



Functions of the converter box

The converter box is used to adapt physically two interfaces and to separate them galvanically.

It is configured as follows:

Two interface slots can be used to plug in the following modules as required:

- M-Bus-interface: (passive or active) for connection to the M-Bus cable. The length of the cable can go up to 10km, depending on the cable and the number of devices connected to it. For small M-Bus systems the converter-box can also be used as mini-master (M-Bus-Repeater) if not more than 10 devices are connected.
- RS232-interface to connect a modem or a PC. The length of the cable must not exceed 15m.
- RS485-interface (2 or 4 wires) for connection to a PC. The length of the cable must not exceed 1,2km and the maximum number of devices is limited to 32 within the bus segment.
- 20mA/CS-current loop (passive or active): for connection to a PC. The length of the cable must not exceed 1km. Up to 3 devices can be connected to the bus segment.
- Fiber-optic cable (820nm) with ST or SMA-connector.
- RS232-interface for Elster EK88 / EK260 / DL240

The following conversions are available:

from \ to	RS232	20mA (passive)	20mA (active)	M-Bus (passive) ³⁾	M-Bus (active) ⁴⁾	RS485	Fiber-optic
RS232	✓	✓	✓	✓	✓	✓ ¹⁾	✓
20mA (passive)	✓	✓	✓	✓	✓	✓ ²⁾	✓
20mA (active)	✓	✓	✓	✓	✓	✓ ²⁾	✓
M-Bus (passive) ³⁾	✓	✓	✓	–	✓	✓ ²⁾	✓
M-Bus (active) ⁴⁾	✓	✓	✓	✓	–	✓ ²⁾	✓
RS485	✓ ¹⁾	✓ ²⁾	✓ ²⁾	✓ ²⁾	✓ ²⁾	✓ ²⁾	✓ ²⁾
Fiber-optic	✓	✓	✓	✓	✓	✓ ²⁾	–

1) The interfaces for RS485 (2 wires) are halfduplex-interfaces which need a control signal to switch between „receive“ and „transmit“. The RTS-signal of the RS232-interface is used for this purpose. If there is no RTS-signal available, the change between reception and transmission is initiated by a timer. The time constant is adapted to the needed baud rate.

2) With no control signal available for the RS485-Module to switch from reception to transmission, a timer is used with a delay (ca. 36ms for 300 baud).

3) Put the M-Bus (passive) module in the left slot (interface 1) only!

4) Put the M-Bus (active) module in the right slot (interface 2) only!

Housing

The housing can be wall mounted; it has a terminal compartment made out of plastic and is built according IP52.

Segment format for M-Bus

The number of devices which can be connected to the repeater and the structure of the segments is defined by the type of cable or wiring and the baud rate.

Indication elements

Six LEDs indicate the status of the interface modules:

- 2 green LEDs indicate the available power supply of 5V for each interface.
- 2 yellow LEDs for transmission (TxD, RxD) and 2 yellow LEDs for control signals (RTS, CTS). They indicate the signals of the relevant interface. Using the converter box as mini-master only the data indicator LEDs TxD and RxD are valid. The yellow LED (RxD) of interface 2 indicates a data request by a PC for devices connected to the M-Bus. The yellow LED (TxD) of interface 1 indicates data from the device to the PC.
- There is an additional red LED on the module of the M-Bus Mini-Repeater (active). During power up it is switched on for a short time, afterwards it is only glowing with low volume under standard conditions. If the current of the M-Bus exceeds the limit of 30 mA, the LED is glowing brightly. If the currents exceeds 100mA, the voltage of the M-Bus is cut-off and the red LED remains switched on. Then the Mini-Repeater tries periodically to switch on the voltage again, but this is only successful, if the current demand is lower than the current limit.

Power supply

- The converter box has got an own power supply (230VAC or 115VAC) with a fuse. Optionally is a version for 24VDC available.
- M-Bus: The Mini-Repeater is used in small M-Bus-Segments to improve the signal quality or is used as Master. Up to 10 devices/terminals can be powered with an individual current demand of up to 1.5mA. The two interface- slots of the converter box are equipped with a selectable interface module and a repeater module with integrated M-Bus interface.

Data transfer for M-Bus

The activation of the data transfer of all M-Bus repeaters is initiated by changes in voltage or current.

