# Automation System TROVIS 5400
# Meter Bus Gateway TROVIS 5488

**Application**

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

The meter bus plug-in module enables simple connection of heat or energy meters as well as water meters to the meter bus gateway. A maximum of 32 meters conforming to EN 1434-3 may be connected for data transfer. 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

See Table 1: Technical data for specifications.

**Ordering text**

TROVIS 5488 Meter Bus Gateway

**Accessories:**

| | |
|---|---|
| RS-232/RS-485 four-wire cable converter, 1.5 m | 1400-7308 |
| Memory module | 1400-9379 |
| RS-232 communication cable (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 possible with mains voltage! |
|---|---|
| | Max. 32 M-Bus meters |
| **Interfaces** | |
| Meter bus | M-Bus according to EN 1434-3 or adapted |
| System bus | RS-232 Modbus interface for modem or point-to-point connection to a PC (Modbus: Hardware according to Table 2 Software according to GOULD MODICON, see Table 2 RTU protocol, data format 8-N-1, RJ-12 connector socket at the back) |
| Supply | 230 V AC (+10 %, −15 %), 48 to 62 Hz, approx. 9 VA power consumption |
| Temperature range | 0 to 40 °C (operation), −20 °C to 60 °C (storage and transport) |
| Degree of protection | IP 40 according to IEC 60529 |
| Class of protection | II according to VDE 0106 |
| Degree of contamination | 2 according to VDE 0110 |
| Overvoltage category | II according to VDE 0110 |
| Humidity rating | 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 modem or point-to-point connection to a PC
- Exchange of configuration data and parameters using memory module
- Modbus connection possible
- Alarm notification by text message or fax (modem required)
- Firmware update using RS-232 system bus interface (point-to-point connection with a PC) possible
- RS-232/RS-485 cable converter for communication with the bus (optional)

## 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 |
| ↑ ↓ | Arrow keys | Navigate through all levels, adjust function blocks and parameters |
| | Enter key | Open levels, confirm and save settings |

The device has a display level and a configuration level.

## Display

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

| INF level | Sublevel | Description |
|---|---|---|
| 8 | FSR1/2 | Error status register 1 and 2* |
| | Bruch | Sensor failure 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 sub-levels:

| 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 controller consists of a housing and back panel. The electronics are integrated into the housing. The back panel contains the terminal block. Two wires of 0.75 mm² may be connected to each terminal. For wall mounting, fasten the back panel with the terminal block to the wall. After installing the connecting lines, attach the housing.

For panel mounting, insert the housing into the prepared panel cut-out and secure it. After installing the connecting lines, attach the housing.

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

## Dimensions in mm



**Panel cut-out:** 138 x 91
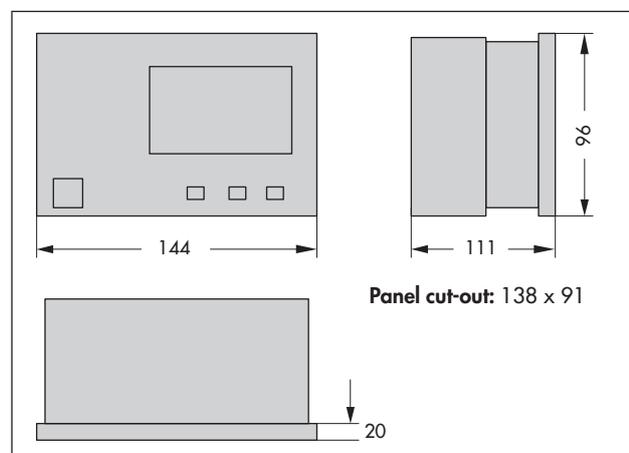
**Table 2:** *Modbus*

| Modbus protocol description | |
|---|---|
| Specification | 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 (8-N-1) |
| 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 |
| Transmission medium | Screened twisted pair (STP, AWG 24) Resistance < 100 Ω/km, Capacitance < 100 nF/km |
| **Topology** | |
| Bus topology | Line, with stubs separated by repeaters |
| Number of bus devices | Max. 32 per segment (including repeaters or converters) |
| Number of repeaters | Max. 5 in series |
| Stub length (branch) | Max. 3 m |
| Segment length | Max. 1200 m |
| Bus range | Maxi. 7200 m, greater distances on request |

**Lightning and overvoltage protection**

Upon installation, 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 the appropriate measures. In addition, sufficient equipotential bonding must be guaranteed.

