

MANUAL



RESI-DALI-MODBUS

RESI-DALI-PS



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1 History

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3 IMPORTANT SECURITY NOTES



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!
- ☐ 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 datasheets, in our manuals, in our catalogues 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 fulfill 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!

4 General Information

Up to 64 DALI lamps can be controlled with the RESI-DALI-MODBUS converter via MODBUS/RTU master protocol. But also lamps using the older DSI protocol can be controlled.

Additionally with the RESI configuration tool a DALI network can be configured and be put in operation.

To control the converter any MODBUS compatible device can be used.

- connection of up to 64 DALI/DSI- lamps (depending on the current consumption)
- galvanically isolated DALI Bus
- additional mode for starting up and configuring
- MODBUS port: RS232 or RS485, 9600 to 57600 bps, 8 data bits, no parity, 1 stop bit
- selectable MODBUS address
- supply voltage 24 V direct current

Type	Description	Voltage	Power	Weight
RESI-DALI-MODBUS	MODBUS/RTU slave to DALI converter with RS232 or RS485 port, supports up to 64 DALI ballasts, DIP switch for settings	24 V=	<0.5W	55 g
RESI-DALI-PS	Power supply for DALI system with 24V= input voltage and 200mA output current for up to 64 DALI ballasts	24 V=	<5W	65 g

Technical Data		
Power supply		
Supply voltage	24 V= +/-10%	Storage temperature -20...85 °C
Power LED	Yes	Operating Temperature 0...60°C
Power consumption		Humidity 25...90 % rH non-condensing
RESI-DALI-MODBUS	<0.5W	Protection Class IP20 (EN 60529)
RESI-DALI-PS	<5W	Dimensions LxWxH 17,5mm x 90mm x 58mm
		Weight
		RESI-DALI-MODBUS 55g
		RESI-DALI-PS 65g
		Mounting on DIN EN50022 rail
only RESI-DALI-MODBUS:		
Modbus Interface		Factory settings
Protocol	Modbus/RTU	Modbus address 255
Type	RS232 or RS485	Modbus baud rate 9600
Baud rates	9600 to 57600/8/N or E/1	Modbus interface RS232
Cable Connection	Via clamps	DALI baud rate 1200
LED indicator	Yes	
Galvanic insulation to MBUS interface	Yes	
DALI Interface		DALI bus cabling
Protocol	DALI/DSI	Cable type JYStY 2 x 1,5mm²
Maximum amount of devices on the bus	64	
DALI baud rate	1200bd	
Cable connection	Via clamps	
Galvanic insulation to MODBUS interface	Yes	
LED indicator	Yes	
Only RESI-DALI-PS:		
DALI power supply		
DALI output voltage	Max. 15Vdc, typ. 14Vdc	
DALI output current	Max. 200mA	
Cable connection	Via clamps	
Galvanic insulation to primary power supply		
LED indicator	Yes	
Clamps		
Clamp wire cross section	Max. 1,5 mm²	
Tightening torque	Max. 0.5Nm	CE conformity Yes

IT Accessories

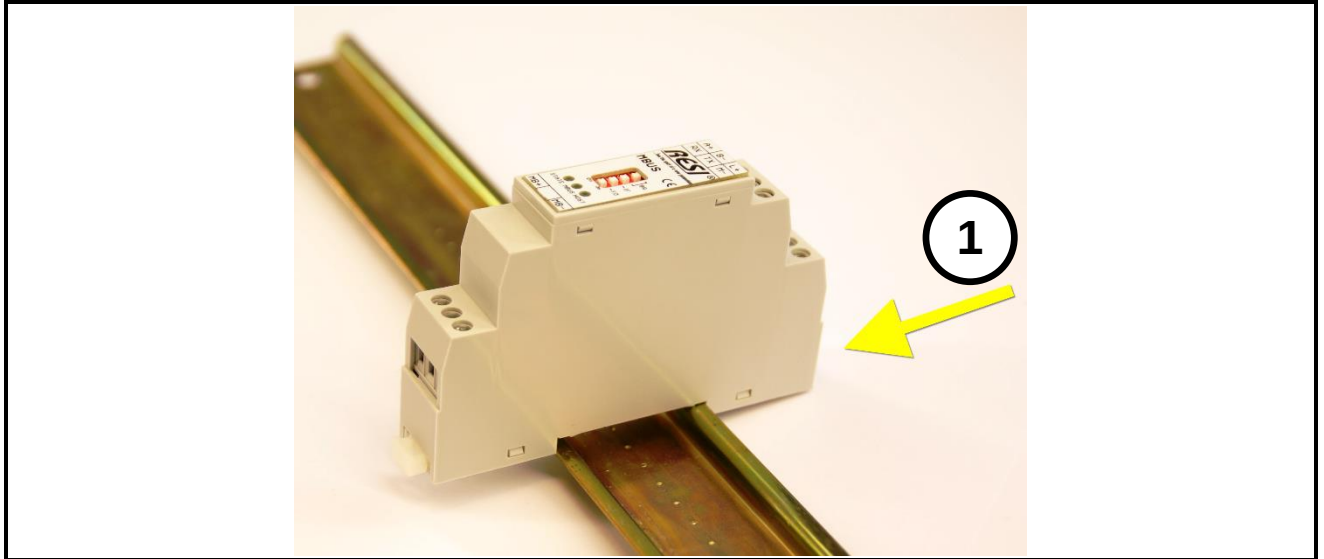
RESI-MODBUS-Configurator	Free configuration software for RESI Modbus devices. Download this software from www.RESI.cc
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5 Mounting and Connections

