SIEMENS

Meters and Energy Cost Allocation

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)

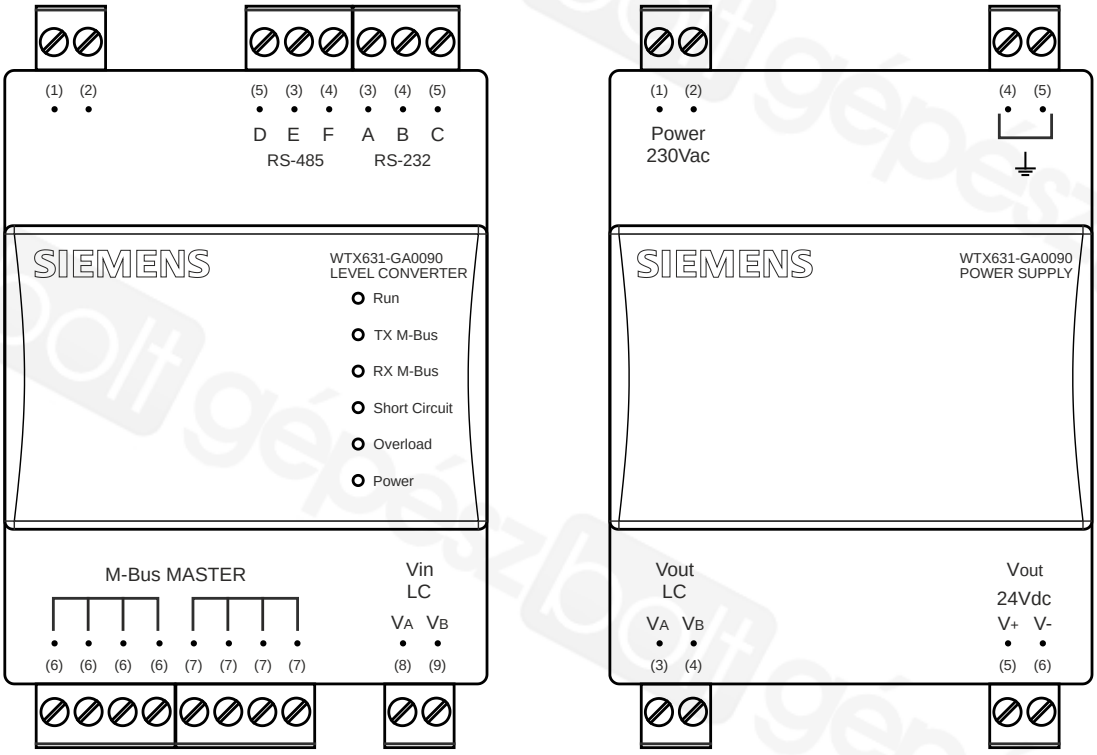
Use

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.

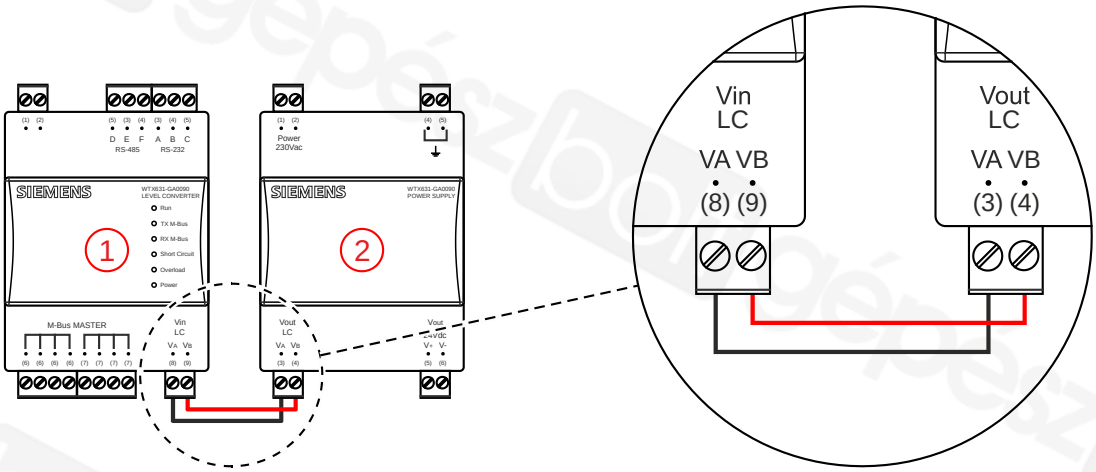
The output on the M-bus master is protected against short circuits.

