FLOAT16,R,10.000000	
#KNX:I:10=10,SINT16,1,0,1.2.22,FLOAT16,R,10.000000	
#KNX:I:11=11,SINT16,1,0,1.3.1,FLOAT16,R,10.000000	
#KNX:I:12=12,SINT16,1,0,1.3.2,FLOAT16,R,10.000000	
#KNX:I:13=13,SINT16,1,0,1.4.1,FLOAT16,R,10.000000	
#KNX:I:14=14,SINT16,1,0,1.4.2,FLOAT16,R,10.000000	
#KNX:I:15=15,SINT16,1,0,1.4.3,FLOAT16,R,10.000000	
#KNX:I:16=16,SINT16,1,0,1.4.4,FLOAT16,R,10.000000	
#KNX:I:17=17,UINT16,1,0,10.3.5,BIT,R,1.000000w	
#KNX:I:18=18,UINT16,1,0,10.3.6,BIT,R,1.000000w	
#KNX:I:19=19,SINT32,2,0,9.3.4,UINT32,R,0.001000w	
#KNX:I:20=21,SINT32,2,0,9.3.6,UINT32,R,0.001000w	
#KNX:I:21=23,SINT16,1,0,1.3.1,FLOAT16,R,10.000000	
#KNX:I:22=24,SINT16,1,0,1.3.2,FLOAT16,R,10.000000	
#KNX:I:23=25,SINT32,2,0,9.3.2,UINT32,R,0.001000w	
#KNX:I:24=27,SINT32,2,0,9.3.5,UINT32,R,0.001000w	
#KNX:I:25=29,SINT32,2,0,9.4.29,UINT32,R,0.001000	
#KNX:I:26=31,SINT32,2,0,9.4.30,UINT32,R,0.001000	
#KNX:I:27=33,SINT16,1,0,1.4.2,FLOAT16,R,10.000000	
#KNX:I:28=34,SINT16,1,0,1.4.3,FLOAT16,R,10.000000	
#KNX:I:29=35,SINT32,2,0,9.4.21,UINT32,R,0.001000	
#KNX:I:30=37,SINT32,2,0,9.4.31,UINT32,R,0.001000@	
#KNX:I:31=39,SINT32,2,0,9.4.32,UINT32,R,0.001000@	
#KNX:I:32=41,SINT32,2,0,9.4.34,UINT32,R,0.001000	
#KNX:I:33=43,SINT16,1,0,1.4.1,FLOAT16,R,10.000000	
#KNX:I:34=44,SINT16,1,0,1.4.4,FLOAT16,R,10.000000	
#KNX:I:35=45,SINT32,2,0,9.4.27,UINT32,R,0.001000	
#KNX:I:36=47,SINT32,2,0,9.4.33,UINT32,R,0.001000	
#KNX:I:37=49,SINT16,1,0,1.3.4,FLOAT16,R,10.000000	
#KNX:I:38=50,SINT16,1,0,1.3.5,FLOAT16,R,10.000000	
#KNX:I:39=51,SINT32,2,0,9.4.35,UINT32,R,0.001000	

Selection (-)



44.10.2 The Add Configuration Line

The ASCII commands ADD CONFIG uses a complex configuration line to add a new entry to the current configuration table. Here is a detailed description of each field of this line.

The common syntax for the line is the following: #<BusAdr>,ADD CONFIG:<MBRegister>,<MBDataType>,<Interval>, <KNXGroup>,<KNXDataType>,<KNXDirection>,<Factor>

<BusAdr> stand for the current MODBUS bus address of the module as a decimal number e.g. 255

<MBRegister> stands for the starting index of the holding registers, starting with 1 for the first holding register 4x00001 and ending by 65535 for the last holding register 4x65535 as a decimal number. If you use 0 as a MODBUS register index, the next free MODBUS register is used for this entry.

<MBDataType> defines a datatype for the MODBUS registers. This is an ASCII text string in capital letters. Choose one of the following strings: UINT16, SINT16, UINT32, SINT32, UINT32R, SINT32R, FLOAT32, FLOAT32R, DOUBLE64, DOUBLE64R, GENERIC, ASCII or ERR. See the explanation of the MODBUS datatypes for more details about this strings.

<Interval> stands for a time interval in seconds as a decimal number for an automatic polling request on the KNX bus for this KNX group address. This is for future use and not used now!

<KNXGroup> defines the KNX group address with the format <Hi>.<Low>. KNX group addresses in the range from 0.0.0 to 31.7.255 are valid here.

<KNXDataType> is a string defining the data type of the incoming or outgoing KNX data. You can use the following ASCII string in capital letters: ERR, BIT, TWOBITS, FOURBITS, SIXBITS, CHARACTER, UINT8, SINT8, UNIT16, SINT16, FLOAT16, TIME, DATE, UINT32, SINT32, FLOAT32, STRING, GENERIC and DATETIME. See the explanation of the KNX datatypes for more details about this strings.

<KNXDirection> is a string defining the communication direction for this entry on the KNX bus. The following ASCII string in capital letters are valid: ERR, READ, WRITE, READ-WRITE, READWRITE, R, W, RW. See the explanation for KNX directions for more details about this string.

<Factor> is a float value defining the multiplication factor for incoming KNX telegrams and the division factor for outgoing KNX telegrams. Use the float format 1234.567. Don't use a comma as a comma sign!

A simple example for a valid ADD CONFIG command:

#AC:1,UINT16,0,1.0.0,BIT,READ,1.0 #255,AC:0,UINT16,0,1.0.1,FLOAT16,RW,1.0



45 RESI-DALI-SIO, RESI-DALI-ETH, RESI-DALI-PS

45.1 General information

With the RESI-DALI-SIO gateway, a DALI 1.0 and DALI 2.0 light system can be integrated in almost every system with a RS232 or RS485 interface and a MODBUS/RTU master protocol or serial ASCII text based protocol. The RESI-DALI-ETH gateway offers an integration with MODBUS/TCP server protocol or ASCII text socket over Ethernet.

The gateway is a serial interface for connection to the DALI with an integrated 2 wire DALI bus coupler. The timecritical DALI communication is done from the gateway itself. The gateway is configured with our MODBUSConfigurator software and maps the incoming and outgoing DALI telegrams to MODBUS holding registers. When the host writes to a MODBUS holding register, the gateway generates the corresponding DALI telegram. When the gateway receives a DALI telegram, it maps and converts the incoming data to the specific MODBUS holding registers for readout through a host.

To control our DALI converters you need a host system with a serial interface (RS232 or RS485), which is able to send ASCII command strings and which can receive ASCII characters. This feature is implemented in almost any media control system like CRESTRON®, AMX® or CONTROL4®. But almost every standard PLC can handle serial ASCII interfaces. Therefore our converter can be integrated everywhere. If the host system offers a MODBUS/RTU master or MODBUS/TCP client interface, our converter can be controlled via MODBUS holding registers.

Our DALI gateways support the easy installation and testing of DALI lamps in a DALI 1.0 or DALI 2.0 network. Therefore our software supports the automatic search and addressing of DALI lamps, physical selection and addressing of DALI lamps. Configuration of DALI scenes and DALI groups. Especially the gateway can handle all the new DALI device type 8 for RGB or RGBW dimmable DALI lamps. But also DALI device type 6 is supported.

Furthermore the device can send and receive to following DALI frame formats:

- * 8 Bit DSI commands
- * 16 Bit DALI 1.0/DALI 2.0 commands
- * 24 Bit DALI Multi Master commands or events
- * 25 Bit eDALI frames
- * 28 Bit DALI Frame for future use
- * 32 Bit DALI Frame for future use
- * Variable bit length frames from 1 to 64 bits for special purposes

This series of IO modules offer the following features:

- Easy integration of a complete DALI 1.0 and DALI 2.0 bus system
- MODBUS/RTU slave or MODBUS/TCP server protocol
- Additional commands with plain ASCII texts
- DALI and host interface are galvanically isolated
- Supports all DALI 1.0 commands
- Supports all DALI 2.0 commands
- Supports DALI priority slot sending
- Supports new DALI device type 6 and device type 8
- Integrated DALI bus-coupler
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system





Figure: Our serial DALI module



Figure: Our Ethernet IO module



With our RESI-DALI-PS we deliver a powerful and stable DALI power supply with max. 200mA output current, but supplied from a primary 12 to 48Vdc power supply. Its extreme slim housing suits in every switchboard cabinet, where you usually have 24Vdc for other automation devices.



Figure: Our DALI power supply module



45.2 Technical specification

Beside the basic technical data, which fulfill all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-DALI-SIO	<1.0W
RESI-DALI-ETH	<1.4W
RESI-DALI-PS	<6.0W
Product housing	
RESI-DALI-SIO	CEM17
RESI-DALI-ETH	CEM35
RESI-DALI-PS	CEM17
Product weight	
RESI-DALI-SIO	50g
RESI-DALI-ETH	83g
RESI-DALI-PS	65g
DALI bus interface	
RESI-DALI-SIO	
RESI-DALI-ETH	
Protocol	DALI 1.0 and DALI 2.0 and DALI multi master
Baud rate	1200Bit/s
Cable connection	via terminals
Galvanic isolation	Yes
LED indicator	Yes
RESI-DALI-PS	
Nominal output voltage	Maximum 18V, typical ~14-~18V
Maximum output current	~200mA
Short circuit output current	~225mA
Galvanic isolation	Yes
LED indicator	Yes
Default serial settings	
Baud rate	via DIP switch
Parity	none
Stop bits	one
UnitID	255
Default Ethernet settings	
IP address	192.168.0.191
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
	200
User	RESI
password	RESI



45.3 Additional terminals & LED states

DALI INTERFACE	DALI bus connector							
	One 3 pin terminal I	blocks						
	Terminal type:	USLIM						
	D+:	DALI+ bus wire						
	D-:	DALI- bus wire						
Pin layout	D+:	DALI+ bus wire						
	N/C:	not connected						
	D-:	DALI- bus wire						
RESI-DALI-SIO								
RESI-DALI-ETH								
STATE	If the DALI bus power is OK and the module has no error, this LED flashes with							
	a 1s rhythm. If the module has an internal error or the DALI bus power is not connected							
	or there is a short circuit on the DALI bus line this LED flashes very quick							
	(~250ms rhythm)							
DALI	If there is bus communication on the DALI, this LED is on, otherwise this LED is OFF							
RESI-DALI-PS								
POWER	Always on to indica	te primary power supply is OK.						
DALI	DALI activity LED, v	vhen transmitting a DALI telegram the LED switches						
	on for a few millised	conds.						
ERR	Power supply fault I	_ED. If the power supply unit malfunctions or if there is a bus error						
	on the DALI line or	if there is a short circuit in the DALI system, this LED lights up.						
	If the DALI bus is w	orking properly, this LED is off.						



45.4 RESI-DALI-SIO: Connection diagram

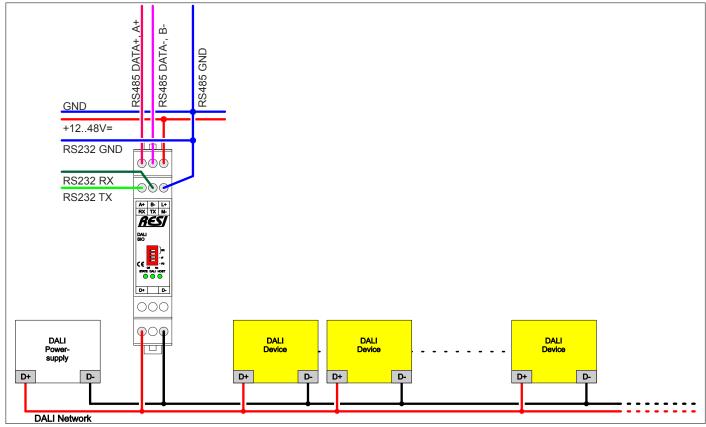


Figure: Connecting a DALI bus system to the RESI-DALI-SIO gateway with external DALI power supply

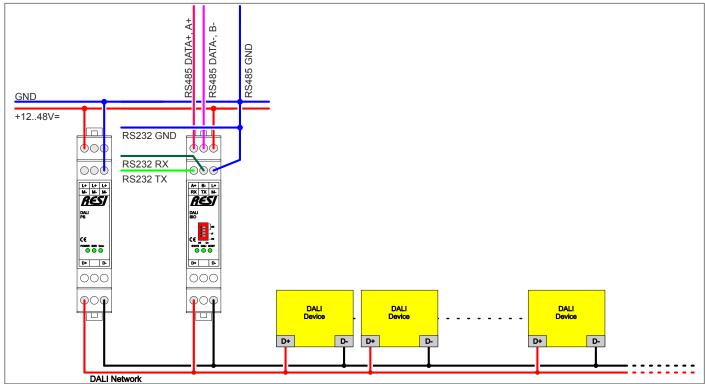


Figure: Connecting a DALI bus system to the RESI-DALI-SIO gateway with RESI-DALI-PS DALI power supply



45.5 RESI-DALI-ETH: Connection diagram

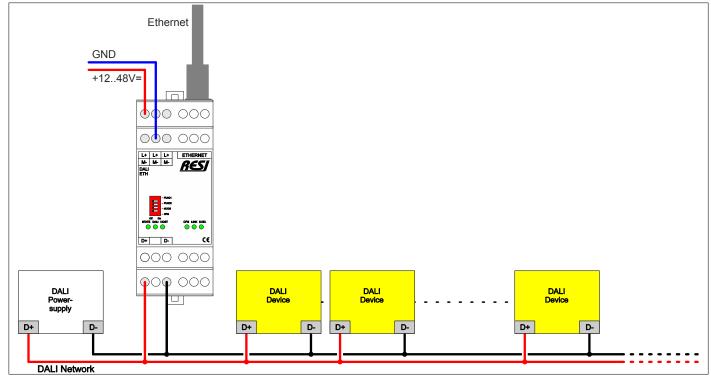


Figure: Connecting a DALI bus system to the RESI-DALI-ETH gateway with external DALI power supply

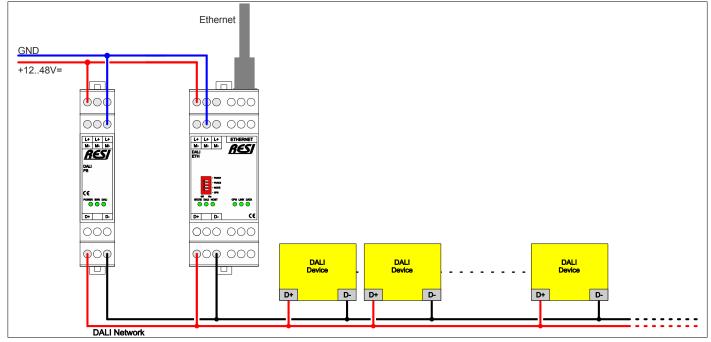
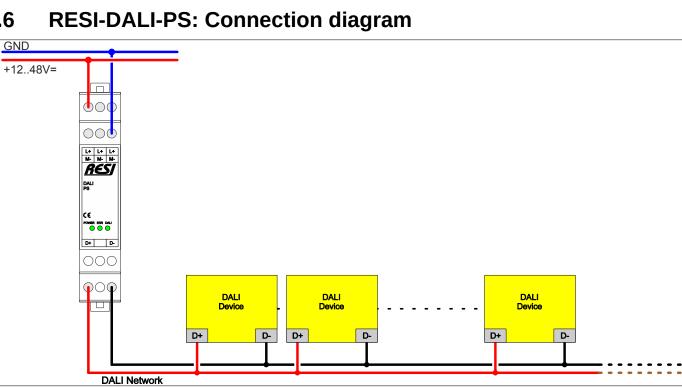


Figure: Connecting a DALI bus system to the RESI-DALI-ETH gateway with RESI-DALI-PS DALI power supply



45.6

Figure: Establishing power supply to a DALI bus system with our RESI-DALI-PS

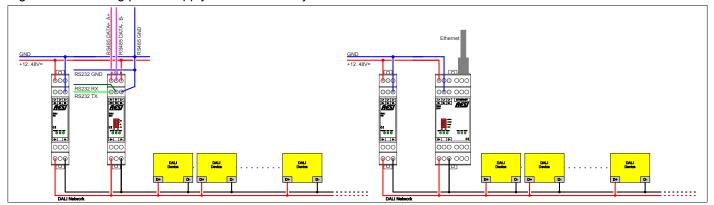


Figure: Using our RESI-DALI-PS DALI power supply in combination with our DALI gateways



45.7 DALI bus installation

There are many common pitfalls in using a DALI light bus system. We give answers to the most common questions around the DALI bus system here:

- What are the logical DALI limits
 - A DALI bus system can address 64 DALI lamps or DALI 1.0 devices
 - A DALI bus system can address 16 logical groups of DALI lamps or devices
 - A DALI bus system can address 64 DALI 2.0 control gears or DALI 2.0 devices like presence detectors, light sensors, motion detectors, manual control units
 - A DALI bus system can address 64 eDALI control gears like presence detectors, light sensors, motion detectors, manual control units (proprietary to LUNATONE)
 - Be careful, how many devices you use on your DALI bus, it depends strongly on your DALI power supply current.
- Maximum DALI cable length
 - The maximum cable length results from the maximum permitted voltage drop on the DALI cable, it is defined as a maximum of 2 V.
 - This corresponds to a maximum cable length of 300 m with a cable cross-section of 1.5 mm².
 - CAUTION: When designing the maximum cable length, the contact resistances must also be observed! 2 V voltage drop must not be exceeded!
- Do you have more than 64 DALI ballasts on a DALI line with a DALI power supply?
 - DALI only allows a maximum of 64 ballasts on a bus line!
 - Divide the DALI bus into two separate bus lines and use two DALI power supplies
- Is your bus system longer than 300m?
 - Separate the bus system into several separate segments with your own DALI power supplies and DALI master
- Measure the DALI output voltage on the DALI-MASTER. This must be around 14 to 18V!
 - Too many lights with ballasts on the DALI bus?
 - Do the ballasts use more power than the DALI power supply can deliver?
 - Usually the DALI power supplies deliver 200mA or 250mA of current
- Does the DALI voltage drop at the ballasts?
 - There may be a maximum voltage drop on the DALI bus of 2V between the DALI supply and the DALI ballast.
 - In the event of a large voltage drop, DALI communication no longer works reliably!
 - Measure this with EVERY ballast using a voltmeter!
 - First check whether all DALI devices are working.
 - Make sure that there is no communication on the DALI line.
 - Measure the voltage on the DALI power supply.
 - The value must be between 11.5 V and 22.5 V; a typical value is 14-16 V.
 - A significantly lower value could indicate a short circuit.
 - Measure the voltage on the DALI device that is furthest away from the DALI power supply.
 - The value must be between 9.5 V and 20.5 V.
 - A much lower value indicates that there is a short circuit somewhere.
 - Create a short circuit between the two DALI bus lines on the DALI device that is furthest away from the DALI power supply.
 - Measure the voltage on the DALI power supply. The value you measure is the DALI voltage drop.
 - This value must not be higher than 2 V.



- If it is higher than 2 V, check whether the following events have occurred:
 - DALI line too long (over 300m with 1.5mm² cross-section)
 - Cross section too small
 - High contact resistance
 - The value must be brought below 2 V.
- Remove the short circuit between the two DALI bus lines furthest away from the DALI device.
- This can be solved by dividing the DALI bus system into two separate DALI bus systems
- Your DALI bus cabling must be a tree structure
 - There must be no ring or loop. If so, cut this loop open!
- Recommendations of DALI cable lengths for different conductor cross-sections: DALI cable length:
 - at Ø 1.5mm² max. 300m
 - at Ø 1.0mm² max. 238m
 - at Ø 0.75mm² max. 174m
 - at Ø 0.5mm² max. 116m



45.8 Configuration with MODBUSConfigurator software

Download our free software from our homepage www.RESI.cc and install it on your computer. After you have successfully established a connection, you will see the following picture for the RESI-DALI-SIO or RESI-DALI-ETH gateways:

	Local COM port settings
BPRJ OPRJ OPRJ OPRJ	Norbusuni, 255 + Device, COM4 + Double stoppin + IP-Address
	modologium [55] • Defice:[CUMA] • Sobulis Talepen • In-Address
	Device specific
	Download coring 1-00- Last connection Quant 12st
New Project New Project De BESEDALESIO - [RESEDALESIO]	PESEDAU SID DALLio MOOBUS//RTU-ASCI converter for 64 DALLiorys
- price over all president of	Software varsion: 40.0
	State Do entri
	Ipitalize tomas Search lamas Querylama states Bearder Lamps Edit Graups Initialize devices Query devices (blas
	-MCDBUS
	Aldress 255 • Boudrole 57600 • Parily NONE • Stopbile 1 stopbile •
	Test bench
	Test Bench DAU 10-20 Lamp stetus DALI Monitor Device stetus
	DAL lange lamp Function Single lamp Image lamp Single lamp Image lamp Set binktness to (0.0%)
	-DALlines and
	Lang group 1 - Palse long grou
	Select OALItary process in the country of the count
	Final 254 diaman
	Allongs F DTP2 C24 C41
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	lange with troadcast produced C Serd/S BraDAU hame Bits C Serd/S BraDAU hame
	DAUN sittome C Send 8 bt DAU/DS teme
	Send Nbt CALlfrome C Send n Bt CALlfrome
	tome Clearlog
	12:12:845:32:822:04:U Ultrays-Sette 9X-bighters: 0.4U:setter 94 17:22:2455:32:822:01.4U Ultrays-Sette 10X-bighters: 0.4U:setter 94 17:22:2455:32:822:01.4U Ultrays-Sette 10X-bighters: 0.4U:setter 94 17:22:2455:32:822:01.4U Ultrays-Sette 10X-bighters: 0.4U:setter 94 17:21:22:85:32:802:01.4U Ultrays-Sette 10X-bighters: 0.4U:setter 94 17:11:22:85:32:802:01.4U ultrays-Sette 10X-bighters: 0.4U:setter 94 17:02:84:85:38:202:01.4U ultrays-Sette 50X-bighters: 0.4U:setter 94 17:02:84:85:38:202:01.4U
Print project report	Lindheid deute score

In the section device specific you will find the following functions:

Local COM	port settings							
Modbus unit:	255	 Device: 	COM4	 Stopbits 	1 stopbit	-	IP-Address:	
Baudrate:	udrate: 57600 ▼ Parity: NONE ▼ Port: evice specific Image: Connection for the system of the system							
Device spe	cific							
	load config	D	nnection 💁	T <u>e</u> st				
RESI-DALI-S	10			DALI	to MODBUS/	RTU+A	SCII converter fo	or 64 DALI lamps
Software vers	ion: 4.0.0							
State:		no e	rror					
l <u>n</u> itialize lamp	s <u>S</u> earch lamps	<u>Q</u> uery lamp	states <u>R</u> eorder L	amps <u>E</u> dit	Groups <u>I</u> nitia	alize dev	vices Q <u>u</u> ery de	vice states
MODBUS Address: 2	55 💌 Ba	audrate: 57	600 -	Pariț	/: NONE	▼ S	topbits: 1 stopb	it 💌

- Button "Download config": If you change the MODBUS/RTU slave address, or the serial parameters, you have to download the new configuration to the gateway to activate the changes.
- Button "Test connection": This button tests, if the software can communicate with the gateway or not.
- Button "Test": This function is not available in the DALI products.
- Button "Initialize lamps": This button opens a dialog window to configure new DALI 1.0 devices with a specific short address. The detailed function is described below.
- Button "Search lamps": This button starts a search for new DALI 1.0 lamps on the DALI bus and adds new lamps to the tree. The detailed function is described below.
- Button "Query lamp states": This button queries from all 64 DALI 1.0 short addresses the current state of the DALI lamps and shows the result in a grid. The detailed function is described below.
- Button "Reorder lamp": This button opens a dialog window, where you can readdress the DALI 1.0 devices and their short addresses. The detailed function is described below.



- Button "Edit Groups": This button opens a dialog window, where you can edit the groups of a DALI 1.0 device. The detailed function is described below.
- Button "Initialize devices": This button opens a dialog window, where you can search and address for new DALI 2.0 control gears on the DALI bus line. The detailed function is described below.
- Button "Query device states": This button queries of all 64 DALI 2.0 short addresses the current state of the DALI control gear and shows the results in a grid. The detailed function is described below.



