

Automation System 5400

TROVIS 5488 Meter Bus Gateway



Application

Used in HVAC networks to integrate M-Bus meters and pulse counters into a control system



The meter bus gateway enables the convenient integration of heat, electricity and water meters into a control system. Up to 32 meters can be connected according to EN 1434-3. Additionally, the meter bus gateway is equipped with 16 inputs for pulse counting, e.g. from heat or water meters.

The meter bus gateway converts the read or recorded data into Modbus data. This allows the meters to be integrated into a control system. Modern control systems, e.g. the TROVIS building control system from SAMSON, visualize and log the meter data, e.g. for billing purposes.

Versions

TROVIS 5488 Meter Bus Gateway
Refer to Table 1 (Technical data) for specifications

Ordering text

TROVIS 5488 Meter Bus Gateway

Accessories:

Cable converter RS-232/RS-485, length 1.5 m	1400-7308
Memory module	1400-9379
Communication cable RS-232 (software update)	1400-7419
Modem cable	1400-7139



Fig. 1 · TROVIS 5488 Meter Bus Gateway

Table 1 · Technical data

Inputs	16 inputs for floating contacts (e.g. pulse counters), each with 32 bit count register Counting only with mains voltage! Max. 32 M-Bus meters
Interfaces	M-Bus according to EN 1434-3 or adapted RS-232 Modbus interface for modem or point-to-point connection to a PC (Modbus: Hardware according to Table 2 Software acc. to Gould Modicon, see Table 2 RTU protocol, data format 8N1, RJ-12 connector at the back)
Supply	230 V AC (+10 %, -15 %), 48 to 62 Hz, power consumption approx. 9 VA
Temperature range	0 to 40 °C (operation) -20 to 60 °C (transport and storage)
Degree of protection	IP 40 according to IEC 529
Class of protection	II according to VDE 0106
Degree of contamination	2 according to VDE 0110
Overtoltage category	II according to VDE 0110
Humidity class	F according to VDE 40040
Noise emission	According to EN 61000-6-3
Noise immunity	According to EN 61000-6-1
Weight	Approx. 0.6 kg

Communication

- RS-232 interface for communication with a PC using a modem or point-to-point connection
- Exchange of configuration data and parameters using the memory module
- Modbus connection possible
- Sending of SMS text message (German D1 network only) or fax in case of error (modem required)
- Firmware update using RS-232 system bus interface (point-to-point connection with a PC) possible
- Optionally: RS-232/RS-485 cable converter to communicate with the bus structure

Operation

All five operating elements are located in the front panel of the device. The front panel is protected by a Plexiglas door.

Icon	Key	Description
	Changeover key	Change from operating level to configuration and parameter level
	Reset key	Reset all freely accessible function blocks and parameters to their default values
	Cursor keys	Navigate through all levels, adjust function blocks and parameters
	Enter key	Open levels, confirm and save inputs

The device provides a display level and a configuration level.

Display

The INF levels contain information about the status of the device.

INF level	Sublevel	Description
8	FSR1/2	Fault status registers 1 and 2*
	Bruch	Sensor breakage information*
	END	Return to operating level
9	Parameter	Modbus information
	END	Return to operating level
10	WMZ ii	Display all active meters and data points: flow rate, total capacity, capacity, energy, flow temperature, return flow temperature, identification number, meter address
	END	Return to operating level

* Currently not used

Configuration

Functions and parameters are available in the following sublevels:

Group	Description
CO9	Functions for Modbus communication
PA5	System date and time
PA9	Parameters for Modbus communication
PA10	Parameters for meter bus communication (M-Bus)

Electrical connection and installation

The device consists of the housing and the back panel. The electronics are integrated into the housing. The back panel contains the terminal block. Two cores with 0.75 mm² each can be connected to each terminal. For wall mounting, fasten the back panel with the terminal block to the wall. After installing the wiring, plug on the housing.

For panel mounting, insert the housing into the prepared panel cut-out and secure it. After installing the wiring, plug on the back panel.

The back panel also provides small hooks for top-hat rail mounting.