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

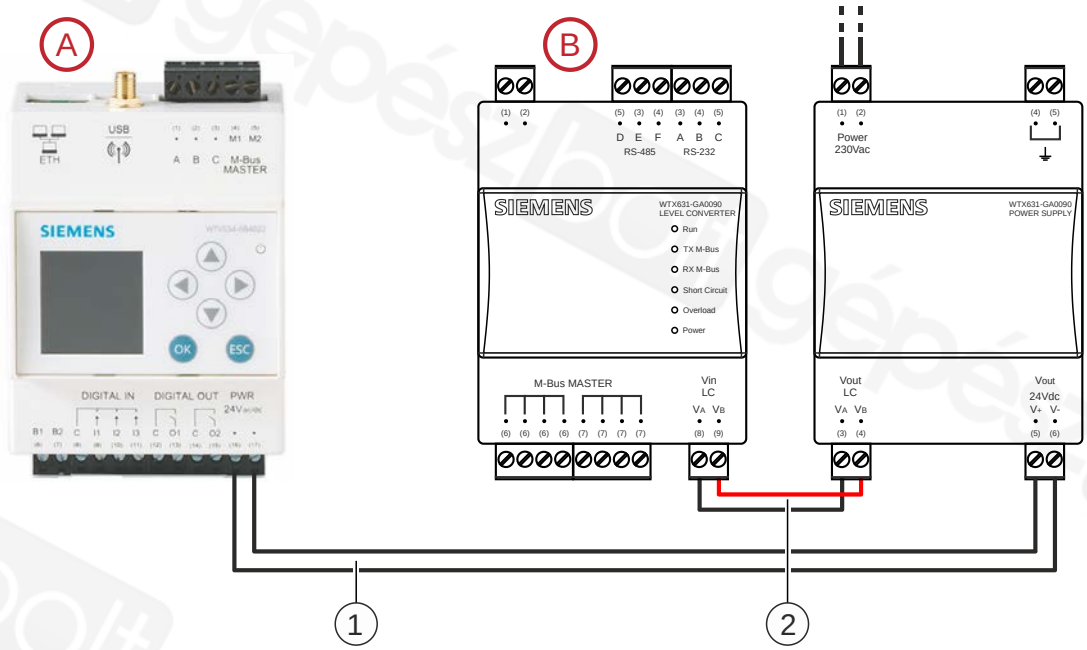
The power supply can be employed as follows:

