

### M-bus Level Converter/Repeater 250

WTX631-GA0090



**The level converter/repeater WTX631-GA0090 is the interface between M-bus device and a read system. It consists of a level converter and the associated power supply.**

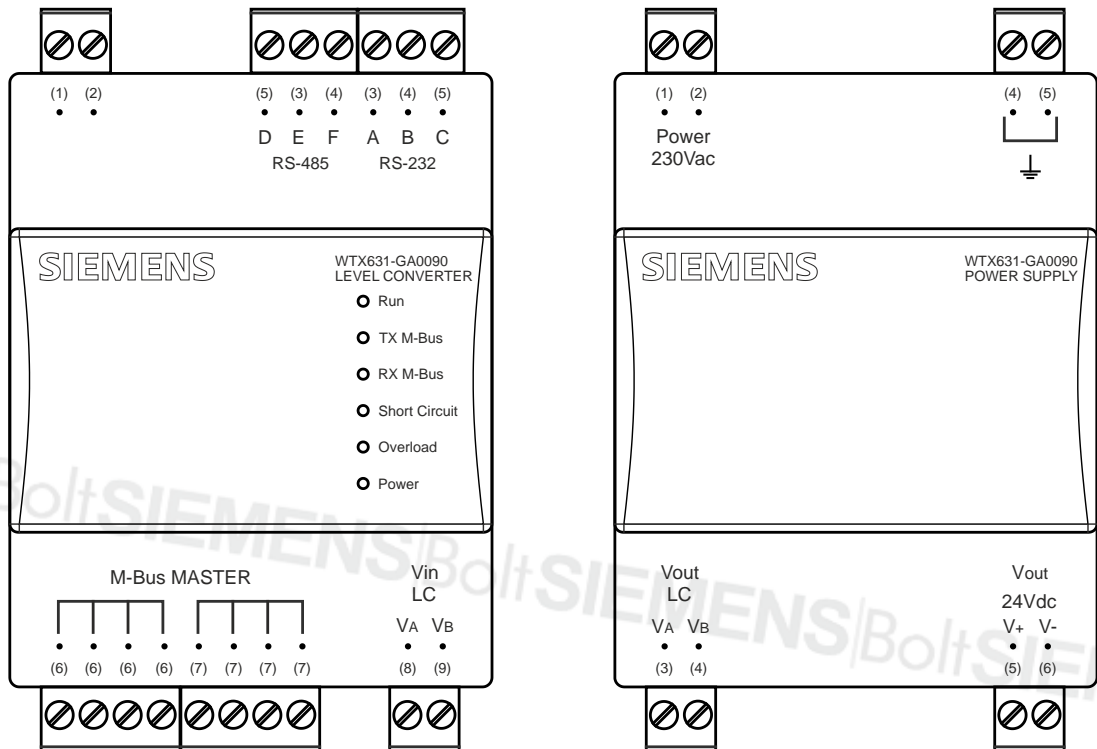
- The level converter and associated power supply form a unit: No addition transformer or auxiliary power required
- Connect up to 250 M-bus devices (max. 250 simply M-bus loads)
- Can be used with the M-bus web server WTV676..., PXC devices, other M-bus read / configuration systems
- Up to 6 level converters connected in parallel on one M-bus network
- Up to 6 level converters (max. 5 level converters as repeater, serial) connected on one M-bus network
- Local data reading of M-bus devices via RS-232 or RS-485 interface
- Remote reading of M-bus devices via M-bus web server WTV676.. (Cloud)

The level converter is the communications interface to read up to 250 M-bus devices (simple M-bus loads).

The data is read via a M-bus web server WTV676, a PXC device, or via other M-bus read/configuration systems.

Multiple level converters can be connected in parallel on one M-bus network. When connected to a M-bus web server, up to six level converters can be connected in parallel. Up to six level converters/repeaters can be serially connected (max. five level converters as repeater).

The power supply can be used to power the M-bus web server (output "Vout 24Vdc").



The level converter/repeater can be connected and used as follows:

- As M-bus slave (repeater) on a M-bus web server WTV676.. .
- As M-bus level converter via interfaces RS-232 or RS-485 to a PXC device or a laptop. Up to 250 M-bus devices can be connected to the M-bus master (250 simple M-bus loads).

The input for the M-bus slave and the RS-232 interface are galvanically isolated.

Interface RS-485 and the output for the M-bus master are not galvanically isolated.