- Surge arrester SA 1000, Surge arrester SA 2000 or Blitzductor® CT Type BCT MLC BE C 5 or equivalent product
- M-Bus: Blitzductor® CT Type BCT MLC BD48 by Dehn or equivalent product
- 230 V network: DEHNguard® T Type DGT 275 by Dehn or equivalent product

TV-SK 6364 contains additional information.

**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 dated 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 |
| Transmission medium | Screened twisted pair Line resistance ≤ 50 Ω per segment Total line capacitance ≤ 220 nF ($\sum$ of all segments) For larger distances, greater line resistance or capacitance, install a repeater at the appropriate location |
| Connection | Reverse polarity and short-circuit protection Max. available load: 48 ZB (ZB = meter bus load; 1 ZB is the equivalent 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: <br> – Heat (energy) <br> – Total capacity <br> – Heat capacity <br> – Flow rate <br> – Primary flow and primary return flow temperatures <br><br> Apart from the error status alarms and identification number, billing date or charge rate data are transmitted depending on the device type. <br><br> The document TV-SK 6311 lists heat, electricity and water meters that have been tested so far. |
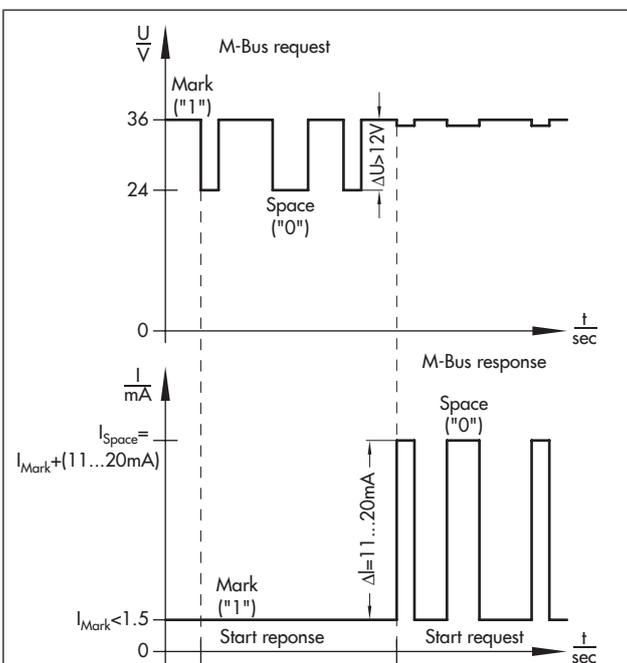
Request from master:
change from 36 V (H = "1") to 24 V (L = "0")

