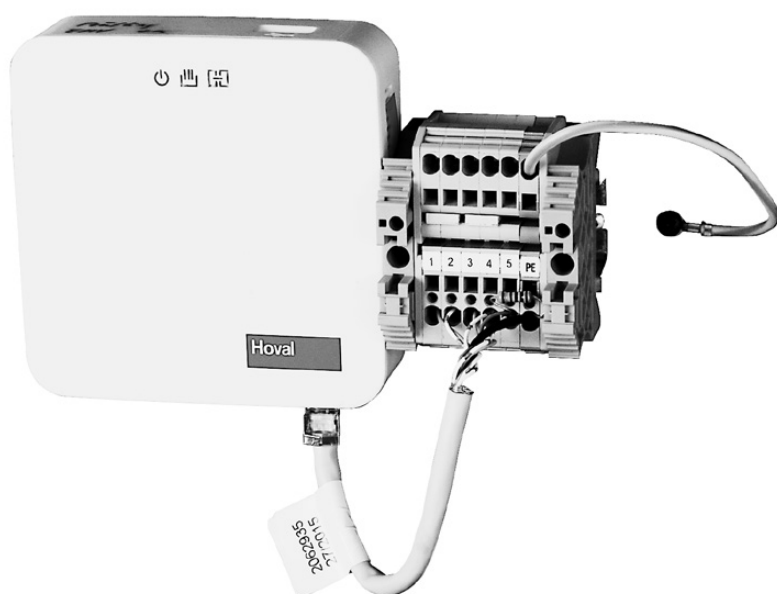# TopTronic® E Gateway module Modbus TCP/RS485

Hoval TopTronic® E Modbus TCP/RTU interface

These instructions are applicable to the following types:

1-TopTronic® E GW-Modbus TCP/RS485

Hoval products may only be installed and commissioned by appropriately qualified experts. These instructions are intended exclusively for the **specialist**. Electrical installations may only be carried out by a qualified electrician.

1. Important notes
1.1 Intended use

The gateway is the connection point between the Hoval CAN bus and a Modbus interface via TCP or RS485 (RTU).
The gateway enables users to access and operate their Hoval heating system via Modbus.

These instructions describe how to connect, install and commission the interface.

1.2 Explanation of the symbols
1.2.1 Warnings

> **!** **NOTICE** 3
> ... indicates a situation of possible danger which can lead to damage to property if not avoided.

⚠ «Warning: dangerous electrical voltage» as a warning for accident prevention.
Ensures that people do not come into contact with electrical voltage. The danger sign with the black lighting symbol warns against the danger of electrical voltage.

1.2.2 Symbols

ⓘ Information:
Provides important information.

2. Technical information

2.1 Installation location in the wall housing/ control panel

Delivery:
TopTronic® E Gateway module Modbus on top-hat rail

The TopTronic® E Gateway module Modbus can be installed in the wall housing, in the control panel or in the heat exchanger

2.1.1 Modbus TCP dimensional drawing
(all dimensions in mm)
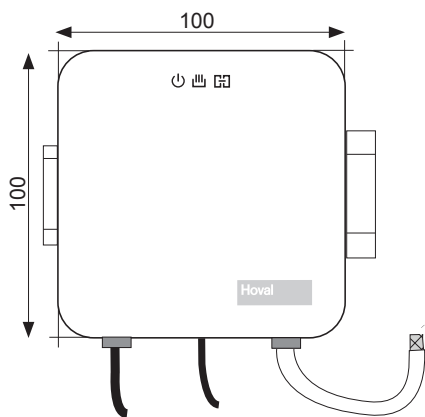
fig. 01

Dimensions:
W = 100
H = 100
D = 27 (including top-hat rail: 42)

2.1.2 Modbus RS485 dimensional drawing
(all dimensions in mm)
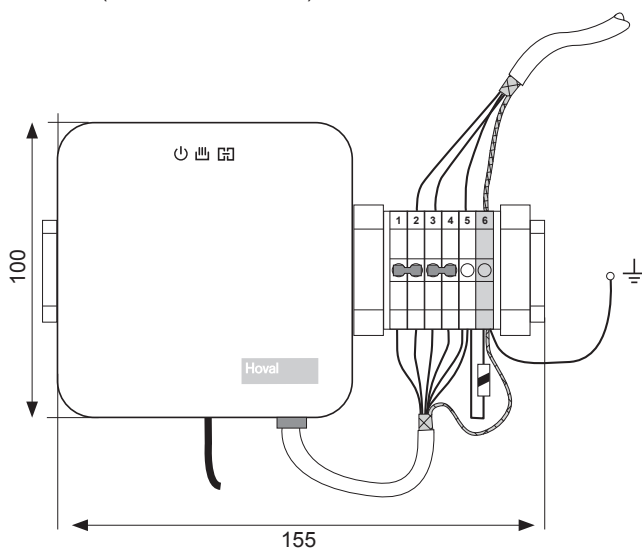
fig. 02

Dimensions:
W = 155
H = 100
D = 47 (terminal block including top-hat rail: 55)