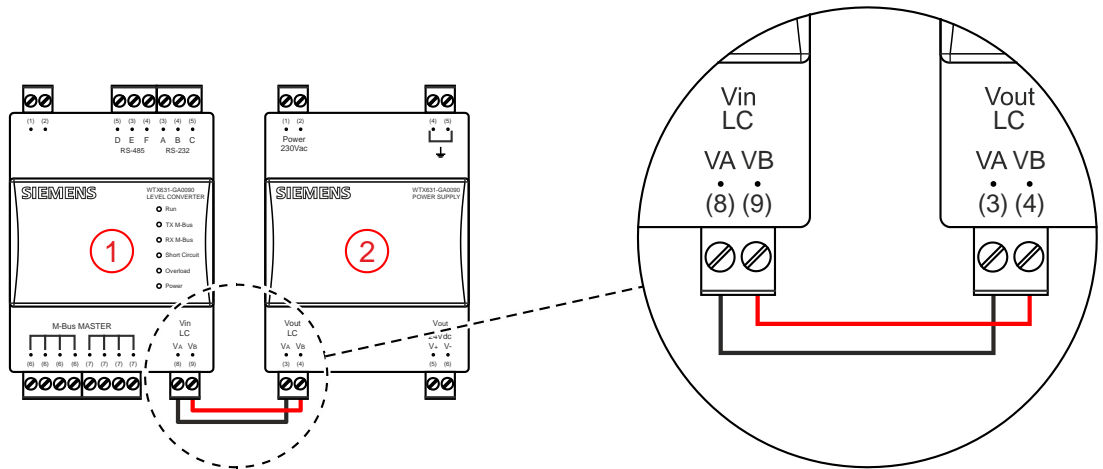
The output on the M-bus master is protected against short circuits.

You can use the level converter at your own risk as an interface as well to suitable software and devices by third-party manufacturers.

Operating modes

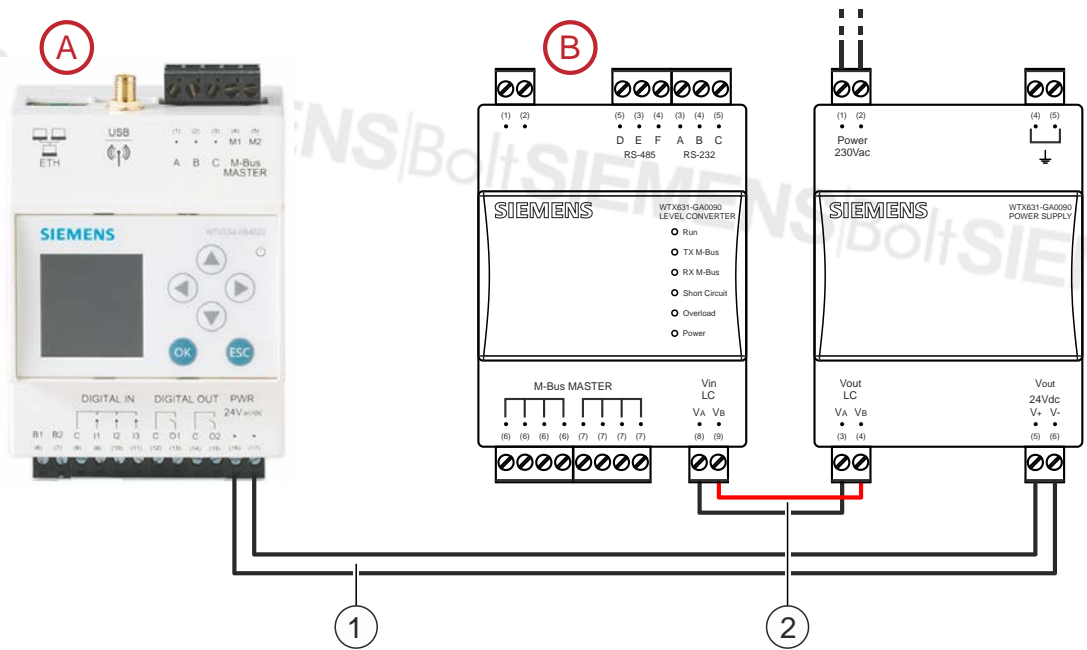
The power supply can be employed as follows:

- To power the level converter



1 Level converter/repeater    2 Power supply

- To power the M-bus web server WTV676.. (DC 24 V).