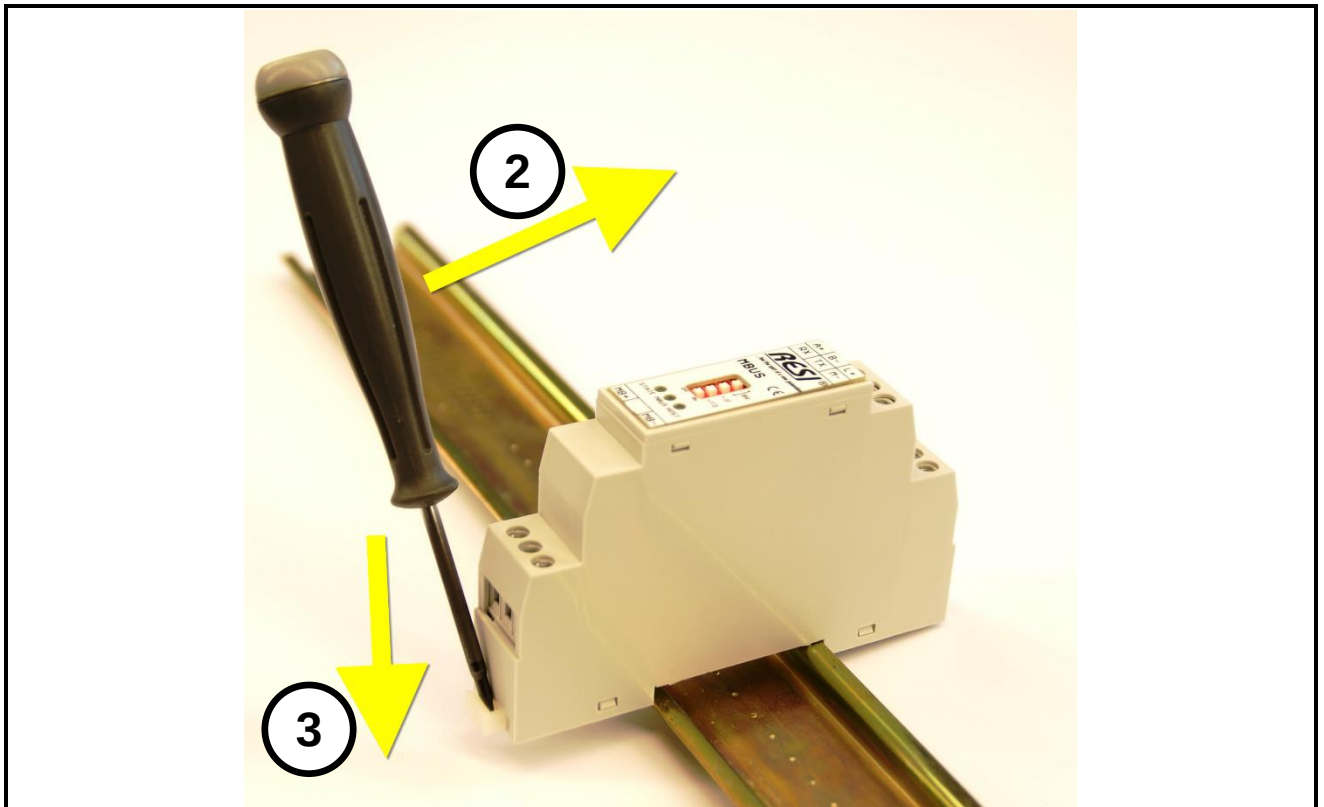
5.1 Assembling

Our RESI-DALI-MODBUS converters and our RESI-DALI-PS power supplies are designed for mounting on a 35mm DIN-EN50022 rail. Please note, that there are symbol photos used in the mounting pictures below.