45.8.1 The Test Bench DALI 1.0+DALI 2.0

The test bench lets you send quickly DALI commands to the DALI bus for test and evaluation of your DALI installation. Open the tab seen below:

Test Bench DALI 1.0+2.0 Lamp status DALI Monitor D	Device status
DALI single lamp Single lamp Select DALI short address of lamp in the range of 1 to 64 DALI lamp group	Function: © Set brightness to 0 (0.0%) © Set brightness to 128 (50.0%) © Set brightness to 254 (100.0%) © Set brightness to x (yy.y%) 254
Lamp group 1 Fulse lamp group Select DALI lamp group in the range of 1 to 16	00:OFF DTR= 254 Short address 1 3 8 bit Value
DALI all lamps All lamps	□ DTR1= 254 8 bit answer □ □ DTR2= 254 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Send to all connected DALI lamps with broadcast protocol	C Send 24 Bit DALI frame C Send 25 Bit eDALI frame C Send 28 Bit DALI frame Bits
Sends a N bit DALI frame	C Send 8 Bit DALI/DSI frame C Send n Bit DALI frame
frame	Clearlog

For DALI 1.0 devices:

First of all DALI 1.0 sends in general 16 bit DALI frames to a DALI 1.0 lamp and if the lamp gives an answer, this answer is an 8 bit DALI frame. Therefore you can send commands to DALI 1.0 devices in three different addressing schemes:

- via SHORT ADDRESS of lamp: The DALI standard allows up to 64 DALI lamps on one bus with a DALI short address between 0 and 63. We use for better understanding the DALI short addresses 1 to 64 in our software.
- via GROUP ADDRESS of lamp: The DALI standard allows up to 16 DALI groups on one DALI bus. A DALI lamp with a specific short address can be part of as many DALI groups, as you want it to be part of. Therefore DALI uses the groups 0 to 15, again, we use in our software 1 to 16 for better understanding.
- via BROADCAST to all lamps: The DALI standard supports a special addressing modes to send a DALI command to all connected DALI lamps. This is very useful for easy testing.

So, choose a DALI command from the Function area and the use the buttons "Single lamp" to send the command to a specific short address, "Lamp group" to send the command to a specific group of lamps or "All lamps" to send the command to all connected lamps.

Use the checkbox **Pulse lamp** to quickly find the lamp with the selected short address of the drop down list. The lamp will pulse the brightness to find the lamp easily.

Use the checkbox **Pulse lamp group** to quickly find a lamp group with the selected group of the drop down list. All lamps of the selected lamp group will pulse the brightness to find them easily.



The following functions are available for DALI 1.0 lamps:

- **Set brightness to ...**: With this command you set the brightness of the addressed lamps to the specific value.
- Execute command: With this command you can select a specific DALI 1.0 command from the drop down list and send it to the addressed lamps. For example choose the command 05:RECALL MAX LEVEL and press the button "All lamps". All connected DALI 1.0 lamps should dim up to the stored maximum brightness level. Some of the DALI commands will generate an answer. The answer will be shown in the log window below the command group. Also some of the commands need DTR, DTR1 or DTR2 register values. Therefore you have the check boxes before DTR, DTR1 and DTR2. This will activate automatic sending of DTR setup commands before executing the desired command. Some of the DALI 1.0 commands must be repeated within 100ms twice. This is also done be the gateway internally.

Test Bench DALI 1.0+2.0 Lamp status DALI Monitor	Jevice status
DALI single lamp Single lamp 8 Pulse lamp Select DALI short address of lamp in the range of 1 to 64	Function: C Set brightness to 0 (0.0%) C Set brightness to 128 (50.0%) C Set brightness to 254 (100.0%) Set brightness t
DALI lamp group Lamp group	
Select DALI lamp group in the range of 1 to 16	T DTR= 254 Short address
DALI all lamps All lamps	□ DTR1= 254 8 bit answer □ DTR2= 254
Send to all connected DALI lamps with broadcast protocol DALI N bit frame Send <u>N</u> bit DALI frame Sends a N bit DALI special	C Send 24 Bit DALI frame DALI frame (0xHHHHHHHH) 0x00000000 □ Repeat frame within 100ms C Send 25 Bit DALI frame Bits 1 □ C Send 8 Bit DALI/DSI frame C Send 8 Bit DALI frame C Send 8 Bit DALI frame 0x00000000 □
frame	Clear log
17:28:25 25:08:2020:DALI single lamp:8:Send command:2 17:28:25 25:08:2020:DALI single lamp:8:Send command:D 17:28:01 25:08:2020:DALI single lamp:1:DALI answer is va 17:28:01 25:08:2020:DALI single lamp:1:Send command:00:OF 17:27:45 25:08:2020:DALI all lamps:Send command:00:OF 17:27:33 25:08:2020:DALI all lamps:Send command:06:RE 17:27:18 25:08:2020:DALI all lamps:Send command:05:RE	ulid:8 bits 0x0000 0:QUERY STATUS[Answer],Answer:0.0x0000 F ECALL MIN LEVEL

For DALI 2.0 devices:

The DALI 2.0 standard introduces new DALI frame formats. Therefore we have implemented a test functionality into the gateway: The functions "Send x bits DALI frame" offers a wide variety of possibilities to send new DALI 2.0 frames.

Enter a valid DALI 2.0 frame and click on the button "Send N bit DALI frame". You will see the result in the log window below.



45.8.2 Query lamp states

This function tries to read out basic data of all DALI 1.0 devices from the connected DALI bus. The result will be displayed in the grid view under the tab "Lamp status". A possible result could look like this:

hort address	Bollast state	Lomp error	Lamp power	Limit error	Dimming	Reset state	Short address missing	Power supply	Actual level	Device Type	Serial Number
	OK	No	On	No	finished	No	No	No	169 -> 66.5%	6 → LED lamp control gear	GTIN:00000000000,SN:0000
	OK	No	On	No	finished	No	No	No	1 -> 0.4%	8 → Colour lampcontrol gear:3CH→RGB	GTIN:00000000000,SN:0000
	OK	Yes	Off	No	finished	No	No	No	255 -> MASK	3 -> Low-voltage halogen lamp control gear	GTIN:03A542930D59,SN:61D
	OK	No	On	No	finished	No	No	No	1-> 0.4%	8 -> Colour lampcontrol gear:Tc	GTIN:00000000000, SN:0000
	Error	Yes	On	Yes	in progress	Yes	Yes	Yes	1 -> 0.4%	8 -> Colour lampcontrol gear:4CH->RGBW 8 -> Colour lampcontrol gear:4CH->RGBW	GTIN:00000000000, SN:0000
	ок	No	On	No	finished	No	No	No	06 -> 33.9%	8 -> Colour lampcontrol gear:4CH->RGBW	GTIN:FFFFFFFFFFFFFFFF.SN:FFF

You will find the following information in this grid view:

- Short address: The current short address of the tested lamp
- **Ballast state**: The current state of the ballast (OK or Error) monitored by the DALI lamp controller.
- Lamp error: If the DALI lamp controller has detected an error in the ballast in in the control gear, it will return Yes. Otherwise it will return No.
- Lamp power: If the DALI lamp controller currently powers the ballast, the return value will be On, else the return value will be Off.
- Limit error: If the brightness of the affected DALI lamp is not within the internal programmed limits of the DALI lamp controller, the return value will be Yes, else the return value will be No.
- Dimming: This flag (In progress or Finished) indicates if actual a dimming or fading is running in the DALI lamp controller (In progress). If the dimming or fading has ended Finished will be returned.
- **Reset state**: This flag (Yes or No) indicates if the DALI lamp is in reset state (Yes) or not (No).
- Short address missing: This flag (Yes or No) indicates if the DALI lamp has no programmed short address (Yes). If there is a short address programmed, the answer will be (No)
- Power supply: This flag (Yes or No) indicates if the DALI lamp has an error or problem with the power supply (Yes) or if the power supply of the DALI lamp is ok (No).
- Actual level: This is the actual brightness value of the lamp between 0 and 254 (0 to 100% scaled linear!) or 255 for MASK.
- Device type: This is the actual device type of the DALI lamp. Additional text information is shown to the basic device type.
- Serial Number: If possible to readout the correct value this is the serial number of the DALI lamp.



45.8.3 Search lamps

This function tries to read out basic data of all DALI 1.0 devices from the connected DALI bus. For each DALI 1.0 lamp, the software adds a leaf into the project tree under the selected DALI converter with the Name "Lamp <ShortAddress>". A possible result will look like this:

Set Profile Device type: 31c=+volage relegentemp control geer F1 F2 F3 F4 F5 F5 F7 F0 Set result Set result Sector hype Set result Sector hype F1	Device byocci Device type:	14 T 15 T 15 55->MASK 55->MASK 55 >MASK
See Model FERS CALLS () Physics minimum.[1 Tel minimum.[2 Tel minim.[2 Tel minimum.[2	Description Preside infimum: Extension (breaching) → Preside faile Scensor duces Scensor duces → Preside faile Manuers Scensor duces Scensor duces → Descide Manuers Scensor duces Scensor duces → Descide Manuers Scensor duces Scensor duces → Descide Scensor duces Scensor duces Scensor duces	5->MASK 5->MASK 5->MASK
Projecti monumi, i Decay of monumi, i Scena values; PES CAL SIO - [DEFI-DALESC] Manuar:	Prescription Prescrint Prescription Prescription <td>5-MASK 5-MASK</td>	5-MASK 5-MASK
FERS FAULSIO Interference Minimum 1.0d1 + 0.03914 Minimum 254.0xFE + 100.0076 11 255-3MASK 9 255-3MASK 12 255-3MASK 14 255-3MASK 14 255-3MASK 14 255-3MASK 14 255-3MASK 14 255-3MASK 12	→D DEST DALISIO Maximum 254.0/E > 100.00% 1251.0/E > 100.00%	5-MASK 5-MASK
Listing 2 Prover us Lot (Lb+L → 100,L0%) Bue feat: 2,40,d L → 100,00% 2; 255-MASK 8; L55-MASK 14; 255-MASK	■ Lamp 2 Power as L54(b)F E ⇒ 101.00% Bas losh: 2240d E ⇒ 100.00% 2: 255⇒MASK 6: 255⇒MASK 10: 255⇒MASK 14: 255⇒MASK	5-MASK 5-MASK
Lorp 3 Face time: Cold of the production Fade table Cold of the production Cold of the production <thcold of="" production<="" th="" the=""> <thcold of="" production<="" t<="" td="" the=""><td>Europ 3 Fact Inte: Child > no tube inte: Fada rate: 7.0.7 > 44 7 segar 2 255 shASK 2 255 shASK 11: 255 shASK 12: 255 shASK <th< td=""><td>S > MASK</td></th<></td></thcold></thcold>	Europ 3 Fact Inte: Child > no tube inte: Fada rate: 7.0.7 > 44 7 segar 2 255 shASK 2 255 shASK 11: 255 shASK 12: 255 shASK <th< td=""><td>S > MASK</td></th<>	S > MASK
Elsenper Est new parameters 4 255-MASK 8 255-MASK 12 225-MASK 18 225-MASK E Lamp 5 Bichness: 0.00000 Image: Comparison of the second of the sec	Examp 6 Fet new promotions 4 255-MASK 12 255-MASK 18 255-MASK 255-MASK 255-M	
E Lamp 6 Brightness: 0.0x0000 Pead al scares(8bi) White al scanes(8 bi)	E Lamp 6 Bichhess: 0.0x000 Read al scenes(8 bit) Write al scenes(8 bit)	

On the left side in the project tree you will see, that there are 6 lamps connected to the DALI bus line. We have selected Lamp 2 for detail view on the right side. The lamp is a DALI device type 3 lamp (Low-voltage halogen lamp control gear) with standard DALI 1.0 commands and parameters.

In this dialog you can execute the following commands:

- Read lamp settings: This commands will re-read the current settings of the DALI ballast and displays the results on this page
- Write lamp settings: This command will write the changed settings from the PC to the DALI lamp control gear and store the new values in the control gear.
- Switch MAX: This command will switch the DALI lamp on and dim up to the programmed maximum brightness level stored in the DALI lamp control gear.
- Switch MIN: This command will switch the DALI lamp on and dim up to the programmed minimum brightness level stored in the DALI lamp control gear.
- Switch OFF: This command will switch the DALI lamp off.
- Set new parameters: This command will store the user changed parameters for the lamp. How you can edit the parameters, please read "How to edit the parameters" section below. You can modify the standard parameters Minimum, Maximum, Power Up, Bus fault Fade time or Fade rate with this function. This are basic setup values for almost every DALI lamp. But you have to select the function "Write lamp settings" to download the changes into the DALI lamp control gear.
- Read all scenes (8 bit): This command will read out all brightness values for all 16 scenes stored in the DALI lamp control gear. The result will be a brightness value in the range 0 to 254 or 0x00 to 0xFE for 0.0% to 100.0% and 255 or 0xFF for MASK.
- Read all scenes (16 bit): This command will read out all brightness values for all 16 scenes stored in the DALI lamp control gear using 16 Bit data format. The result will be a brightness value in the range 0 to 65279 or 0x0000 to 0xFEFF for 0.0% to 100.0% or 65280 to 65535 or 0xFF00 to 0xFFFF for MASK. CAUTION: Not all DALI 1.0 devices support 16 Bit data mode. So better use only 8 bit data mode functions, if you don't know exactly, if your control device supports this data mode!
- Write all scenes (8 bit): This command will immediately write the new scene values to the DALI lamp control gear.
- Write all scenes (16 bit): This command will immediately write the new scene values to the DALI lamp control gear with 16 bit data format. CAUTION: Not all DALI 1.0 devices support 16 Bit data mode. So better use only 8 bit data mode functions, if you

CAUTION: Not all DALI 1.0 devices support 16 Bit data mode. So better use only 8 bit data mode functions, if you don't know exactly, if your control device supports this data mode!

- **Query brightness**: This command will query the actual brightness of the selected lamp.
- Set brightness: The command will set the new selected brightness for the current lamp in the DALI lamp control gear. Select the brightness with the slider or the up down keys, if you have focused on the slider. Or double click on the text field with current selected brightness to edit the brightness as a text value. The choose this button to generate the DALI command.
- Groups: Select the desired groups for this control gear by checking the Groups 1 to 16. The press the button Write lamp settings to download the group selection into the control gear.



How to edit the parameters:

- Brightness: To change a brightness value, enter a valid number between 0 and 254 or 0x00 and 0xFE for the brightness 0% and 100%, 255 or 0xFF for MASK or 0.0 to 100.0 for a brightness level in percent. Enter the word MASK for the MASK value of 255.
- Fade time: To change a fade time, enter a valid number between 0 and 255 or 0x00 to 0xFF for the fade time or 0.0 to 90.5 for a fade time in seconds. Enter the word NO for no fade time (value 0).
- Fade rate: To change a fade rate, enter a valid number between 0 and 255 or 0x00 to 0xFF for the fade rate or 0.0 to 357.8 for a fade rate in steps/seconds. Enter NO for no fade rate (value 0).
- Color parts RGB or WAF: To change a color part, enter a new value for 8 bit mode between 0 and 254 or 0x00 to 0xFE for 0.0% to 100.0%, or 255 or 0xFF for MASK value. Enter a new value for 16 bit mode between 0 and 65279 or 0x0000 and 0xFEFF for 0.0% to 100.0% or 65280 to 65535 or 0xFF00 to 0xFFFF for MASK. Or enter a percentage value between 0.0% and 100.0%. Enter the word MASK for MASK.
- Color temperature Tc: To change a color temperature Tc, enter a new value for 16 bit mode between 0 and 65279 or 0x0000 and 0xFEFF or 65280 to 65535 or 0xFF00 to 0xFFFF for MASK. Or enter a KELVIN value between 1.0 and 1000000.0 Kelvin. Enter the word MASK for MASK.
- **Primary N**: To change a primary N channel, enter a new value for 16 bit mode between 0 and 65279 or 0x0000 and 0xFEFF or 65280 to 65535 or 0xFF00 to 0xFFFF for MASK. Or enter a percentage value between 0.0 and 100.0. Enter the word MASK for MASK.



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Device type 6 lamps:

For lamps of DALI device type 6 you will see additional information in two tabs. The first tab shows more information about the DALI lamps itself and its features.

.amp name:	Lamp 4							iroups:				
Short address	s: 4 🗸	Device type: 6	LED lamp control gear					9 🗆	10 🗆 11	□ 12 I	13	
Physical minir	num: 169		Set manual de		values:							
/inimum: 1	69.0xA9 -> 66.54%	Maximum:	250.0xFA -> 98.43%	1: 255	->MASK	5: 2	55->MASK	255->MASK				
owerup: 2	54.0xFE -> 100.00%	Bus fault							: 255->M/ 0: 255->M/		_	255->MASK
ade time: 0	,0x0 -> no fade time	Fade rate:	7,0x7 -> 44.7steps/s	3: 255	->MASK		55->MASK		: 255->M		_	255->MASK
1		new parameters	1	4: 255	->MASK	8: 2	55->MASK	12	: 255->N	IASK	16:	255->MASK
Brightness:	0,0×0000				d all scenes(1	all scene		1		1
	Query brightne	ess	Set brightness		d all scenes(1			all scene		1		
DT6 status 1	DT6 status 2		-							-		
-Gear type-												
5,0x05	Bit 0:1:Integrated LE	D power supply is	supported]					
	Bit 1:0:Integrated LE	D module is not s	upported]					
	Bit 2:1:AC power su	pply is possible]					
	Bit 3:0:DC power su	pply is not possibl	e]					
Dimming cu	rve						-					
0,0x00	Bit 0:0:Logarithmic o	dimming curve is u	sed]					
Possible or	erating modes						-					
4,0×04	Bit 0:0:PWM mode i	s not supported]					
	Bit 1:0:AM mode is r	not supported]					
	Bit 2:1:Current contro	Bit 2:1:Current controlled output is activated										
	Bit 3:0:High current i	mpulse mode is n				1						
Features												
99,0x63	Bit 0:1:Shortcut dete	ction is supported]					
	Bit 1:1:Open circuit o	detection is suppo	ted									
	Bit 2:0:Load decrea	se detection is not	supported]					
	Bit 3:0:Load increas	e detection is not	supported]					
	Bit 4:0:Currrent prote	ection device is no	t supported]					
	Bit 5:1:Thermal shut	down detection is	supported]					
	Bit 6:1:Luminous flux	reduction due to t	hermal overload detection	is supported								
	Bit 7:0:Physical sele	ection is not suppo	rted				1					



The second page shows information about the failures or the operating mode of the DALI DT 6 lamp. Also you can change the fast fade time in this dialog, which is new to the DALI device type 6 lamps.

amp name:	Lamp 4			Groups:
amp name.				
hort address:	4 v D	evice type: 6:LED lamp control gear		
hysical minimu	um: 169	Set manual	device type Scene values:	
-				
	9,0xA9 -> 66.54%	Maximum: 250,0xFA -> 98.43%		55->MASK 9: 255->MASK 13: 255->MASK
	4,0xFE -> 100.00%	Bus fault 254,0xFE -> 100.00%		55->MASK 10: 255->MASK 14: 255->MASK
ade time: 0,0	x0 -> no fade time	Fade rate: 7,0x7 -> 44.7steps/s		55->MASK 11: 255->MASK 15: 255->MASK
		parameters		55->MASK 12: 255->MASK 16: 255->MASK
Irightness:	0,0×0000		Read all scenes(8 bit)	Write all scenes(8 bit)
	Query brightness	Set brightness	Read all scenes(16 bit)	Write all scenes(16 bit)
DT6 status 1	DT6 status 2			
Failure status				
99,0x63	Bit 0:1:Shortcut is detect			
	Bit 1:1:Open circuit is de			
	Bit 2:0:No load decreas			
	Bit 3:0:No load increase			
	Bit 4:0:Current protection			
	Bit 5:1:Thermal shutdow			
		luction due to thermal overload detecti	on is active	
	Bit 7:0:Reference meas	urement was ok		
Operating mo				
4,0x04	Bit 0:0:PWM mode is no	ot active		
	Bit 1:0:AM mode is not a	active		
	Bit 2:1:Output is current of	controlled		
	Bit 3:0:High current impu	ulse mode is not active		
	Bit 4:0:Logarithmic dimn	ning curve is active		
Fast fading				
27,0x1B	Fast fade time is 675ms	\$		 Set fast fade time
	Minimum fast fade time	is 675ms		



Device type 8 lamps:

For DALI device type 8 lamps additional information is displayed below the standard information of a DALI lamp. The tab "DT8 status" shows the following information:

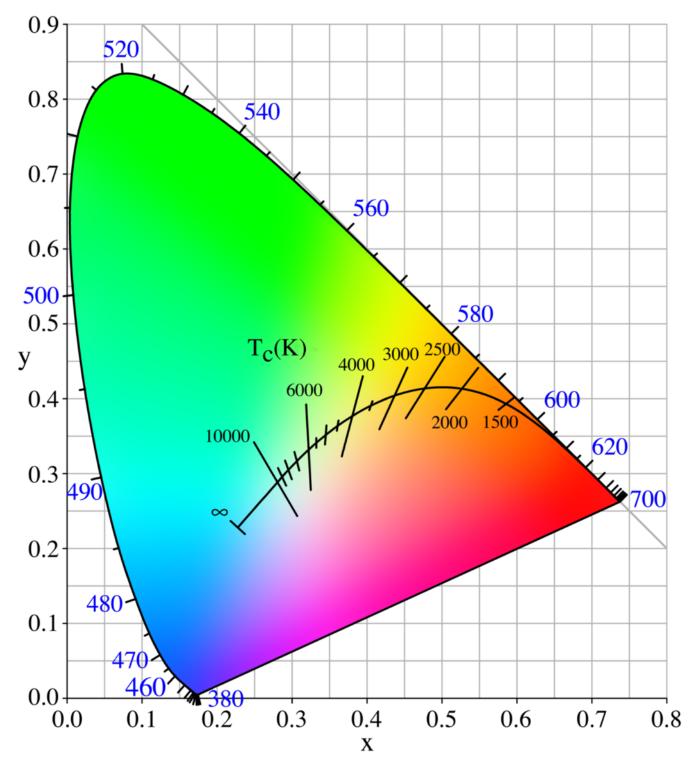
			Groups:
.amp name:	Lamp 1		
Short address:	1 Device type: 8:Colour	r lampcontrol gear	
Physical minim		Set manual device type	
-nysicai minimi		Scene values:	
/linimum: 1,0	x01 -> 0.39% Maximum: 254,0;	XFE -> 100.00% 1: 255->MASK 5: 2	255->MASK 9: 255->MASK 13: 255->MASK
Power up: 25	4,0xFE -> 100.00% Bus fault 127,0	0x7F→ 50.00% 2: 255→MASK 6: 2	255->MASK 10: 255->MASK 14: 255->MASK
Fade time: 10,	0xA -> 16.0s Fade rate: 6,0x6	-> 63.3steps/s 3: 255->MASK 7: 2	255->MASK 11: 255->MASK 15: 255->MASK
	Set new parameters	4: 255->MASK 8: 2	255->MASK 12: 255->MASK 16: 255->MASK
Brightness:	0,0x0000	Read all scenes(8 bit)	Write all scenes(8 bit)
	Query brightness Se	et brightness Read all scenes(16 bit)	Write all scenes(16 bit)
DT8 status	colour Scenes Init parameters		
-Gear features			_
1,0x01	Bits 0-1:1:16-bit data mode enabled+16/8 bit	t data mode supported	
	Bit 2:0:Auto calibration is not supported		
	Bit 6:0:Identification is not active		
Colour status			
128,0x80	Bit 0:0xy-coordinate colour point is ok		
	Bit 1:0:Colour temperature Tc is ok		
	Bit 2:0:Auto calibration is not running		
	Bit 3:0:Auto calibration is erromeous		
	Bit 4:0:Colour type xy-coordinate is not active	3	
	Bit 5:0:Colour type colour temperature Tc is n	not active	
	Bit 6:0:Colour type primary N is not active		
	Bit 7:1:Colour type RGBWAF is active		
-Colour type fe	atures		
128,0x80	Bit 0:0xy-coordinate not capable		
	Bit 1:0:Colour temperature Tc not cappable		
	Bit 2-4:0:Number of primaries:0		
	Bit 5-7:4:Number of RGBWAF channels:4->R	GBW	
-RGBWAF co	ntrol		
143,0x8F	Bit 0:1:Channel 0-RED is active	Bit 3:1:Channel 3-WHITE is active	
	Bit 1:1:Channel 1-GREEN is active	Bit 4:0:Channel 4-AMBER is inactive	3
	Bit 2:1:Channel 2-BLUE is active	Bit 5:0:Channel 5-FREECOLOUR is	

Especially the section "Color type features" shows you, what type of color commands your DALI DT8 lamp controller can handle. Also the amount and type of dimming channels is displayed here.