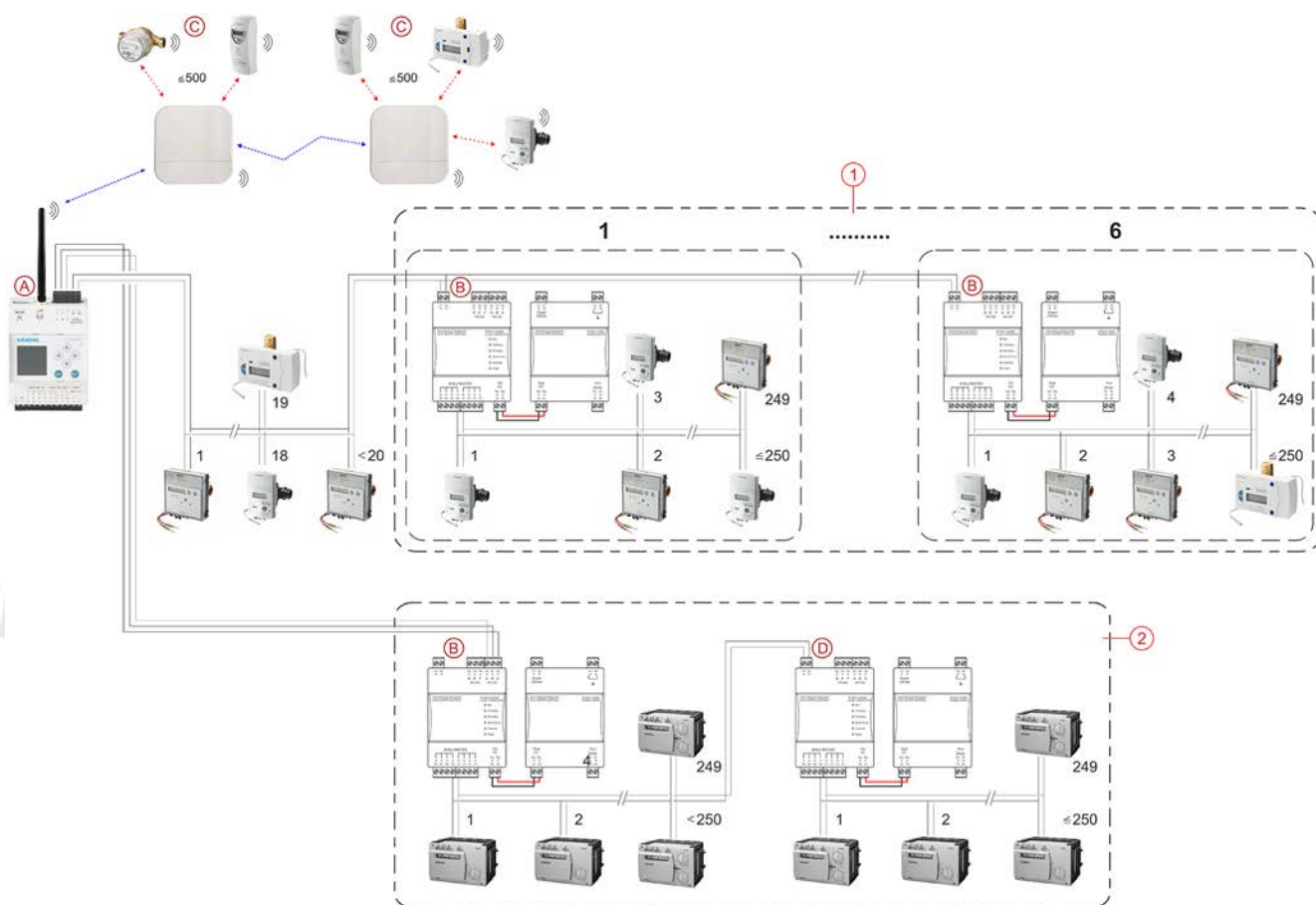
A Web server WTV676..    1 Connection web server WTV676.. with power supply WTX631  
 B Level converter/repeater WTX631    2 Connection level converter/repeater with power supply

The level converter can be used in various ways.

### Level converter as slave, reading over the M-bus web server

The level converter is connected as a slave to a M-bus web server WTV676.. to extend the M-bus network. Up to six level converters can be connected in parallel. A max. of six level converters (max. five repeaters) can be connected serially to overcome large distances. The data is read via the M-bus web server.

A maximum of 250 M-bus devices can be read via M-bus web server.

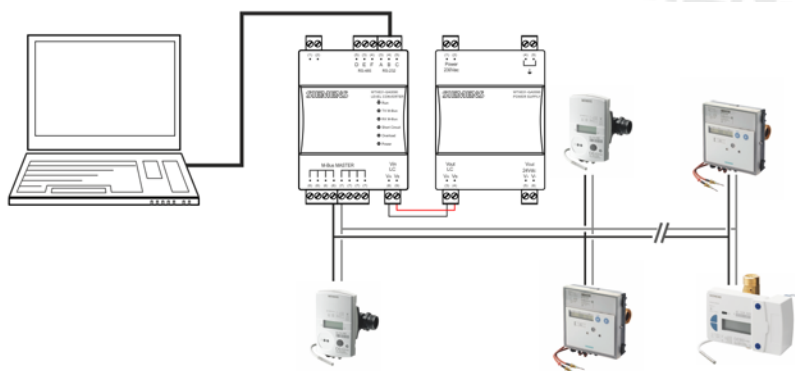


- |   |                                    |   |   |
|---|------------------------------------|---|---|
| A | M-bus web server<br>(M-bus master) | 1 | M-bus slave, connected in parallel<br>(max. 6 level converters)   |
| B | Level converter                    | 2 | RS-232, serially connected (1 level converter and 5<br>repeaters) |
| C | M-bus wireless devices             |   |   |
| D | Level converter as repeater        |   |   |

Additional information on web server WTV676.. is available in the user guide "M-bus web server WTV676-HB6035, M-bus level converter WTX631-GA0090, M-bus level converter WTV531-GA5060, RF converter WTX660-E05060", document A6V11157985. See Section "Product documentation [→ 12]".