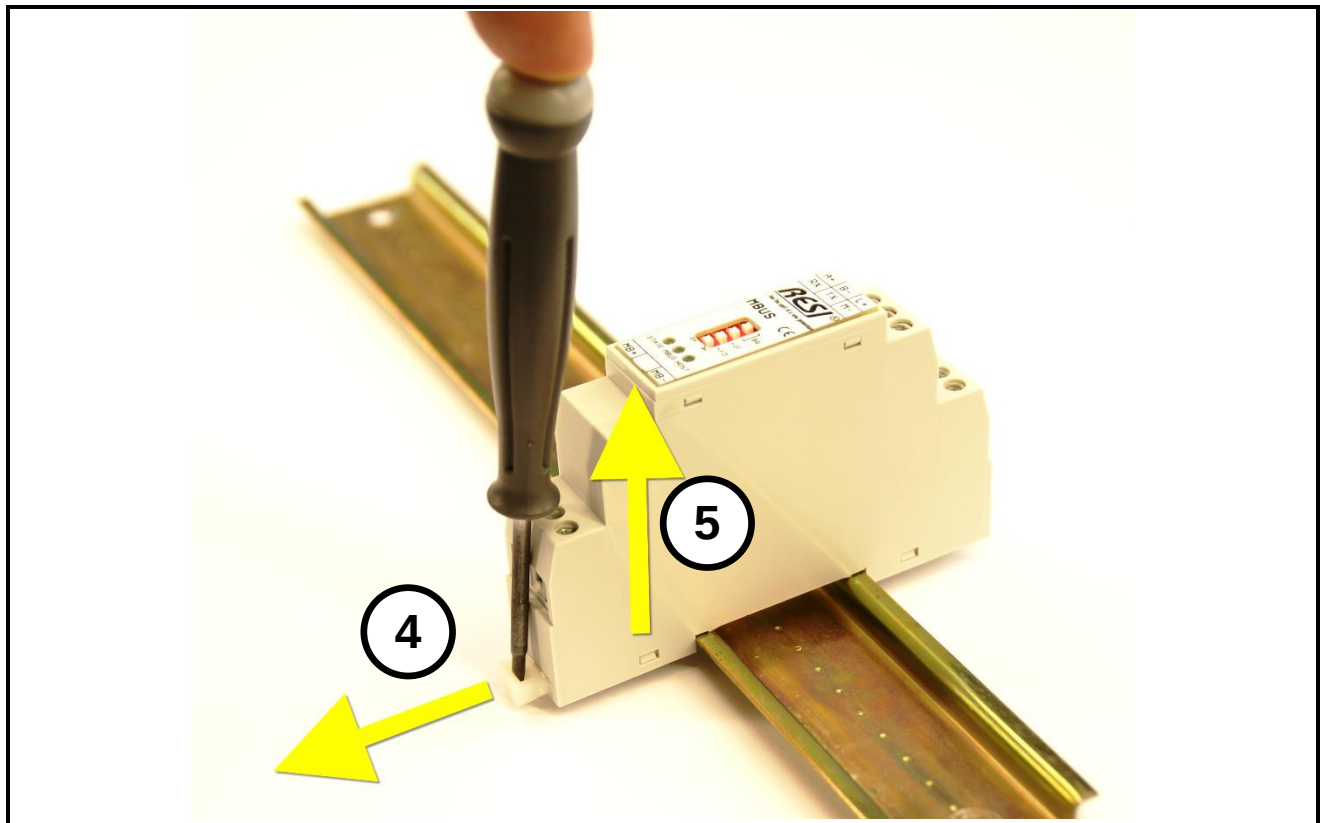
At first, put the converter with the top side on the DIN rail (1).



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 converter from the bar with while pulling it on the top side.



5.2 Clamps

	RESI-DALI-MODBUS
L+	Power supply
M-	L+: 24 V= M-: Ground
A	RS485 Modbus/RTU slave interface
B	A: DATA+ B: DATA-
RX	RS232 Modbus/RTU slave interface
TX	RX: serial receive
M-	TX: serial transmit M-: Ground for RS232
D+	Interface to DALI devices
D-	
STATE	State-LED, flashes fast, when no DALI bus is connected, flashes slow, when DALI bus is connected and OK
DALI	DALI activity LED, is permanent on, flashes short when DALI telegrams are on the bus
HOST	HOST-LED, flashes, when host sends/receive MODBUS/RTU telegrams

Table: Description of connectors and LEDs of the RESI-DALI-MODBUS converter

	RESI-DALI-PS
L+ M-	Power supply L+: 24 V= M-: Ground
D+ D-	Interface to DALI devices
POWER	Power-LED, is ON when the power supply has input voltage
ERR	Error LED of Power supply, is short on, when a DALI telegram is on the bus, when permanent on, the power supply has a malfunction or there is a bus error in the DALI system
DALI	DALI activity LED, is permanent on. When transmitting a DALI telegram the LED switches off of a few milliseconds.