Dimensions in mm

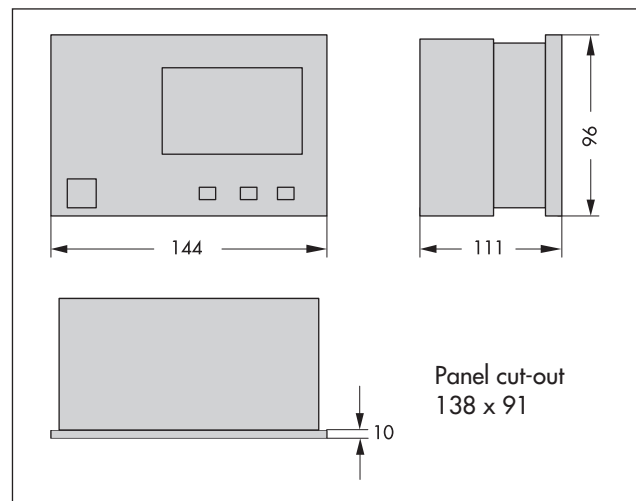


Table 2 · Modbus

Modbus protocol description	
Specification	By Gould Modicon
Protocol name	Modbus
Protocol type	584
Protocol format	RTU (remote terminal unit)
Protocol principle	Master/slave
Max. word length	2 bytes
Max. block length	256 bytes
Block start identification	None
Block end identification	Min. 3 bytes transmission pause
Data integrity check	CRC-16
Ranges	
Address range	0 to 255
Standard addresses	1 to 247
Special addresses	0 and 248 to 255
Register range	0001 to 9999
Supported function codes for TROVIS 540x and 6400	1, 3, 5, 6, 15, 16
Supported function codes for TROVIS 5100, 547x, 5488, 5500	1, 3, 5, 6
Special function codes	65, 66, 67, 68, 69
Data transmission	
Standard format	1 start bit, 8 data bits, 1 stop bit, no parity (8N1)
Transfer rates	150 to 19200 baud (standard: 9600 baud)
Transmission standard	RS-485, RS-422, four-wire bus
Driver load	> 54 Ω
RS-485 line termination	200 Ω between receiver lines
Transfer medium	Screened twisted pair cable (STP, AWG 24) Resistance < 100 Ω/km, Capacitance < 100 nF/km
Topology	
Bus topology	Line, with stubs separated by repeaters
No. of bus devices	Max. 32 per segment (including repeaters or converters)
No. of repeaters	Max. 5 in series
Stub length (branch)	Max. 3 m
Segment length	Max. 1200 m
Bus range	Max. 7200 m, greater distances on request

Lightning and overvoltage protection

Upon installation you are required to observe the relevant standards and regulations governing lightning and overvoltage protection. For data transmission lines running between buildings, lightning and overvoltage protection must be ensured by means of the appropriate measures. In addition, sufficient equipotential bonding must be guaranteed.

- SA1000 overvoltage protection, SA2000 overvoltage protection, Type BCT MLC BE C 5 Blitzductor® CT by Dehn or technically equal equipment
- M-Bus: Type BCT MLC BD48 Blitzductor® CT by Dehn or technically equal equipment
- 230 V network: Type DGT 275 DEHNguard® T by Dehn or technically equal equipment

For additional information refer to TV-SK 6364.

Installing bus line and shielding

Make sure the bus lines are installed correctly to avoid any possible disturbances.

- Properly shield the bus cable (shielding must be used on both sides and cover a large area)
- Connect the bus devices over the shortest distance
- Reduce different potentials by using sufficient equipotential bonding, otherwise transient currents can be conducted over the shielding!