### Level converter as master for reading data over the RS-232 or RS-485 interface

The level converter can be connected as master via the RS-232 or RS-485 interface to a PXC device or a PC to read device data.

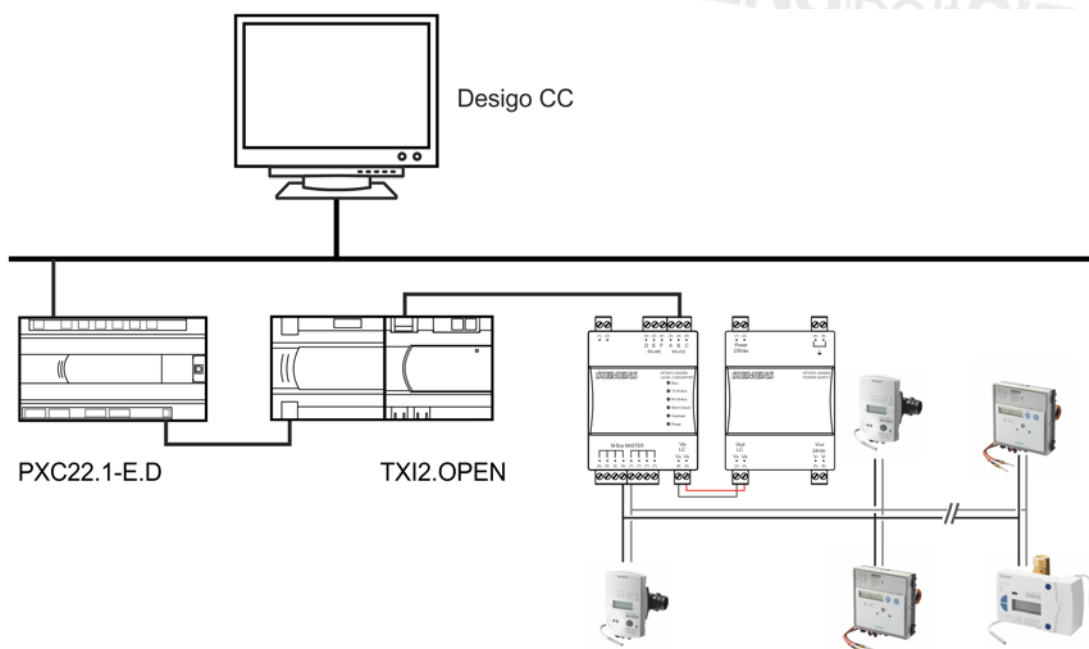


- A Level converter (RS232 or RS485 interface)
- B PC or M-bus devices

<b>!</b>	<b>NOTICE</b>
	The level converter WTX631-GA0090 does not have a mini USB interface to locally read the data. The device data cannot be read locally with the ACT531 software.

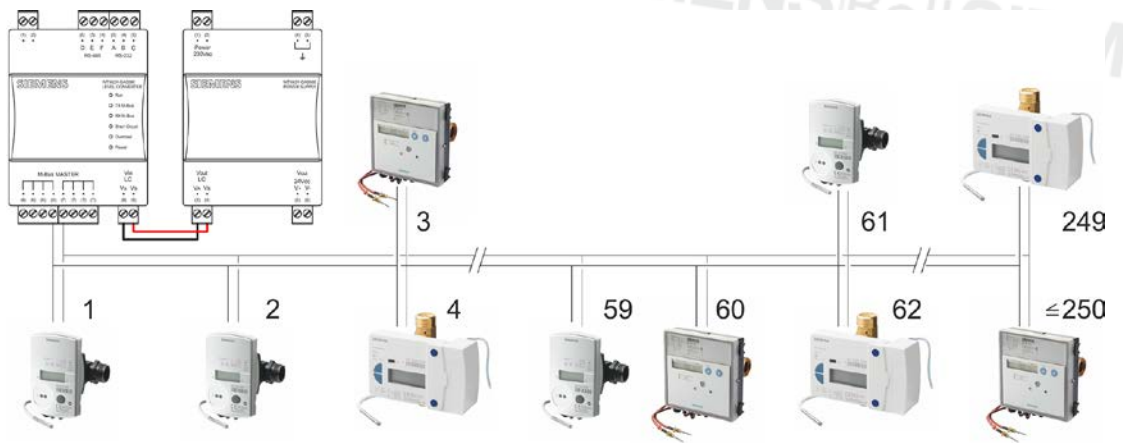
The TX Open module integrates M-bus devices via a RS-232 or RS-485 interface to the Desigo CC building management platform.