2.2 Connections of the gateway

Modbus RS485

or

Modbus TCP

To the heat generator CAN bus
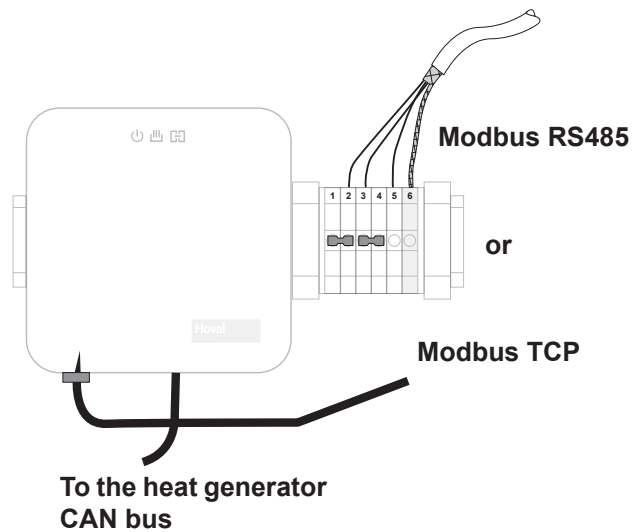
fig. 03

2.2.1 Back

On the back, the CAN bus can be connected to the terminal.

fig. 04

CAN bus	The terminals permit direct wiring to the Hoval CAN bus
CAN+	CAN bus data line
CAN-	CAN bus data line
12VDC	12V power supply via CAN bus
GND	Earth CAN bus

NOTICE

! The earth must always be connected to all CAN bus subscribers.
This also applies when a mains adapter is used.

NOTICE

! When using a mains adapter, 12 V DC must not be connected.

2.3 Technical data for the TopTronic® E Modbus interface

2.3.1 Connections on the underside

fig. 05

Power	Connection for the external power supply (only use the supplied mains adapter)
LAN	Modbus TCP interface
USB	Not used
CAN	Connection for Hoval CAN bus, pluggable connection RJ45
RS 485	Modbus RS485 interface

NOTICE

! Do not confuse CAN bus with LAN. Ethernet hardware can be damaged by the 12 V voltage of the CAN bus!

2.3.2 CAN pin assignment on RJ45
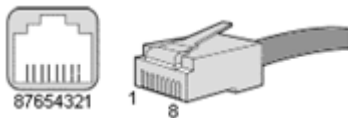
RJ45 pin	Signals
1	CAN_H
2	CAN_L
3	CAN_GND
8	CAN_12VDC++

Electrical safety
- Protection class (according to EN 60529): IP 20
- Complies with EN 50491-3
- Safety extra-low voltage SELV 24 V DC

EMC requirements
- Complies with EN 61000-6-2, EN 61000-6-3, EN 50491-5-1, EN 50491-5-2 and EN 50491-5-3
- According to EMC Directive (residential and functional building)

Environmental conditions
- Ambient temp. during operation: 0 to +45°C
- Storage temperature: -20 to +60°C
- Rel. humidity (not condens.):   20% to 80%

Mechanical data
- Housing: plastic
- Weight: approx. 500 g

Ethernet
- 10BaseT (10 Mbit/s)
- Supported protocols: UDP/IP, TCP/IP, DHCP and static IP

Power supply
- External supply: 12 V DC
- Power consumption: < 800 mW

Connections
- RJ45 LAN connector
- RS 485
- CAN bus

3. Installing and connecting the gateway

3.1 Installing the gateway in the wall housing or control panel

• Install the gateway in the wall housing or control panel.
• It may be necessary to remove the gateway and the connector base from the top-hat rail prior to this.
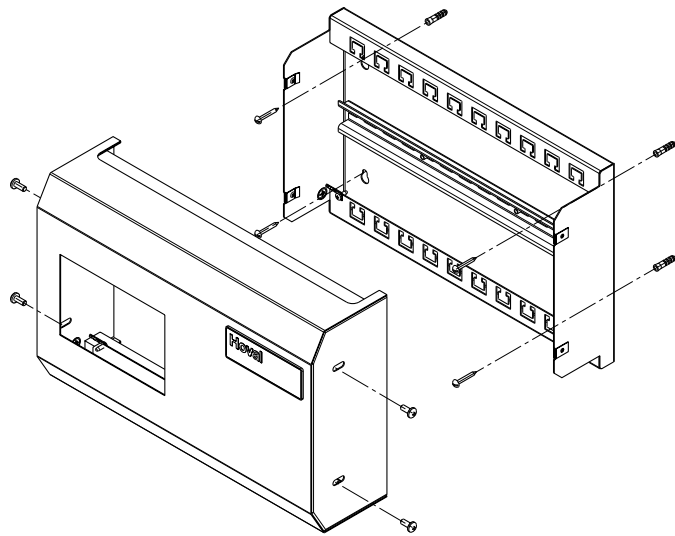
fig. 06

3.2 Installing the gateway in the heat generator

If, after installing all modules and extensions, there is still space in the heat exchanger, this can be used for the gateway.

- See also "Technical Information Installation Instructions" in the "Electrical connection" chapter.
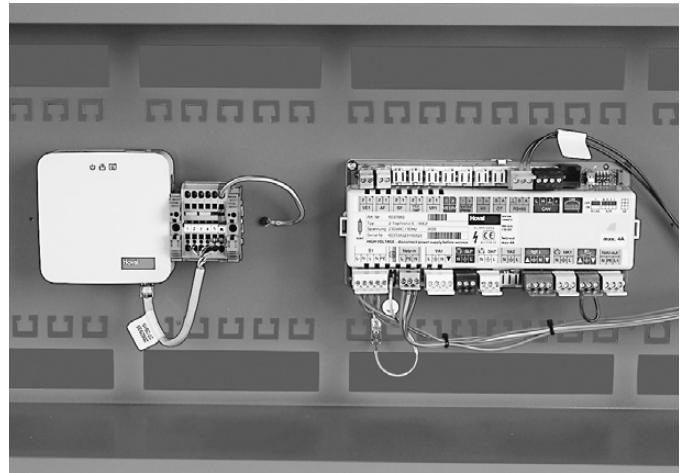
fig. 07

Installation example: UltraGas with Modbus RS485 gateway

3.3 Connection for the heat generator (WEZ / CAN bus)

⚠ There is a danger of electric shock.
The heat generator can only be de-energised by disconnecting it from the mains (fuse).