- To power the level converter



1 Level converter/repeater 2 Power supply

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



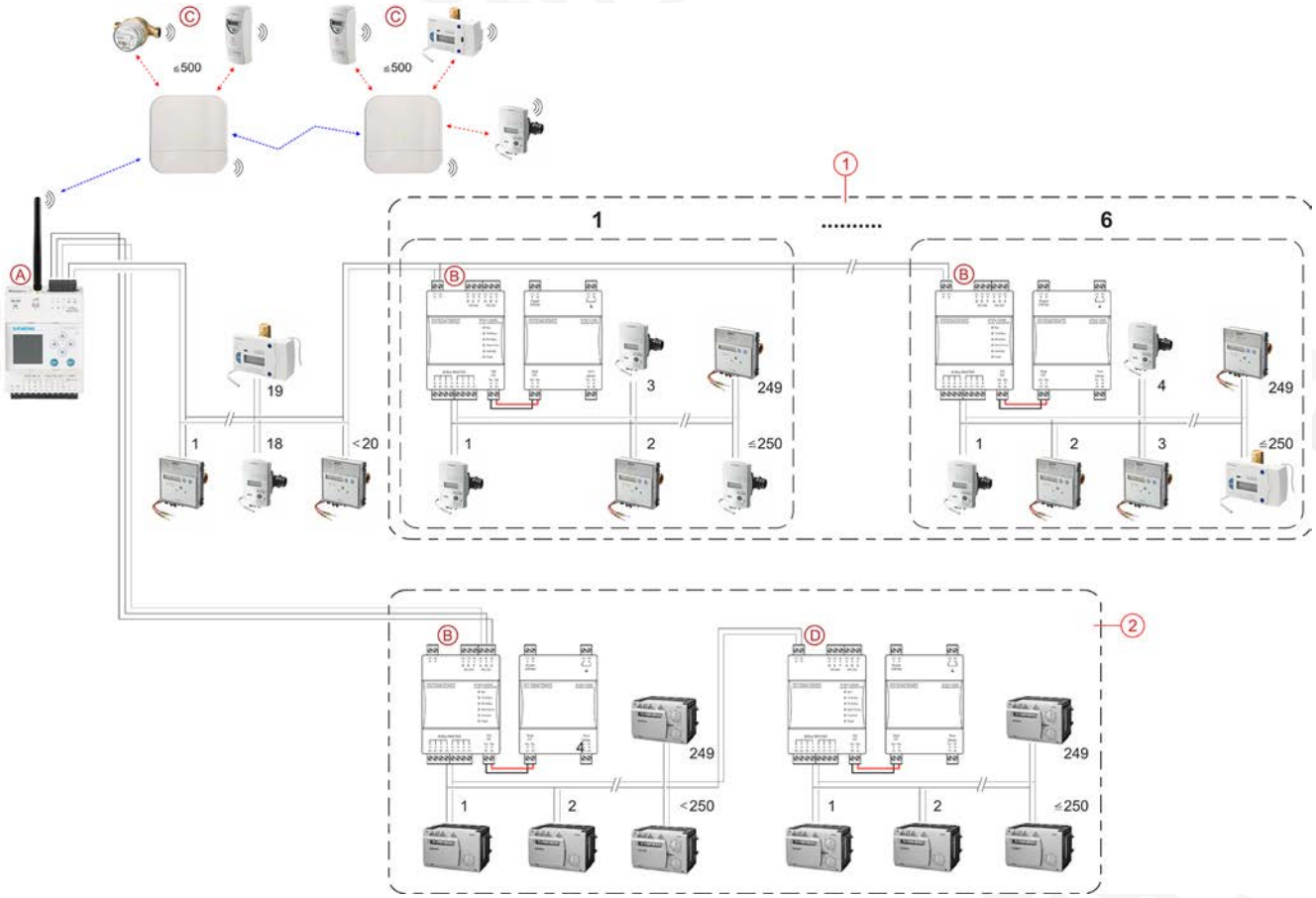
A	Web server WTV676..	1	Connection web server WTV676.. with power supply WTX631
B	Level converter/repeater WTX631	2	Connection level converter/repeater with power supply

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.

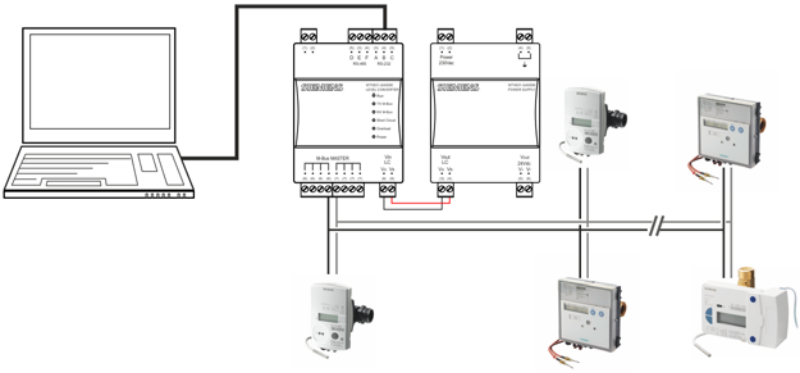


A	M-bus web server (M-bus master)	1	M-bus slave, connected in parallel (max. 6 level converters)
B	Level converter	2	RS-232, serially connected (1 level converter and 5 repeaters)
C	M-bus wireless devices		
D	Level converter as repeater		

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.