Table 3 · TROVIS 5488 Meter Bus Gateway

Specification	M-Bus according to EN 1434-3 M-Bus User Group, V 4.8 of 1997-11-11
Meter bus topology	Two-wire bus system with free topology Bus, star, ring or tree (recommended: star) Total segment length ≤ 1000 m Max. distance (stub) between meter bus gateway and meter ≤ 350 m
Transfer medium	Screened twisted pair cable Line resistance ≤ 50 Ω per segment Total line capacitance ≤ 220 nF (Σ all segments) For larger distances, greater line resistance or capacitance, install a repeater in the appropriate location
Connection	Reverse polarity and short-circuit protection Max. available load: 48 ZB (ZB = meter bus loads; 1 ZB corresponds to the standard power consumption of a bus-capable meter = 1.5 mA)
Transfer rates	300 to 2400 baud
Access See Fig. 2	The connected meters can be read either cyclically, every 24 hours or by request from the building control system. According to EN 1434-3, the following data points are transmitted: – Heat (energy) – Total capacity – Heat capacity – Flow rate – Primary flow and return flow temperatures Apart from the fault status alarms and identification number, billing date or charge rate data are transmitted depending on the device type. Technical documentation TV-SK 6311 lists heat, electricity and water meters that have been tested so far.

Specifications subject to change without notice.

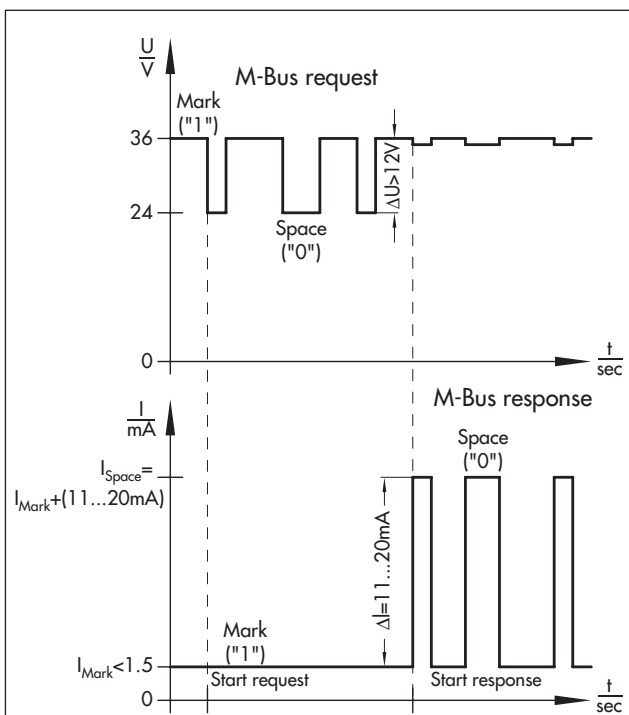


Fig. 2 · MASTER SLAVE, pulse diagram (resistance/current)

Request from the master:

change from 36 V (H = "1") to 24 V (L = "0")

Response of addressed slave: bit-wise switching of no-load current from 1.5 mA (H = "1") to approx. $I_{\text{Mark}} (1.5 \text{ mA}) + 11$ to 20 mA (L = "0")