Please consult the DALI standard to understand the different DALI color schemes. basically DALI 2.0 supports:

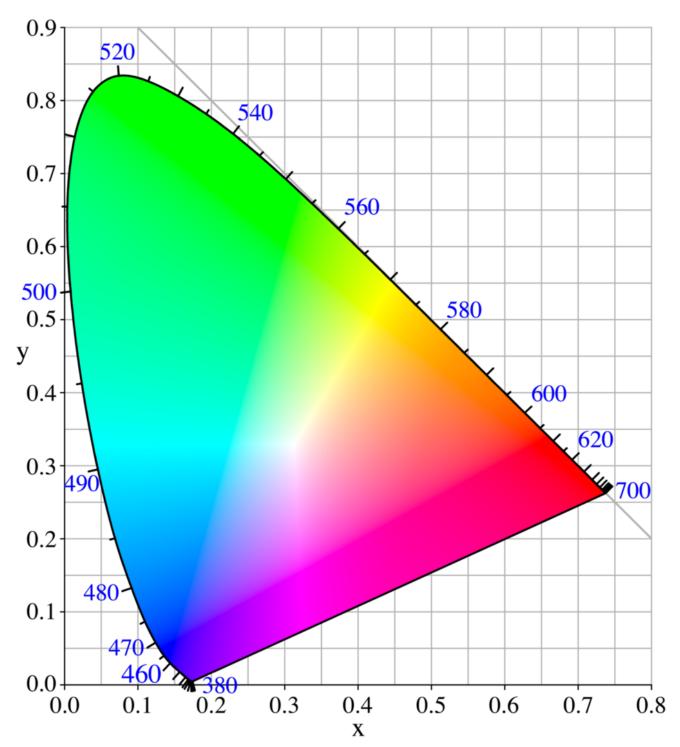
Color type Tc (Tunable White): Allows control of the correlated color temperature (CCT) along the black-body line, from warm white to cool white.



- Color type primary N : Allows simple control of up to 6 dimmable channels .
- Color type RGBWAF: Allows simple control of up to 6 channels of color (Red, Green, Blue, White, Amber and Free-color).



■ **Color type xy coordinate:** Also known as xy chromatically, this allows precise and repeatable selection of the color co-ordinates from the CIE color space chromaticity diagram (1931).





On the tab Color, you can read and write new color settings to the lamp:

Dali lamp settings									
<u>R</u> ead lamp settings <u>W</u> rite la	mp settings <u>S</u> witch MAX	Switch MIN Switch OFF							
Lamp name: Lamp 1					Group				6
Short address: 1	 Device type 	8:Colour lampcontrol gear			1				14 🗆 15 🗆 16
Discont and a single state of the second state		Set manual device	type		i L				
Physical minimum: 1			Scene values:						
Minimum: 1,0x01 -> 0.39%	Maximur	n: 254,0xFE -> 100.00%	1: 255->MASK	5: 255-	MASK	9:	255->MASK	13: 2	55->MASK
Power up: 254,0xFE -> 100	.00% Bus fault	: 127,0x7F -> 50.00%	2: 255->MASK	6: 255-	MASK	10:	255->MASK	14: 2	55->MASK
Fade time: 10,0xA -> 16.0s	Fade rat	e: 6,0x6-> 63.3steps/s	3: 255->MASK	7: 255-	MASK	11:	255->MASK	15: 2	55->MASK
	Set new parameters		4: 255->MASK	8: 255-	MASK	12:	255->MASK	16: 2	55->MASK
Brightness: 127,0x00	7F 🗾 🗖	127->50.0%	Read all scenes	s(8 bit)	Write all s	cenes	s(8 bit)		
Que	ry brightness	Set brightness	Read all scenes	(16 bit)	Write all so	cenes	(16 bit)		
DT8 status Colour Scer	nes Init parameters								
Read colours (8 bit mod	le) Read colours (16	(hitmode)							
		i bir mode)							
x coordinate	2555								<- XY
y coordinate	????							Y	<u>/+</u>
									Tc+
Tc colour temperature	????								Tc
									Tc-
Primary N dimlevel 0	????								CH0
Primary N dimlevel 1	????								CH1
Primary N dimlevel 2	????								CH2
Primary N dimlevel 3	????								CH3
Primary N dimlevel 4	????								CH4
Primary N dimlevel 5	????								CH5
Channel 0 RED	254,0×FE		ļ	,	185	->72.8	%		
Channel 1 GREEN	254,0×FE				0->	0.0%			RGB
Channel 2 BLUE	0,0×00			l	254	->100	0%	RGBW	
Channel 3 WHITE	149,0×95				223	- > 87.8	%	T(GDT)	
Channel 4 AMBER	2222								WAF
Channel 5 FREECOLOUR	????								
RGBWAF control	????								
Colour type	128,0×0080								

In this tab page you can execute the following commands:

- Read colors (8-bit mode): This commands will read the current settings of all colors of the DALI ballast and displays the results on this page. Only the supported color values are displayed here. Not every DALI ballast can handle all four color profiles defiled by the DALI standard.
- Read colors (16-bit mode): This commands will read the current settings of all colors of the DALI ballast with 16 bit data mode and displays the results on this page. Only the supported color values are displayed here. Not every DALI ballast can handle all four color profiles defiled by the DALI standard. CAUTION: Not all DALI 1.0 devices support 16 Bit data mode. So better use only 8 bit data mode functions, if you don't know exactly, if your control device supports this data mode!
- RGB: The command will set the new RGB colors (red, green and blue) for the current lamp in the DALI lamp control gear. Select the red, green and blue parts of your desired color with the slider or the up down keys, if you have focused on the slider. Or double click on the text field with current selected color part to edit the color part as a text value. Then choose this button to generate the DALI DT8 commands.
- WAF: The command will set the new WAF colors (white, amber, freecolor) for the current lamp in the DALI lamp control gear. Select the white, amber and freecolor parts of your desired color with the slider or the up down keys, if you have focused on the slider. Or double click on the text field with current selected color part to edit the color part as a text value. Then choose this button to generate the DALI DT8 commands.
- RGBWAF: The command will set the new RGB and WAF colors (red, green blue, white, amber, freecolor) for the current lamp in the DALI lamp control gear. Select the red, green, blue, white, amber and freecolor parts of your desired color with the slider or the up down keys, if you have focused on the slider. Or double click on the text



field with current selected color part to edit the color part as a text value. Then choose this button to generate the DALI DT8 commands.

Tc: The command will set the new color temperature Tc between 0 and 100000K for the current lamp in the DALI lamp control gear. Select your desired color temperature Tc with the slider or the up down keys, if you have focused on the slider. Or double click on the text field with current selected color part to edit the color temperature as a text value. The choose this button to generate the DALI DT8 commands.

HINT: Color temperature Tc mode uses 16 bit data mode. So first read out the current colors with the button Read colors (16 bit mode). Then write the new color temperature to the lamp with this button or use Tc+ and Tc- button.

- **Tc+**: This command will step the current color temperature a little bit warmer.
- **Tc-**: This command will step the current color temperature a little bit colder.

Dali lamp settings											
<u>B</u> ead lamp settings <u>W</u> rit	e lamp settings 🔉	Switch MAX S	witch MIN Sw	ritch OFF							
Lamp name: Lamp	16			1			Grou	ips:			
							_ □ 1	□ 2 T	3 🗆 4	□5 □6	□7 □8
Short address: 6	• D	evice type: 8					_	🗆 10 Г	11 🗆 12	13 🗆 14	□ 15 □ 16
Physical minimum: 1			5	et manual device	Scene values:						
Minimum: 1.0x01 -> 0.3	9%	Maximum:	254.0xFE ->	100.00%	1: 255->MASK	5: 255	i->MASK	9: 2!	55->MASK	13: 255-	>MASK
Powerup: 254.0xFE ->		Bus fault:	254.0xFE ->		2: 255->MASK	_	i->MASK		5->MASK	14: 255-	
Fade time: 0,0x0 -> no fade time		Fade rate:	7,0x7 -> 44.7	steps/s	3: 255->MASK	7: 255	i->MASK	11: 29	55->MASK	15: 255-	>MASK
1.1.1.1		parameters	1		4: 255->MASK	_	->MASK	_	5->MASK	16: 255-	
Brightness: 0,0x0				167->65.7%	Read all scene			scenes(8			
	Query brightness		Set brigh	tness	Read all scenes	s(16 bit)	Write all	scenes(16	bit)		
DT8 status Colour	cenes Init paran	neters									
Read colours (8 bit i	node) Read	colours (16 bi	t mode)								
x coordinate	2222									X- X+	XY
y coordinate	????			1			-			Y- Y+	
y 000.000				J.							Tc+
Tc colour temperature	9090,0×2382-	>110.01K					13	H->73308K		7	Tc
					~						Tc-
Primary N dimlevel 0	????						19	659->23.9	9%		CHO
Primary N dimlevel 1	????				v						CH1
Primary N dimlevel 2	????) Ť							CH2
Primary N dimlevel 3	????			j							CH3
Primary N dimlevel 4	????			j							CH4
Primary N dimlevel 5	????			i i							CH5
Channel 0 RED	????					1	18	15 -> 72.8%			
Channel 1 GREEN	????						0-	> 0.0%			RGB
Channel 2 BLUE	????						1 25	i4->100.0%	5 –	RGBWAF	
Channel 3 WHITE	????						22	3 -> 87.8%		(GDTA)	
Channel 4 AMBER	????			J							WAF
Channel 5 FREECOLO	UR ????										
RGBWAF control	????										
Colour type	8192.0×2000										
yes	0.00,0.000										



Primary N: Some lamps define up to 6 dimmable channels without specific color dedication. This is the primary N mode of a DALI 2.0 DT8 lamp. You can choose for every channel a value either in 8 bit mode or in 16 bit mode, depending, how you have read out the colors before this command. With the buttons CH0 to CH6 you can set the new values for each channel individually.

Dali lamp settings								
<u>R</u> ead lamp settings <u>W</u> rite I	amp settings <u>S</u> witch MAX	Switch MIN Switch OFF						
Lamp name: Lamp 5				G	roups:			
				E	1 🗆 2	□3 □4	□ 5 □	6 🗆 7 🗖 8
Short address: 5	Device type:	8:Colour lampcontrol gear			9 🗆 10	0 🗆 11 🗖 12	□ 13 □	14 🔲 15 🕅 16
Physical minimum: 86		Set manual device	Scene values:					
Minimum: 86,0x56 -> 33.8	6% Maximum	254,0xFE -> 100.00%	1: 255->MASK 5:	255->MASK	9:	255->MASK	13: 2	55->MASK
Power up: 254,0xFE -> 10		254.0xFE -> 100.00%		255->MASK	10:	255->MASK		55->MASK
Fade time: 2,0x2 -> 1.0s	Fade rate	: 7,0x7 -> 44.7steps/s		255->MASK	11:	255->MASK	15: 0	->0.0%
	Set new parameters		4: 255->MASK 8:	255->MASK	12:	255->MASK	16: 0	->0.0%
Brightness: 0,0x000		167->65.7%	Read all scenes(8 bit		all scene:	1		
Qu	ery brightness	Set brightness	Read all scenes(16 bi	it) Write a	all scenes	(16 bit)		
DT8 status Colour Sce	nes Init parameters							
Read colours (8 bit mo	de) Read colours (16	bit mode)						
x coordinate	????						X- >	<+ XY
y coordinate	????						Y- Y	(+
								Tc+
Tc colour temperature	????		J		13->7330	8K		Tc
								Tc-
Primary N dimlevel 0	????				15659->2	3.99%		CH0
Primary N dimlevel 1	????		ļ		32478->4	9.75%		CH1
Primary N dimlevel 2	????		J		51906->7	9.51%		CH2
Primary N dimlevel 3	????				65534- > N	IASK		CH3
Primary N dimlevel 4	????		J		50456->7	7.29%		CH4
Primary N dimlevel 5	????				32768- > 5	0.20%		CH5
Channel 0 RED	????		Ţ		185->72.8	3%		
Channel 1 GREEN	????				0->0.0%			RGB
Channel 2 BLUE	????				254->100		RGBW	AF
Channel 3 WHITE	????				223->87.8	1%		
Channel 4 AMBER	????							WAF
Channel 5 FREECOLOUR	(<u>7777</u>							
DOBUME	0000							
RGBWAF control	????							
Colour type	????							



XY: Set the selected XY coordinate according to the CIE color space chromaticity diagram (1931).

HINT: xy coordinate mode uses 16 bit data mode. So first read out the current colors with the button Read colors (16 bit mode). Then set the new xy coordinate for the lamp with this button or use X-,X+,Y- or Y+ command buttons.

- **X**-: Decrement X coordinate with one step
- X+: Increment X coordinate with one step
- Y-: Decrement Y coordinate with one step
- Y+: Increment Y coordinate with one step

Dali lamp settings															
<u>R</u> ead lamp settings <u>W</u> rite	lamp settings <u>S</u> v	witch MAX S	witch MIN	Switch OF	FF										
Lamp name: Lamp 1										Group	os:				
										□ 1	□ 2	□3 □4	□ 5	□ 6 T	7 🗆 8
Short address: 1	- De	vice type: 8	:Colour lan							□ 9	□ 10	0 🗆 11 🗆 12	E 13	🗆 14 T	15 🗆 16
Physical minimum: 1				Setman	iual device		ene values:								
Minimum: 1.0x01 -> 0.399	2	Maximum:	254 0vEE	-> 100.00	%	-	255->MASK	5.	255- > MA	SK	9:	255->MASK	13	255->	MASK
Power up: 254,0xFE -> 10		Bus fault:		-> 50.00%			255->MASK	_	255->MA		_	255->MASK	_	255->	
Fade time: 10,0xA -> 16.0		Fade rate:		3.3steps/		-	255->MASK		255->MA		-	255->MASK	_	255->	
ade ane. [10,004-218.0	» Setnew p		0,000 -2 0	5.5steps/	5		255->MASK		255->MA		_	255->MASK	_	255->	
Brightness: ????	Settlew p						Read all scene:			ite all s			10	· [200->	MAGN
	ery brightness		Seth	rightness			Read all scenes			te all so					
			Seco	ignuless			-teau all scelles	,(10 blg		te dil st	Lenes				
DT8 status Colour Sci	enes Init parami	eters													
Read colours (8 bit mo	ode) Read o	olours (16 bi	it mode)												
x coordinate	????								- 1	655	34->0	99997	X-	X+	XY
y coordinate	7777							-		519	85->0	79323	Y-	Y+	
2								~							Tc+
Tc colour temperature	????								_				1		Tc
				V									1		Tc-
Primary N dimlevel 0	????								_						CHO
Primary N dimlevel 1	????				Ť										CH1
Primary N dimlevel 2	????				Ť.										CH2
Primary N dimlevel 3	????				Ť										CH3
Primary N dimlevel 4	????				Ť –										CH4
Primary N dimlevel 5	????				Ť										CH5
ŕ				_	Ŷ										
Channel 0 RED	????												1		
Channel 1 GREEN	????				ľ –					1					RGB
Channel 2 BLUE	????				ľ –										
Channel 3 WHITE	????				Ĩ T				_				RG	BWAF	
Channel 4 AMBER	????				Ť,										WAF
	0000				Ť			_							
Channel 5 FREECOLOU	K mm										_				
Channel 5 FREECOLOU	R				Ť										
Channel 5 FREECOLOU	????				Ŷ										



On the tab Scenes, you can read and write all DALI color scenes for a DALI device type 8 lamp. Choose the button "Read all scenes(8 bit)" for 8 bit data mode readout or the button "Read all scenes(16 bit)" for 16 bit data mode readout of all scene values of the selected lamp. You will see for a RGBW device the following sample screen:

				Switch MAX S		-					Crawnai				
mp nam	ie: [_amp 5									Groups:				7 – 0
ort add	ress:	5	-	Device type: 8	:Colour larr	nocontrol de	ar								
	L.	-				Set manua		/ne			1 9 1				15 1 16
ysical n	ninimum: [36					,	Scene valu	es:						
nimum:	86,0×56	; - > 33.86%		Maximum:	254.0xFE	-> 100.00%		1: 255->MA	.sĸ	5: 255->	MASK 9:	255->MA	ASK 1	3: 255->MA	SK
ower up:	254.0xE	E -> 100.00%		 Bus fault:	254.0xEE	-> 100.00%		2: 255->MA	SK	6: 255->	MASK 10	: 255->MA	ASK 1	4: 255->MA	SK
	2,0x2->			- Fade rate:		4.7steps/s		3: 255->MA		7: 255->		: 255->MA		5: 0->0.0%	
ue une	12,002 -7	1.05	Catural		17.007-24	n./alepa/a	_								
			Sethev	v parameters				4: 255->MA		8: 255->		: 255->MA	ASK I	6: 0->0.0%	
ightness	: [[),0×0000						Read all	scenes(8 bit)	Write all scene	es(8 bit)			
		Query br	ightness	s	Set br	ightness		Read all	scenes(1	6 bit)	Write all scene	s(16 bit)			
DT8 stati	us Colou	r Scenes	Init pare	ameters											
Read a	all scenes	(8 bit) Re	ad all so	cenes(16 bit)	Write all	scenes(8 bit) Vvrite	e all scenes(16 bit)						
Scene	×	Y	Tc		N Ch 1	N Ch 2	N Ch 3	N Ch 4	N Ch S		G	B	W	A	F
1	????	????	????		????	????	????	????	????	229		178	127	????	????
2	????	????	????		????	????	????	????	????	229		178	127	????	????
3	????	????	????		????	????	????	????	????	229		178	127	????	????
4	????	????	????		????	????	????	????	????	229		178	127	????	????
5	????	????	????		????	????	????	????	????	229		178	127	????	????
6	????	????	????		????	????	????	????	????	229		178	127	????	????
7	????	????	????		????	????	????	????	????	229		178	127	????	????
8	????	????	????		????	????	????	????	????	229		178	127	????	????
9	????	????	????		????	????	????	????	????	229		178	127	????	????
10	????	????	????		????	????	????	????	????	229		178	127	????	????
11	????	????	????		????	????	????	????	????	229		178	127	????	????
12	????	????	????		????	????	????	????	????	229		178	127	????	????
13	????	????	????		????	????	????	????	????	229		178	127	????	????
14	????	????	????		????	????	????	????	????	229		178	127	2225	????
15 16	???? ????	???? ????	???? ????		???? ????	???? ????	???? ????	2222	???? ????	229		178 178	127	???? ????	???? ????
16	rrrr	rrrr	rrrr	r rrrr	rrrr	rrrr	rrrr	rrrr	rrrr	223	204	170	127	rrrr	rrri
XY coor	dineto		- Colo	ur temperature	То	Primary	N			RGBWAF					
X: [annote		Tc: [a temperature	10	- CH0:				Red:					
						. CH1: Г				Green:			-		
Y:				Set colour temp	erature	CH2:				Blue:			_		
Se	et XY coor	dinate													
		annatto				CH3:				White:					
Conner						CH4: [Amber:			-		
Scenes:						CH5:				Freecolou	e [-		
	2 🗆 3		5 🗆 6	□7 □8		CH5.				reecolou					
		1 🗆 12 🗆 1					Set prin	a mark bl			Set RGBWA				



Now select a scene form the list, the current scene parameters will be shown in the dialog below the 16 scenes. It could look like this:

amp nam	e:	Lamp 5										Groups:				
hort addr	000	5	•	Device type: 8	Colour larr	incontrol de	ar									
noncadar	600.	0	•	Device type.	.colourium	Set manua		me			1	9 🗆 1	0 🗆 11		3 🗆 14 🗆	15 🗆 1
hysical m	inimum:	86				Decinication	a device (Scene valu	es:		_					
finimum:	86,0×5	i6 -> 33.86%		Maximum:	254.0×FE	-> 100.00%	_	1: 255->MA	SK.	5: 255	->MA	SK 9:	255->M	ASK	13: 255->MA	ASK
ower up:	254.0x	FE -> 100.00	1%	Bus fault:	254.0×FE	-> 100.00%		2: 255->MA	SK	6: 255	->MA	SK 10	255->M	ASK	14: 255->MA	ASK
ade time:				- Fade rate:		4.7steps/s	_	3: 255->MA		7: 255			255->M		15: 0->0.0%	
due ante.	12,002	1.05	Setney	v parameters	17,000 - 2 - 4	1.7 3(0p3/3		4: 255->MA		8: 255			255->M		16: 0->0.0%	
		0.0.0000	Settlev	v parameters										HON I	10. 0-20.0%	
Irightness		0,0×0000						Read all		<u> </u>		/rite all scene				
			brightness		Setbr	ightness		Read all s	scenes	(16 bit)	W	rite all scene:	s(16 bit)			
DT8 stati	ıs Colo	our Scenes	lnit para	ameters												
Read a	ll scene	s(8 bit) F	Read all so	cenes(16 bit)	Write all :	scenes(8 bi	0 Writ	e all scenes(16 bit)	1						
Scene	X	Y	Tc	N Ch 0	N Ch 1	N Ch 2	N Ch 3	N Ch 4	N Ch		۹	G	В	l w	A	F
1	2222	2222	2222		2222	2222	2222	2222	2222			204	178	127	2222	222
2	7777	????	7777		????	2222	7777	2222	???		29	204	178	127	2222	???
3	????	????	????	2777	????	????	????	????	????	? 22	29	204	178	127	????	???
4	????	????	????	2777	????	????	????	????	???1	? 22	29	204	178	127	2225	???
5	????	????	????	2777	????	????	????	????	????	? 22	29	204	178	127	????	???
6	????	????	????	????	????	????	????	????	???1	? 22	29	204	178	127	????	???
7	????	????	????	????	????	????	????	????	????	? 22	29	204	178	127	????	???
8	????	????	????	????	????	????	????	????	????	? 23	29	204	178	127	????	???'
9	????	????	????	????	????	????	????	????	???1	? 22	29	204	178	127	????	???1
10	????	????	????	????	????	????	????	????	???1		29	204	178	127	????	???'
11	????	????	????		????	????	????	????	????			204	178	127	????	????
12	????	????	????	2222	????	????	????	????	????	? 22	29	204	178	127	????	???1
13	????		????		????	????	????	????	????			204	178	127	????	????
14	????	????	????		????	????	????	????	????			204	178	127	????	????
15	????	????	????		????	????	????	????	???1		29	204	178	127	????	???1
16	????	????	????	?????	????	????	????	????	???	? 22	29	204	178	127	????	???1
XY coord	linete		Cala		Te	Primary	/ N			RGBWA	F					
X: 7777	amate		Tc:	ur temperature ????	10	CH0:	????			Red:	2	29,0×E5 -> 90	0.16%			
Y: 2222						CH1:	????			Green:	2	204,0xCC -> 8	0.31%	_		
1		P	. <u> </u>	Set colour temp	erature	CH2:	????		- 11	Blue:	1	78,0xB2 -> 70	0.08%	_		
Se	tXY coc	ordinate				CH3:	????		- 11	White:	1	27.0x7F -> 50	0.00%	_		
C						CH4:	????		-11	Amber:	2	????		_		
-Scenes:							????		-11	Freecolo	1	2772		-		
		3 🗆 4 🗆		□7 🔽 8												
		44 E 40 E	1 A A	4 🗆 15 🗆 16			Set prir	nary N			5	Set RGBWAF				

Now modify the scene values by entering new values into the selected fields. Then choose other scenes by checking the appropriate check boxes if you want to modify more than one scene at a time. Then click onto "Set RGBWAF" or the other set buttons to modify the selected scenes in the PC software.