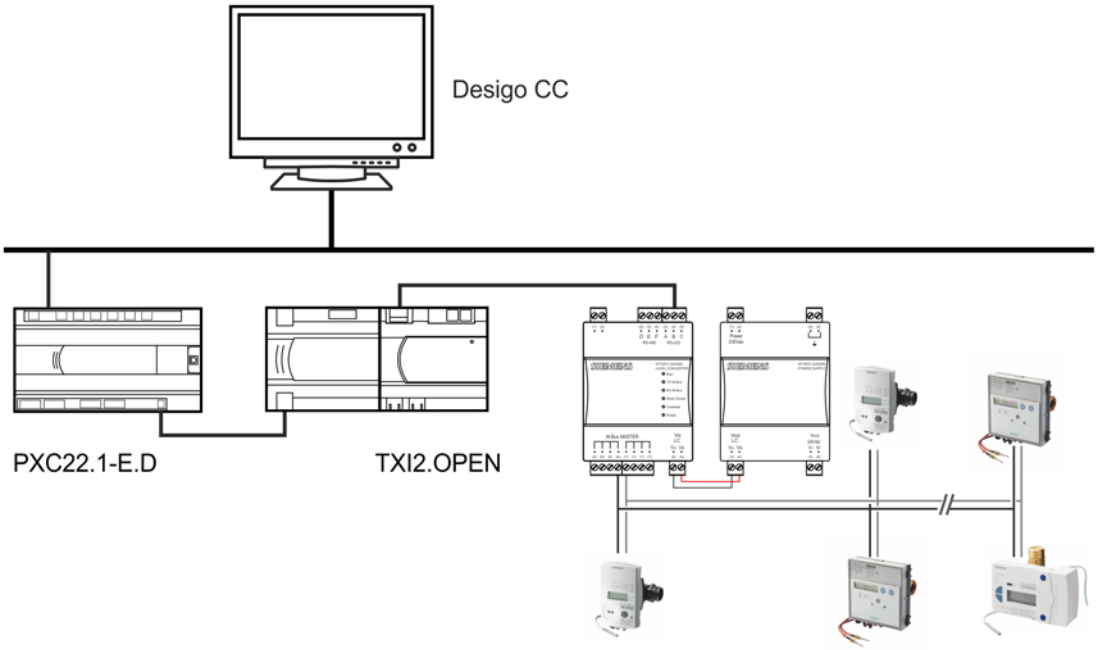


A	Level converter (RS232 or RS485 interface)
B	PC or M-bus devices

!	***NOTICE***
	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.

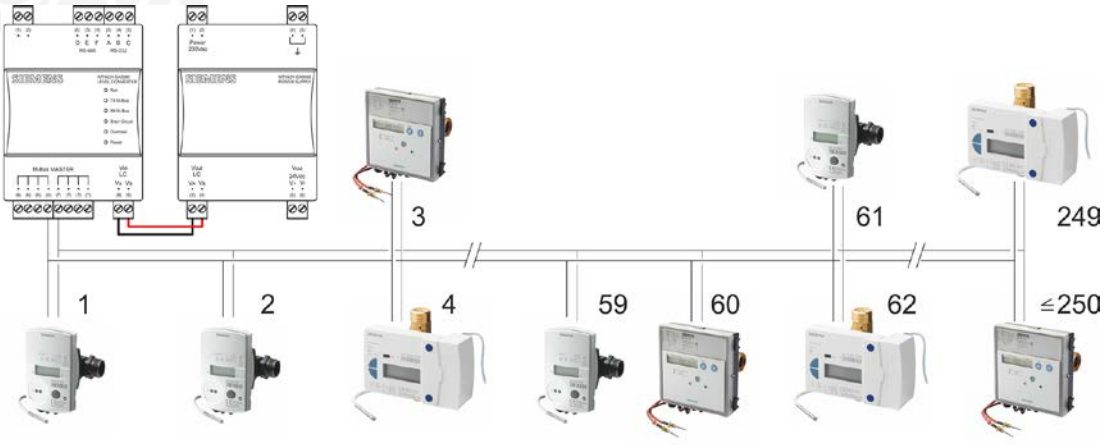
The TX Open module integrates M-bus devices via a RS-232 or RS-485 interface to the Desigo CC building management platform.

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

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.

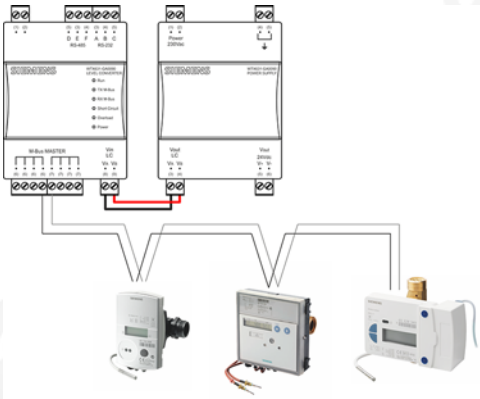
Topology

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.