! NOTICE

The gateway can be connected to the CAN bus at any point on the bus system.
• In doing so, ensure that the CAN bus is correctly terminated.

1. Plug the CAN bus into the gateway
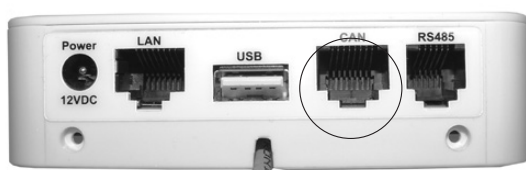
or establish the CAN connection via the terminals on the back of the gateway.

If installing the gateway in the heat exchanger, continue to point 3:

2. Expose a basic or controller module in the heat generator, wall housing or control panel according to the "Technical Information Installation Instructions" in the "Electrical connection" chapter.

3. Connect the Hoval CAN bus to a basic or controller module (fig. 08) according to chapter 2.3.2

! NOTICE

When using an external mains adapter, the 12 V line (CAN_V+) of the CAN bus must NOT be connected.

4. Route the cable according to the "Technical Information Installation Instructions" in the "Electrical connection" chapter.

! NOTICE

The CAN bus cable must have strain relief applied.

CAN bus
Terminal connection

CAN bus
Pluggable connection
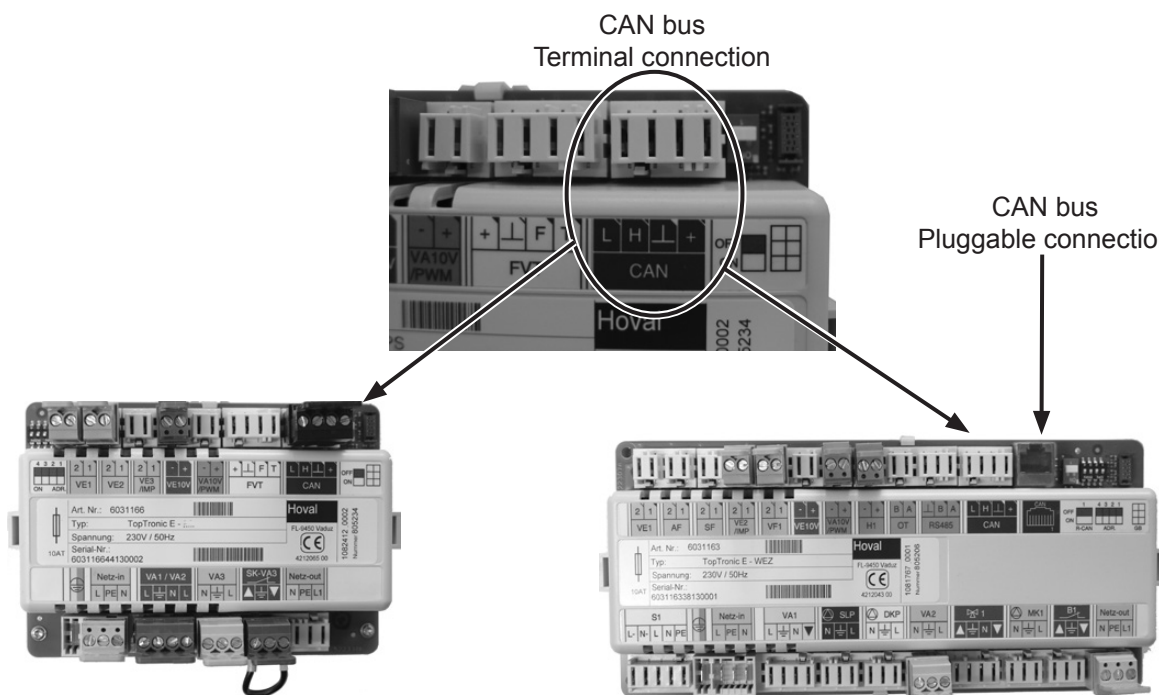
fig. 08

3.4   Connection for the Modbus TCP

(If using Modbus RS485, proceed to point 3.3)