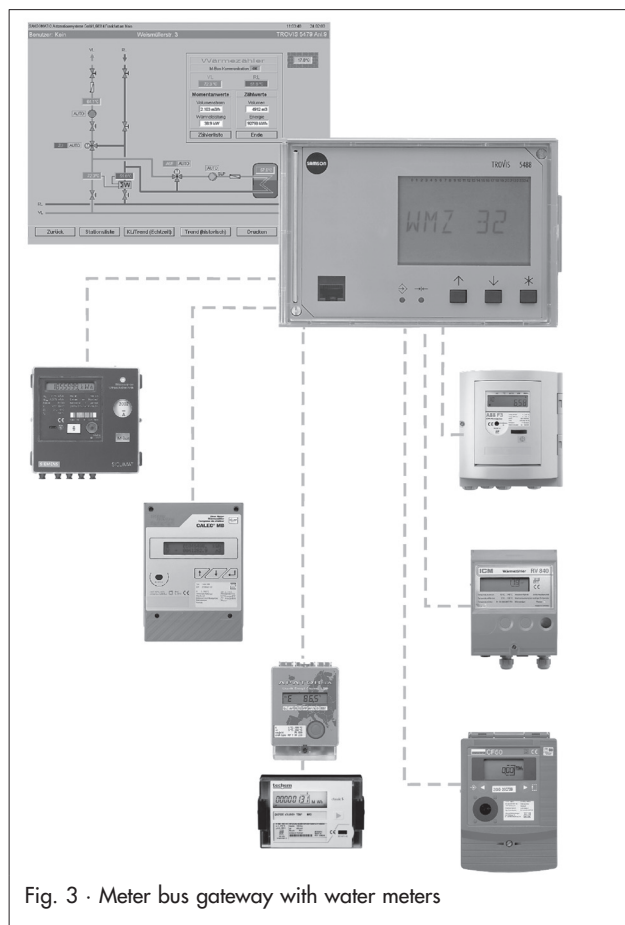
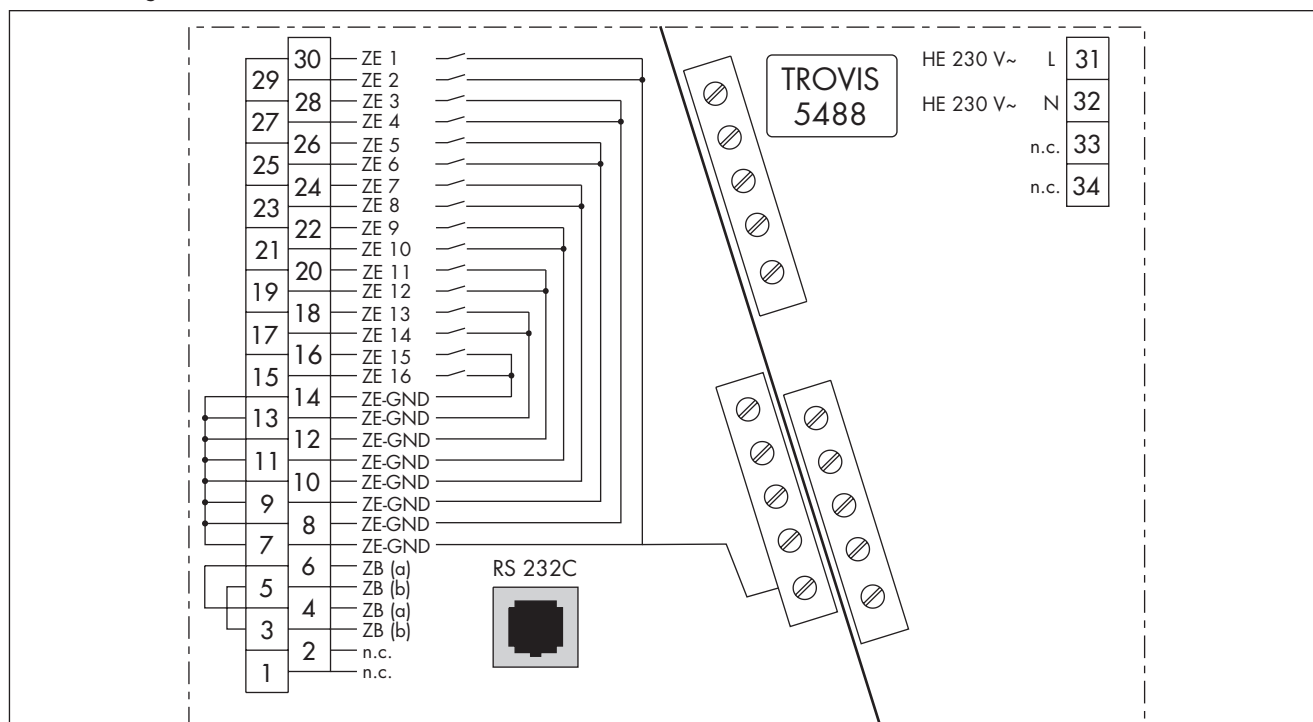


Fig. 3 · Meter bus gateway with water meters

Terminal assignment



- ZB (a) Meter bus connection (terminal 6 = terminal 4,
- ZB (b) terminal 5 = terminal 3), electrically isolated towards ZE
- ZE 1...16 Counter inputs for pulse counters
- ZE_GND Ground for counter inputs
- n. c. Free
- RS-232-C Serial interface for connection to higher-level control system (Modbus protocol)