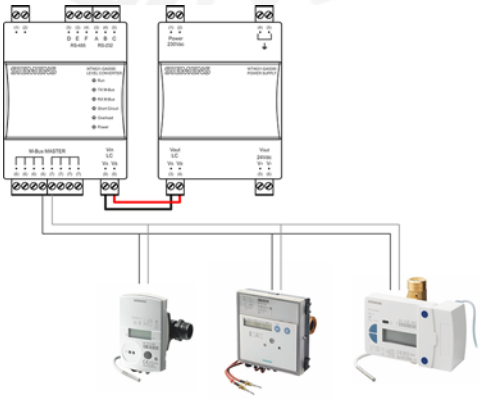
Ring topology is not permitted.

Bus cable polarity is not relevant, simplifying installation.

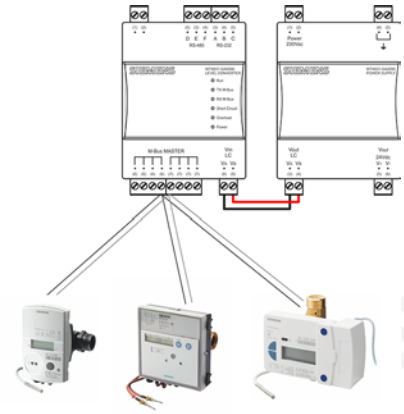
Line topology



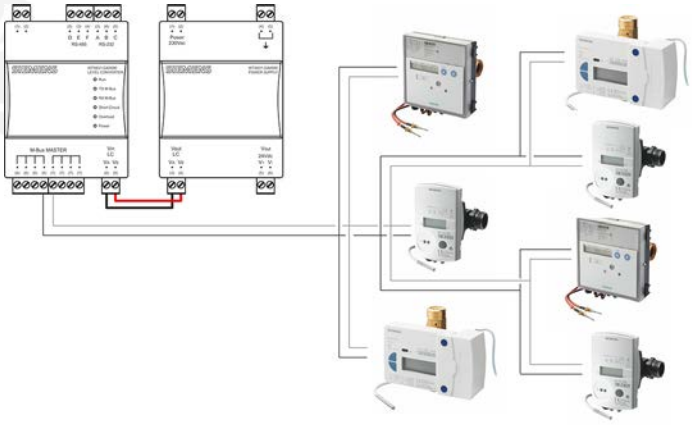
Bus topology



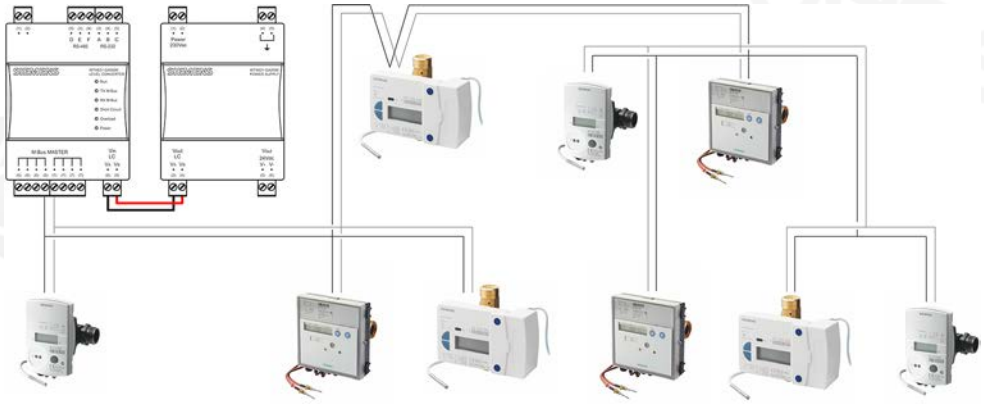
Star topology



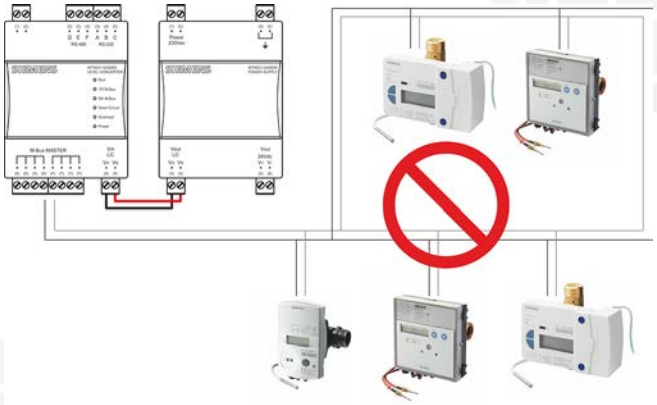
Tree topology



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^2	250	9600 baud