| 1 | 2 | 3 | 4 | 5 | 6 |

Modbus
TCP
LAN

CAN bus

Disconnect

This section is not necessary in Modbus TCP. The parts can be removed.
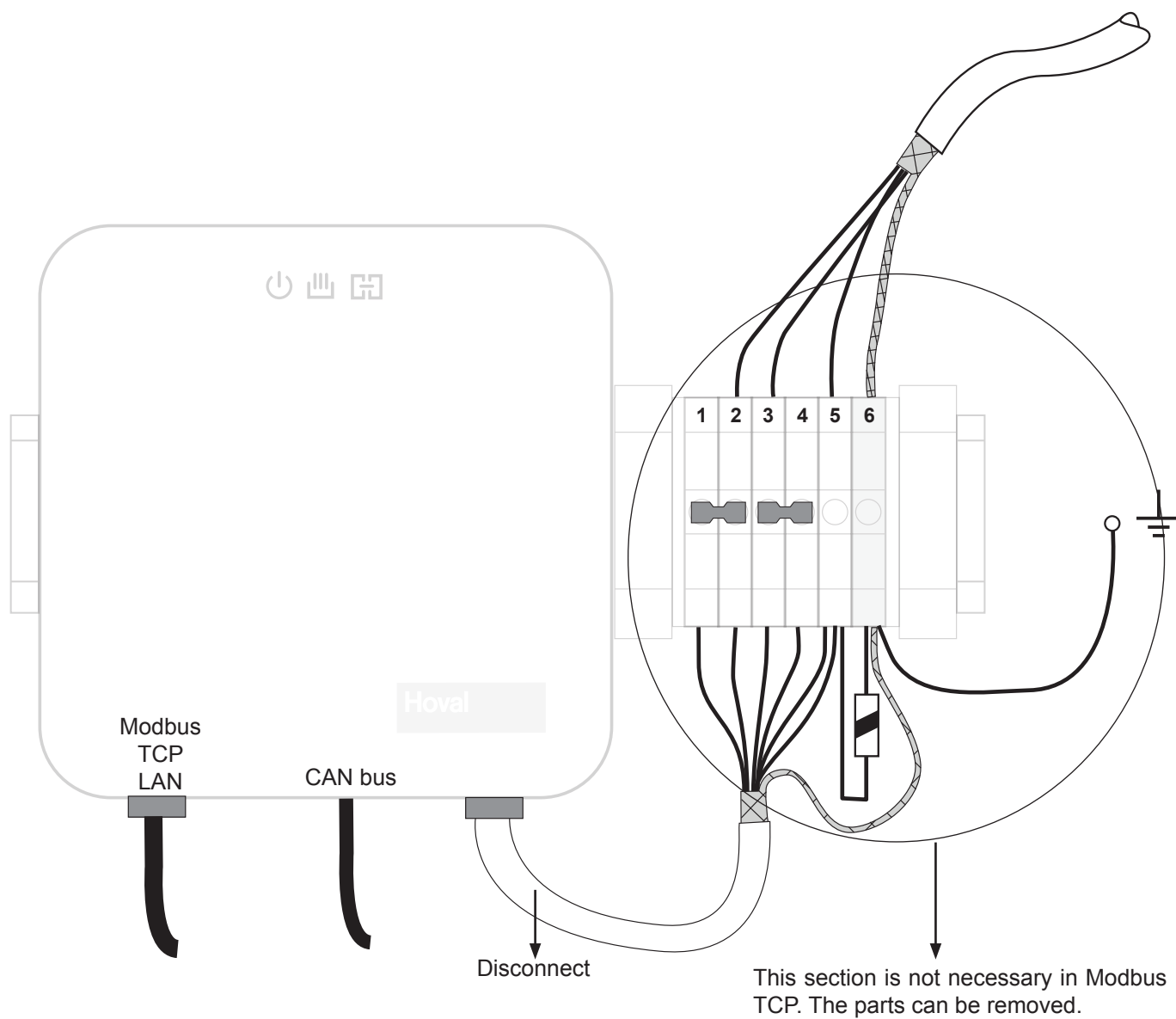
fig. 09

3.5 Connection for the Modbus RS485

The RS485 interface and the terminal strip supplied are assigned as follows:

• Connect Modbus RS485
• Install earth cable
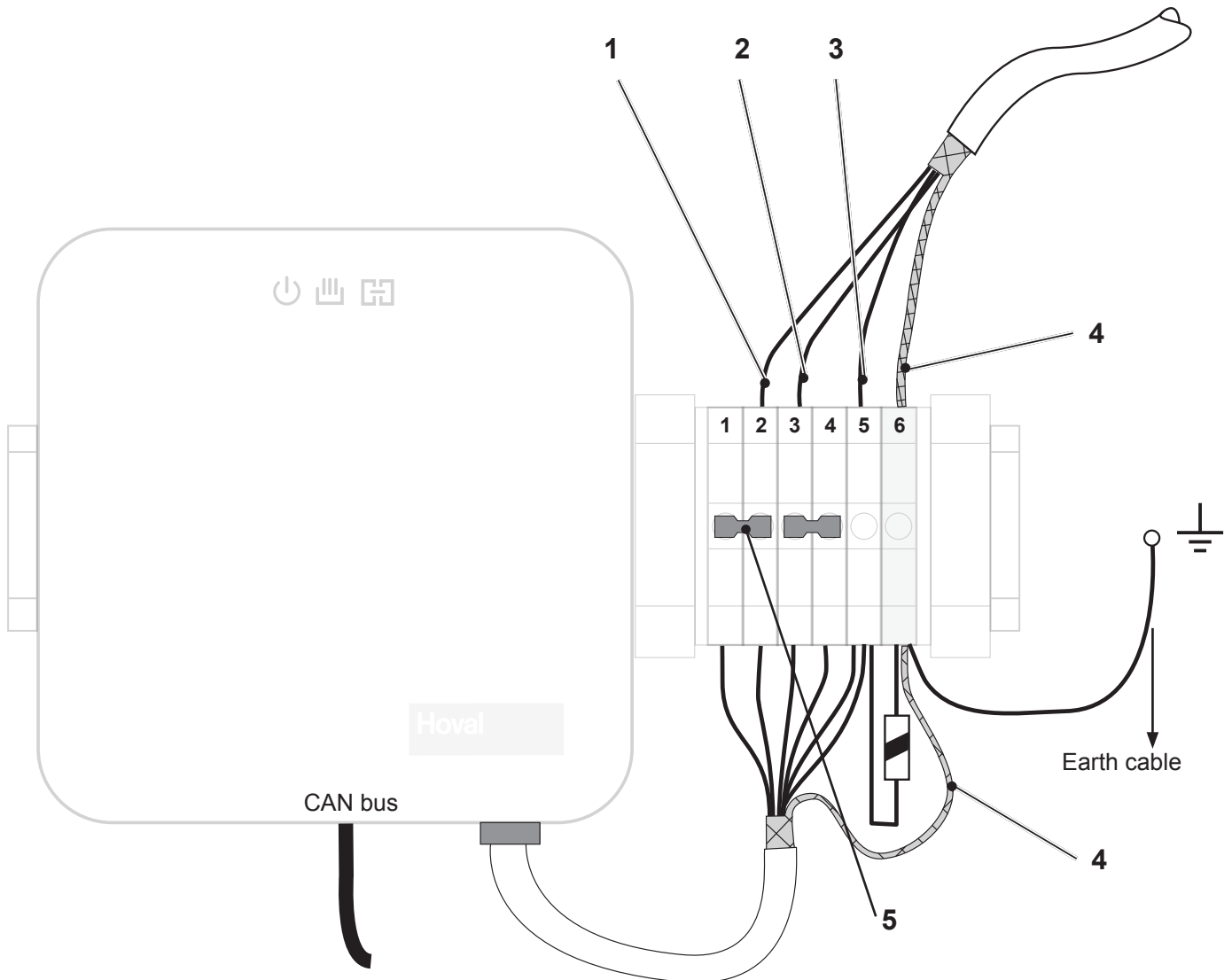
fig. 10