Last but not least you have to download the scenes into your lamp by using the buttons "Write all scenes(8 bit)" or "Write all scenes(16 bit).



On the tab Init parameters, you can read and write all DALI color settings for initial or error states of the DALI device type 8 lamp. Choose the button "Read ..." for the appropriate color model your device will use. e.g. for CW-WW dimmer use "Read color temperatures TC", you will get a similar result:

Read	lamn settings. Write lamn se	ettings <u>S</u> witch MAX Sw <u>i</u> tch MIN	Switch OEE			
		eangs <u>s</u> witchmer switchmin	Swijch Of I		⊢ Groups:	
Lamp	name: Lamp 6					□ 8
Short	address: 6	➡ Device type: 8:Colour las	npcontrol gear			
Dhuni	aal minimum 1		Set manual devi			
Fnys	cal minimum: 1			Scene values:		
Minim	um: 1,0x01 -> 0.39%	Maximum: 254,0xFl	E -> 100.00%	1: 255->MASK 5: 2	55->MASK 9: 255->MASK 13: 255->MAS	SK
Powe	r up: 254,0xFE -> 100.00%	Bus fault: 254,0xF8	E -> 100.00%	2: 255->MASK 6: 2	55->MASK 10: 255->MASK 14: 255->MAS	SK
Fade	time: 0,0x0 -> no fade time	Fade rate: 7,0x7->	44.7steps/s	3: 255->MASK 7: 2	55->MASK 11: 255->MASK 15: 255->MAS	SK
	1	Set new parameters		4: 255->MASK 8: 2	55->MASK 12: 255->MASK 16: 255->MAS	SK
Brigh	ness: 167,0x00A7			Read all scenes(8 bit)	Write all scenes(8 bit)	
	Query brig	ghtness Set b	rightness	Read all scenes(16 bit)	Write all scenes(16 bit)	
DT	status Colour Scenes	Init parameters				
	coordinates	1	- Primary N co	louro		
\sim	System failure color:	Power on colour:	Filmary N CO	System failure color:	Power on colour:	
X	2222	????	Channel 0:	2	7777	
Y:	2222	????	Channel 1:	2222	7777	
	Read XY coordinates		Channel 2:	2222	7777	
	Set System failure	Set Power on	Channel 3:	????	7777	
			Channel 4:	2222	7777	
Tc	imits		Channel 5:	????	????	
_	System failure:	Power on:	_	Read primary N (8 bit)	Read primary N (16 bit)	
Tc:	MASK	MASK		Set System failure	Set Power on	
	Physical coolest	Physical warmest:				
Tc:	50,0×0032 -> 20000.0K	10000,0x2710 -> 100.0K	-RGBWAF co	lours System failure color:	Power on colour:	
	Coolest:	Warmest:	- Red:	2722	?????	
Tc:	50,0×0032 -> 20000.0K	10000,0x2710 -> 100.0K	Green:	????	????	
		r temperatures Tc	Blue:	????	????	
	Set System failure	Set Power on	White:			
	Set physical	& logical Tc limits	Amber:	????	????	
	Write physica	al & logical Tc limits	FreeColour:	????	????	
				????	????	
				Read RGBWAF(8 bit)	Ort Drugs or	
				Set System failure	Set Power on	

Now you can modify the parameters and limits. Enter new values and select the buttons "Set SystemFailure", "Set Power on" and/or "Set physical & logical Tc limit" to edit the fields. When you are finished, you have to download the new settings into the DALI lamp with the button "Write lamp settings". Only the physical and logical limits of this lamp are not written by this general write command. Therefore you have to use the command "Write physical & logical Tc limits" to download your new settings into your lamp.

When using a RGWAF dimmer, you can read out the current settings with the button "Read RGBWAF(8 bit) and modify the System failure color or the power on color and the use the buttons "Set System Failure" or "Set Power on" to save the values on the PC. When you download this settings with the button "Write lamp settings" you will store the values in the lamp.



Dali lamp settings

<u>R</u> ead	lamp s	ettings <u>W</u> rite lamp set	tings <u>S</u> witch MAX	Switch MIN S	Switch OFF										
Lamp	name:	Lamp 3								Group			E 5 F	6 2 7 2	
Short	addres	ss: 3	 Device type 	8:Colour lamp	control gear										
Dhuni	منسامه				Set manual devi								1.101		Ŭ.
Physi	cai min	imum: 1				S	cene values:				_				
Minim	ium: [1,0x01 -> 0.39%	Maximu	n: 254,0xFE -	> 100.00%	1:	25->9.8%	5:	255->MA	SK	9:	255->MASK	13:	255->MASK	_
Powe	rup: [254,0xFE -> 100.00%	Bus faul	: 254,0xFE -	> 100.00%	2:	255->MASK	6:	255->MA	SK	10:	255->MASK	14:	255->MASK	_
Fade	time: [2,0x2 -> 1.0s	Fade ra	e: 5,0x5 -> 89	.4steps/s	3:	255->MASK	7:	255->MA	SK	11:	255->MASK	15:	255->MASK	-
		S	et new parameter	1		4:	255->MASK	8:	255->MA	SK	12:	255->MASK	16:	255->MASK	-
Bright	ness:	0,0×0000					Read all scenes	(8 bit) w	rite all so	cenes	(8 bit)			
		Query brig	htness	Set brig	ghtness		Read all scenes	(16 bi	t) Wr	te all sc	enes	(16 bit)			
DT8	status	Colour Scenes In	it parameters												
	coordir	atoc .			Primary N col	loure-									
		n failure color:	Power on colou	r.			em failure color:		Powe	r on colo	our:				
X	????		????		Channel 0:	2222			????						
Y:	2222		2222		Channel 1:	2222	1		2777						
		Read XY	coordinates		Channel 2:	2222	1		2222						
		Set System failure	Set Por	veron	Channel 3:	2222	1		2222						
					Channel 4:	2222			2222						
Tc	imits	6-11	D		Channel 5:	2222			2222						
-		n failure:	Power on:			-	lead primary N (8	bit)		ad prim	ary N	(16 bit)			
IC:	????	-11 +	???? Dhusiaal	- 4			Set System failu	re		Set P					
-		al coolest	Physical warme	st	-RGBWAF col										
IC:	3333		2225		RGBWAF CO		em failure color:		Powe	r on cold	our:				
-	Cooles	st	Warmest:		Red:	MAS			MAS						
TC:	3555		????		Green:	MAS			MASI						
			temperatures Tc		Blue:	MAS			MASH						
		Set System failure	Set Pov	veron	White:	2222			????	`					
			& logical Tc limits		Amber:	2222			2777						
		Write physical	& logical Tc limits		FreeColour:	2222			2222						
							Read RGBWAF(8	hitì	-						
						<u>.</u>	Set System failu			Set P	ower	on			



45.8.4 Initialize lamps

This function opens a window where you can select how you want to address the new DALI 1.0 lamps on the DALI bus:

asse Initialise new Dali lamps	
Initialisation mode Random address Physical selection	Initialise C all ballasts C ballast with specific short address
🗖 Auto names	
Name for Lamps:	• ballast(s) without short address
Lamp	Choose specific short address: 1
Switch off existing short addresses	HELP
Status:	
Ready	
	0%
Select short address:	
Lamp name:	
Start Stop	Continue Clear log
14	4

You can select the following options:

- Initialisation mode: DALI supports two modes of initialization of new lamps:
 - **Random adddress:** In this mode the system searches automatically for new lamps on the DALI bus and address the new lamps with a unique short address between 1 and 64 (0 to 63 in the DALI commands).
 - **Physical selection**: Older DALI lamps support an additional addressing mode, where you can address the lamp by disconnecting the bulb in the lamp and then address the lamp with a unique short address between 1 and 64 (0 to 63 in the DALI commands).
- Initialize...: This selection offers three possible search modes for random addressing mode:
 - **all ballasts**: All ballast will be readdressed with new short addresses. All stored short addresses are deleted before the search will start. This means a complete reinitialisation of the DALI network.
 - ballast with specific short address: You can choose a specific short address from the drop down list, before you start search to readdress this ballast with a new short address. This mode is supported by the DALI standard but makes in real life not much sense.
 - **ballast(s) without short address:** This mode is the most common used mode to address only the new connected ballasts without a short address on the DALI bus.



- Auto names: This option allows you a complete automatic search process. If this check box is checked, the software will search for new ballasts and give each found ballast a unique name consisting out of the prefix entered in the text filed Name for lamp and the assigned short address from 1 to 64.
- Switch off existing short addresses: To visualize only the new lamps when searching, you can use this checkbox, then all existing ballasts with short addresses are switched off before the search for new lamps will began.
- Start, Stop, Continue Buttons: While the search process will run, use this buttons to navigate through the addressing search process.

This process will add automatically all found DALI lamps to the project tree!



45.8.5 Reorder DALI lamps

This function opens a window where you can easily change the short address of DALI lamps to order your lamps in a certain way. You will see the following dialog:

👜 Reorder D			lalog.				
Status:							
Pulsing sh	ort address 1	with 244]	
					B 1 4 4	-	
Keo	order lamp	Co	ру		Delete sho	rt address	Clear log
							Resetused
_Short Add	dresses				ort Addresses-		
€ 1	C 17	C 33	C 49	• 1	C 17	O 33	C 49
O 2	O 18	C 34	C 50	0 2	C 18	O 34	C 50
O 3	C 19	C 35	C 51	03	C 19	O 35	C 51
O 4	C 20	C 36	C 52	0.4	C 20	O 36	O 52
0.5	C 21	O 37	O 53	0.5	C 21	0 37	O 53
0.6	C 22	C 38	O 54	0.6	C 22	O 38	C 54
07	C 23	C 39	O 55	0.7	C 23	O 39	0 55
0.8	C 24	C 40	0 56	0.8	C 24	O 40	C 56
09	C 25	C 41	0.57	0 9	C 25	O 41	0.57
O 10	C 26	C 42	O 58	0 10	C 26	C 42	0.58
0.11	C 27	O 43	O 59	0 11	C 27	C 43	0 59
C 12 C 13	C 28 C 29	C 44 C 45	C 60	C 12 C 13	C 28 C 29	O 44 O 45	C 60 C 61
0 13	C 30	C 45	C 62	0 13	C 30	C 45	0 62
0 14	C 30	C 46	C 63	0 14	C 30	0 46 O 47	0 63
0 16	C 32	C 48	C 64	0 16	C 32	C 48	0 64
~ 10		010			~ JE	01 0	0 01
							*
							-
•							P.
,							

You will notice that after opening this dialog, the DALI lamp with the short address 1 (out of 64) will flash. This will help you to find the lamp in the field. As soon as you select a new short address from the panel Short addresses, the new selected DALI lamp will flash and all other DALI lamps are off.



In our sample we want to readdress the DALI lamps 1 and 2 to the short addresses 10 and 11. So we select 1 and see that the correct lamp will flash. No we select in the right panel New Short addresses the address 10 and then we select the button Reorder lamp:

🕰 Reorder D	ALI Lamps	•					
Status:							
Pulsing sh	ort address 1	with 216					
Be	order lamp	Co	nv		Delete sho	rt address	Clear log
				_			Resetused
							Resetused
-Short Add		~ ~ ~			ort Addresses-	~ ~ ~	
⊙ 1	O 17	O 33	C 49	01	O 17	O 33	C 49
02	O 18 O 19	O 34 O 35	O 50 O 51	0 2	O 18 O 19	O 34	C 50
C 3 C 4	C 19 C 20	C 35 C 36	C 51 C 52	03	C 19 C 20	O 35 O 36	C 51 C 52
0 4	C 21	C 37	C 53	0 4	O 21	0 37	C 53
0.5	C 22	C 38	C 54	0.6	C 22	O 38	C 54
07	C 23	C 39	0 55	07	0 23	C 39	0 55
08	C 24	C 40	C 56	0.8	C 24	C 40	C 56
C 9	C 25	C 41	C 57	0 9	C 25	C 41	C 57
C 10	C 26	C 42	C 58	• 10	C 26	C 42	C 58
0.11	C 27	C 43	C 59	C 11	C 27	O 43	C 59
O 12	C 28	C 44	C 60	C 12	C 28	C 44	C 60
O 13	C 29	C 45	C 61	C 13	C 29	C 45	C 61
O 14	C 30	C 46	C 62	0.14	C 30	O 46	C 62
O 15	C 31	C 47	C 63	C 15	O 31	O 47	C 63
O 16	C 32	C 48	C 64	C 16	O 32	O 48	C 64
							^
							v
<u> </u> ∢							4

The system will show the following dialog:

Status:							
Pulsing sho	ort address 1	0 with 248					
Reo	ırder lamp	Co	ру		Delete sho	rt address	Clear log
				_			Reset used
-Short Add	resses				rt Addresses-		
0.1	O 17	C 33	O 49	01	O 17	O 33	C 49
C 2	O 18	C 34	O 50	0.2	O 18	O 34	C 50
O 3	O 19	O 35	O 51	03	O 19	O 35	O 51
C 4	O 20	C 36	O 52	0.4	O 20	O 36	O 52
O 5	O 21	O 37	O 53	0.5	O 21	O 37	O 53
C 6	O 22	O 38	O 54	0.6	O 22	O 38	C 54
0.7	O 23	O 39	O 55	0.7	C 23	O 39	C 55
C 8	C 24	O 40	O 56	0.8	O 24	O 40	C 56
C 9	C 25	O 41	O 57	09	O 25	O 41	O 57
10*	C 26	O 42	O 58	• 10*	C 26	O 42	O 58
O 11	O 27	O 43	O 59	0.11	O 27	O 43	O 59
O 12	C 28	C 44	O 60	C 12	O 28	O 44	C 60
O 13	C 29	O 45	C 61	C 13	C 29	O 45	C 61
O 14	O 30	O 46	C 62	C 14	O 30	O 46	C 62
O 15	O 31	O 47	O 63	C 15	O 31	O 47	O 63
O 16	O 32	O 48	C 64	O 16	O 32	O 48	C 64
18:44:48 25	08 2020 Bec	order short add	dress 1 to short a	address 10			

As you will notice, now the old DALI lamp 1 has the new short address 10 and will flash. To indicate, that we have used the short address 10, there is an asterix behind the short address in both panels. Now we select the DALI short address 2 in the left panel. The second DALI lamp will flash. In the right panel we select the new DALI short address 11. Now we click again on the button Reorder lamp.

👜 Reorder DALI Lamps

æ.

🔊 Reorder D	ALI Lamps						
Status:							
Pulsing she	ort address 2	with 207				7	
_		1	1				
Rec	order lamp	Co;	ру		Delete sho	rt address	Clearlog
							Resetused
⊢Short Add	Irocco			Now Sh	ort Addresses-		
0.1	0 17	O 33	C 49	01	C 17	C 33	C 49
© 2	O 18	O 34	C 50	0.2	C 18	C 34	C 50
03	O 19	O 35	C 51	03	C 19	C 35	C 51
C 4	O 20	C 36	C 52	0.4	C 20	C 36	O 52
C 5	O 21	O 37	C 53	0.5	C 21	C 37	O 53
C 6	C 22	O 38	C 54	0.6	C 22	C 38	O 54
0.7	O 23	O 39	O 55	0.7	C 23	C 39	O 55
C 8	C 24	O 40	C 56	0.8	C 24	C 40	C 56
C 9	C 25	O 41	O 57	0.9	C 25	C 41	O 57
C 10*	C 26	O 42	O 58	0 10*	C 26	C 42	C 58
C 11	C 27	O 43	O 59	• 11	C 27	C 43	C 59
C 12	C 28	O 44	C 60	0 12	C 28	C 44	C 60
C 13	C 29	O 45	O 61	0 13	C 29	C 45	C 61
C 14	C 30	C 46	C 62	0.14	C 30	C 46	C 62
C 15	O 31	O 47	O 63	0 15	C 31	C 47	C 63
C 16	O 32	O 48	C 64	O 16	O 32	C 48	C 64
18:44:48 25	5.08.2020:Reo	rder short add	lress 1 to short a	address 10			<u>~</u>
4							· ·
1,							F

If successful you will see the following result:

<u>RES</u>

	_			
167	Reord	ler DA	LILa	mps



Status:

Pulsing short address 11 with 169

Red	order lamp	Co	ру		Delete sho	rt address	Clear log
				_			Resetused
hort Add	dresses				t Addresses-		
1	O 17	O 33	O 49	01	C 17	O 33	C 49
2	O 18	O 34	O 50	0 2	C 18	O 34	C 50
3	O 19	O 35	O 51	03	C 19	O 35	C 51
4	O 20	O 36	O 52	C 4	C 20	O 36	C 52
5	O 21	O 37	O 53	0.5	C 21	O 37	C 53
6	O 22	O 38	O 54	0.6	C 22	O 38	C 54
7	O 23	O 39	O 55	0.7	C 23	O 39	C 55
8	O 24	O 40	O 56	0.8	O 24	O 40	C 56
9	O 25	O 41	O 57	09	O 25	O 41	O 57
10*	C 26	C 42	O 58	C 10*	C 26	O 42	C 58
11*	C 27	C 43	C 59	○ 11 *	C 27	O 43	C 59
12	C 28	C 44	C 60	C 12	C 28	O 44	C 60
13	O 29	C 45	61	C 13	C 29	O 45	C 61
14	O 30	C 46	C 62	O 14	C 30	C 46	C 62
15	O 31	C 47	C 63	C 15	C 31	O 47	C 63
16	C 32	C 48	C 64	C 16	C 32	C 48	C 64

Again now in the left panel the new short address 11 is selected and the DALI lamp flashes. In both panels now the addresses 10 and 11 are marked with an asterix to indicate, that we have used them already. You can clear this signs with the button "Reset used". In the log you see the last actions.

The button Copy will select the same short address in the right panel as you have selected in the left panel.



45.8.6 Edit groups

This function opens a window where you can easily change the groups of of all DALI lamps. You will see the following dialog. Select the button "Read groups from all lamps". You will see a similar result:

ERR ERR OK OK OK ERR ERR ERR O OK							
OK OK OK ERR ERR ERR							
OK OK ERR ERR ERR							
OK OK ERR ERR ERR				1	1.3		
OK ERR ERR ERR				3	3-4		
ERR ERR ERR							
ERR							
ERR							
OK					4-6		
OK				4	4-6		
ERR							
ERR							
ERR							
ERR							
ERR							
ERR							
ERR							
ERR							
ERR							
ERR							-
ual short address: N/A	Clear all desired gro	una fram all lamon					
	Clear all desired gro	ips nom an iamps					
esired groups			12 🗆 13 🗖 14 🗖 15	16	Change selected lamps to desired groups		
	Copy actual grou	ips to desired groups		i`			
tual groups							
	□ 5 □ 6 □ 7 □ 8	□ 9 □ 10 □ 11 □	12 🗆 13 🗖 14 🗖 15	16	Read groups from selected lamps	Read groups from all lamps	
est groups					Write groups to selected lamps	Write groups to all lamps	
1 05 09					Load groups from file	Save groups to file	
2 06 01					2000 groups non no		
3 07 01							
4 08 01	2 0 16						

In the List you will see the following information in the columns:

- Short Address: The DALI short address from 1 to 64
- Status: The status of the DALI lamp since the last readout of group data from this lamp. OK means the readout was ok, ERR means that the short address is not available (no lamp connected with this DALI short address). Unknown means, that no readout has been done.
- Desired Groups: This is the list of desired groups for each short address. You can prepare a list of groups for all short addresses, and the download this list to all DALI lamps with one command. But you can also modify only one DALI lamp or a DALI lamp group.
- Actual Groups: This are the group settings which are currently stored in the DALI lamp.



As soon as you click on one line in this list, the display will show the actual group configuration below this list for this short address:

$\begin{bmatrix} EAB} \\ BAB \\ B$	Edit DALI groups					
$ \begin{array}{c} & & & & & & & & & & & & & & & & & & &$	Short Address	Status	Desired Groups		Actual Groups	
3 OK 13 34 34 34 34 34 34 34 34 34 34 35 34 36 0K 00 K 01 0K 02 6 03 6 04 46 47 47 48 48 48 49 49 49 49 49 49 49 40 40 41 48 48 49 49 49 49 49 49 49 49 49 49 49 49 49 49 49 49 41 49 49	1	ERR				
4 OK 6 6 6 7 7 8 8 7 8 8 1 0 <td< td=""><td>2</td><td>ERR</td><td></td><td></td><td></td><td></td></td<>	2	ERR				
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	3	OK			1,3	
S OK S OK S ERR 00 OK 10 OK 12 ERR 33 ERR 14 ERR 15 ERR 16 ERR 17 ERR 16 ERR 17 ERR	4	OK			3-4	
2 EPA EPA Find the selected lamps to desired groups to all lamps 0 0K 46 46 10 0K 46 46 10 0K 46 46 12 EPA 46 46 13 EPA 46 46 14 EPA 46 46 15 EPA 47 EPA 16 EPA 47 EPA 16 EPA 47 EPA 16 EPA 47 EPA 17 EPA 47 EPA 18 EPA 47 EPA 19 EPA 47 EPA 10 Clear all desired groups from all lamps Change selected lamps to desired groups 11 12 13 74 75 76 7 10 11 12 13 14 15 16 7 78 9 10 11 12 13 14 15 16 7 78 9 10 11 12	5					
a FRA FRA FRA b0 OK 46 11 OK 46 12 EPRA 46 13 EPRA 46 14 EPRA 46 15 EPRA 1000000000000000000000000000000000000	6					
a EPR i	7					
10 0 k 4-6 11 0 k 4-6 12 ERR 4-6 13 ERR 4-6 13 ERR 4-6 14 ERR 4-6 15 ERR 4-6 16 ERR 4-6 17 ERR 4-6 18 ERR 4-6 19 ERR 4-6 10 ERR 4-6 11 ERR 4-6 12 ERR 4-6 13 ERR 4-7 14 ERR 4-7 15 ERR 4-7 16 ERR 4-7 17 ERR 4-7 18 ERR 4-7 19 Clear all desired groups from all lamps Catual short address: 10 11 12 13 14	8					
11 0K 46 12 ERR 13 ERR 14 ERR 15 ERR 16 ERR 17 ERR 18 ERR 19 ERR 10 Clear all desired groups from all lamps 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 14 15 16 17 16 <	9					
12 ERR Image: Selected lamps to desired groups trom all lamps 13 ERR Image: Selected lamps to desired groups trom all lamps 15 ERR Image: Selected lamps to desired groups trom all lamps 11 12 13 14 15 16 <td< td=""><td>10</td><td></td><td></td><td></td><td></td><td></td></td<>	10					
13 FRR FRR FRR 14 ERR FRR FRR 15 ERR FRR FRR 16 ERR FRR FRR 18 ERR FRR FRR 19 ERR FRR FRR 20 ERR FRR FRR 21 ERR FRR FRR 22 FRR FRR FRR 21 ERR FRR FRR 22 FRR FRR FRR 21 ERR FRR FRR 22 FRR FRR FRR 23 FRR FRR FRR 11 C G FR FRR 21 FRR FR FR FRR 21 FRR FR FR FRR 21 C G FR FR FR 21 C FR FR FR FR FR 21 C G FR FR FR	11				4-6	
14 ERR 15 ERR 16 ERR 17 ERR 18 ERR 19 ERR 10 Elear all desired groups from all lamps 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19<	12					
15 ERR 16 ERR 17 ERR 18 ERR 19 ERR 19 ERR 20 ERR 21 ERR 22 FRR 21 ERR 22 FRR 23 F4 F5 F6 F7 7 8 9 10 11 12 13 74 F5 F6 7 8 9 10 11 12 13 14 F5 F6 7 8 9 10 11 12 13 74 F5 F6 7 8 F9 10 11 12 13 F4 F5 F6 7 8 F9 10 11 12 13 K1 F5						
16 ERR ERR Image: Constraint of the second se	14					
17 ERR ER						
18 ERR ER						
13 ERR ER						
20 ERR ER						
21 ERR 22 ERR Ctual short address: 10 Clear all desired groups from all lamps Desired groups 1 1 0 0 1 1<						
22 FRR Clear all desired groups from all lamps Desired groups Clar all desired groups to desired groups to desired groups to desired groups Change selected lamps to desired groups Actual groups Change selected lamps to desired groups from all lamps Change selected lamps to desired groups Actual groups Copy actual groups to desired groups Actual groups Catual or op actual groups to desired groups Actual groups Catual or op actual groups to desired groups Actual or op actual groups to desired groups Read groups from selected lamps Write groups to selected lamps Write groups to all lamps Load groups from file Serve groups to file						
Ctear all desired groups from all lamps Desired groups 1 1 2 1						-
Desired groups Change selected lamps to desired groups Copy actual groups to desired groups Change selected lamps to desired groups Actual groups Read groups from selected lamps Read groups from selected lamps Test groups Vrite groups to 10 Vrite groups to selected lamps Write groups to all lamps C1 C5 C9 C13 C4 C4 C11 C15 C4 C8 C12 C16 C13 C7 C11 C15	//	FRR				
Change selected lamps to desired groups Change selected lamps to desired groups Change selected lamps to desired groups Actual groups Catual groups Read groups from selected lamps Read groups to all lamps Write groups to all damps Save groups to file Catual groups from file Save groups to file	Actual short addres	ss: 1 0	Clear all desired groups from all lamps			
Copy actual groups Read groups from selected lamps Read groups from all lamps Actual groups 0	Desired groups					
Actual groups Read groups from selected lamps Read groups from all lamps Test groups 0 <t< td=""><td></td><td>3 🗆 4 🗆</td><td>5 6 7 8 9 10 11</td><td>□ 12 □ 13 □ 14 □ 15 □ 16</td><td>Change selected lamps to desired groups</td><td></td></t<>		3 🗆 4 🗆	5 6 7 8 9 10 11	□ 12 □ 13 □ 14 □ 15 □ 16	Change selected lamps to desired groups	
Test groups Read groups from selected lamps Read groups from all lamps 01 05 09 013 02 06 010 014 03 07 011 015 04 08 012 016			Copy actual groups to desired groups	8		
Test groups Write groups to selected lamps Write groups to all lamps C1 C5 C9 C13 C2 C6 C10 C14 C3 C7 C11 C15 C4 C8 C12 C16	Actual groups				1	
C1 C5 C9 C13 C2 C6 C10 C14 C3 C7 C11 C15 C4 C8 C12 C16		3 🔽 4 🔽	5 🔽 6 🗆 7 🗆 8 🖂 9 🖂 10 🗆 11	□ 12 □ 13 □ 14 □ 15 □ 16	Read groups from selected lamps	Read groups from all lamps
© 1 C 5 C 9 C 13 C 2 C 6 C 10 C 14 C 3 C 7 C 11 C 15 C 4 C 8 C 12 C 16	Test groups				Write groups to selected lamps	Write groups to all lamps
C 2 C 6 C 10 C 14 C 3 C 7 C 11 C 15 C 4 C 8 C 12 C 16		C 9	C 13			
C 4 C 8 C 12 C 16					Load groups from file	Save groups to file
	C3 C7	C 11	C 15			
Activate Group Test	C4 C8	C 12	C 16			
	Activate Group	Test				