Large residential buildings	350 m	4000 m	0.8 mm^2	250	2400 baud
				64	9600 baud
Small developments	1000 m	4000 m	0.8 mm^2	64	2400 baud
Large developments	…3000 m*	5000 m	1.5 mm^2	64	2400 baud
Direct vicinity	…5000 m*	7000 m	1.5 mm^2	16	300 baud
Point-to-point connection	…10000 m*	10000 m	1.5 mm^2	1	300 baud

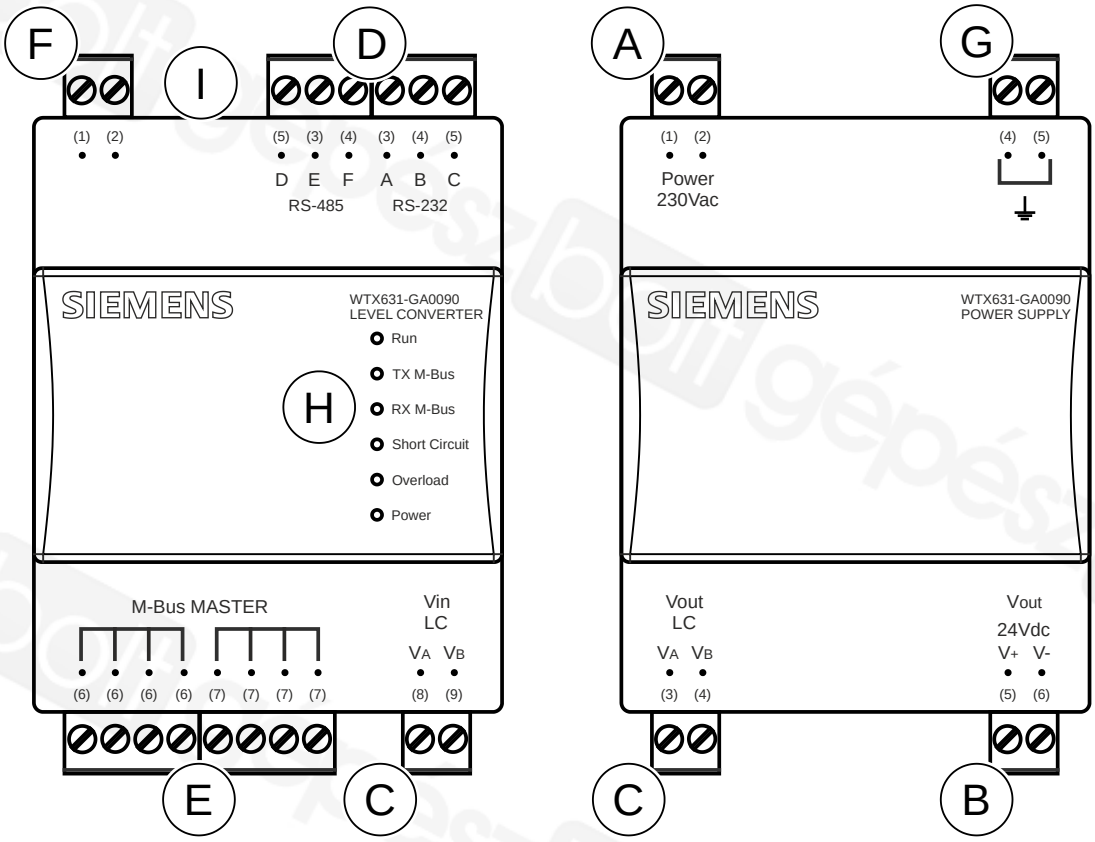
*Shielded cabling required at a distance in excess of 1000 m (see EN13757-2 appendix E).