Additional information on the Desigo CC management platform is available in the engineering guide 'Desigo TM TX Open, TX M-bus', document CM110572. See Section "Product documentation [→ 12]".



### Level converter as standalone device with up to 250 connected M-bus devices

The level converter can be used as the master on one M-bus network with up to 250 M-bus devices.



## Displays

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The level converter has six LEDs on the front side for indicating the operating state.

- Run
- TX M-Bus
- RX M-Bus
- Short Circuit
- Overload
- Power

### Run...

The (green) LED indicates the operational state of the device.

- Blinking at 1 Hz (slow) -> Device functions are being set up. No communication.
- Blinking at 0 Hz (fast) -> Device update pending.
- On -> The device is operational.

### TX M-bus

The (green) LED indicates the transmission state on the M-bus network (terminals 9 and 10).

- On -> Data is transmitting.
- Off -> No data is transmitting.

### RX M-bus

The (orange) LED indicates the receive state of data on the M-bus network (terminals 6 and 7).

- On -> Data is being received.
- Off -> No data is being received.

### Short circuit

The (red) LED indicates a short circuit on the bus, very high traffic, or a collision.

### Overload

The (orange) LED indicates a bus overload that may prevent correct operation.

- On -> Bus overload that may prevent correct operation.
- Off -> No bus overload recognized.

### Power

The (green) LED indicates the state of the level converter power supply.

- On -> The device power supply is correct.
- Off -> Device power is not correct or unavailable.

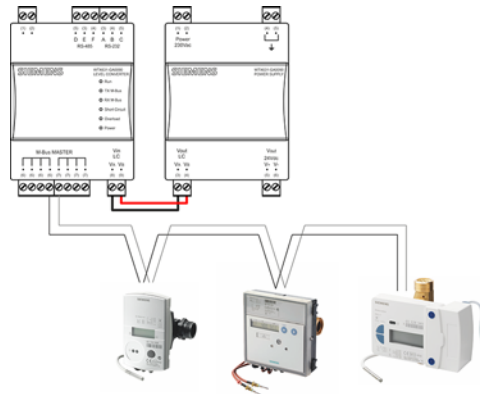
**Topology**

The M-bus permits various network topologies. The devices can be connected to the level converter in a line, bus, star, or tree topology, or a combination thereof.

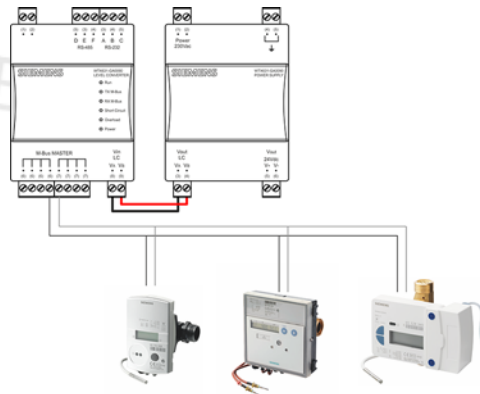
Ring topology is not permitted.

Bus cable polarity is not relevant, simplifying installation.