Now you can copy the actual groups to the desired groups section by using the button "Copy actual groups to desired groups". You will notice, that now the same groups are selected in the panel Desired groups. No we manually check the group 10. After that we multi select the lamps 3 to 6 in the list. Now we press the button "Change selected lamps to desired groups". You will see the following result:

Short Address	Status	Desired Groups	Actual Groups	
	EBB			
2	ERR			
}	OK	4-6.10	1.3	
1	OK	4-6.10	3-4	
;	OK	4-6,10		
i	OK	4-6,10		
	ERR			
	ERR			
	ERR			
0	OK		4-6	
1	OK		4-6	
2	ERR			
3	ERR			
4	ERR			
5	ERR			
5	ERR			
·	ERR			
3	ERR			
	ERR			
0	ERR			
2	ERR			
tual short addre	_	lear all desired groups from all lamps		
ual short addre	ss. o	ear air deshed groups nom air lamps		
Desired groups				
	3 🔽 4 🔽 5		16 Change selected lamps to desired groups	
		Copy actual groups to desired groups		
Actual groups				
₽ 1 □ 2 ₽	3 🗆 4 🗆 5		16 Read groups from selected lamps	Read groups from all lamps
			Write groups to selected lamps	Write groups to all lamps
Fest groups	C 9 (C 13		
		0.14	Load groups from file	Save groups to file
•1 05 02 06				
1 05		15		
1 05 2 06	C 11 (



As long as the groups are not identical in the columns "Desired Groups" and "Actual Groups", you have to download the group configuration into the lamps. For that you can use the buttons "Write groups to selected lamps", which will modify only the selected lamps from the list or you use the button "Write groups to all lamps" to modify all 64 DALI lamps with the new group information.

Edit DALI groups				
Short Address	Status	Desired Groups	Actual Groups	A
1	ERR			
2	ERR			
3	OK	4-6,10	4-6,10	
4	OK	4-6,10	4-6,10	
5	OK	4-6,10	4-6,10	
6	OK	4-6,10	4-6,10	
7	ERR			
8	ERR			
9	ERR			
10	OK		4-6	
11	OK		4-6	
12	ERR			
13	ERR			
14	ERR			
15	ERR			
16	ERR			
17 18	ERR			
19	ERR			
20	ERR			
21	ERR			
21	FRR			· · · · · · · · · · · · · · · · · · ·
Actual short addre: Desired groups		ear all desired groups from all lamps		
	3 🔽 4 🗹 5		Change selected lamps to desired groups	
		Copy actual groups to desired groups		
Actual groups				
V 1 T 2 V	3 🗆 4 🗖 5	Г 6 Г 7 Г 8 Г 9 Г 10 Г 11 Г 12 Г 13 Г 14 Г 15 Г 16	Read groups from selected lamps	Read groups from all lamps
Test groups			Write groups to selected lamps	Write groups to all lamps
	C 9 (0 13		
C2 C6	C 10 (3 14	Load groups from file	Save groups to file
C3 C7		15		
	(12 (16		
C4 C8		10		

HINT: If the field Desired groups is empty no download will be done for the selected lamp.

With the button "Read groups from selected lamps" you can update the list with new status information from the selected lamps.

The buttons "Load groups from file..." and "Save groups to file..." you cane save your group setup for all 64 DALI lamps for further use in a similar DALI system.

The button "Clear all desired groups from all lamps" will clear all desired groups from all 64 DALI lamps to start with an empty group information in the list.

For easy testing of the new group setup you can activate the checkbox "Activate Group Test" and select a group from 1 to 16 (in the DALI command from 0 to 15). All DALI lamps which are part of this group will flash. Select from the panel Test groups other groups to check if your configuration meets your requirements.



45.8.7 Initialize devices

This function opens a window where you can search and address DALI24 (DALI 2.0) control devices. It is similar to the search for DALI 1.0 lamps, but it uses 24 bit DALI frames and special DALI 2.0 commands to address the DALI 2.0 control devices like occupancy sensors or push button devices.

🚧 Initialise new DALI 2.0 devices (DALI24)	
Initialisation mode Random address	 Initialise ○ all control devices ○ control devices with specific short address ● control device(s) without short address
T Auto names	Choose specific short address: 1
Name for control devices:	
Device	
Status:	
Ready	
0%	
Select short address:	
Device name:	
Start Stop Continue	Clear log
	*
4	• •



You can select the following options:

- Initialisation mode: DALI supports two modes of initialization of new devices:
 - Random adddress: In this mode the system searches automatically for new devices on the DALI bus and address the new devices with a unique short address between 1 and 64 (0 to 63 in the DALI commands). This is NOT the same short address, which a DALI ballast will use. So in fact, you can combine 64 DALI ballasts and 64 DALI control devices on a DALI line.
- Initialize...: This selection offers three possible search modes for random addressing mode:
 - all control devices: All control devices will be readdressed with new short addresses. All stored short addresses are deleted before the search will start. This means a complete reinitialisation of the 24 bit DALI network.
 - control devices with specific short address: You can choose a specific short address from the drop down list, before you start search to readdress this control device with a new short address. This mode is supported by the DALI standard but makes in real life not much sense.
 - **control device(s) without short address:** This mode is the most common used mode to address only the new connected control devices without a short address on the DALI bus.
- Auto names: This option allows you a complete automatic search process. If this check box is checked, the software will search for new control devices and give each found devices a unique name consisting out of the prefix entered in the text filed Name for control devices and the assigned short address from 1 to 64.
- Start, Stop, Continue Buttons: While the search process will run, use this buttons to navigate through the addressing search process.

This process will add automatically all found DALI control devices to the project tree!



45.8.8 Query device states

This function tries to read out basic data of all DALI 2.0 (DALI24) control devices from the connected DALI bus. The result will be displayed in the grid view under the tab "Device status". A possible result could look like this:

nitialize lamps Search lamps Query lamp states Beorder Lamps Edit Groups Initialize devices Query device states												
Address: 255 V Baudrate: 57600 V Parity: NONE V Stopbits: 1 stopbit V												
	Test bench Test Bench DALI 1.0+2.0 Lamp status DALI Monitor Device status Short address App Controller Instances Nr. of instances Input device Quiescent SA=MASK Application Controller Error Power Cycle seen Reset state Instance types											
Short address												
	NO	YES	2	OK	YES	NO	NO	NO	YES	NO	10:occupancy sensor,11:light sensor	
2	YES	YES	1	ERROR	YES	NO	NO	NO	YES	NO	10:push button	

You will find the following information in this grid view:

- Short address: The current short address of the tested control device
- App controller: The current state of the internal application controller of the device. YES indicates, that the application controller is running, NO indicates that the application controller is stopped.
- Instances: If the devices supports instances, this flag is YES, otherwise NO.
- Nr. of instances: Maximum number of instances of the device
- Input device: If the device supports input and everything is ok, this flag is OK, otherwise ERROR
- Quiescent: if the device is currently in quiescent mode (No events are generated by the devices) this flag is YES, otherwise NO.
- **SA=MASK**: This flag is YES if the short address is 255, 0xFFF or MASK
- Application: This flag (Yes or No) indicates if the application is active or not
- Controller error: This flag (Yes or No) indicates if the application controller has an error or not
- Power cycle seen: This flag (Yes or No) indicates if the device has seen a power cycle since last DALI power on
- Reset state: This flag (Yes or No) indicates if the device is in reset state or not
- Instance types: this list shows the name of each instance of the device



45.8.9 DALI Monitor

We have implemented a DALI monitor feature in the software. Our RESI-DALI-SIO or RESI-DALI-ETH gateway can save up to 128 incoming or outgoing DALI frames in an internal FIFO. This FIFO is cyclically readout by this function and the DALI frames are decoded for easier understanding. If you activate this function you can use the rest of the software normal, so you can easily monitor all your activities. But don't forget to close the dialog by unchecking the checkbox Enable DALI monitor, before you change to another device in the project tree.

This feature is for better understanding, what happens on a DALI bus and for better error search in case of problems. You can save the log file in a text file and mail it to our support if you have a suspicious behavior on the DALI bus.

Also you can use our gateway to sniff a foreign DALI bus, what happens on the BUS or what special DALI events are sent by control devices.

Local COM port s	ettings				
Modbus unit: 255	Device: COM	14 - Stopbits 1 stopb	it VIP-Address:		
			K		
Baudrate: 57600	 Parity: NON 	IE	Port:		
evice specific					
Download c	onfig Test connecti	ion 🔼 Test			
RESI-DALI-SIO		DALI to MODB	US/RTU+ASCII converter for 64 DALI lamps		
Software version:	4.0.0				
State:	no error				
nitialize lamps Sea	arch lamps Query lamp state	es Reorder Lamps Edit Groups	Initialize devices Query device states		
MODBUS		_ , _ ,	/		
Address: 255	▼ Baudrate: 57600	 Parity: NONE 	 Stopbits: 1 stopbit 		
Test bench					
	a a a lu a a Dalla				
l est Bench DALI 1.	0+2.0 Lamp status DALI M				
Enable DALI mor					
TYPE	DATA	ADDRESS	DESCRIPTION	TIMESTAMP	GAP
24:DALI24:TX	0xFFFE1D	Broadcast	Device:START QUIESCENCE MODE	19:43:21 25.08.2020	37ms
24:DALI24:TX	0xFFFE1D	Broadcast	Device:START QUIESCENCE MODE	19:43:21 25.08.2020	6.162s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.685s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.675s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21.0x015	19:43:21 25.08.2020	29.682s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.678s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.678s
4:DALI24:BX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25:08:2020	29.689s
					29.680s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.678s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.687s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.688s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.689s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.691s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.686s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21.0x015	19:43:21 25.08.2020	29.676s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25:08:2020	29.676s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25:08:2020	29.678s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25:08:2020	29.685s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.678s
4:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.677s
24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:21 25.08.2020	29.681s
		Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:20 25.08.2020	29.686s
24:DALI24:RX	0x888415				
24:DALI24:RX 24:DALI24:RX	0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015	19:43:20 25.08.2020	29.675s
4:DALI24:RX 4:DALI24:RX		Event DSA:5 Event DSA:5	Instance number:0x01:Event:21,0x015 Instance number:0x01:Event:21,0x015	19:43:20 25.08.2020 19:43:20 25.08.2020	29.675s 3.672s
4:DALI24:RX 4:DALI24:RX 4:DALI24:RX	0x888415				
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:RX	0x888415 0x888415	Event DSA:5	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE	19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E	Event DSA:5 Broadcast Broadcast	Instance number:0x01:Event21,0x015 Device:STOP QUIESCENCE MODE Device:STOP QUIESCENCE MODE	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX 16:Command:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE Device:STOP QUIESCENCE MODE 256:TERMINATE	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX 16:Command:TX 24:DALI24:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1 DSA:49	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE30	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1 DSA:49 DSA:49	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 184ms 180ms
24-DALI24:RX 24-DALI24:RX 24-DALI24:RX 24-DALI24:RX 24-DALI24:TX 24-DALI24:TX 24-DALI24:TX 24-DALI24:TX 24-DALI24:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE30 0x61FE46	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1 DSA:49 DSA:49 DSA:49	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS Device:QUERY DEVICE CAPABILITIES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 180ms 295ms
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE30 0x61FE46 0x5FFE35	Event DSA:5 Broadcast Broadcast SpcI cmd:161,0xA1 DSA:49 DSA:49 DSA:49 DSA:48	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS Device:QUERY DEVICE CAPABILITIES Device:QUERY NUMBER OF INSTANCES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 180ms 295ms 184ms
24:DALI24:RX 24:DALI24:RX 24:DALI24:RX 24:DALI24:TX 24:DALI24:TX 16:Command:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX 24:DALI24:TX	0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE36 0x61FE46 0x5FFE35 0x5FFE35	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1 DSA:49 DSA:49 DSA:49 DSA:48 DSA:48	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS Device:QUERY DEVICE CAPABILITIES Device:QUERY NUMBER OF INSTANCES Device:QUERY NUMBER OF INSTANCES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 180ms 285ms 184ms 184ms 183ms
24DAL24FX 24DAL24FX 24DAL24FX 24DAL24FX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX 24DAL24TX	0x888415 0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE30 0x61FE46 0x5FFE35	Event DSA:5 Broadcast Broadcast SpcI cmd:161,0xA1 DSA:49 DSA:49 DSA:49 DSA:48	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS Device:QUERY DEVICE CAPABILITIES Device:QUERY NUMBER OF INSTANCES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 180ms 295ms 184ms
24DALI24FRX 24DALI24FRX 24DALI24FRX 24DALI24FRX 24DALI24TX 24DALI24TX 24DALI24TX 24DALI24TX 24DALI24TX 24DALI24TX 24DALI24TX 24DALI24TX	0x888415 0xFFFE1E 0xFFFE1E 0xA100 0x61FE35 0x61FE36 0x61FE46 0x5FFE35 0x5FFE35	Event DSA:5 Broadcast Broadcast Spcl cmd:161,0xA1 DSA:49 DSA:49 DSA:49 DSA:48 DSA:48	Instance number:0x01:Event:21,0x015 Device:STOP QUIESCENCE MODE 256:TERMINATE Device:QUERY NUMBER OF INSTANCES Device:QUERY DEVICE STATUS Device:QUERY DEVICE CAPABILITIES Device:QUERY NUMBER OF INSTANCES Device:QUERY NUMBER OF INSTANCES	19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020 19:43:20 25.08.2020	3.672s 37ms 45ms 184ms 184ms 180ms 295ms 184ms 184ms 183ms

45.8.10





45.9 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-DALI-SIO-ETH-MODBUS+ASCII-ENxx.pdf

Don't forget, that there are some standard MODBUS registers for this device, which you cannot overwrite with your configuration!

45.10 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-DALI-SIO-ETH-MODBUS+ASCII-ENxx.pdf



45.11 HOWTO use the MODBUS registers

This chapter will show sample code, how to use the MODBUS registers with a host.

HINT: Our demo software is designed for a MODBUS master, which uses for the registers the index 0 to 65535, not the MODBUS syntax of 1 to 65536.

45.11.1 Set brightness of a lamp

```
To set the brightness of a lamp use this register:
```

	3×00511 4×00511 1:510	0,0x0000 B:00 00	639	50,0	UINT16 R/W	NO	
			0x027F				1
			LAMP	2:LAMP SHORT ADDRESS 3			1
Sets for a lamp short address a new brightness Upper 8 bits:8-15:SHORTADRESS:number of Lower 8 bits: 0-7:VALUE:brightness value that	the lamp to be controlled	(063)					

Sample code:

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Brightness.Lamp(num ASIO, int AUnitID, int ALamp, int ABrightness)
  int v
 bit r
  // High 8 Bit of holding register is lamp address between 0 and 63
  // Low 8 Bit of holding register is brightness value between 0 and 254, 255 stands for MASK
  v=(ALamp<<8)|ABrightness
  // REGISTER: LAMP LEVEL 3x00511 4x00511 I:510
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,510,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
    DALI.Info("ERROR with MODBUS communication")
  endif
endsub
```

Sample code to use this function:

// Set lamp 1 to 100%
DALI.Brightness.Lamp(SIO,255,1,254)
// Set lamp 3 to 50%
DALI.Brightness.Lamp(SIO,255,3,128)
// Set lamp 63 to 0%
DALI.Brightness.Lamp(SIO,255,63,0)

45.11.2 Set brightness of a group of lamps

To set the brightness of a group of lamps use this register:

To obt and brightero	oo or a groap o	i lampo abo imo rogiotor.				
GROUP LEVEL	3×00521	0,0x0000	383	50,0	UINT16	NO
	4x00521	B:00-00			RAV	
	1:520					
			0x017F			
			GROUP	1:LAMP GROUP 2		
Sets for a lamp group a new brightness Upper 8 bits:8-15:GROUP:number of the Lower 8 bits:0-7:VALUE:brightness value	e group to be controlled (015)					

Sample code:

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Brightness.Group(num ASIO,int AUnitID,int AGroup,int ABrightness)
 int v
 bit r
  // High 8 Bit of holding register is group number between 0 and 15
  // Low 8 Bit of holding register is brightness value between 0 and 254, 255 stands for MASK
  v=(AGroup<<8)|ABrightness
  // REGISTER: GROUP LEVEL 3x00521 4x00521 I:520
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,520,v)
  if r==true then
   DALI.Info("SUCCESS")
  else
   DALI.Info("ERROR with MODBUS communication")
  endif
endsub
```



Sample code to use this function:

// Set group 1 to 100%
DALI.Brightness.Group(SIO,255,1,254)
// Set group 5 to 50%
DALI.Brightness.Group(SIO,255,5,128)
// Set group 15 to 0%
DALI.Brightness.Group(SIO,255,15,0)

45.11.3 Set brightness for all lamps

To set the brightness for all lamps use this register:

ALL LEVEL	3×00531	0,0x0000	127	50,0	UINT16	NO
	4x00531	B:00 00			RAW	
	1:530					
			0x007F			
Sets for all lamps a new brightness level betwee Upper 8 bits:8-15:Unused, always 0 Lower 8 bits:0-7:VALUE:brightness value that :						

Sample code:

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Brightness.All(num ASIO,int AUnitID,int ABrightness)
  int v
  bit r
  // High 8 Bit of holding register is 0
  // Low 8 Bit of holding register is brightness value between 0 and 254, 255 stands for MASK
  v=ABrightness
  // REGISTER: ALL LEVEL 3x00531 4x00531 I:530
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,530,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
    DALI.Info("ERROR with MODBUS communication")
  endif
endsub
```

Sample code to use this function:

// Set all ballasts to 100%
DALI.Brightness.All(SIO,255,254)
// Set all ballasts to 50%
DALI.Brightness.All(SIO,255,128)
// Set all ballasts to 0%
DALI.Brightness.All(SIO,255,0)

45.11.4 Send DALI 1.0 command to lamp

To send a DALI 1.0 command to a lamp use this register:

LAMP COMMAND DALI 1.0	3x00512 4x00512 I:511	21112	919	A0	UINT16 W/O	NO	
			0x0397				
			COMMAND	97:QUERY VERSION NUMBER			
LAMP 3:LAMP SHORT ADDRESS 4							
Sends a command to a specific lamp short address. The 16 bit value is divided into two parts: Upper 8 bits: 15-8: Short address of hamp 0 86 for lamp 1 to 84 Lower 8 bits: 7-0: Command value between 0 and 255 or 0x00 and 0xFF							
If you read this register, you can poll the 8 bit DALI answer. The return value is defined with: 0x8000: No answer received from the DALI bus up to now 0x20FF: A collision was detected on the DALI bus. 0x00. 0xFF: The 8 bit result of the last command. NUMD: VAFF: The 8 bit result of the last command.							

Sample code for sending a command to a specific DALI lamp. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Commandlx.Lamp(num ASIO,int AUnitID,int ALamp,int ACommand)
int v
bit r
v=(ALamp<<8) |ACommand
// REGISTER: LAMP COMMAND DALI 1.0 3x00512 4x00512 I:511
r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,511,v)
if r==true then
DALI.Info("SUCCESS")
else
DALI.Info("ERROR with MODBUS communication")
endif
endsub
```



45.11.5 Send DALI 1.0 command to group of lamps

To send a DALI 1.0 command to a group of lamps use this register:

To bolia a Driel 1.0 boliminaria to a group of lampe deb this register.						
GROUP COMMAND	3x00522	????	151	A0	UINT16	NO
DALI 1.0	4x00522				W/O	
	1:521					
			0x0097			
			COMMAND	97:QUERY VERSION NUMBER		
			GROUP	0:LAMP GROUP 1		
Sends a command to a specific kmp group. The Upper 8 bits: 15-8: Group of kamp 0.15 for kam Lower 8 bits: 7-0: Command value between 0 a If you read this register, you can poll the 8 bit D 0x8000: No answer received from the DAL 1b 0x00.0xFF: Collision was detected on the DAL 1b 0x00.0xFF: The 8 bit result of the last comman HINT: After you have read out the DAL I result,	p group 1 to 16 and 255 or 0x00 and 0xFF XALI answer. The return v s up to now Dus nd.		you can only reado	ut the result one time		

Sample code for sending a command to a specific DALI lamp group. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module % \mathcal{A} = \mathcal{A} = \mathcal{A} = \mathcal{A} = \mathcal{A}
sub DALI.Commandlx.Group(num ASIO, int AUnitID, int AGroup, int ACommand)
  int v
  bit r
  v=(AGroup<<8)|ACommand
  // REGISTER: GROUP COMMAND DALI 1.0 3x00522 4x00522 I:521
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,521,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
    DALI.Info("ERROR with MODBUS communication")
  endif
endsub
// Switch off lamp group 1
DALI.Command1x.Group(SIO,255,1,0x00)
// recall max level lamp group 15
```

DALI.Commandlx.Group(SIO,255,15,0x05)

45.11.6 Send DALI 1.0 command to all lamps

To send a DALI 1.0 command to all lamps use this register:

	3x00532 4x00532 I:531	????	151	A0	UINT16 W/O	NO
	1.551		0x0097			
			COMMAND	97:OUERY VERSION NUMBER		
Sends a command to all lamps. Only the lower 8 bits of the 16 bit value is used: Upper 8 bits 7-9: Command value between 0 and 255 or 0x00 and 0xFF Lower 8 bits:7-9: Command value between 0 and 255 or 0x00 and 0xFF						
If you read this register, you can poll the 8 bit D. 0x8000: No answer received from the DALI bus 0x20FF: A collision was detected on the DALI bus 0x00.0xFF: The 8 bit result of the last comman HINT: After you have read out the DALI result,	us d.	uue is defined with: ut will again result in 0x8000 for no further 8 bit data! 9	So you can only reado	but the result one time		

Sample code for sending a command to all DALI lamps. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Commandlx.All(num ASIO,int AUnitID,int ACommand)
int v
bit r
// ACommand 8 bit
v=ACommand
// REGISTER: ALL COMMAND DALI 1.0 3x00532 4x00532 I:531
r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,531,v)
if r==true then
DALI.Info("SUCCESS")
else
DALI.Info("ERROR with MODEUS communication")
endif
endsub
```