Modbus RS485 connection
1. RXTX+
2. RXTX-
3. GND
4. Supply line shielding on PE
5. Bridges for bus terminating resistors

> **NOTICE**
>
> **!** **Remove the bridges to deactivate the bus terminating resistors.**
> **(Factory setting: terminated)**

3.6 LED lights on the gateway

For commissioning it is important to know what status the gateway is currently in. The LEDs indicate the current status for this purpose.

The LED electrical power supply is green, all other LEDs are dark.
• Gateway is in boot status, i.e. the operating system is starting up – can take up to 60 seconds

fig. 11

1	Left LED, "Power supply": Power supply via CAN bus or external supply	Green
2	Middle LED, "CAN bus": • Connecting to the CAN bus • Connection to the CAN bus established • No connection to the CAN bus	Flashing blue Blue Red

3	Right LED, "Network"
	• No connection to the server
	  - Occurs whilst establishing connection to the LAN network
	  - Occurs during initialisation in the WLAN (green LED on
	  - WLAN aerial flashes) – can take up to 60 seconds
	  - Otherwise, check the settings on the gateway
	• Connection setup to the server - can take up to 30 seconds
	• Connection to the server established
	• Data logging on USB active
	• No physical network connection
	• No connection to the server
		Not used

4. Commissioning the TopTronic® E Gateway module Modbus

ℹ The settings described below can be performed on the control module of the system.

4.1 Connecting the Modbus TCP/RS485 (RTU) to the gateway

1. Launch the TopTronic® E control module and select
   - Main menu > Service.
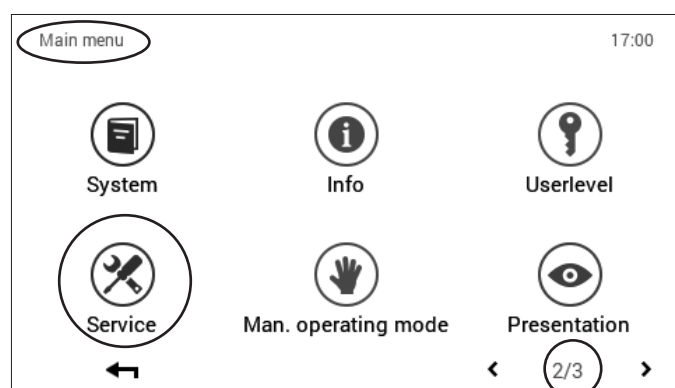
fig. 12

Only required for Modbus TCP:
Service > TTE-GW > General > Gateway general > All data points > Internet access

2. Select network (=cable connection) and confirm with "OK".
   > **Network** is set as standard.

3. DHCP (router gives the address)
   - DHCP > Yes is set as standard.
   - Open and select DHCP > Yes > Apply IP changes > Apply and confirm with "OK".
   - This automatically searches for and sets the correct IP address. The TopTronic® E gateway is installed.

ℹ For Modbus TCP, DHCP should be set to "No" and a static IP address should be given as the IP address cannot be changed as a result.

Only required for Modbus TCP:

4. Set a fixed IP address, this setting can be carried out by a specialist.
   - Set DHCP > No.
   - Open > IP address, enter the required IP address and confirm with "OK".
   - Open > Subnet mask, enter the required subnet mask and confirm with "OK".
   - Open > Default gateway, enter the required IP address and confirm with "OK".
   - Open and select > Apply IP changes > Apply and confirm with "OK".
   - The TopTronic® E gateway is installed.

ℹ A reliable IP mask must be entered in the subnet even if the system does not have a default gateway.

5. When the connection has been established, the gateway is restarted; the control module continues to operate. The gateway must be restarted manually if it does not restart automatically.
   Service > TTE-GW > General > Settings > All data points > Restart

ℹ The restart can take a few minutes.

6. The Modbus is configured via TTE-GW > Modbus > Settings.
   - Active: Activates or deactivates the Modbus service
   - UnitID: Modbus address of the gateway for Modbus RTU
   - Mode: Modbus RTU (via RS485) or Modbus TCP
   - Parity: Even, uneven or none. This setting must be the same on all units in the RS485 bus system.
   - Baud rate: This setting must be the same on all units in the RS485 bus system.