Table: Description of connectors of the RESI-DALI-PS module

5.3 DIP switch settings

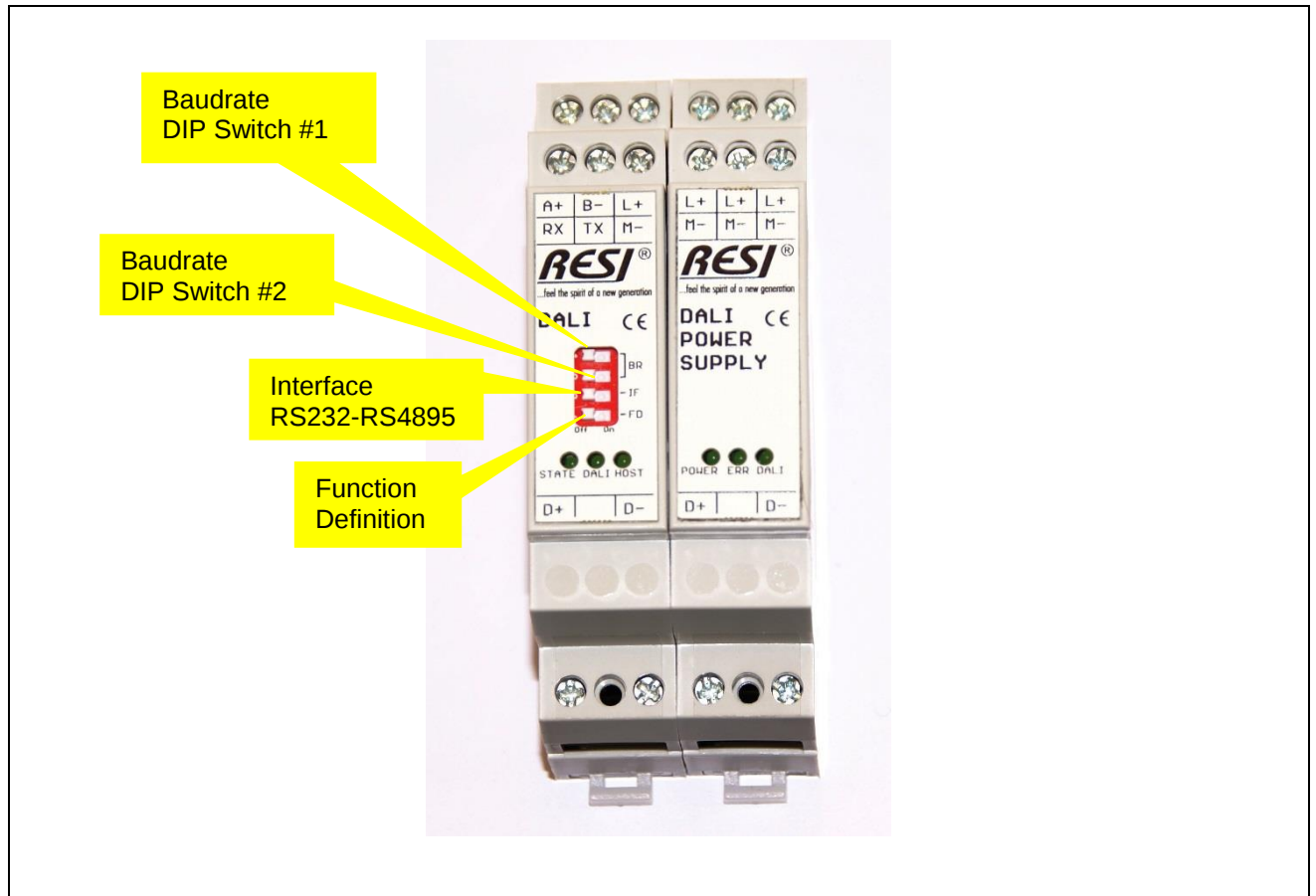


Illustration: Description of the DIP switch settings and LED status displays

DIP Switch	Description
Baudrate BR	Use DIP Switches 1+2 to select baudrate: OFF OFF: 9600Bd ON OFF: 19200Bd OFF ON: 38400Bd ON ON: 57600Bd HINT: The correct parity (NONE, EVEN or ODD) is configured with the PC software, not via DIP switches!
Interface IF	Select serial interface for MODBUS/RTU Slave OFF=RS232 ON=RS485
Function Definition FD	Selects special Functions OFF=Use Modbus RTU slave busaddress from FLASH memory ON=Use always Slave address 255
HINT	After changing the DIP switches the converter reboots immediately, so no power off or on is necessary. After reboot all the LEDs are on for half a second to signal the power on sequence.