45.11.7 Send DALI 1.0 16 bit command to all lamps

To send a DALI 1.0 16 Bit command to all lamps use this register:

DIRECT 16 BIT	3x00542	????	43264	A100	UINT16	NO	
COMMAND	4x00542				VWO		
DALI 1.0	1:541						
0xA900							
			COMMAND	A900:COMPARE			
V A0							
Sends a 16 bit DALI 1.0 frame to the DALI bus line							
If you read this register, you can poil the 8 bit I 0x8000: No answer received from the DALI b 0x20FF: A collision was detected on the DALI 0x00.0xFF: The 8 bit result of the last comma HINT: After you have read out the DALI result	bus' nd.	alue is defined with; ut will again result in 0x8000 for no further 8 bit data! So	you can only reado	ut the result one time			

Sample code for sending a 16 bit command to all DALI lamps. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.16BitCommand1x.All(num ASIO, int AUnitID, int ACommand)
  int v
  bit r
  // ACommand 16 bit
  v=ACommand
  // REGISTER: DIRECT 16 BIT COMMAND DALI 1.0 3x00542 4x00542 I:541
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,541,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
   DALI.Info("ERROR with MODBUS communication")
  endif
endsub
// Load DTR with value 0x12
DALI.16BitCommand1x.All(SIO,255,0xA312)
// enable device type 8
DALI.16BitCommand1x.All(SIO,255,0xC108)
// Set short address 0 to 100%
DALI.16BitCommand1x.All(SIO,255,0x0x0000|(0<<9)|0xFE)
// Set short address 63 to 100%
DALI.16BitCommand1x.All(SIO,255,0x0x0000)(63<<9)(0xFE)
// Set group address 0 to 100%
DALI.16BitCommand1x.All(SIO,255,0x0x8000|(0<<9)|0xFE)
// Set group address 15 to 100%
DALI.16BitCommand1x.All(SIO,255,0x0x8000|(15<<9)|0xFE)
// Set all lamps to 100%
DALI.16BitCommand1x.All(SIO,255,0x0xFE00|0xFE)
// Send command OFF to short address 0
DALI.16BitCommand1x.All(SIO,255,0x0x0100|(0<<9)|0x00)
// Send command OFF to short address 63
DALI.16BitCommand1x.All(SIO,255,0x0x0100|(63<<9)|0x00)
// Send command OFF to group address 0
DALI.16BitCommand1x.All(SIO,255,0x0x8100|(0<<9)|0x00)
// Send command OFF to group address 15
DALI.16BitCommand1x.All(SIO,255,0x0x8100|(15<<9)|0x00)
// Send command OFF ot all lamps
DALI.16BitCommand1x.All(SIO,255,0x0xFF00|0x00)
```



45.11.8 Send DALI 1.0 command twice to lamp

Special DALI commands need to be sent twice within 100ms to the DALI ballasts. Therefore we have special MODBUS registers implemented. To send a DALI 1.0 command to a lamp twice within 100ms use this register:

	3×00513	????	768	A0	UINT16	NO
	4×00513				W/O	
	1:512					
			0x0300			
			COMMAND	00:OFF		
			LAMP	3:LAMP SHORT ADDRESS 4		
Sends a command twice within 100ms to a speci Upper 8 bits 1-8: Short address of lamp 0. 83 h Lower 8 bits 7-0: Command value between 0 an If you read this register, you can poll the 8 bit DA 0x9000: Not answer received from the DALI bus 0x20FF: A collsion was detected on the DALI bus 0x00. 0xFF: The 8 bit result of the last commans HINT: After you have read out the DALI result, t	for lamp 1 to 64 nd 255 or 0x00 and 0xFF ALI answer. The return va up to now us d.		you can only reado	ut the result one time		

Sample code for sending a command twice to a specific DALI lamp. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Command2x.Lamp(num ASIO, int AUnitID, int ALamp, int ACommand)
  int v
  bit r
  v=(ALamp<<8)|ACommand
  // REGISTER: LAMP COMMAND+REPEAT DALI 1.0 3x00513 4x00513 I:512
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,512,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
    DALI.Info("ERROR with MODBUS communication")
  endif
endsub
// Send STORE ACTUAL LEVEL IN DTR to ballast 1
DALI.Command2x.Lamp(SIO, 255, 1, 0x21)
// Load DTR with value 0xFE 100%
DALI.16BitCommand1x.All(SIO,255,0xA3FE)
// Send STORE THE DTR AS MAX LEVEL to ballast 1
DALI.Command2x.Lamp(SIO,255,1,0x2A)
```

45.11.9 Send DALI 1.0 command twice to group of lamps

Special DALI commands need to be sent twice within 100ms to the DALI ballasts. Therefore we have special MODBUS registers implemented. To send a DALI 1.0 command to a lamp group twice within 100ms use this register:

GROUP COMMAND+REPEAT	3x00523	????	0	A0	UINT16	NO		
DALI 1.0	4x00523				W/O			
	1:522							
			0x0000					
			COMMAND	00:OFF				
	GROUP 0:LAMP GROUP 1							
Sends a command wrice wrihin 100ms to a spec- Upper 8 bits 15-8: Group of lamp 0.15 for lamp Lower 8 bits 7-0: Command value between 0 ar If you read this register, you can poll the 8 bit D/ 0x8000: No answer received from the DALI bu 0x20FF: A collision was detected on the DALI bu 0x20FF: The 8 bit result of the last comman HINT: After you have read out the DALI result, 1	ALI answer. The return va up to now us		you can only reado	ut the result one time				

Sample code for sending a command to a specific DALI lamp group. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Command2x.Group(num ASIO,int AUnitID,int AGroup,int ACommand)
int v
bit r
v=(AGroup<<8)|ACommand
// REGISTER: GROUP COMMAND+REPEAT DALI 1.0 3x00523 4x00523 I:522
r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,522,v)
if r==true then
DALI.Info("SUCCESS")
else
DALI.Info("ERROR with MODBUS communication")
endif
endsub
```



// Send STORE ACTUAL LEVEL IN DTR to lamp group 15 DALI.Command2x.Group(SI0,255,15,0x21)

// Load DTR with value 0xFE 100%
DALI.16BitCommand1x.All(SIO,255,0xA3FE)
// Send STORE THE DTR AS MAX LEVEL to ballast group 3
DALI.Command2x.Group(SIO,255,3,0x2A)

45.11.10 Send DALI 1.0 command twice to all lamps

Special DALI commands need to be sent twice within 100ms to the DALI ballasts. Therefore we have special MODBUS registers implemented. To send a DALI 1.0 command to all lamps twice within 100ms use this register:

					,	J
ALL COMMAND+REPEAT	3x00533	2722	0	A0	UINT16	NO
DALI 1.0	4x00533				VWO	
D/(C) 1.0						
	1:532					
			0x0000			
			COMMAND	00:OFF		
Sends a command wrice wrhin 100ms to all am Upper 8 bits 15-8. Always 0 Lower 8 bits 7-0: Command value between 0 al If you read this register, you can poll the 8 bit D. 0x8000: No answer received from the DALI bo 0x20FF: A collision was detected on the DALI bo 0x00: 0xFF: The 8 bit result of the last comman HINT: After you have read out the DALI result,	nd 255 or 0x00 and 0xFF ALI answer. The return va s up to now us d.		you can only reado	ut the result one time		

Sample code for sending a command to all DALI lamps. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Command2x.All(num ASIO, int AUnitID, int ACommand)
  int v
  bit r
  // ACommand is 8 bit
  v=ACommand
  // REGISTER: ALL COMMAND+REPEAT DALI 1.0 3x00533 4x00533 I:532
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,532,v)
  if r==true then
    DALI.Info("SUCCESS")
  else
   DALI.Info("ERROR with MODBUS communication")
  endif
endsub
// Send STORE ACTUAL LEVEL IN DTR to all lamps
DALI.Command2x.All(SIO,255,0x21)
// Load DTR with value 0xFE 100%
DALI.16BitCommand1x.All(SIO,255,0xA3FE)
// Send STORE THE DTR AS MAX LEVEL to all lamps
```

DALI.Command2x.All(SIO,255,0x2A)



45.11.11 Send DALI 1.0 16 bit command twice to all lamps

Special DALI 16 bit commands need to be sent twice within 100ms to the DALI ballasts. Therefore we have special MODBUS registers implemented. To send a DALI 1.0 16 bit command to all lamps twice within 100ms use this register:

DIRECT 16 BIT COMMAND+REPEAT	3x00543 4x00543	????	41216	A100	UINT16 VWO	NO		
DALI 1.0	1:542							
			0xA100					
			COMMAND	A100:TERMINATE				
			V	A0				
Sends a 16 bit DALI 1.0 frame twice within 100ms to to the DALI bus line								
0x20FF: A collsion was detected on the DALI b 0x00.0xFF: The 8 bit result of the last comman	Sends a to bit DALL I.D. Wanne whoe within I.D.Wis ob the DALL bus line If you read this register, you can poll the 8 bit DALL answer. The return value is defined with: 0x20FF; A colsion was detected on the DALL bus up to now 0x00, 0xFF: The 8 bit result of the last command. HINT: After you have read out the DALL result, the next MODEUS readout will again result in 0x8000 for no further 8 bit data! So you can only readout the result one time							

Sample code for sending a 16 bit command to all DALI lamps. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.16BitCommand2x.All(num ASIO,int AUnitID,int ACommand)
int v
bit r
v=ACommand
// REGISTER: DIRECT 16 BIT COMMAND+REPEAT DALI 1.0 3x00543 4x00543 I:542
r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,542,v)
if r==true then
DALI.Info("SUCCESS")
else
DALI.Info("ERROR with MODBUS communication")
endif
endsub
```

// Start random addressing mode INITIALIZE (ALL GEARS)
DALI.16BitCommand2x.All(SIO,255,0xA500)



45.11.12 Send DALI 1.0 command to lamp and wait for answer

To send a DALI 1.0 command to a lamp and wait for the answer use this register:

LAMP COMMAND DALI 1.0	3x00512 4x00512 1:511	2222	919	A0	UINT16 W/O	NO		
			0x0397					
			COMMAND	97:QUERY VERSION NUMBER				
	LAMP 3:LAMP SHORT ADDRESS 4							
Sends a command to a specific lamp short address. The 16 bit value is divided into two parts: Upper 8 bits 15-8: Short address of lamp 0.63 for lamp 1 to 64 Lower 8 bits 7-0: Command value between 0 and 255 or 0x00 and 0xFF								
If you read this register, you can poll the 8 bit DALI answer. The return value is defined with: 0x8000: No answer received from the DALI bus up to now 0x00.fr; A colsion was detected on the DALI bus 0x00.oxF; The 8 bit result of the last command. HNT: After you have read out the DALI result, the next MODEUS readout will again result in 0x8000 for no further 8 bit data! So you can only readout the result one time								

Sample code for sending a command to a specific DALI lamp and wait for the answer or timeout. Please refer to the section Basic DALI command list for more details about commands.

```
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
sub DALI.Commandlx.Answer.Lamp(num ASIO,int AUnitID,int ALamp,int ACommand,intadr AAnswer)
  int v
  bit r,ok
  num Timeout
  v=(ALamp<<8)|ACommand
  AAnswer=0xFFFFFFF
  // REGISTER: LAMP COMMAND DALI 1.0 3x00512 4x00512 I:511
  r=ModbusMaster.MbWriteSingleRegister(ASIO,AUnitID,511,v)
  if r then
    // We define 2000ms Timeout, if no answer is available...
    Timeout=DateTime.ActualDateTime2Num()+DateTime.MilliSeconds2Num(2000.)
    ok=false
    while DateTime.ActualDateTime2Num() <=Timeout and not ok
      r=ModbusMaster.MbReadHoldingRegisters(ASIO,AUnitID,511,v,1)
      if r==true then
        // 0x8000 means wait for answer
        // \texttt{0x20FF} means collision
        // 0x00 to 0xFF means 8 bit answer
        if v!=0x8000 then
          DALI.Info("Answer is here:"+String.FormatHex(v,4))
          AAnswer=v
          ok=true
        endif
      endif
    endwhile
  endif
endsub
// query status of lamp 0
int MyAnswer
DALI.Command1x.Answer.Lamp(SIO, 255, 0, 0x90, MyAnswer)
if MvAnswer==0xFFFFFFFF then
  DALI.Info("Host Timeout has happened"
elseif MyAnswer==0x20FF then
  DALI.Info("DALI bus collision has happened"
else
  DALI.Info("DALI Asnwer is:"+String.FormatHex(MyAnswer,4))
endif
```



45.11.13 Send DALI 1.0/2.0 command frames

To send a DALI 1.0 or DALI 2.0 commands to the DALI bus system use this registers:

DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE 4x10015 1:10014 1:10014 1:10014 1:10014 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 0 0 0 DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 65024 FE00 AND REPEAT WITHIN 100ms 4x10017 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 0 0 0	UINT32 W/O UINT32 W/O UINT32R W/O UINT32R W/O UINT32R W/O UINT32 W/O UINT32 W/O	YES YES YES YES YES
4x10001 1:10000 1:10000 Writing a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus A0 DALI10 SEND 8 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10003 4x10003 1:10002 ???? 160 A0 Writing a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10005 1:10004 3x10005 1:10004 ???? 255 FF Writing a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10007 1:10004 3x10007 4x10007 ???? 160 A0 Writing a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10007 ????? 160 A0 MVriting a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus DALI 16 BIT FRAME 3x10007 ???? 65278 FEFE DALI 10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 ????? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 ????? 65024 FE00 DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 ????? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013	UINT32 W/O UINT32R W/O UINT32R W/O UINT32R W/O UINT32 W/O	YES YES YES YES
DALI10 SEND 8 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10003 4x10003 1:10002 ???? 160 A0 Wring a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus 3x10005 1:10004 ???? 255 FF Wring a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus 3x10005 1:10004 ???? 255 FF Wring a 8 bit value to this register generates a 8 bt DALI/DSI value on the DALI bus 0 0 0 DALI10 SEND 8 BIT DALI FRAME AVD005 3x10007 1:10004 ???? 160 A0 Wring a 8 bit value to this register generates a 8 bit DALI/DSI value on the DALI bus 0 0 0 DALI 16 BIT FRAME 3x10007 4x10001 ???? 65278 FEFE DALI 16 BIT FRAME 3x10011 4x10011 ???? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 ???? 65024 FE00 Wring a 16 bit value to this register generates a 16 bit DALI10 command on the DALI bus 0 0 0 0 DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 ????? 65278 FEFE Uring a 16 bit value to this register generates a 16 bit DALI10 command on the D	UINT32R W/O UINT32R W/O UINT32R W/O UINT32 W/O	YES
AND REPEAT WITHIN 100ms 4x10003 1:10002 Writing a 8 bit value to this register generates a 8 bit DALIDSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10005 ???? 255 FF Writing a 8 bit value to this register generates a 8 bit DALIDSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10007 ???? 160 A0 Writing a 8 bit value to this register generates a 8 bit DALIDSI value on the DALI bus DALI10 SEND 8 BIT DALI FRAME 3x10007 ???? 160 A0 AND REPEAT WITHIN 100mis 4x10007 ???? 160 A0 Writing a 8 bit value to this register generates a 8 bit DALIDSI value on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10011 ???? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME 3x10011 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10013 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI F	UINT32R W/O UINT32R W/O UINT32R W/O UINT32 W/O	YES
DALI10 SEND 8 BIT DALI FRAME 3x10005 ???? 255 FF UNITING a 8 bit value to this register generates a 8 bit DALI/DSI value on the DALI bus 255 FF DALI10 SEND 8 BIT DALI FRAME 3x10007 ???? 160 A0 AND REPEAT WITHIN 100ms 3x10007 ???? 160 A0 Writing a 8 bit value to this register generates a 8 bit DALI/DSI value on the DALI bus DALI10 BIT FRAME 3x10011 ???? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME 3x10011 ???? 65278 FEFE U110 SEND 16 BIT DALI FRAME 3x10013 ???? 65024 FEO0 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10013 ???? 65024 FEO0 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE UNI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE	UINT32R W/O UINT32R W/O UINT32 W/O	YES
4x10005 4x10004 Writing a & bit value to this register generates a & bit DALI/DSI value on the DALI bus DALI10 SEND & BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10007 4x10007 ???? 160 A0 Writing a & bit value to this register generates a & bit DALI/DSI value on the DALI bus DALI 16 BIT FRAME A0 DALI 16 BIT FRAME 3x10011 (1:10016) ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI/DC command on the DALI bus 55278 FEFE DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 55278 FEFE FEFE DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALII.0 command on the DALI bus 55278 FEFE DALI10 SEND 16 BIT DALI FRAME I:10012 3x10015 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALII.0 command on the DALI bus 55278 FEFE DALI10 SEND 16 BIT DALI FRAME I:10014 3x10017 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALII.0 command on the DALI bus 55024 FE00	UINT32R W/O UINT32R W/O UINT32 W/O	YES
DALI10 SEND 8 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10007 4x10007 ???? 160 A0 Wring a 8 bit value to this register generates a 8 bit DALI/DSI value on the DALI bus DALI 16 BIT FRAME 5278 FEFE DALI10 SEND 16 BIT DALI FRAME AX10011 ???? 65278 FEFE Wring a 16 bit value to this register generates a 16 bit DALI/DC command on the DALI bus 65278 FEFE DALI10 SEND 16 BIT DALI FRAME AX10013 ???? 65024 FE00 Wring a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 56024 FE00 DALI10 SEND 16 BIT DALI FRAME AX10013 ???? 65024 FE00 Wring a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 56024 FE00 DALI10 SEND 16 BIT DALI FRAME AX10015 ???? 65278 FEFE Wring a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 55278 FEFE DALI10 SEND 16 BIT DALI FRAME I:10014 ???? 65278 FEFE Wring a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 7??? 65024 FE00 DALI10 SEND 16 BIT DALI FRAME I:10016 ???? 65024 FE00 Wring a 16 bit value to this register generates a 16 bit DALI/D command on the DALI bus 55024 FE00 Wring a 16 bit value to	VIO UINT32 W/O UINT32 W/O	YES
AND REPEAT WITHIN 190ms 4×10007 1:10006 Writing a 8 bit value to this register generates a 8 bit DALI/DSI value on the DALI bus DALI 16 BIT FRAME DALI 16 BIT FRAME DALI 10 SEND 16 BIT DALI FRAME 3×10011 1:10011 1:10012 Writing a 16 bit value to this register generates a 16 bit DALI 10 command on the DALI bus DALI 10 SEND 16 BIT DALI FRAME 3×10013 AND REPEAT WITHIN 100ms 1:10012 Writing a 16 bit value to this register generates a 16 bit DALI 0 command on the DALI bus DALI 10 SEND 16 BIT DALI FRAME 3×10013 1:10012 Writing a 16 bit value to this register generates a 16 bit DALI 0 command on the DALI bus DALI 10 SEND 16 BIT DALI FRAME 3×10013 1:10012 Writing a 16 bit value to this register generates a 16 bit DALI 10 command on the DALI bus DALI 10 SEND 16 BIT DALI FRAME 3×10015 1:10014 Writing a 16 bit value to this register generates a 16 bit DALI 10 command on the DALI bus DALI 10 SEND 16 BIT DALI FRAME 3×10017 AND REPEAT WITHIN 100ms 3×10017 AND REPEAT WITHIN 100ms 4×10017 1:10016 Writing a 16 bit value to this register generates a 16 bit DALI 10 command on the DALI bus	VIO UINT32 W/O UINT32 W/O	YES
DALI 16 BIT FRAME 3x10011 ???? 65278 FEFE DALI10 SEND 16 BIT DALI FRAME 3x10011 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10013 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10013 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE Uriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 65024 FE00 Mriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 65024 FE00 MVITHIN 100ms I:10016 ????? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus	UINT32 W/O	YES
DALI10 SEND 16 BIT DALI FRAME 3x10011 4x10011 1:10010 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x1001.3 4x10013 1:10012 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DAL110 SEND 16 BIT DALI FRAME 3x10015 1:10012 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DAL110 SEND 16 BIT DALI FRAME 3x10015 1:10014 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DAL110 SEND 16 BIT DALI FRAME 3x10017 (1:10016 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DAL110 SEND 16 BIT DALI FRAME 3x10017 ????? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus	UINT32 W/O	YES
4x10011 1:10010 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55024 DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 1:10012 ???? Mriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55024 DALI10 SEND 16 BIT DALI FRAME 1:10015 3x10015 ???? Mriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55278 DALI10 SEND 16 BIT DALI FRAME 1:10014 3x10015 ???? Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55278 DALI10 SEND 16 BIT DALI FRAME NOT \$x10017 ???? Mriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55024 DALI10 SEND 16 BIT DALI FRAME Av10017 \$x10017 ???? Mriting a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55024 DALI10 SEND 16 BIT DALI FRAME Av10017 \$x10017 \$x10017 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 55024	UINT32 W/O	YES
DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 1:10012 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI 0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 4x10015 1:10014 3x10015 1:10014 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI 0 command on the DALI bus PEFE PEFE PEFE Writing a 16 bit value to this register generates a 16 bit DALI 0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 1:10014 SEND 16 BIT DALI FRAME 1:10016 PEFE Writing a 16 bit value to this register generates a 16 bit DALI10 command on the DALI bus PE00 PE00	W/O	
AND REPEAT WITHIN 100ms 4x10013 1:10012 Writing a 16 bit value to this register generates a 16 bit DALI10 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10015 4x10015 1:10014 ???? 65278 FEFE Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 65024 FE00 DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10017 4x10017 ???? 65024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus Utility of the this register generates a 16 bit DALI bus	W/O	
DALI10 SEND 16 BIT DALI FRAME 3x10015 ???? 65278 FEFE 1:10014 1:10014 1:10014 1:10014 1:10014 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus 0 0 0 DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 65024 FE00 AND REPEAT WITHIN 100ms 1:10016 1:10016 1:10016 1:10016	LIINT 32D	VES
4x10015 1:10014 Writing a 16 bit value to this register generates a 16 bit DALI10 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? AND REPEAT WITHIN 100ms 4x10017 ???? 1:10016 1:10016 1:10016	LIINT32D	VEC
Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 4x10017 1:10016 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus	WO	105
DALI10 SEND 16 BIT DALI FRAME 3x10017 ???? 55024 FE00 AND REPEAT WITHIN 100ms 4x10017 ???? 55024 FE00 Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus Vital 10.0000 Vital 10.0000 Vital 10.0000		
Writing a 16 bit value to this register generates a 16 bit DALI1.0 command on the DALI bus	UINT32R W/O	YES
DALI 24 BIT FRAME		
DALI20 SEND 24 BIT DALI FRAME 3x10021 2??? 8946700 88840C 4x10021 1:10020	UINT32 W/O	YES
Writing a 24 bit value to this register generates a 24 bit DALI2.0 frame on the DALI bus		
DALI20 SEND 24 BIT DALI FRAME 3x10023 ???? 8946701 88840D AND REPEAT WITHIN 100ms 4x10023 1:10022	UINT32 W/O	YES
Writing a 24 bit value to this register generates a 24 bit DALI2.0 frame on the DALI bus		
DALI20 SEND 24 BIT DALI FRAME 3x10025 7??? 8946700 88840C 4x10025 1:10024	UINT32R WO	YES
Writing a 24 bit value to this register generates a 24 bit DALI2.0 frame on the DALI bus		
DALI20 SEND 24 BIT DALI FRAME 3x10027 ???? 8946701 88840D AND REPEAT WITHIN 100ms 4x10027 1:10026	UINT32R WO	YES
Writing a 24 bit value to this register generates a 24 bit DALI2.0 frame on the DALI bus		



DALI 25 BIT eDALI FRAME – automa	atic redundand bit					
DALI20 SEND 25 BIT eDALI FRAME		????	272742	42966	UINT32	YES
Difference and an entry with the	4x10031 1:10030		272772	-2000	W/O	120
Writing a 24 bit value to this register generates		mand a valid 25 bit eDALI frame on the DALI bus			• •	
DALI20 SEND 25 BIT eDALI FRAME AND REPEAT WITHIN 100ms	4x10033	????	272743	42967	UINT32 W/O	YES
Malan - 24 kitatin anakir analasa ana	1:10032	mand a walki 25 kè a Del Linama an tha Del Lina				
		mand a valid 25 bit eDALI frame on the DALI bus	070740	10000		
DALI20 SEND 25 BIT eDALI FRAME	3x10035 4x10035 1:10034	?????	272742	42966	UINT32R W/O	YES
Writing a 24 bit value to this register generates		mand a valid 25 bit eDALI frame on the DALI bus				
DALI20 SEND 24 BIT DALI FRAME AND REPEAT WITHIN 100ms	3×10037 4×10037 I:10036	,,,,,	272743	42967	UINT32R W/O	YES
Writing a 24 bit value to this register generates	out of a 24 bit eDALI com	mand a valid 25 bit eDALI frame on the DALI bus				
DALI 25 BIT eDALI FRAME – user de	efined redundand bit	t				
DALI20 SEND 25 BIT eDALI FRAME	4x10041	2222	545382	85266	UINT32 W/O	YES
Writing a 25 bit value to this register generates	1:10040	ne DALLbus				
DALI20 SEND 25 BIT eDALI FRAME		????	545383	85267	UINT32	YES
AND REPEAT WITHIN 100ms	3x10043 4x10043 1:10042		545383	05267	W/0	TES
Writing a 25 bit value to this register generates	a 25 bit eDALI frame on t	he DALI bus				
DALI20 SEND 25 BIT eDALI FRAME	3x10045 4x10045 1:10044	27772	545382	85266	UINT32R W/O	YES
Writing a 25 bit value to this register generates	a 25 bit eDALI frame on t	he DALI bus				
DALI20 SEND 25 BIT DALI FRAME AND REPEAT WITHIN 100ms	3x10047 4x10047 I:10046	,,,,,	545383	85267	UINT32R W/O	YES
Writing a 25 bit value to this register generates	a 25 bit eDALI frame on t	he DALI bus				
DALI 28 BIT FRAME						
DALI20 SEND 28 BIT DALI FRAME	3x10051 4x10051 I:10050	2222	19088743	1234567	UINT32 W/O	YES
Writing a 28 bit value to this register generates	a 28 bit DALI2.0 frame on	the DALI bus		-		
DALI20 SEND 28 BIT DALI FRAME AND REPEAT WITHIN 100ms	3x10053 4x10053 I:10052	????	19088744	1234568	UINT32 W/O	YES
Writing a 28 bit value to this register generates	a 28 bit DALI2.0 frame on	the DALI bus				
DALI20 SEND 28 BIT DALI FRAME	3×10055 4×10055 1:10054	????	19088743	1234567	UINT32R W/O	YES
Writing a 28 bit value to this register generates	a 28 bit DALI2.0 frame on	the DALI bus				
DALI20 SEND 28 BIT DALI FRAME AND REPEAT WITHIN 100ms	3x10057 4x10057 I:10056	,,,,,	19088744	1234568	UINT32R W/O	YES
Writing a 28 bit value to this register generates	a 28 bit DALI2.0 frame or	the DALI bus				
DALI 32 BIT FRAME						
DALI20 SEND 32 BIT DALI FRAME	3×10051 4×10051 1:10050	2222	305419896	12345678	UINT32 W/O	YES
Writing a 32 bit value to this register generates		the DALI bus			· · · · · ·	
DALI20 SEND 32 BIT DALI FRAME AND REPEAT WITHIN 100ms	3×10053 4×10053 I:10052	7777	305419896	12345678	UINT32 W/O	YES
Writing a 32 bit value to this register generates		-				
DALI20 SEND 32 BIT DALI FRAME	3×10055 4×10055 I:10054	????	305419896	12345678	UINT32R W/O	YES
Writing a 32 bit value to this register generates	a 32 bit DALI2.0 frame on	the DALI bus				
DALI20 SEND 32 BIT DALI FRAME AND REPEAT WITHIN 100ms	3×10057 4×10057 1:10056	2222	305419896	12345678	UINT32R W/O	YES
Writing a 32 bit value to this register generates		the DALI bus				

Sample code for sending commands with special frame length. Please refer to the section Basic DALI command list for more details about commands.

// ASio: In our development system the handle to the serial port // AUnitID: The unit ID of the RESI-DALI-SIO module sub DALI.Command.nBits(num ASIO,int AUnitID,int ABits,int ACommand,bit ARepeat) int V[2] bit r // Split ACommand into two 16 bit registers V[0] = (ACommand>>16) & 0xFFFF V[1]=ACommand&0xFFFF if ABits==8 then // REGISTER: DALI10 SEND 8 BIT DALI FRAME 3x10001 4x10001 I:10000 // REGISTER: DALI10 SEND 8 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10003 4x10003 I:10002 if ARepeat==false then r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10000,V,2) else r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10002,V,2) endif return elseif ABits==16 then // REGISTER: DALI10 SEND 16 BIT DALI FRAME 3x10011 4x10011 I:10010 // REGISTER: DALI10 SEND 16 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10013 4x10013 I:10012 if ARepeat==false then r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10010,V,2)