5. General Modbus information

On the gateway, Modbus RTU is implemented via RS485 and Modbus TCP via Ethernet. Either Modbus RTU or Modbus TCP can be used. The two protocols cannot be used at the same time.

The following Modbus function codes are implemented:
• Function 03 (03hex) Read Holding Registers
• Function 04 (04hex) Read Input Registers
• Function 06 (06hex) Write Single Register

However, no more than 10 to 15 data points should be read at the same time as this can cause the time for generating the response to increase significantly.

Modbus uses the terms "register" and "address". Whilst the registers begin with the number 1, the addresses start with 0. The data point list uses Modbus addresses to address the data points.

6. Data point list

The complete data point list can be downloaded from
www.hoval.com/misc/TTE/TTE-GW-Modbus-datapoints.xlsx

6.1 Important columns

Modbus address

Address by which the data point on the Hoval CAN bus via Modbus can be addressed

UnitName

Name of the TopTronic® E module

UnitId

Hoval CAN bus module address (Explanation further below)

DatapointName

Name of the data point in the Hoval CAN bus

TypeName

Indicates whether a data point is unsigned (U) or signed (S).
The length in bit of the data point is also given.
(e.g. U8, S16, S32)

Decimal

The number of decimal places that the value has.
(e.g. if the value 263 (decimal) is transmitted and "Decimal" is 1, the value is represented as 26.3.)

FunctionGroup name

Indicates the Hoval CAN bus data point function group where the value can be found (e.g. heating circuits)

Function name

Indicates the Hoval CAN bus data point function where the value can be found (e.g. heating circuits 1)

Steps

Indicates the number of valid steps when adjusting values.
(e.g. 5 -> value may only take on 0, 5, 10, etc.)

Min. value

Smallest possible value

Max. value

Largest possible value

Writable

"Yes" if the value is writable.

Commentary

Comments

Text 0 to text 31

If a selection is possible on control module, this column indicates the value that represents the selection.

(e.g. text 0 is "Standby", text 1 is "Week 1" -> Value 0 of the Modbus data point represents "Standby", value 1 represents "Week 1")

6.2 Module addresses

The "UnitId" column indicates the Hoval CAN bus address of the module that is to be addressed. If, for example, an MWA is configured with number "1" via the control module, this corresponds to the "UnitId" "385" in the Modbus data point list.

Name of the Hoval TopTronic® E module	Start address	End address
SOL	65	80
WEZ	1	16
HC/DHW	257	272
DH	193	203
MWA	385	400
GW	1153	1160
PS	129	144
BCT	449	464

6.3 Special data points
6.3.1 Four-byte data points

If a data point of the Hoval CAN bus is longer than 2 bytes, the data point is distributed to 2 Modbus data points. This is suffixed with "high" for high bytes and "low" for low bytes.

Example:

Modbus address	Unit name	Data point Id	Data point name	Steps	Min. value	Max. value	Writable
3	SOL	2034	Total yield collector_high	1	0	0	No
4	SOL	2034	Total yield collector_low	1	0	0	No

6.3.2 Active errors

Active errors are complied of 9 Modbus addresses. There is only an error if the "Active error X_error_type" data point has a different value to 0xFF.

Active error 1_appearance_time	Time of the appearance in minutes since midnight
Active error 1_appearance_date	Date of the appearance in days since 1.1.1900
Active error 1_disappear_time	Time of the disappearance in minutes since midnight
Active error 1_disappear_date	Date of the disappearance in days since 1.1.1900
Active error 1_source	Hoval CAN bus address of the module in which the error occurred.
Active error 1_function_group	Hoval CAN bus data point function group where the error occurred
Active error 1_function_number	Hoval CAN bus data point function where the error occurred
Active error 1_error_type	Error type
Active error 1_error_code	Error code

The meanings of "error type" and "error code" can be taken from the respective manuals of the modules.

6.3.3 LIST data types

If a text selection can be made for a data point on the control module (e.g. "Standby", "Week 1", "Week 2", etc.), the LIST data type manages the text that is represented by a number. Fields "Text 0" to "Text 31" of the data point list indicate which number means what and which text it represents. If, for example, the value of a LIST data point is "2", the setting, which is entered in the "Text 2" column in the data point list, is active.

The value in the "Min. value" column regulates which selection is permissible. This value represents a bit pattern, which is laid over the 32 text columns and masks the texts that can be selected.

6.4 Essential data points

6.4.1 The following lists contain a selection of important data points. TTE-WEZ

This list applies to the first heat generator module; the data point list must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
1477	WEZ	1	AF1 - outdoor sensor 1	S16	1	General	General	1	0	0	No	Outdoor sensor 1 (AF1, local HW input)
1513	WEZ	1	Supply actual	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
1514	WEZ	1	Supply actual	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
1515	WEZ	1	Supply actual	S16	1	Heating circuit	Heating circuit 3	1	0	0	No	
1500	WEZ	1	Hot water actual SF	S16	1	Hot water	Hot water 1	1	0	0	No	
1539	WEZ	1	WEZ status	U8	0	Auto unit	FA General	1	0	0	No	Burner status
1531	WEZ	1	WEZ set value	S16	1	Auto unit	FA general	1	0	0	No	WEZ set value
1525	WEZ	1	WEZ temperature	S16	1	Auto unit	FA general	1	0	0	No	WEZ temperature
1536	WEZ	1	WEZ output	U8	0	Auto unit	FA General	1	0	0	No	WEZ output
1528	WEZ	1	Burner flame	U8	0	Auto unit	FA General	1	0	0	No	Burner flame
1487	WEZ	1	Set temperature Manual operating mode	S16	1	Heating circuit	Heating circuit 1	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
1488	WEZ	1	Manual mode set temperature	S16	1	Heating circuit	Heating circuit 2	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
1489	WEZ	1	Manual mode set temperature	S16	1	Heating circuit	Heating circuit 3	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
1481	WEZ	1	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 1	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.
1483	WEZ	1	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 2	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.
1485	WEZ	1	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 3	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.