Table: Description of DIP Switch functions

5.4 Wiring diagram

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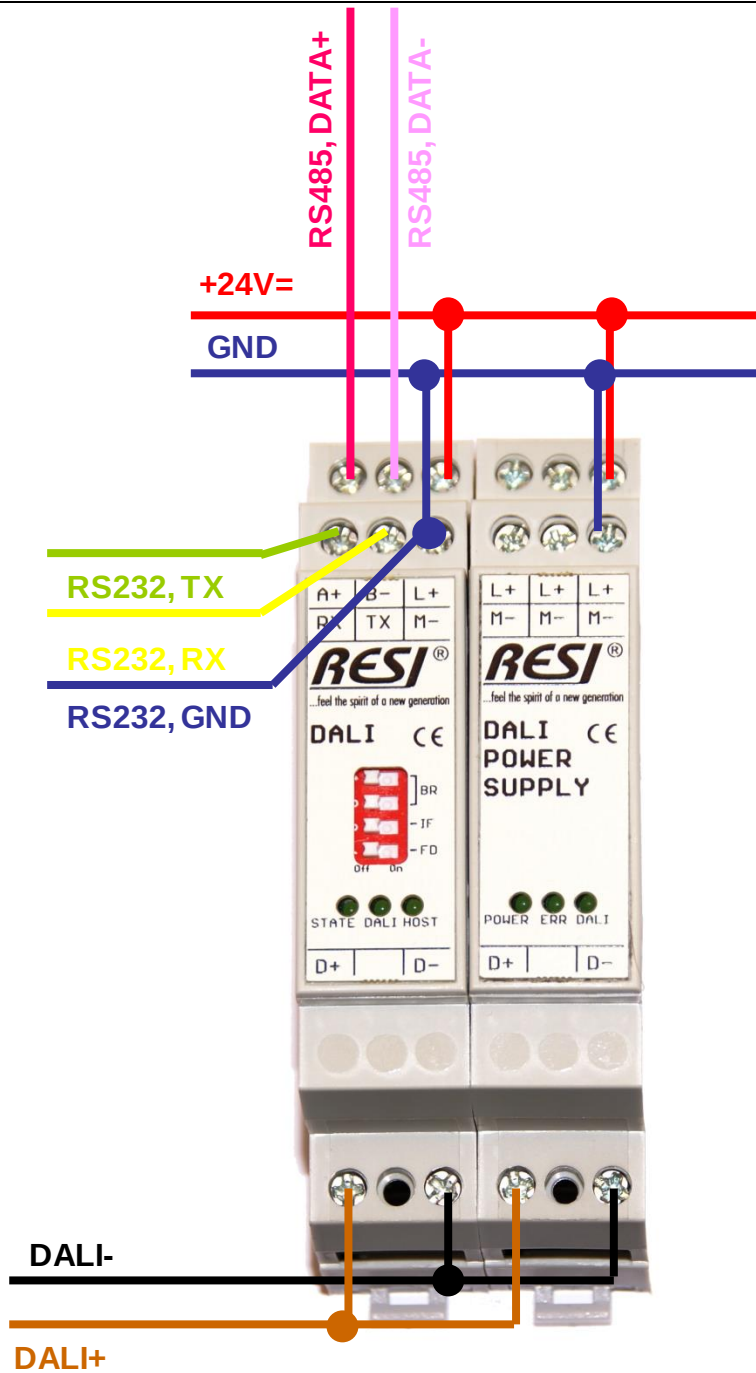


Illustration: Wiring diagram of the RESI-DALI-MODBUS converter and RESI-DALI-PS power supply

6 Function description

The RESI-DALI-MODBUS converter enables the connecting of up to 64 DALI/DSI lamps in a MODBUS based automated system. The RESI-DALI-PS supplies the DALI bus system with the necessary supply voltage and supply current.

Required is a lamp ballast (dimmer, EVG, etc.) compatible to the DALI standard.

To learn more about the detailed mode of function of the DALI bus please refer to the appropriate standards (see EN60929).

In the case of proper function the converter the status LED flashes once per second. In case of an error at the DALI bus side (e.g. lacking DALI power supply) the status LED flashes faster.