Two directions are possible:

From the repeater to the devices by voltage decrease (ca. 12V).

From the devices to the repeater by request of a higher current (11mA to 20mA).

This type of data transfer enables a secure data exchange also in an environment with many disturbances.

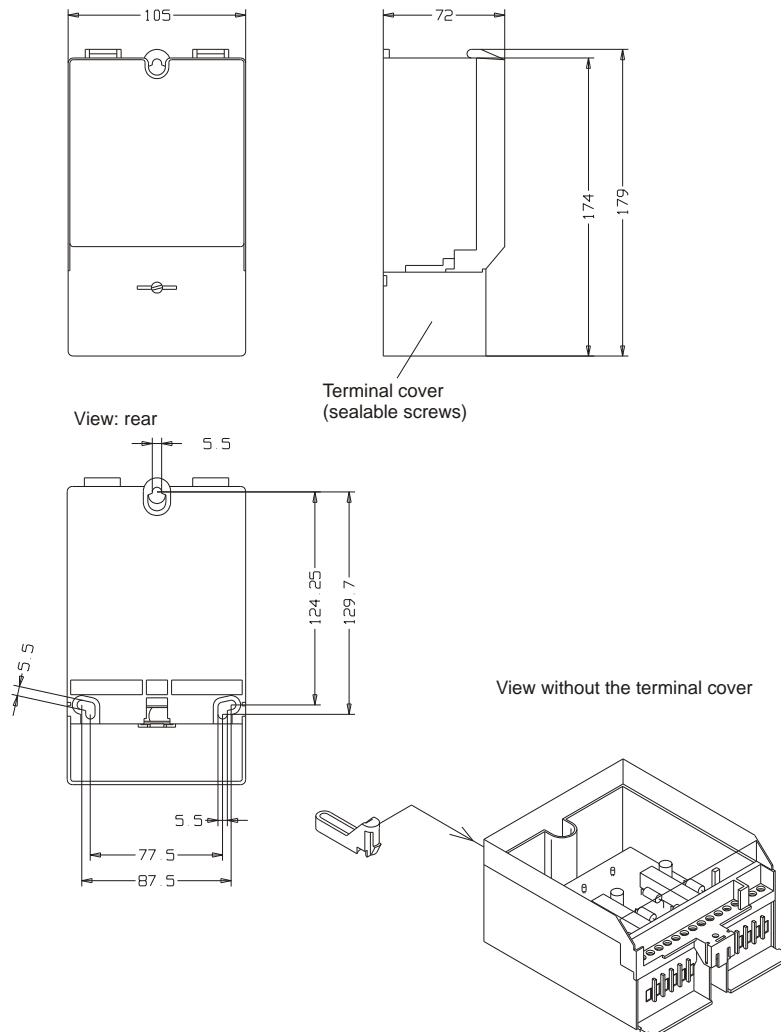
Hardware handshake

For hardware handshake set the RTS and CTS jumper (needed for 2 wires connections).

Technical data:

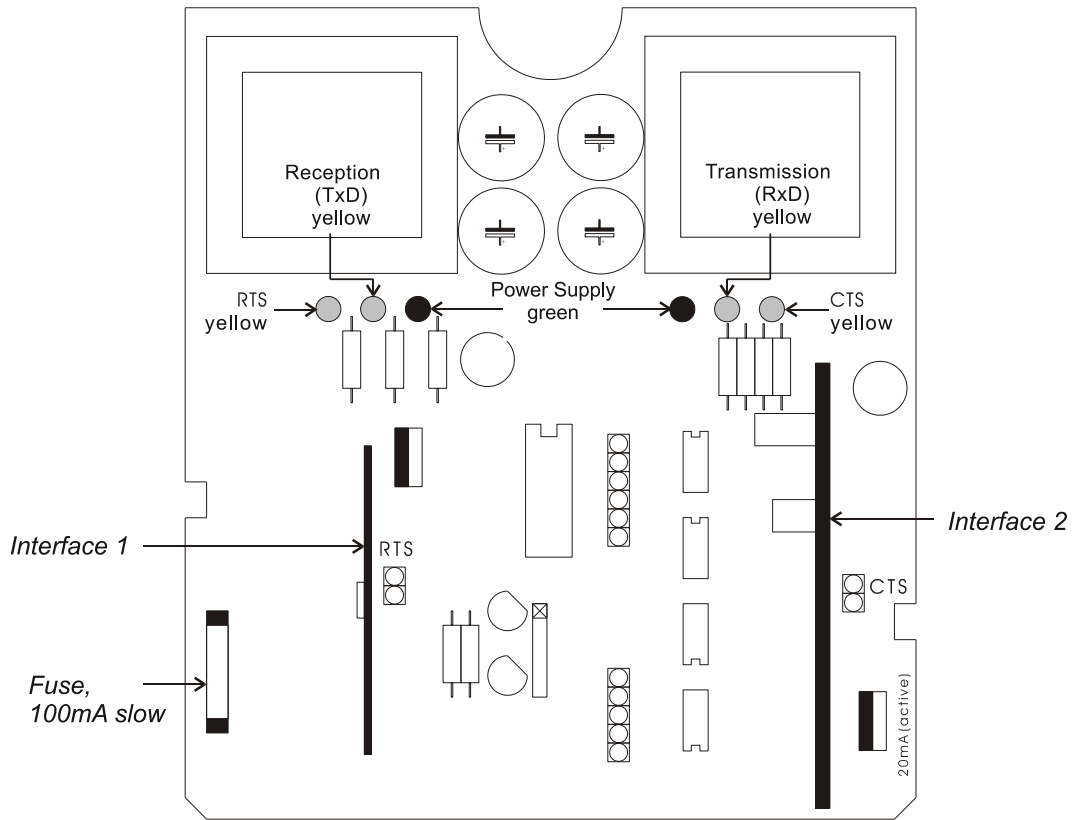
Housing:	Wall-mounted housing according to DIN 43861-2
Degree of protection:	IP52 (IEC)
Dimensions:	105mm × 179mm × 72mm (W×H×D)
Nominal voltage:	230VAC ±15%, 50/60Hz; optional 115VAC or 24VDC
Power consumption:	ca. 9VA
Fuse:	100mA, slow (for 230VAC) 160mA, slow (for 115VAC) or 500mA, slow (for 24VDC)
Display:	6 LED's
Interfaces:	RS232 20mA/CS active or passive M-Bus active (max. 10 devices à 1.5mA), right slot (interface 2) only M-Bus passive, left slot (interface 1) only RS485 (2 or 4 wires) Fiber-optic (820nm) with ST or SMA-connector
Baud rate:	300 to 9600 Baud
Data format:	7E1, 8N1, 8E1, ...
Transmission protocol:	All protocols are possible (transparent data transmission)
Temperature range:	-25°C to +60°C (operational) -40°C to +90°C (storage temperature)

Dimensions



Terminal assignment

The valid terminal connection is always displayed at the terminal block of the converter-box!



	Interface 1							Interface 2						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
RS232 - M-Bus (active)	○	○	●	○	○	○	○	○	●	○	○	-	+	○
	L1	N	RTS	TxD	RxD	CTS	GND					M-Bus (active)		
RS232 - RS232	○	○	●	○	○	○	○	○	●	○	○	○	○	○
	L1	N	RTS	TxD	RxD	CTS	GND			GND	CTS	RxD	TxD	RTS
RS485 - M-Bus (active)	○	○	●	○	○	○	○	○	●	○	○	○	+	○
	L1	N		A	B							M-Bus (active)		
M-Bus (passive) - M-Bus (active)	○	○	●	○	+	-	○	○	●	○	○	-	+	○
	L1	N		M-Bus (passive)								M-Bus (active)		
20mA (active) - M-Bus (active)	○	○	●	○	○	○	○	○	●	○	○	○	-	+
	L1	N		-	+							M-Bus (active)		
20mA (passive) - M-Bus (active)	○	○	●	○	○	○	○	○	●	○	○	○	-	+
	L1	N		+	-							M-Bus (active)		
M-Bus (passive) - RS232 (Elster EK88/260)	○	○	●	○	+	-	○	○	●	○	+9V	○	○	○
	L1	N		M-Bus (passive)						GND	CTS	RxD	TxD	RTS
RS232 - RS485-4	○	○	●	○	○	○	○	○	●	○	○	○	○	○
	L1	N	RTS	TxD	RxD	CTS	GND			GND	Y+	B-	A+	Z-