1478	WEZ	1	Heating operation choice	LIST	0	Heating circuit	Heating circuit 1	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling
1479	WEZ	1	Heating operation choice	LIST	0	Heating circuit	Heating circuit 2	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling
1480	WEZ	1	Heating operation choice	LIST	0	Heating circuit	Heating circuit 3	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling
1563	WEZ	1	Emissions test output limitation	U8	0	Heat gen.	Heat gen.	1	1	100	Yes	Can be requested for each H-Gen, can be changed continuously as parameter, initialise emissions at start
1564	WEZ	1	Activate emissions test	U8	0	Heat gen.	Heat gen.	1	0	1	Yes	Activate emissions test #0=OFF, #1=ON
1561	WEZ	1	Operation choice Heat generator	LIST	0	Heat gen.	Heat gen.	1	0x00000013	0	Yes	The following operating modes can be selected: #0 = Heat generator off #1 = Automatic mode #4 = Manual heating #5 = Manual cooling
1562	WEZ	1	Set temperature Manual operating mode	S16	1	Heat gen.	Heat gen.	10	0	900	Yes	Set value for the heat generator flow temperature in manual operating mode.

Comment:

- **Room set temperature for heating circuit:** Set "Heating operation choice" to constant and set required temperature below "Normal room temp. heating oper.". Cascade management in TTE
- **Flow set temperature for heating circuit:** "Heating operation choice" to manual. Set "Manual mode set temperature" to required temperature. Cascade management in TTE
- **Output set temperature at heat exchanger:** Set "Activate emissions test" to "0" and immediately to "1" every 59 minutes and set "Emissions test output limitation" to required modulation. The cascade management is external.
- **Set temperature to heat generator:** Set "Heat generator operation choice" to manual and enter required temperature below "Manual mode set temperature". The cascade management is external.

6.4.2   TTE-HK/WW

This list applies to the first heating circuit/domestic hot water module; the data point list must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
3705	HK/WW	257	AF1 - outdoor sensor 1	S16	1	General	General	1	0	0	No	Outdoor sensor 1 (AF1, local HW input)
3738	HK/WW	257	Supply actual	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
3739	HK/WW	257	Supply actual	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
3740	HK/WW	257	Supply actual	S16	1	Heating circuit	Heating circuit 3	1	0	0	No	
3735	HK/WW	257	Room actual	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
3736	HK/WW	257	Room actual	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
3737	HK/WW	257	Room actual	S16	1	Heating circuit	Heating circuit 3	1	0	0	No	
3728	HK/WW	257	Hot water actual SF	S16	1	Hot water	Hot water 1	1	0	0	No	
3727	HK/WW	257	Hot water setpoint	S16	1	Hot water	Hot water 1	1	0	0	No	Calc. ref. value for the hot water temp.
3729	HK/WW	257	SLP hot water charging pump	U8	0	Hot water	Hot water 1	1	0	1	No	
3718	HK/WW	257	Manual mode set temperature	S16	1	Heating circuit	Heating circuit 1	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
3719	HK/WW	257	Manual mode set temperature	S16	1	Heating circuit	Heating circuit 2	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
3720	HK/WW	257	Manual mode set temperature	S16	1	Heating circuit	Heating circuit 3	5	100	900	Yes	In manual operation, the flow temperature is controlled at the reference value set here.
3709	HK/WW	257	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 1	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.
3711	HK/WW	257	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 2	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.
3713	HK/WW	257	Normal room temp. heating oper.	S16	1	Heating circuit	Heating circuit 3	5	100	300	Yes	The parameter selects the required setpoint for the room temperature during normal heating operation.

3706	HK/WW	257	Heating operation choice	LIST	0	Heating circuit	Heating circuit 1	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling
3707	HK/WW	257	Heating operation choice	LIST	0	Heating circuit	Heating circuit 2	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling
3708	HK/WW	257	Heating operation choice	LIST	0	Heating circuit	Heating circuit 3	1	0x01D3	0	Yes	The setting determines the operation choice of the heating circuit: #0 = Standby mode #1 = Automatic mode #4 = Constant normal mode #5 = Constant energy-saving mode #6 = Summer mode #7 = Manual operating mode heating #8 = Manual operating mode cooling

Comment:

- Room set temperature for heating circuit: Set "Heating operation choice" to constant and set required temperature below "Normal room temp. heating oper.".
- Flow set temperature for heating circuit: "Heating operation choice" to manual. Set "Manual mode set temperature" to required temperature.