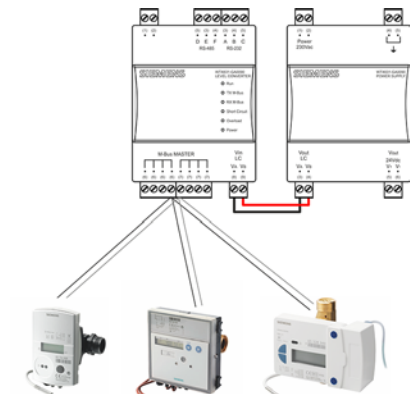
**Line topology**



**Bus topology**

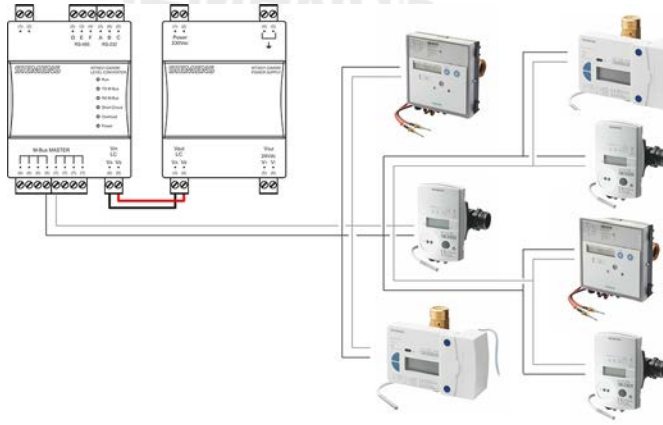


**Star topology**

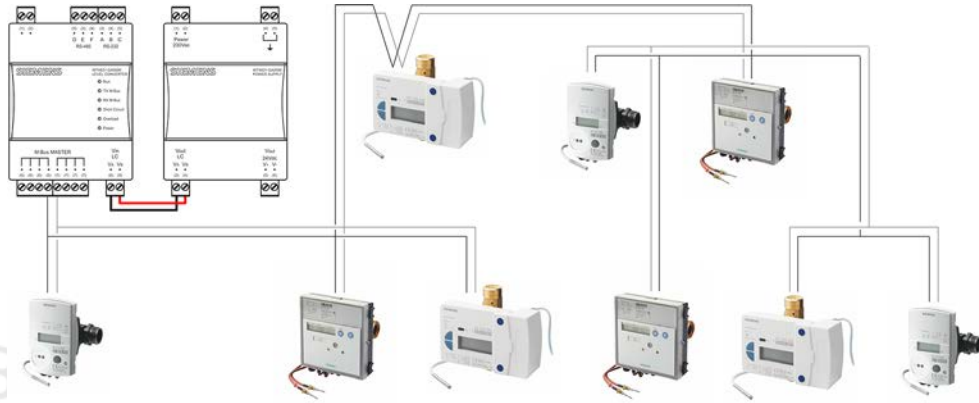




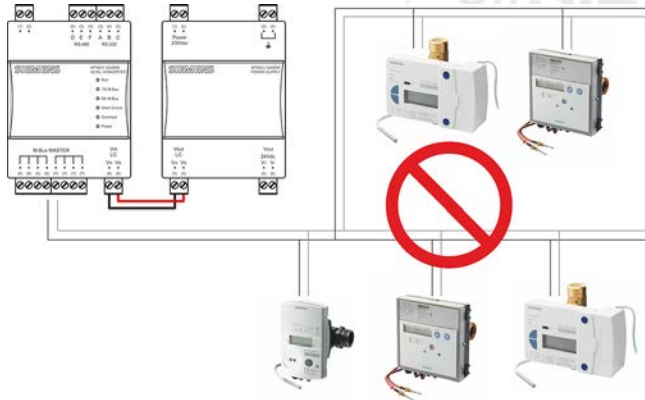
### Tree topology



### Combination of topologies



### Ring topology



**Address**

M-bus uses two types of addresses to recognize devices:

- Primary addressing: Up to 250 primary addresses can be assigned to a M-bus system. The primary address is normally assigned during device commissioning. Pure primary addressing is not possible if more than 250 devices are read on the M-bus network.
- Secondary addressing: Secondary addressing consists of 8 bytes and permits the assignment of any number. In the default setting, the secondary address for a device normally matches the serial number issued by the device manufacturer. The assignment prevents address conflicts on the bus.

**Bus expansion**

Plant type	Maximum distance	Total cable length	Cable cross section	Number of devices (slaves)	Max. transmission rate
Small residential buildings	350 m	1000 m	0.8 mm <sup>2</sup>	250	9600 baud
Large residential buildings	350 m	4000 m	0.8 mm <sup>2</sup>	250	2400 baud
				64	9600 baud
Small developments	1000 m	4000 m	0.8 mm <sup>2</sup>	64	2400 baud
Large developments	...3000 m*	5000 m	1.5 mm <sup>2</sup>	64	2400 baud
Direct vicinity	...5000 m*	7000 m	1.5 mm <sup>2</sup>	16	300 baud
Point-to-point connection	...10000 m*	10000 m	1.5 mm <sup>2</sup>	1	300 baud