Signal specification

M-bus	Condition	Minimum	Typical	Maximum	Measuring unit
Number simple M-bus loads per segment	WTX631-GA0090	0	-	250	-
Transmission rate	$C_{Segment} \leq 382$ 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

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

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

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

	⚠ **CAUTION**
	National safety regulations Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

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. ● Dispose of the device through channels provided for this purpose. ● Comply with all local and currently applicable laws and regulations.

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: ● Connect to a PC: – Terminal A: TX (PC/data logger receiving line) – Terminal B: RX (PC/data logger transmission line) – Terminal C: GND (interface reference voltage) ● Connection to M-bus web server WTV676..: – Terminal 3[A] RS-232 with terminal 1[A] web server – Terminal 4[B] RS-232 with terminal 2[B] web server – Terminal 5[C] RS-232 with terminal 3[C] web server
RS-485 interface (terminal D, E, and F on the level converter)	Non-isolated connection for connecting to a PC ● Connections to connect to PC/data logger as master: – Terminal D: REF (interface reference voltage) – Terminal E: D+ (Receive/transmission line potential +) – Terminal F: D- (Receive/transmission line potential -)

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

M-bus master	
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..

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

Environmental compatibility
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 http://siemens.com/bt/download.

Degree of protection	
IP class	IP20 per EN60529
Protection class	II as per EN 62368-1

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

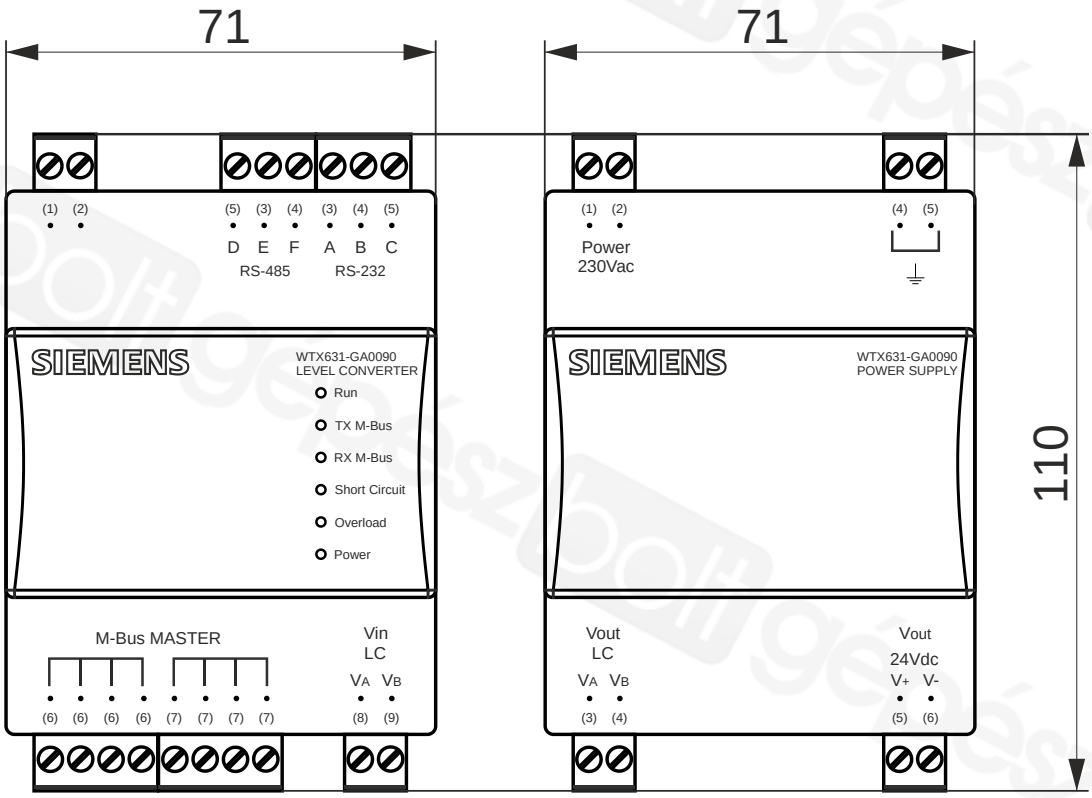
Materials and colors	
Housing	PC + ASA, RAL 9010 (white)

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



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