6.4.3 TTE-PS
This list applies to the first solar pump module; the data
point list must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
16516	PS	129	Status buffer	U8	0	Buffer	Buffer	0	0	0	No	Buffer function operating state: Charging control: #0 = No requirement, OFF #1 = Requirement, low temp., PLP off (discharge protection) #2 = Requirement, charging running #3 = Requirement, setpoint achieved, follow-on active #4 = Requirement, setpoint achieved #6 = Forced energy #7= Skimming function Discharge control: #0 = No requirement (WEZ release) #2 = Requirement, setpoint not achieved, UPE in direction of WEZ or YPEL regulates constantly to PEF #3 = Requirement, UPE changeover delay, UPE/YPEL in direction of WEZ #4 = Requirement, setpoint achieved, UPE/YPEL in direction of buffer #6 = Forced energy #8 = Preferential operation SmartGrid #9 = Forced acceptance SmartGrid
16517	PS	129	Buffer setpoint	S16	1	Buffer	Buffer	1	0	0	No	Buffer setpoint
16518	PS	129	Buffer PF/KPF2 actual	S16	1	Buffer	Buffer	1	0	0	No	Buffer PF/KPF2 actual
16519	PS	129	Buffer PF2/KPF actual	S16	1	Buffer	Buffer	1	0	0	No	Buffer PF2/KPF actual

6.4.4 SOL
This list applies to the first SOL module; the data point list
must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
1	SOL	65	TKO1 collector temperature	S16	1	Collector	Collector 1	1	-300	3000	No	TKO1 collector temperature
81	SOL	65	TKR collector return temp.	S16	1	Collector	Collector 1	1	0	1000	No	TKR collector return temperature
86	SOL	65	PS curr. speed solar pump	U8	0	Collector	Collector 2	1	0	100	No	PS curr. speed solar pump
8	SOL	65	Total yield collector_high	S32	0	Collector	Collector 1	1	0	0	No	Total yield collector
9	SOL	65	Total yield collector_low	S32	0	Collector	Collector 1	1	0	0	No	Total yield collector
79	SOL	65	Vset volume flow solar circuit	S16	2	Collector	Collector 1	1	0	0	No	Vset volume flow solar circuit
6	SOL	65	Operating hours PS solar pump	U16	0	Collector	Collector 1	1	0	65535	No	Below 81 reset of operating hours (only change to "0" possible)
10	SOL	65	Current collector output	S16	1	Collector	Collector 1	1	0	32767	No	Current collector output
69	SOL	65	Solar controller status	U8	0	Collector	Collector 1	1	0	3	No	Solar functions status #0 = Switched off #1= Charging active #2= Fault #3= Warning / info
71	SOL	65	TU storage tank bottom temp.	S16	1	Solar storage tank	Solar storage tank 1	1	0	1000	No	Current temperature in the solar storage tank bottom.

6.4.5 TTE-FW

This list applies to the first district heating module; the data point list must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
5309	DH	193	AF1 - outdoor sensor 1	S16	1	General	General	1	0	0	No	Outdoor sensor 1 (AF1, local HW input)
5325	DH	193	Room setpoint	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
5326	DH	193	Room setpoint	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
5345	DH	193	Hot water setpoint	S16	1	Hot water	Hot water 1	1	0	0	No	Calc. ref. value for the hot water temp.
5346	DH	193	Hot water actual SF	S16	1	Hot water	Hot water 1	1	0	0	No	
5366	DH	193	Room actual	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
5367	DH	193	Room actual	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
5371	DH	193	Supply actual	S16	1	Heating circuit	Heating circuit 1	1	0	0	No	
5372	DH	193	Supply actual	S16	1	Heating circuit	Heating circuit 2	1	0	0	No	
5480	DH	193	Current energy_high	U32	3	MBUS	MBus 1	1	0	0	No	
5481	DH	193	Current energy_low	U32	3	MBUS	MBus 1	1	0	0	No	
5482	DH	193	Current power_high	U32	1	MBUS	MBus 1	1	0	0	No	
5483	DH	193	Current power_low	U32	1	MBUS	MBus 1	1	0	0	No	
5488	DH	193	Current flow rate_high	U32	0	MBUS	MBus 1	1	0	0	No	
5489	DH	193	Current flow rate_low	U32	0	MBUS	MBus 1	1	0	0	No	
5490	DH	193	Current volume_high	U32	1	MBUS	MBus 1	1	0	0	No	
5491	DH	193	Current volume_low	U32	1	MBUS	MBus 1	1	0	0	No	
5492	DH	193	Current flow temperature	S16	1	MBUS	MBus 1	1	0	0	No	
5493	DH	193	Current return temperature	S16	1	MBUS	MBus 1	1	0	0	No	
5494	DH	193	Current differential temperature	S16	1	MBUS	MBus 1	1	0	0	No	

6.4.6   TTE-MWA

This list applies to the first MWA module; the data point
list must be consulted for all other modules.

Modbus address	Unit name	UnitId	DatapointName	Type name	Decimal	FunctionGroup name	Function name	Steps	Min. value	Max. value	Writable	Commentary
11207	MWA	385	Current energy_high	U32	3	MBUS	MBus 1	1	0	0	No	
11208	MWA	385	Current energy_low	U32	3	MBUS	MBus 1	1	0	0	No	
11239	MWA	385	Current power_high	U32	1	MBUS	MBus 1	1	0	0	No	
11240	MWA	385	Current power_low	U32	1	MBUS	MBus 1	1	0	0	No	
11271	MWA	385	Current volume_high	U32	1	MBUS	MBus 1	1	0	0	No	
11272	MWA	385	Current volume_low	U32	1	MBUS	MBus 1	1	0	0	No	
11273	MWA	385	Current flow rate_high	U32	0	MBUS	MBus 1	1	0	0	No	
11274	MWA	385	Current flow rate_low	U32	0	MBUS	MBus 1	1	0	0	No	
11275	MWA	385	Current flow temperature	S16	1	MBUS	MBus 1	1	0	0	No	
11276	MWA	385	Current return temperature	S16	1	MBUS	MBus 1	1	0	0	No	
11277	MWA	385	Current differential temperature	S16	1	MBUS	MBus 1	1	0	0	No	

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