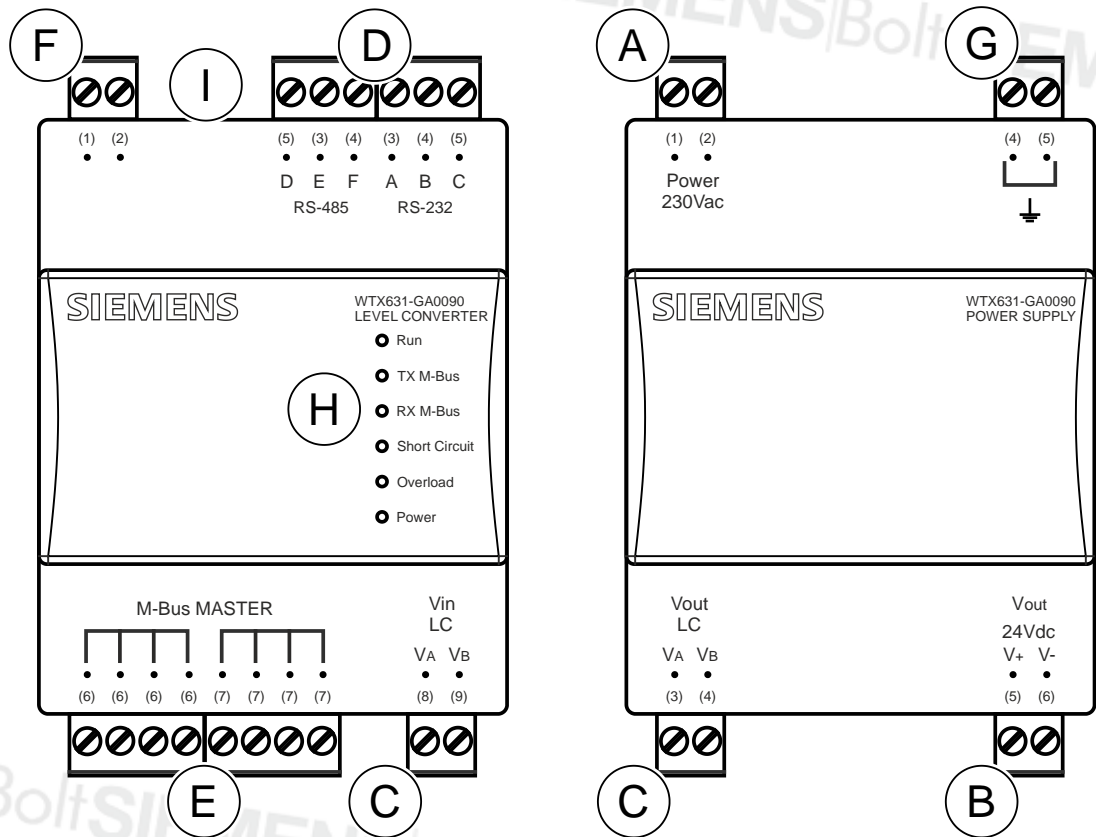
\*Shielded cabling required at a distance in excess of 1000 m (see EN13757-2 appendix E).

**Signal specification**

M-bus	Condition	Minimum	Typical	Maximum	Measuring unit
Number simple M-bus loads per segment	WTX631-GA0090	0	-	250	-
Transmission rate	$C_{\text{Segment}} \leq 382 \text{ nF}$	300	2400	9600	baud
Bus power (Master)	WTX631-GA0090	30	39	42	R
Bus current (master)	WTX631-GA0090	0	-	375	mA

## Connection terminals

The device as the following connection terminals / LEDs.



- A Mains voltage AC 230 V.
- B Output for web server WTV676 power supply (DC 24 V)
- C Connect the power supply (Vout LC) to the level converter (Vin LC) (do not use for other purposes)
- D Serial interface RS232 and RS485 to connect to a PC or M-bus master
- E M-bus master connections for M-bus devices or repeaters
- F M-bus slave connections to the M-bus web server WTV676.. or to the previous master level converter if the level converter is used as repeater.
- G Electrical grounding
- H Status-LEDs
- I Push button for firmware update

RS-232	RS-485
A = TX	D = REF
B = RX	E = D-
C = GND	F = D+

- E M-bus master connections for M-bus devices or repeaters

## Type summary

### Order information

Description	Order number	Type
Level converter to power a max. 250 simple M-bus loads	S55563-F159	WTX631-GA0090

### Product inserts

Mounting instructions for the level converter are included in the following languages: Bulgarian, German, English, Finnish, French, Greek, Italian, Croatian, Lithuanian, Dutch, Norwegian, Polish, Slovakian, Slovenian, Spanish, Czech, Turkish, and Hungarian.

### Equipment combinations

The following products are available for reading data:

Description	Order number	Type
M-bus web server for remote meter data reading	S55563-F150	WTV676-HB6035

### Product documentation


Topic	Title	Document ID
Device mounting, wiring, connecting peripheral devices	Mounting instructions, level converter WTX631-GA0090.	A6V11751461
Engineering, commissioning, operation, and troubleshooting	User guide M-bus web server WTV676-HB6035, M-bus level converter WTX631-GA0090, M-bus level converter WTV531-GA5060, RF converter WTX660-E05060	A6V11157985
Engineering instructions	Desigo TM TX Open, TX M-bus	CM110572

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:


<http://siemens.com/bt/download>

## Notes

### Safety

	<b>⚠ CAUTION</b>
	<b>National safety regulations</b> Failure to comply with national safety regulations may result in personal injury and property damage. <ul style="list-style-type: none"><li>• Observe national provisions and comply with the appropriate safety regulations.</li></ul>