```
else
      r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10012,V,2)
    endif
    return
  elseif ABits==24 then
    // REGISTER: DALI20 SEND 24 BIT DALI FRAME 3x10021 4x10021 I:10020
    // REGISTER: DALI20 SEND 24 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10023 4x10023 I:10022
    if ARepeat==false then
      r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10020,V,2)
    else
     r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10022,V,2)
    endif
    return
  elseif ABits==25 then
    // REGISTER: DALI20 SEND 25 BIT eDALI FRAME 3x10031 4x10031 I:10030
                                                                               3x10033 4x10033 I:10032
    // REGISTER: DALI20 SEND 25 BIT eDALI FRAME AND REPEAT WITHIN 100ms
    if ARepeat==false then
      r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10030,V,2)
    else
      r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10032,V,2)
    endif
    return
  elseif ABits==28 then
    // REGISTER: DALI20 SEND 28 BIT DALI FRAME
                                                 3x10051 4x10051 I:10050
    // REGISTER: DALI20 SEND 28 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10053 4x10053 I:10052
    if ARepeat == false then
     r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10050,V,2)
    else
     r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10052,V,2)
    endif
    return
  elseif ABits==32 then
    // REGISTER: DALI20 SEND 32 BIT DALI FRAME
                                                 3x10061 4x10061 I:10060
    // REGISTER: DALI20 SEND 32 BIT DALI FRAME AND REPEAT WITHIN 100ms 3x10063 4x10063 I:10062
    if ARepeat==false then
      r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10060,V,2)
    else
     r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10062,V,2)
    endif
    return
  else
    DALI.Info("Wrong DALI frame bit length!")
  endif
endsub
// query status of lamp 0
int MyAnswer
DALI.Command1x.Answer.Lamp(SIO, 255, 0, 0x90, MyAnswer)
if MyAnswer==0xFFFFFFFF then
  DALI.Info("Host Timeout has happened"
elseif MyAnswer==0x20FF then
  DALI.Info("DALI bus collision has happened"
else
  DALI.Info("DALI Asnwer is:"+String.FormatHex(MyAnswer,4))
endif
// Send 8 bit value without repeat
DALI.Command.nBits(SIO,255,8,0xFF,false)
// Send 16 bit command Brightness to 0% to all lamps
DALI.Command.nBits(SIO,255,16,0xFE00,false)
// Send 24 bit DALI 2.0 control gear command and repeat it within 100ms
DALI.Command.nBits(SIO, 255, 24, 0x123456, true)
// Send 25 bit eDALI frame
DALI.Command.nBits(SIO,255,25,0x123456,false)
// Send 28 bit DALI frame for future use
DALI.Command.nBits(SIO,255,28,0x1234567,false)
// Send 32 bit DALI frame for future use
DALI.Command.nBits(SIO, 255, 32, 0x12345678, false)
```



45.11.14 Receive DALI 1.0/2.0 frames

To received a DALI 1.0 or DALI 2.0 frames the gateway has an internal ring puffer. To red out this ring puffer, you can use this registers:

DALI ANSWER RING PUFFER					
DALI RING PUFFER COUNTER	3×20001 4×20001 1:20000	1,0x0001 B:00 01	1	1	UINT16 R/O
		Current receive counter:1			
Returns a 16 bit counter for indicating a chang	e in the received data: Eve	ry time the gateway receives a new DALI frame this cou	unter will be increme	nted by one.	
DALI RING PUFFER FLAGS	3x20002 4x20002 1:20001	2,0x0002 B:00 02	1	1	UINT16 R/O
		Flags of the received DALI frame:2 -> 2:RX			
Indicates additional information for the DALI fra =1:DALI frame was transmitted by the gateway =2:DALI frame was received by the gateway =3:DALI collision on the bus detected	<i>y</i>				
DALI RING PUFFER BITLENGTH	3×20003 4×20003 1:20002	24,0x0018 B:00 18	1	1	UINT16 R/O
		Bit size of last received DALI frame:24 bits			
Indicates the DALI frame length in bits of the la	ist received DALI frame				
DALI RING PUFFER DATA 32 BIT	3×20004 4×20004 1:20003	8946700,0x0068840C B:00 88 84 0C	1	1	UINT32 R/O
		32 bit DALI frame from ring puffer:0088840C			
Contains the 32 bit value of the last received D	ÁLI frame				
DALI RING PUFFER TICKS	3×20006 4×20006 1:20005	24449,0x00005F81 B:00 00 5F 81	1	1	UINT32 R/O
		Gap to previous DALI frame:24449ms -> 24,4	449s		
Contains a value in Milliseconds, which describ	es the gap to the previous	DALI frame on the DALI bus.			
DALI RING PUFFER DATA 32 BIT	3×20008 4×20008 1:20007	8946700,0×0068840C B:84 0C 00 88	1	1	UINT32R R/O
		32 bit DALI frame from ring puffer:0088840C			
Contains the 32 bit value of the last received D	ÁLI frame				
DALI RING PUFFER TICKS	3x20010 4x20010 1:20009	24449,0x00005F81 B:5F 81 00 00	1	1	UINT32R R/O
		Gap to previous DALI frame:24449ms -> 24,4	449s		
Contains a value in Milliseconds, which describ	es the gap to the previous	DALI frame on the DALI bus.			



Sample code for reading the internal ring puffer:

```
// Counter of last read ring puffer entry
int OldCounter
sub DALI.Init()
 OldCounter=0xFFFFFFFF
endsub
// ASio: In our development system the handle to the serial port
// AUnitID: The unit ID of the RESI-DALI-SIO module
function bit DALI.Check.RxRing(num ASIO,int AUnitID,intadr ACounter,intadr AFlags,intadr ABits,intadr
AFrame, intadr AGap)
  int V[7]
  bit r
  // REGISTER: DALI RING PUFFER COUNTER 3x20001 4x20001 I:20000
  // REGISTER: DALI RING PUFFER FLAGS 3x20002 4x20002 I:20001
  // REGISTER: DALI RING PUFFER BITLENGTH 3x20003 4x20003 I:20002
  // REGISTER: DALI RING PUFFER DATA 3x20004 4x20004 I:20003
  // REGISTER: DALI RING PUFFER TICKS 3x20006 4x20006 I:20005
  r=ModbusMaster.MbWriteMultipleRegisters(ASIO,AUnitID,10000,V,7)
  if r == true then
    ACounter=V[0]
    AFlags=V[1]
    ABits=V[2]
    // UINT32 -> first register: HIGH 16 bit word, second register LOW 16 bit word
    AFrame=(V[3]<<16)|V[4]
    // UINT32 -> first register: HIGH 16 bit word, second register LOW 16 bit word
    AGap = (V[5] << 16) |V[6]
    // Check for new data in ring buffer ...
    if ACounter!=OldCounter then
     OldCounter=ACounter
      return true
    else
      return false
    endif
  else
    DALI.Info("MODBUS error")
    return false
  endif
  return false
endfunction
```