For communication via MODBUS the following MODBUS functions are available:

- READ HOLDING REGISTER (function code: 3)
- PRESET SINGLE REGISTER (function code: 6)
- PRESET MULTIPLE REGISTERS (function code: 16)

Note: The functions READ HOLDING REGISTER and PRESET MULTIPLE REGISTERS are limited to max. 50 register per query!

The functions of the converter can be divided into three different groups:

- ,conventional' MODBUS DALI/DSI control
- DALI start up
- DALI configuration

The process of starting up and configuring a DALI system is described in detail in the DALI-MODBUS addressing tool user manual.

The process of starting up and configuring a DALI system is described in detail in the online manual of our configuration software. Or consult our online WIKI information system under http://www.resi.cc/resiwiki/index.php/Main_Page

7 MODBUS – register description:

7.1 Overview

Register Group	Function
4x00500	DALI commands
4x00599	
4x00600	inoperable
4x05999	
4x06000	converter internally
4x06009	
4x06010	inoperable
4x59999	
4x60000	converter internally
4x65536	

Note:

Register that are not described in detail below, but are not explicitly stated as inoperable in this table, are reserved for internal commands and updates as well as program extensions in the future and therefore must not be read or written.

All inoperable registers return the value 0 when access read.

Be aware that this manual indexes the MODBUS registers starting with 1 in accordance to the MODBUS standard.

<i>write only</i>	Holding register (4x 00501)	factory settings: -
-------------------	-------------------------------------	---------------------

bit	description
DSIVALUE	send value – DSI mode sends a value in DSI mode (8Bit – no addressing)

Although a mixed DSI and DALI light system might be controlled by one converter, we advice not to do so as the light may work unpredictable (feedbacks of DALI slaves are equal to DSI light values!)

7.2.4 DALI – brightness value for a group of lamps

write only holding register (4x00521) factory settings: -

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
GROUPADDRESS								VALUE							

bit	description
GROUPADDRESS	group address
VALUE	defines the group of lamps that should be controlled (0..15) value brightness value that should be send

Note:

According to the standard norm DALI lamps accept 254 (0xFEh) as upper threshold for the brightness value. Therefore the value 255 (0xFFh) will be ignored and designated as threshold error. For more detailed information please contact the manufacturer of the DALI unit or standard EN60929.

7.2.5 DALI – Commando for a group of lamps

(read /)write holding register (4x00522, 4x00523) factory settings: -

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
GROUPADDRESS								COMMAND / READVALUE							

bit	description
GROUPADDRESS	group address
COMMAND	Nummer der Leuchte die angesteuert werden soll (0..63) command
READVALUE	defines which command should be sent feedback signal If a command returns a value it can be read here when reading authorisation is given. As long as no feedback signal is received 0x8000h is returned.

Note:

Writing into register 4x00522 sends the command only once (appropriate for standard commands). If a command must be send multiple times (special configuration commands) register 4x00523 should be chosen. Please act with caution when using configuration commands.
To verify if a command has returned a value or not use bit 0-2 in the status register.

7.2.6 DALI – brightness value for all lamps

write Only

holding register (4x**00531**)

factory settings: -

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				-											
								VALUE							

bit	description
VALUE	brightness value defines which brightness value should be send

Note:

According to the standard norm DALI lamps accept 254 (0xFEh) as upper threshold for the brightness value. Therefore the value 255 (0xFFh) will be ignored and designated as threshold error. For more detailed information please contact the manufacturer of the DALI unit or standard EN60929.

7.2.7 DALI – Command for all lamps

(read /)write

holding register (4x**00532**, 4x**00533**)

factory settings: -

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				-											
								COMMAND / READVALUE							

bit	description
-	
COMMAND	command defines which command should be send
READVALUE	feedback signal If a command returns a value it can be read here when reading authorisation is given. As long as no feedback signal is received 0x8000h is returned.

Note:

Writing into register 4x00532 sends the command only once (appropriate for standard commands). If a command must be send multiple times (special configuration commands) register 4x00533 should be chosen. Please act with caution when using configuration commands.
To verify if a command has returned a value or not use bit 0-2 in the status register.

Von
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Status register

The status register indicates the status of the DALI bus.
Under normal conditions this MODBUS register is not used.

read only

holding register (4x00551)

factory settings: -

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
CONVSTAT															

bit	description
CONVSTAT	converter status indication indicates the current status of the DALI/DSI communication

bit	name	bit=0	bit=1
0-2	RXState	number of received bytes	0 as value indicates that no value is received. Under normal DALI conditions a value of 1 indicates a feedback signal from the slave.
3	-	reserved	reserved
4	RXBusy	RX inactive	RX active
5	RXError	no receiving error	receiving error
6	TXBusy	TX inactive	TX active
7	TXError	no sending error	sending error
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-

Note:

The status register is only relevant for the bits 0..2 under normal MODBUS conditions.