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

**Fig. 2:** *MASTER SLAVE, voltage/current pulse diagram*
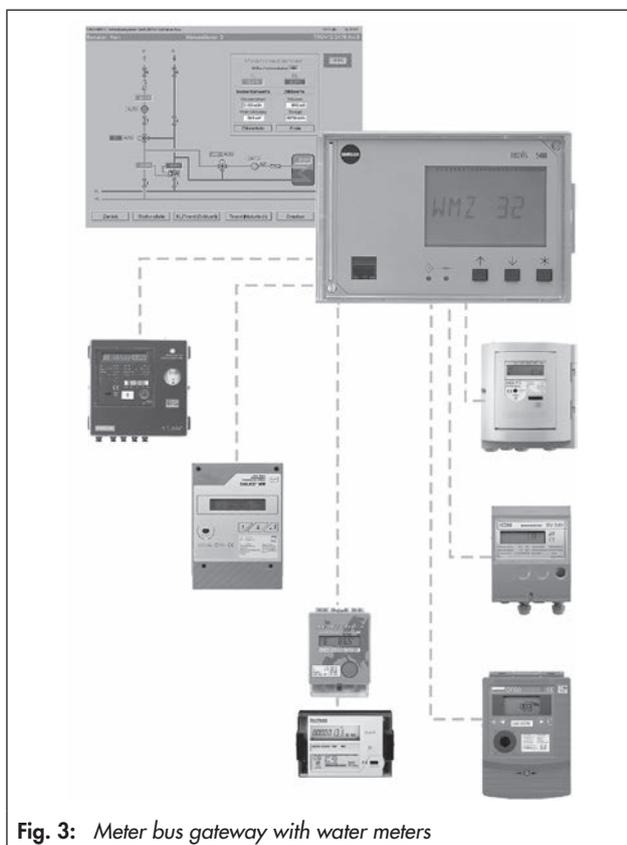


**Fig. 3:** *Meter bus gateway with water meters*

## Terminal assignment
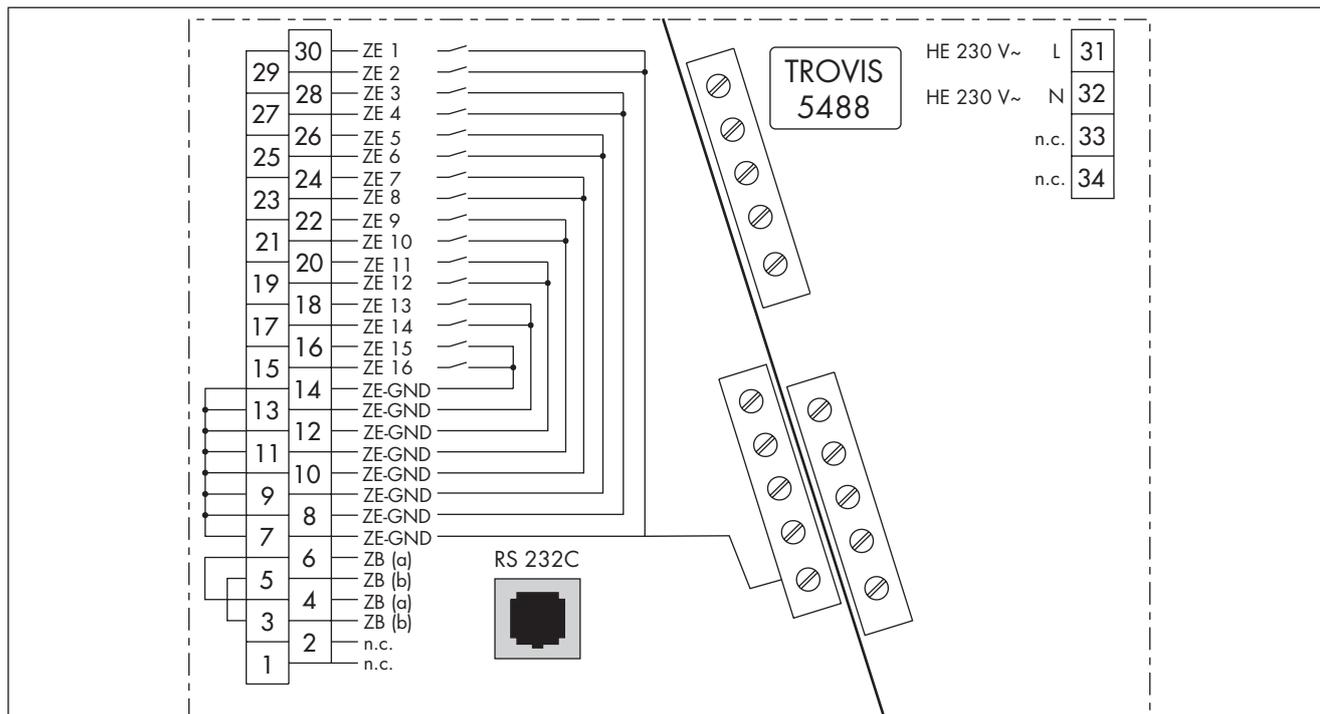


| ZB (a) | Meter bus connection (terminal 6 = terminal 4, |
| ZB (b) | terminal 5 = terminal 3), electrically isolated against ZE |
| ZE 1…16 | Counter inputs for pulse counters |
| ZE_GND | Ground for counter inputs |
| n. c. | Unassigned |
| RS-232-C | Serial interface for connection to higher-level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

Specifications subject to change without notice.

**T 5488 EN**

2012-03-16