

- USB connection for meter reading through EQUOBOX TOOLKIT software (SIN.EQSW1)
- M-Bus interface for SIN.EQRTU1 datalogger
- M-Bus signal booster/repeater.
- Typical use with SIN.EQRTU4, SIN.EQRTU1T/X or SIN.EQRTUEVO1T datalogger
- Manages up to 60 M-Bus devices\*\*
- Communication speed from 300bps to 9600bps
- Power supply 24V\*
- Maximum power consumption 12W
- Mounting on DIN rail (4 modules)
- Short-circuit and surge protection



- \*\* Device means an M-Bus load unit (≤ 1.5 mA)
- A** Power input connector
- B** M-Bus Master connector
- C** M-Bus Slave connector
- D** Serial BUS connector for datalogger
- E** USB port for connection to the PC
- F** Leds for status indication

### 1. INSTALLATION AND POSITIONING

It is suggested not to place the device in adherence with others in order to avoid their overheating

### 2. CONNECTIONS

#### M-Bus Slave Input connector

- (1) - Pin 1 connection to M-Bus network (Repeater Mode)
- (2) - Pin 2 connection to M-Bus network (Repeater Mode)

#### M-Bus Master Output connector

- (6) - Pin 1 connection to M-Bus meters (Master Mode)
- (7) - Pin 2 connection to M-Bus meters (Master Mode)

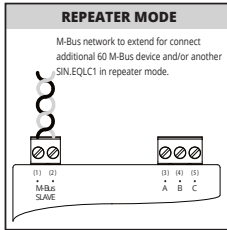
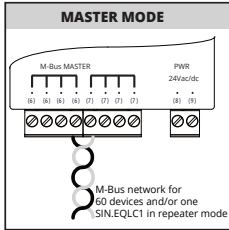
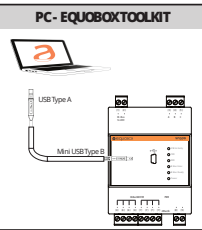
#### Connection to datalogger

- (3) - Pin A
- (4) - Pin B
- (5) - Pin C

#### Power supply\*

- (8) - Input 1 for power supply\*
- (9) - Input 2 for power supply \*

**\*Observe the following voltage supply values:**  
 - 24Vdc +/- 10% for HW1.0 versions or if not specified on the label of the device  
 - 24Vdc +/- 10%, 24Vac (min 20Vac, max 40Vac) 50/60 Hz for HW 2.0 versions  
**\*It is suggested to prefer continuous power supply (dc) in order to limit thermal dissipation and consumption**



### 3. FUNCTIONALITY

SIN.EQLC1 is a device that allows reading of devices using the M-Bus (Meter Bus) communication standard as required by EN 13757-2 (physical Layer). At every SIN.EQLC1 level converter is possible to connect up to 60 M-Bus devices to terminal "B".

There are two possible different uses of the device:

- In "MASTER" mode: the device allows the application EQUOBOX TOOLKIT (SIN.EQSW1) software to be able to communicate with devices that will be connected to M-Bus Master port [max 60 devices]. For the software to read the of M-Bus devices connected, the PC on which the EQUOBOX TOOLKIT is installed must be connected via a USB cable supplied with the software. During software communication with the devices, the level converter temporarily disables the communication of any datalogger connected to terminal "D". The device also allows to the EQUOBOX datalogger family (SIN.EQRTU1) to communicate with M-Bus devices connected to the M-Bus Master port [max 60 devices]. The datalogger must be connected to the "D" connector through its bus (refer to the SIN.EQRTU1 datalogger user guide for connection information).
- In "REPEATER/SLAVE" mode: the device works as an M-Bus amplifier/signal regenerator therefore allows extension of an existing M-Bus network in terms of distance and in terms of devices (additional 60). Typical use in combination with SIN.EQRTU4, SIN.EQRTU1T/X or SIN.EQRTUEVO1T datalogger.

### 4. STATUS LEDs DESCRIPTION

<input type="radio"/> USB Activity (orange)	- 2 blinks: device ready for connection to PC via USB; - 5 blinks: PC connection was successful (device recognised by the PC)
<input type="radio"/> TXD (green)	- Shows transmission of data on the M-Bus network connected to terminals (6) and (7); - ON: transmission in progress - OFF: no transmission in progress
<input type="radio"/> RXD (green)	- Shows reception of data on the M-Bus network connected to (6) and (7); - ON: reception in progress - OFF: no reception in progress
<input type="radio"/> M-Bus Error (red)	- Indicates the presence of a power surge on the bus that can prevent operation: - ON: Overload on the bus (Short-circuited or too many devices connected) - OFF: No overload error
<input type="radio"/> M-Bus Ready (green)	- Indicates that the voltage on the bus is correct and has no anomalies: - ON: voltage on bus is sufficient to allow the operation - OFF: voltage on bus is not sufficient to allow the operation
<input type="radio"/> Power (green)	- Shows power supply status: - ON: power supply OK - OFF: power supply non OK

### 5. M-Bus NETWORK WIRING

Please, respect the following guide-lines for the length of a M-Bus cable and the number of slaves, in compliance with EN13757-2 Annex E.