7.2.9 Converter reset

WRITE only

holding register (4x06001)

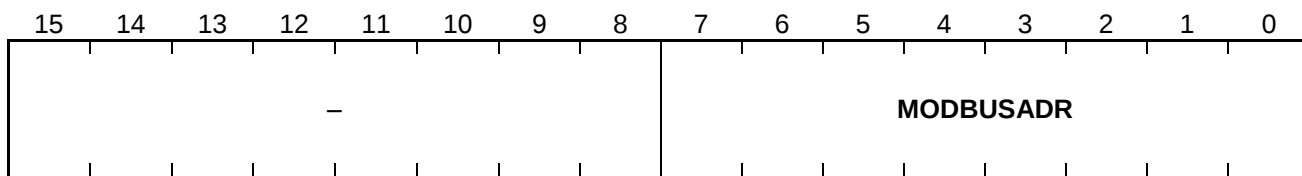
factory settings: 0

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RESET															

bit	description
RESET	reset converter If RESET=1 the converter is restarted and a new configuration is contingently loaded.

READ / WRITE

factory settings: 255



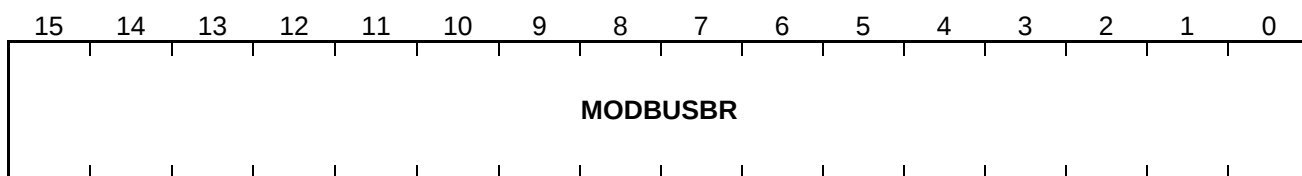
bit	description
MODBUSADR	Modbus address defines the MODBUS address of the converter. Range: 0 to 255

Note:

To overwrite the old values the converter must be restarted.

READ / WRITE

factory settings: 1



bit	description
MODBUSBR	Modbus Baudrate – defines the Modbus baud rate of the converter. 0: 9600 bps 1: 19200 bps 2: 38400 bps 3: 57600 bps

Note:

If the set value is greater than 3, the standard baud rate of 19200 bps is used!

To overwrite the old values it is necessary to save the new configuration and to restart the converter.