### Disposal

	The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage. <ul style="list-style-type: none"><li>• Dispose of the device through channels provided for this purpose.</li><li>• Comply with all local and currently applicable laws and regulations.</li></ul>
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### Warranty service

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

## Technical data

Power supply		
Operating voltage	AC 110...240 V	
AC frequency	47...63 Hz	
Power consumption	6 W + 0.07 W for each connected M-bus device	
Maximum power consumption	45 W, 45 VA Vout: DC 24 V, max. 15 VA	
Power consumption level converter (in series)	≤3 mA (2 M-bus loads)	
Internal fuse	PTC resistance and varistor	
Fusing of supply lines	Circuit breaker	Max. 13 A, type B, C, D per EN 60898
	or Power supply with current limitation at 10 A	

Connections	
M-bus master (terminals 9 and 10 on the level converter)	Connections for M-bus devices and Connections for the following repeater
M-bus slave (terminals 1 and 2 on the level converter)	Galvanically isolated connections to the M-bus web server or to the previous master level converter if the level converter is used as repeater.
Vin LC / Vout LC (terminals 11 and 12 on the level converter) / (terminals 4 and 5 on the power supply)	Power supply for level converter/repeater
Vout 24 Vdc (terminals 6 and 7 on the power supply)	DC 24 V, max. 15 VA

Interface	
RS-232 interface (terminals A, B, and C level converter)	Galvanically isolated connections to connect to PC/data logger as master: <ul style="list-style-type: none"> <li>• Connect to a PC: <ul style="list-style-type: none"> <li>– Terminal A: TX (PC/data logger receiving line)</li> <li>– Terminal B: RX (PC/data logger transmission line)</li> <li>– Terminal C: GND (interface reference voltage)</li> </ul> </li> <li>• Connection to M-bus web server WTV676...: <ul style="list-style-type: none"> <li>– Terminal 3[A] RS-232 with terminal 1[A] web server</li> <li>– Terminal 4[B] RS-232 with terminal 2[B] web server</li> <li>– Terminal 5[C] RS-232 with terminal 3[C] web server</li> </ul> </li> </ul>
RS-485 interface (terminal D, E, and F on the level converter)	Non-isolated connection for connecting to a PC <ul style="list-style-type: none"> <li>• Connections to connect to PC/data logger as master: <ul style="list-style-type: none"> <li>– Terminal D: REF (interface reference voltage)</li> <li>– Terminal E: D+ (Receive/transmission line potential +)</li> <li>– Terminal F: D- (Receive/transmission line potential -)</li> </ul> </li> </ul>

M-bus master	
Reference standard	EN13757-2 (physical layer)
Baud rate	300 bps...9600 bps
Max. number of M-bus devices per level converter	250 (simple M-bus loads)
Max. number of M-bus devices per level converter	250 simple M-bus loads

<b>M-bus master</b>	
network	
Max. number of level converters in parallel per network	Up to 6 slave level converters
Max. number of serial level converters per network	6 level converters, of which 5 repeaters
Bus power	Minimum 30 V Maximum 42 V
Bus current	Maximum 90 mA
Protection against short circuits	Yes
Galvanic isolation	Interface RS-232. Connection to a PC and connection to a M-bus web server WTV676..

<b>Directives and standards</b>	
Product standards	EN 62368-1 Information Technology Equipment Safety
Electromagnetic compatibility	For residential and industrial environments
EU conformity (CE)	A5W00068854A *)

<b>Environmental compatibility</b>	
The product environmental declaration A5W00050130 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
*) The documents can be downloaded at <a href="http://siemens.com/bt/download">http://siemens.com/bt/download</a> .	

<b>Degree of protection</b>	
IP class	IP20 per EN60529
Protection class	II as per EN 62368-1

<b>Ambient conditions</b>	
<b>Operation</b>	as per EN 60721-3-3
Climatic conditions	Class 3K5
Temperature	-20...+55 °C
Air humidity	5...95 % r.h.
Mechanical conditions	Class 3M2
<b>Transportation</b>	as per EN 60721-3-2
Climatic conditions	Class 2K3
Temperature	-25...+65 °C
Air humidity	5...95 %
Mechanical conditions	Class 2M2
<b>Storage</b>	To EN 60721-3-1
Climatic conditions	Class 1K3
Temperature	-25...+65 °C
Air humidity	5...95 %
Mechanical conditions	Class 1M2

<b>Materials and colors</b>	
Housing	PC + ASA, RAL 9010 (white)

Dimensions	
Length x Width x Height	110 x 71 x 62 mm per device (including terminals)

Weight	
Level converter with mounting instructions	0.392 kg for both devices
Packaging	0.055 kg

Mounting	
Mounting type	On 35mm DIN rails (EN60715)

## Dimensions