```
// Init system
DALI.Init()
sub DALI.Test.Receive()
  int MyCounter
  int MyFlags
  int MyBits
  int MyFrame
  int MyGap
  while true
    // Check for new data in receive ringpuffer...
    if DALI.Check.RxRing(SIO,UnitID,MyCounter,MyFlags,MyBits,MyFrame,MyGap) then
      // Check flags
      if MyFlags==1 then
        DALI.Info("DALI frame was sended by the RESI-SIO-xxx gateway")
      elseif MyFlags==2 then
       DALI.Info("DALI frame was received by the RESI-SIO-xxx gateway")
      elseif MyFlags==3 then
       DALI.Info("Collision on the DALI bus was detected by RESI-SIO-xxx gateway")
      endif
      // Check Bit Length
      if MyBits==8 then
        DALI.Info("8 bit frame:DALI 1.0 answer:"+String.FormatHex(MyFrame&0xFF,2))
      elseif MyBits==16 then
       DALI.Info("16 bit frame:DALI 1.0 command:"+String.FormatHex(MyFrame&0xFFFF,6))
      elseif MyBits==24 then
        DALI.Info("24 bit frame:DALI 2.0 command:"+String.FormatHex(MyFrame&OxFFFFFF,6))
      elseif MyBits==25 then
        DALI.Info("25 bit frame:eDALI command:"+String.FormatHex(MyFrame&0xFFFFF,6))
      elseif MyBits==28 then
        DALI.Info("28 bit frame:future use:"+String.FormatHex(MyFrame&OxFFFFFF,7))
      elseif MyBits==32 then
       DALI.Info("32 bit frame:future use:"+String.FormatHex(MyFrame,8))
      else
       DALI.Info("Invalid frame:"+String.FormatInt(MyBits,1)+":"+String.FormatHex(MyFrame,8))
      endif
      // Show gap time to previous DALI frame
      DALI.Info("Gap:"+String.FormatInt(MyGap,1)+"ms")
    endif
  endwhile
endsub
```



45.12 Basic DALI command list

This is an excerpt from the DALI standard, it is only for quick information. For more details refer to the original DALI standard.

STANDARD	VALUE	COMMAND	ADDRESSING/PARAMETER	FUNCTION
DALI 1.0	0,0x00	OFF	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Switch off lamp
DALI 1.0	1,0x01	UP	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Dim lamp up for 200ms. If the lamp was switched off it stays switched off.
DALI 1.0	2,0x02	DOWN	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Dim lamp down for 200ms. As soon as the lower brightness threshold level is reached the lamp stays at this value.
DALI 1.0	3,0x03	STEP UP	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Lamp switches one step brighter. If the lamp was switched off it stays switched off.
DALI 1.0	4,0x04	STEP DOWN	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Lamp switches one step darker. As soon as the lower brightness threshold level is reached the lamp stays at this value.
DALI 1.0	5,0x05	RECALL MAX LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Set lamp to maximal threshold level.
DALI 1.0	6,0x06	RECALL MIN LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Set lamp to minimal threshold level.
DALI 1.0	7,0x07	STEP DOWN AND OFF	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Lamp switches one step darker. If the lower brightness threshold level is reached the lamp switches off.
DALI 1.0	8,0x08	ON AND STEP UP	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Lamp switches one step brighter. If the lamp was switched off it is now switched on.
DALI 1.0	9,0x09	ENABLE DAPC SEQUENCE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	This command defines the start of a direct arc power control (DAPC) sequence that allows the host to control the dimming speed by sending direct arc power commands.
DALI 1.0	10,0x0A	GOTO LAST ACTIVE LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Indirect Arc Power command. The last active level will be restored.
DALI 1.0	16,0x10 to 31,0x1F	GOTO SCENE x	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	Load scene value stored in scene 0 to 15.
DALI 1.0	32,0x20	RESET	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Reset the ballast
DALI 1.0	33,0x21	STORE ACTUAL LEVEL IN DTR	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual brightness level in the register DTR
DALI 1.0	42,0x2A	STORE THE DTR AS MAX LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as maximum level for lamp
DALI 1.0	43,0x2B	STORE THE DTR AS MIN LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as minimum level for lamp
DALI 1.0	44,0x2C	STORE DTR AS SYSTEM FAILURE LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as system failure level for lamp
DALI 1.0	45,0x2D	STORE DTR AS POWER ON LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as power on level for lamp
DALI 1.0	46,0x2E	STORE DTR AS FADE TIME	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as fade time for lamp
DALI 1.0	47,0x2F	STORE DTR AS FADE RATE	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as fade rate for lamp
DALI 1.0	64,0x40 to 79,0x4F	STORE THE DTR AS SCENE X	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as new brightness level for scene x (0 to 15)
DALI 1.0	80,0x50 to 95,0x5F	REMOVE FROM SCENE X	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Removes the affected lamps from the scene x (0 to 15)



STANDARD	VALUE	COMMAND	ADDRESSING/PARAMETER	FUNCTION
DALI 1.0	96,0x60 to 111,0x6F	ADD TO GROUP x	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Adds the lamps to group x (0 to 15)
DALI 1.0	112,0x70 to 127,0x7F	REMOVE FROM GROUP x	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Removes the lamps from group x (0 to 15)
DALI 1.0	128,0x80	STORE DTR AS SHORT ADDRESS	ADDRESSING: LAMP, GROUP, ALL DTR: YES, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Stores the actual register value DTR as new short address
DALI 1.0	129,0x81	ENABLE WRITE MEMORY	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	Activates memory write operations in ballasts.
DALI 1.0	144,0x90	QUERY STATUS	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	Query of the status of the lamp Answer: Bit 0: Status of control gear 0=OK Bit 1: Lamp failure 0=OK Bit 2: Lamp arc power on 0=OFF 1=ON Bit 3: Limit Error 0=Actual level is between MIN and MAX or OFF Bit 4: Fade running 0=Fading is finished 1=Fading is active Bit 5: RESET STATE 0=OK Bit 6: Missing short address 0=No 1=Yes Bit 7: POWER FAILURE 0=No
DALI 1.0	145,0x91	QUERY CONTROL GEAR	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the ballast exists and can answer, the answer is YES, otherwise NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	146,0x92	QUERY LAMP FAILURE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the ballast has a problem with the lamp, the answer is YES, otherwise NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	147,0x93	QUERY LAMP POWER ON	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the ballast has switched on the lamp, the answer is YES, otherwise NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	148,0x94	QUERY LIMIT ERROR	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the arc power of the ballast is outside of MIN and MAX LEVEL, the answer is YES, otherwise NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	149,0x95	QUERY RESET STATE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the ballast is in RESET STATE, the answer is YES, else NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	150,0x96	QUERY MISSING SHORT ADDRESS	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If the ballast has no short address (=0xFF MASK), the answer is YES, else NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	151,0x97	QUERY VERSION NUMBER	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is always 1.
DALI 1.0	152,0x98	QUERY CONTENT DTR	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current content of register DTR.
DALI 1.0	153,0x99	QUERY DEVICE TYPE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the actual device type of the ballast. The following device types are defined by the DALI consortium: 0:Fluorescent lamp control gear 1:Self-contained emergency lamp control gear 2:Discharge (HID) lamp control gear 3:Low-voltage halogen lamp control gear 4:Incandescent lamp dimmer 5:DC voltage lamp dimmer (0/1-10V) 6:LED lamp control gear 7:witching (relay) control gear 8:Color lamp control gear 15:Load referencing" 16:Thermal gear protection 17:Dimming curve selection 18:Under consideration 19:Centrally supplied emergency operation 20:Demand response 21:Thermal lamp protection 22:Under consideration 23:Non-replaceable light source
DALI 1.0	154,0x9A	QUERY PHYSICAL MINIMUM LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	Returns the current physical minimum arc power level for the ballast in the range of 0 to 254. 255 means MASK.

STANDARD	VALUE	COMMAND	ADDRESSING/PARAMETER	FUNCTION
DALI 1.0	155,0x9B	QUERY POWER FAILURE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	If there is a failure with the arc power, the result is YES; else NO. YES is 0xFF, NO is timeout or no answer
DALI 1.0	156,0x9C	QUERY CONTENT DTR1	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current content of register DTR1.
DALI 1.0	157,0x9D	QUERY CONTENT DTR2	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current content of register DTR2.
DALI 1.0	160,0xA0	QUERY ACTUAL LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current arc power between 0 and 254 or 255 for MASK.
DALI 1.0	161,0xA1	QUERY MAX LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the maximum level for the arc power between 0 and 254, 255 means MASK
DALI 1.0	162,0xA2	QUERY MIN LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the minimum level for the arc power between 0 and 254, 255 means MASK
DALI 1.0	163,0xA3	QUERY POWER ON LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the power on level for the arc power between 0 and 254, 255 means MASK
DALI 1.0	164,0xA4	QUERY SYSTEM FAILURE LEVEL	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the system failure level for the arc power between 0 and 254, 255 means MASK
DALI 1.0	165,0xA5	QUERY FADE TIME/FADE RATE	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the fade time and fade rate for the ballast. The higher 4 bits define the fade time The lower 4 bits define the fade rate
DALI 1.0	178,0xB0 to 191,0xBF	QUERY SCENE LEVEL x	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the current setting of the scene x (0 to 15) level for the arc power between 0 and 254, 255 means MASK
DALI 1.0	192,0xC0	QUERY GROUPS 0-7	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the group membership of the ballast. Each bit stands for one group: Bit 0 for group 0, bit 1 for group 1,
DALI 1.0	193,0xC1	QUERY GROUPS 8- 15	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the group membership of the ballast. Each bit stands for one group: Bit 0 for group 8, bit 1 for group 9,
DALI 1.0	194,0xC2	QUERY RANDOM ADDRESS (H)	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer are the highest 8 bit of the 24 bit random number used for random addressing mode
DALI 1.0	195,0xC3	QUERY RANDOM ADDRESS (M)	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer are the middle 8 bit of the 24 bit random number used for random addressing mode
DALI 1.0	196,0xC4	QUERY RANDOM ADDRESS (L)	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer are the lowest 8 bit of the 24 bit random number used for random addressing mode
DALI 1.0	196,0xC5	READ MEMORY LOCATION	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1: YES, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the content of the memory location defines with DTR within the memory bank defined with DTR1
DALI 1.0	255,0xFF	QUERY EXTENDED VERSION NUMBER	ADDRESSING: LAMP, GROUP, ALL DTR, DTR1, DTR2: NO ANSWER: YES, REPEAT: NO	The answer is the extended version number of the ballast

<u>RES</u>



STANDARD	VALUE	COMMAND	ADDRESSING/PARAMETER	FUNCTION
DALI 1.0	0xA100	TERMINATE	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	This commands terminates special functions for all ballasts
DALI 1.0	0xA3HH	DTR=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	This command loads the hex value HH into the DTR register
DALI 1.0	0xA500	INITIALIZE (ALL GEARS)	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command starts random addressing mode for all ballasts
DALI 1.0	0xA5FF	INITIALIZE (GEARS WITHOUT SHORT ADDRESS)	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command starts random addressing mode for all ballasts without a short address
DALI 1.0	0xA5HH	INITIALIZE (SHORT ADDRESS)	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command starts random addressing mode for one ballasts with a specific short address. HH=(SA<<1) 1
DALI 1.0	0xA700	RANDOMIZE	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command commands the ballasts to dice a 24 bit random number for automatic addressing
DALI 1.0	0xA900	COMPARE	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	This command activates a compare of the internal diced 24 bit number with the given number with SEARCHADR commands. if the internal number is less than or equal the answer is YES (0xFF)
DALI 1.0	0xAB00	WITHDRAW	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	The ballast with the same 24 bit random number as defined by the SEARCHADR commands should exit the addressing mode.
DALI 1.0	0xB1HH	SEARCHADDRH=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	The command sets the highest 8 bit of the 24 bit random number for compare mode in all ballasts.
DALI 1.0	0xB3HH	SEARCHADDRM=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	The command sets the medium 8 bit of the 24 bit random number for compare mode in all ballasts.
DALI 1.0	0xB5HH	SEARCHADDRL=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: NO	The command sets the lowest 8 bit of the 24 bit random number for compare mode in all ballasts.
DALI 1.0	0xB7HH	PROGRAM SHORT ADDRESS	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	If the ballast is selected (physical selection mode or random address fits) the given short address is stored as new short address of the device. HH=(SA<<1) 1
DALI 1.0	0xB9HH	VERIFY SHORT ADDRESS	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	The ballast asnwers with YES 0xFF, if the given short address is the same as the internal stored short address. HH=(SA<<1) 1
DALI 1.0	0xBB00	QUERY SHORT ADDRESS	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	If the random address fits the ballast will answer with the internal stored short address in the format HH=(SA<<1) 1 or MASK (0xFF), if none is defined
DALI 1.0	0xBD00	PHYSICAL SELECTION	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command start physical selection addressing mode
DALI 1.0	0xC1HH	ENABLE DEVICE TYPE	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	If you want to use special device type depended commands you have to precede this commands with this enable command. HH is the selected device type e.g. 8)
DALI 1.0	0xC3HH	DTR1=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command loads the hex value HH into the DTR1 register
DALI 1.0	0xC5HH	DTR2=	ADDRESSING: ALL DTR, DTR1, DTR2: NO ANSWER: NO, REPEAT: YES	This command loads the hex value HH into the DTR2 register
DALI 1.0	0xBDHH	WRITE MEMORY LOCATION	ADDRESSING: ALL DTR, DTR1: YES, DTR2: NO ANSWER: NO, REPEAT: YES	This command writes the content HH into the memory bank defined with DTR1 at the memory address defined with DTR.



46 RESI-SMIX-SIO, RESI-SMIX-ETH, RESI-SMI-DIAG

46.1 General information

Our RESI-SMIx-SIO and RESI-SMIx-ETH family of gateways enables the integration of Standard Motor Interface® motors for shades & blinds into your BMS system with MODBUS or with ASCII commands.

This series SMI gateways offer the following features:

- Easy integration of a complete SMI motor system for shades & blinds
- MODBUS/RTU slave or MODBUS/TCP server protocol
- Additional commands with plain ASCII texts
- SMI interface and host interface are galvanically isolated
- Versions for 8 SMI motors and 16 SMI motors available
- Supports all known SMI commands
- RESI-SMIx-SIO: Special support to use the module together with the standard SMI easyMonitor 3® software
- RESI-xxx-SIO: Galvanic isolated RS232 and RS485 interface for communication with a host system
- RESI-xxx-ETH: Galvanic isolated Ethernet interface for communication with a host system



Figure: Our serial RESI-SMI16-SIO module



Figure: Our Ethernet RESI-SMI16-ETH module

With our RESI-SMI16-DIAG gateway we deliver a diagnostic system, which is connected to an existing SMI bus systemn. The gateway has no internal SMI power supply, but can send/receive every SMI command for diagnostic and analysis reasons.



Figure: Our RESI-SMI16-DIAG gateway

/**1**



46.2 Technical specification

Beside the basic technical data, which fulfill all of our IO modules, this IO modules meet the following technical specifications:

Power consumption	
RESI-SMI16-SIO	<1.0W
RESI-SMI8-SIO	<1.0W
RESI-SMI16-ETH	<1.5W
RESI-SMI8-ETH	<1.5W
RESI-SMI16-DIAG	<1.0W
Product housing	
RESI-SMI16-SIO	CEM17
RESI-SMI8-SIO	CEM17
RESI-SMI16-ETH	CEM35
RESI-SMI8-ETH	CEM35
RESI-SMI-DIAG	CEM17
Product weight	
RESI-SMI16-SIO	50g
RESI-SMI8-SIO	50g
RESI-SMI16-ETH	83g
RESI-SMI8-ETH	83g
RESI-SMI16-DIAG	50g
SMI bus interface	
RESI-SMIX-SIO	
RESI-SMIX-ETH	
RESI-SMIX-DIAG	
Protocol	SMI - Standard Motor Interface
Baud rate	2400Bit/s
Cable connection	via terminals
Galvanic isolation	Yes
LED indicator	Yes
SMI power supply	
RESI-SMIx-SIO	
RESI-SMIx-ETH	
Nominal output voltage	typical ~22
Maximum output current	~23mA
Galvanic isolation	Yes
LED indicator	Yes
RESI-SMIx-DIAG	
No integrated SMI power supplying	



Default serial settings

Delault Sellar Sellings	
RESI-SMI16-SIO	
RESI-SMI8-SIO	
RESI-SMI16-DIAG	
Baud rate	via DIP switch
Parity	none
Stop bits	one
UnitID	255
Default Ethernet settings	
RESI-SMI16-ETH	
IP address	192.168.0.223
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
RESI-SMI8-ETH	
IP address	192.168.0.222
IP mask	255.255.255.0
gateway	192.168.0.1
UnitID	255
User	RESI
password	RESI

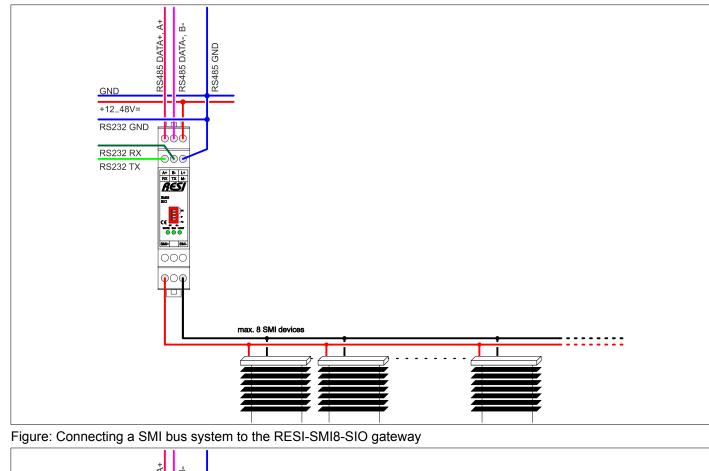


46.3 Additional terminals & LED states

SMI INTERFACE	SMI bus connector		
	One 3 pin terminal	blocks	
	Terminal type:	USLIM	
	SMI+:	SMI+ bus wire	
	SMI-:	SMI- bus wire	
	IMPORTANT: The	SMI bus is not protected against reverse polarity!	
Pin layout	SMI+:	SMI+ bus wire	
	N/C:	not connected	
	SMI-:	SMI- bus wire	
STATE	If the gateway has r	no error, this LED flashes with a 1s rhythm.	
	If the module has an internal error this LED flashes very quick.		
	(~250ms rhythm)		
SMI If there is bus communication on the SMI, this LED is on, other		nunication on the SMI, this LED is on, otherwise this LED is OFF	



46.4 RESI-SMIx-SIO: Connection diagram



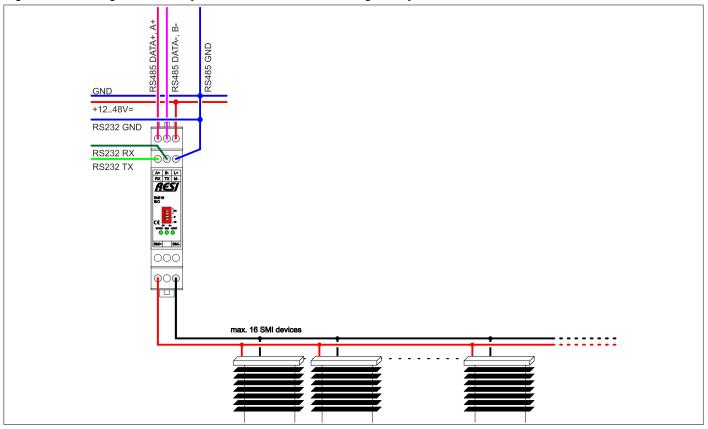


Figure: Connecting a SMI bus system to the RESI-SMI16-SIO gateway



46.5 RESI-SMIX-ETH: Connection diagram

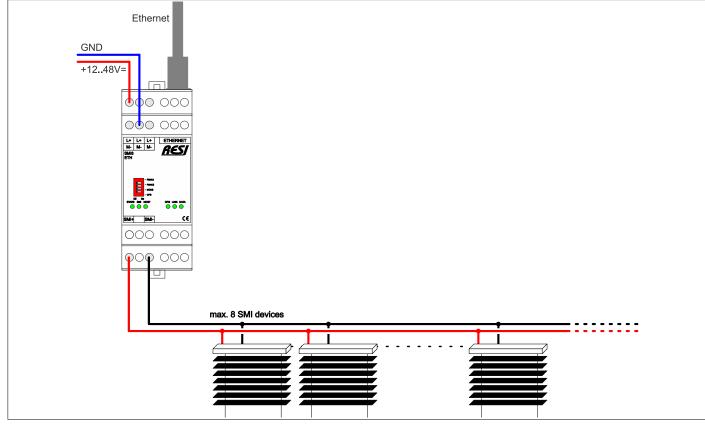


Figure: Connecting a SMI bus system to the RESI-SMI8-ETH gateway

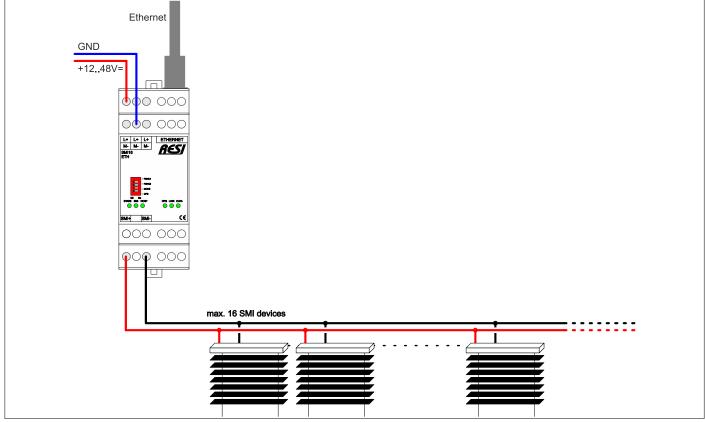


Figure: Connecting a SMI bus system to the RESI-SMI16-ETH gateway



46.6 SMI bus installation

The SMI interface offers the following features in general:

- Basic idea: One gateway and up to 16 motors
- Gateway is master, motors are slaves
- Connecting line is 5-wire cable including power supply and PE
- Connection signals: SMI+ (I+), SMI- (I-), L, N, PE usually 5x1.5mm²
- Connecting line type is installation cable without shielding
- maximum length of connection lines in total: 350m
- Communication speed is 2400 baud
- Data transfer is bidirectional with master/slave protocol

Wire sizes:

The recommendations are for guidance only. Other wire sizes and lengths may be used, depending on wiring rules and when appropriate. The connecting cable is a 5-wire cable, which supplies both power and transmits data. The connector of a SMI shade or blind motor has five terminals, labeled I+, I-, N, PE, and L, to which the cable is connected. Our SMI gateway uses SMI+ for the I+ connector and SMI- for the I- connector.

The maximum total cable length is 350 m, which means that distances of up to 350 m between the SMI gateway and to all shade or blind motors are possible.

Wire sizes (cross-sectional areas) from 0.75 mm² (18 AWG) to 2.5 mm² (14 AWG) can be used depending on the following factors:

- Total cable length
- Minimum voltage required by the blind motor
- Rated motor current
- Number of blind motors

Because up to 16 blind motors (drives) can be connected in parallel to one SMI gateway, you must consider the number of blind motors connected to the SMI blind module when calculating the dimension of the cables.

For example, blind motors that operate from mains voltage (230VAC) can typically handle a maximum voltage reduction of 10% (207VAC). When several shade or blind motors are connected in parallel to the SMI module, the cables must be dimensioned in a way that the voltage does not drop below 207VAC for the last shade or blind motor.

For more information, see the SMI Standard Motor Interface website www.standard-motor-interface.com



The topology of a SMI installation should be either a bus line or a star. See the picture below:

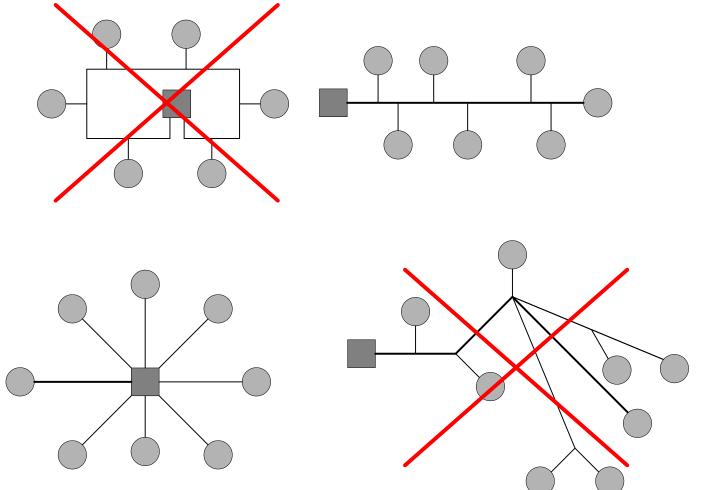


Figure: SMI bus topology



46.7 Commissioning of a SMI system

Download the free software SMI easy Monitor 3 from www.standard-motor-interface.com.

If you have successfully installed the software you will see the following screen:

🚧 SMI - easyMonitor	
Datei Optionen Hilfe	
Auswahl	Fahren Konfigurieren Adressieren
 Alle Hersteller DUNKERMOTOREN BECKER Antriebe 2 elero 3 SELVE 4 SUN-MASTER Sonnensch 5 VESTAMATIC 6 WAREMA 7 GROENINGER Antriebst. 8 GEIGER Antriebst. 9 Griesser Electronic 10 Manufacturer domain for M 11 Reserved domain 13 Domain for entry to data pr 14 Reserved domain 15 	Fahren Auf Pos1 Pos1 übemehmen Auf Step 10 0 Pos2 Pos2 übemehmen Stop Position 50.00 % Ab Step 10 0 Info Postionsanzeige ektiv %
Log	
Time Sent	Command Answer
08:24:29 Alle Hersteller [AB]	Alle Hersteller [AB] ACK
08:24:30 Alle Hersteller [STOP]	Alle Hersteller [STOP] ACK
Schnittstelle COM4	



46.7.1 Use SMI easyMonitor 3 with RESI-SMIx-SIO

Usually our gateways use MODBUS/RTU slave protocol or ASCII text command for communication with the host system. You have to switch the gateway into a transparent mode with fixed baud rate of 2400Baud to communicate with the SMI easy Monitor software. To enable this, you have to use a terminal program like hterm, which allows you to send/receive ASCII text strings via serial line.

- 1. Close the SMI easyMonitor 3 software, because it will use the serial interface of your PC
- 2. Wire and connect our RESI-SMIx-SIO gateway to your serial interface (RS232 or RS485)
- 3. Put the DIP switches to 1-OFF, 2-OFF, 3-ON for RS485 or 3-OFF for RS232, 4-OFF
- 4. Open hterm software

🗗 HTerm 0.8.9						
File Options View Help						
Connect Port COM5						
Rx 63 Reset Tx 48 Reset Count 0 - 0 Reset Newline at CR V Show newline						
Clear received Ascii Hex Dec Bin Save output						
Sequence Overview X Received Data						
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70						
Selection (-)						
Input control X						
Clear transmitted · 🖉 Ascii 🔲 Hex 📄 Dec 📄 Bin · Send on enter CR 🔷 · Send file · DTR RTS						
Type ASC V Autosend						
Transmitted data X						
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75						
Selection (-)						
History 1/1/30 Not connected						



- 5. Change the settings for Send on Enter to CR
- 6. Change the settings for Newline at to CR
- 7. Connect to the gateway: Select your serial interface baud rate 9600 and press connect button
- 8. To check the connection: Enter #TYPE followed by RETURN to send the command to the gateway.

🗗 HTern 0.8.9 🕞 🕞 💽						
File Options View Help						
Disconnect Port COM5						
Rx 84 Reset Tx 54 Reset Count 0 💭 0 Reset Newline at CR V Show newline Characters						
Clear received Ascii Hex Dec Bin Save output Clear at 0 Newline every uncharacters 0 Image: Clear at 0 Imag						
Sequence Overview X Received Data						
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 🔶						
<pre>#TYPE:RESI-SMI16-SIO;#</pre>						
Input control X						
Clear transmitted · 🖉 Ascii 📄 Hex 📄 Dec 📄 Bin · Send on enter CR 🔹 · Send file · DTR RTS						
Type ASC V Autosend						
Transmitted data ×						
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 ^						
Selection (-)						
History 1/1/30 Connected to COM5 (b:9600 d:8 s:1 p:None)						

9. If everything is successfully connected, you will see the answer: #TYPE:RESI-SMI16-SIO above in the Received Data window.

10. Now we can switch to plain mode with 2400baud to use the gateway for the SMI easyMonitor 3 software.

11. Send command #SMIPLAINMODE followed by RETURN to switch the gateway into transparent mode.

THTerm 0.8.9					
File Options View Help					
Disconnect Port COM5 R Baud 9600 Data 8 Stop 1 Parity None CTS Flow control					
Rx 84 Reset Tx 68 Reset Count 0 - 0 Reset Newline at CR V Show newline					
Clear received VAscii Hex Dec Bin Save output Clear at 0 Newline every Autoscroll Show errors					
Sequence Overview X Received Data					
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 🔺					
#TYPE:RESI-SMI16-SIOv					
Selection (-)					
input control x					
Clear transmitted Ascii Hex Dec Bin Send on enter CR Send file DTR RTS					
Type ASC V SMIPLAINMODE Autosend					
Transmitted data ×					
1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 🔺					
Selection (-)					
History 1/2/30 Connected to COM5 (b:9600 d:8 s:1 p:None)					

12. The gateway signals the successful switch with a fast flashing STATE LED.

13. Now close the hterm software



14. Start the SMI easyMonitor 3 software and select the correct serial interface of your PC

🚧 SMI - easyMonitor		
Datei Optionen Hilfe		
Auswahl	Fahren Konfigurieren Adressieren	
Ale Hersteller O DUNKERMOTOREN 1 BECKER Antriebe 2 elero 3 SELVE 4 SUN-MASTER Sonnenscr 5 VESTAMATIC 6 WAREMA 7 GROENINGER Antriebst. 8 GEIGER Antriebst. 9 Griesser Electronic 10 Manufacturer domain for M 11 Reserved domain 12 Reserved domain 13 Domain for entry to data pr 14 Reserved domain 15	Fahren Auf Pos1 Auf Pos1 Auf Step 10 o Stop Postion Ab Step Einstellungen Ab Serieller Port COM5 Ø Experteneinstellungen aktivieren Timeout serieller Port 36 ØK Abbrechen	Pos1 übemehmen Pos2 übemehmen 50.00 % Postionsanzeige aktiv %
Log Time Sent	Command	Answer
Schnittstelle COM5		

15. Send commands like STOP to all manufacturers and check the Log window. If there stands Timeout, you have no connection to your SMI bus system. IN our case ACk shows, that the motor has answered.

Datei Optionen Hilfe Auswahl Fahren Konfiguiteren Adessieren	🚧 SMI - easyMonitor				
• Ale Hersteller • Comparison Participation Participation • Ale Hersteller • Comparison Participation • DUNKERMOTOREN • Fahren • BECKER Antriebe • Auf • elero • Auf • SUN-MASTER Sonnensch • Auf • VESTAMATIC • Ge • WAREMA • Companie • GROENINGER Antriebst. • Sup • Geserved domain • Companie • Manufacturer domain for M • Domain for entry to data pr • Beserved domain • Sent • Command	Datei Optionen Hilfe				
DUNKERMOTOREN 1 BECKER Antnebe 2 elero 3 SELVE 4 SUN-MASTER Sonnensch 5 VESTAMATIC 6 Marken A 7 GROENNINGER Antnebst. 8 GEIGER Antnebst. 9 Gridesser Bectronic 10 Manufacturer domain for M 11 Reserved domain 12 Reserved domain 13 Domain for entry to data pr 14 Reserved domain 15 Ime Sent Command Answer	Auswahl	Fahren Konfigurieren Adressieren			
Log Time Sent Command Answer	DUNKERMOTOREN 1 BECKER Antriebe 2 elero 3 SELVE 4 SUN-MASTER Sonnensch 5 VESTAMATIC 6 WAREMA 7 GROENINGER Antriebst. 8 GEIGER Antriebst. 9 Griesser Electronic 10 Manufacturer domain for M 11 Reserved domain 12 Reserved domain 13 Domain for entry to data pr 14	Fahren Auf Auf Step 10 ° Stop Ab Step 10 ° Ab	Pos2 Pos	s2 übernehmen	%
Time Sent Command Answer	Reserved domain				
	Log	1			
09:57:35 Alle Hersteller [STOP] Alle Hersteller [STOP] ACK	Time Sent	Command		Answer	
	09:57:35 Alle Hersteller [STOP]	Alle Hersteller [STOP]		ACK	
Schnittstelle COM5					



16. Now you can switch to Addressing tab and start a request of all available motors

🚧 SMI - ea	asyMonitor							- 9 %
Datei	Optionen Hilfe							
Auswahl		Fahren Konfigu	rieren Adressie	ren				
Alle Her	rsteller 0							Abfrage
O DUNKE	ERMOTOREN 1							/bildge
BECKE		ID	Hersteller	Тур	Slave	Kommentar		Konflikte auflösen
elero	3	42A639B5h	9	1	15			
SELVE								Adressen senden
	ASTER Sonnensch 5							
O VESTA								Speichem
O WAREI								
	NINGER Antriebst. 8							
GEIGEI								
	r Electronic 10							
	cturer domain for M 11							
C Reserve								
 Reserve Description 	for entry to data pr 🔄 14							
 Domain Reserve 								
 Reserve 								
Log								
Time	Sent		Command	_			Answer	A
09:59:03	Slave 15 [SYN]		Slave 15 [S	YN]			STX [SYN (19)]	
09:59:03	Slave 15 [SYN]		Slave 15 [S	YN]			STX [SYN (19)]	
09:59:03	Slave 15 [SYN]		Slave 15 [S	YN]			STX [SYN (19)]	
09:59:03	Slave 15 [ID_R]		Slave 15 [ID	_R]			STX [KEY_ID_R (42a6	39b5)]
09:59:03	Slave 15 [ID_R]		Slave 15 [ID	_R]			STX [KEY_ID_R (42a6	39b5)]
09:59:03	Slave 15 [ID_R]		Slave 15 [ID	_R]			STX [KEY_ID_R (42a6	39b5)] 🔫
	e COM5							

17. Configure each SMI motor to a different Slave ID between 0 and 15, if you use our RESI-SMI16-SIO gateway, in case of the RESI-SMI8-SIO gateway configure Slave IDs between 0 and 7!

18. Test all of your configured motors with the SMI easyMonitor software to be sure, that the SMI bus system is ok.

When you are finished with this procedure close the software and re-power our gateway to stop the transparent mode and to start listening to MODBUS or ASCII protocol commands.



46.8 Additional MODBUS register & coils

Here you will find only the additional MODBUS registers and coils especially for this IO module. Please refer to the description of of the standard MODBUS mapping for more details about the available basic MODBUS registers and coils.

Please refer to the external document for detailed documentation of the current MODBUS register mapping for this IO module:

RESI-L-SMI8-SIO-ETH-MODBUS+ASCII-ENxx.pdf RESI-L-SMI16-SIO-ETH-MODBUS+ASCII-ENxx.pdf

46.9 Additional ASCII commands

Here you will find only the additional ASCII commands especially for this IO module. Please refer to the description of of the standard commands for more details about the available basic ASCII commands.

Please refer to the external document for detailed documentation of the current ASCII commands for this IO module:

RESI-L-SMI8-SIO-ETH-MODBUS+ASCII-ENxx.pdf RESI-L-SMI16-SIO-ETH-MODBUS+ASCII-ENxx.pdf