8 Specifications

8.1 Dimensions

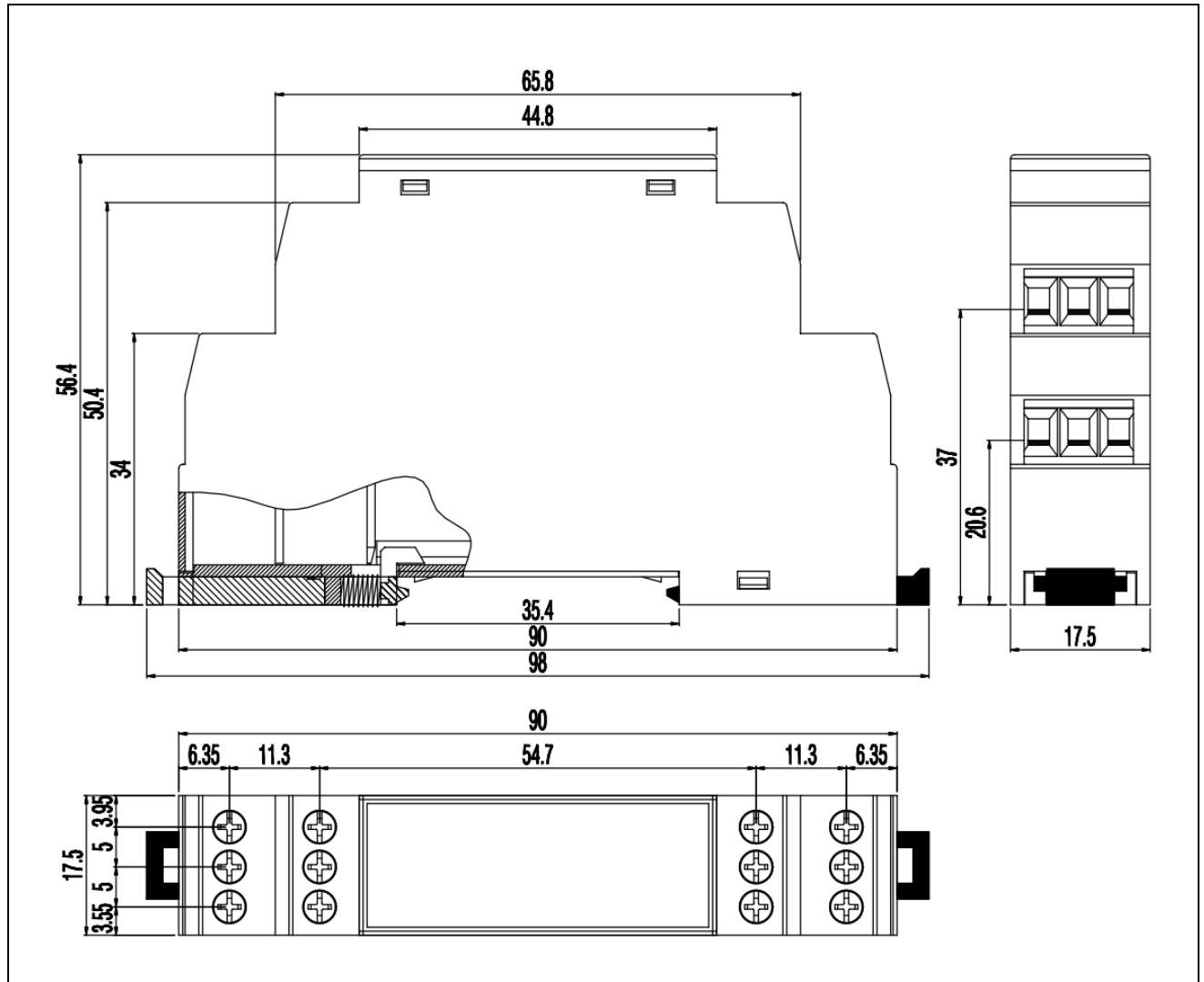


Illustration: dimension illustration in mm

Dimensions	
Enclosure dimensions L x W x H (mm)	17,5 x 90 x 58
Weight	60 g
Colour	Grey RAL7035
Material	PA - UL 94 V0
Protection class	IP20 based on DIN 40050/EN 60529

Table: Data of enclosure

9 Important DALI commands

Command	Function
0 (0x00h) OFF	switch off lamp
1 (0x01h) UP	dim lamp up for 200ms If the lamp was switched off it stays switched off.
2 (0x02h) DOWN	dim lamp down for 200ms As soon as the lower brightness threshold level is reached the lamp stays at this value.
3 (0x03h) STEP UP	Lamp switches one step brighter. If the lamp was switched off it stays switched off.
4 (0x04h) STEP DOWN	Lamp switches one step darker. As soon as the lower brightness threshold level is reached the lamp stays at this value.
5 (0x05h) RECALL MAX LEVEL	Set lamp to maximal threshold level.
6 (0x06h) RECALL MIN LEVEL	Set lamp to minimal threshold level.
7 (0x07h) STEP DOWN AND OFF	Lamp switches one step darker. If the lower brightness threshold level is reached the lamp switches off.
8 (0x08h) ON AND STEP UP	Lamp switches one step brighter. If the lamp was switched off it is now switched on.
16 – 31 (0x10h – 0x1Fh) GOTO SCENE	Load scene 0..15
32 (0x20h) RESET	Reset the load
33 (0x21h) STORE ACTUAL LEVEL IN THE DTR	Stores the actual brightness level in the register DTR
42 (0x2Ah) STORE DTR AS MAX LEVEL	Stores the actual register value DTR as maximum level for lamp
43 (0x2Bh) STORE DTR AS MIN LEVEL	Stores the actual register value DTR as minimum level for lamp
44 (0x2Ch) STORE DTR AS SYSTEM FAILURE LEVEL	Stores the actual register value DTR as system failure level for lamp
45 (0x2Dh) STORE DTR AS POWER ON LEVEL	Stores the actual register value DTR as power on level for lamp

46 (0x2Eh) STORE DTR AS FADE TIME	Stores the actual register value DTR as fade time for lamp
47 (0x2Fh) STORE DTR AS FADE RATE	Stores the actual register value DTR as fade rate for lamp
64-79 (0x40h-0x4F) STORE DTR AS SCENE	Stores the actual register value DTR as scene value for scene 0..15
80-95 (0x50h-0x5F) REMOVE FROM SCENE	Removes the actual brightness from scene 0..15
128 (0x80h) STORE DTR AS SHORT ADDRESS	Stores the actual register value DTR as new short address
144 (0x90h)	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

Note:

For further command please refer to standard EN60929.