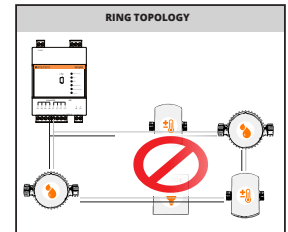
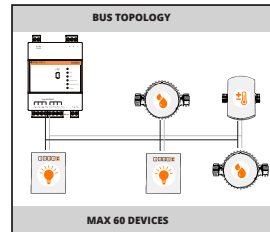
- Shielded telephone cable 0,5mm2

TYPE	Plant	max distance between master and slave	Total cable Length	Cable section	Number of slaves	Max baudrate
A	Small residential buildings	350m	1000m (<30 Ohm)	0.5 mm2 (0.8mm)	250	9600
					64	9600
B	Large residential buildings	350m	4000m (<30 Ohm)	0.5 mm2 (0.8mm)	250	2400
					64	9600
C	Small district	1000m	1000m (<90 Ohm)	0.5 mm2 (0.8mm)	64	2400

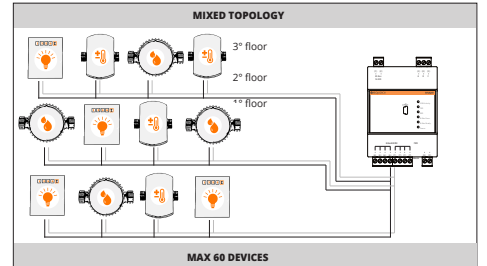
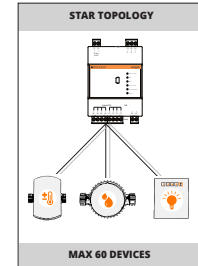
For a good communication, at the point farthest from SIN.EQLC1, check that the voltage on the bus is always greater or equal than 30V.

### 6. CONNECTION OF SIN.EQLC1 TO M-Bus NETWORK IN MASTER MODE

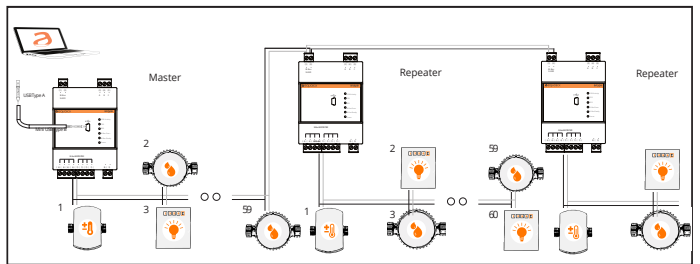
In an M-Bus network, the connections are independent of the polarity and the allowed network topologies are "bus", "star" and "mixed". Avoid the "ring" topology.



The ring connection of the devices is **NOT ALLOWED** while the star or mixed topology are preferable as they allow to isolate some pathways in the event of maintenance. The connection of devices to the network is independent of the polarity of the two conductors.



### 7. CONNECTION OF SIN.EQLC1 IN REPEATER MODE ON EXISTING M-Bus NETWORK



### TROUBLESHOOTING

- 1) The device does not turn on (Power Led off)**
  - Check with multimeter that the supply voltage to the terminals (8) and (9) is between the correct range.
- 2) Led M-Bus Error on:**
  - On the bus there is an overload caused by a possible short-circuits between the two poles of the bus or from an excessive number of connected devices. Check the wiring.
- 3) Led M-Bus ready off:**
  - Check that the voltage at the terminals (6) and (7) is between 30Vdc and 42Vdc. If the voltage is lower verify that there are no short-circuits on the bus.
- 4) The datalogger connected to the terminal does not detect some or all devices:**
  - Check the correct bus connection between the datalogger and terminal D of the SIN.EQLC1
  - Check that the bus is not used by the software connected to the USB port
  - Check with the multimeter that the voltage on devices not recognized is between 30Vdc-42Vdc
  - Verify that the communication settings of the M-Bus datalogger or the SW are compatible with the devices (speed of communication, addressing)
- 5) The devices connected to the levelconverter in repeater mode do not communicate:**
  - Verify that the M-Bus network is connected to terminal C of SIN.EQLC1 and that the USB cable is not connected
  - Verify the correct power of the repeater
  - Verify the M-Bus led error is off