Installation and operating instructions

Electronic counter for recording heat quantity

These operating instructions are part of the product.

- Read the instructions carefully before use,
- keep them over the entire lifetime of the product,
- and pass them on to any future owner or user of this product.

EN

737.789 | Z01 | 10.28 | Subject to change due to technical improvements!

Content

Product information

EC declaration of conformity

"This product conforms to the applicable European directives with regard to its design and its operating behaviour. This conformity has been verified. Further information in this regard can be obtained from your dealer."

1 Safety

1.1 Proper usage

The electronic counter for recording heat quantity is an independent device for on-surface installation. The device may only be used within the permissible ambient conditions (see chapter 13 "Technical data").

The counter must not be operated in the following environments:

- outdoors
- in damp rooms
- in rooms where highly flammable gas mixtures can occur
- in rooms in which the operation of electrical and electronic components may cause dangers to arise

1.2 Dangers during assembly / commissioning

The following dangers exist during installation/commissioning of the counter and during operation (in case of installation errors):

- risk of death by electrocution
- risk of fire due to short-circuit
- damage to any of the constructional fire safety measures present in the building due to incorrectly installed cables

- damage to the counter and the connected sensors due to improper ambient conditions, inappropriate power supply, connection of prohibited devices, faulty devices, or devices not included in the device specifications, as well as incorrect assembly or installation

NOTE

Observe the counter's type plate!

Therefore, all safety regulations apply when working on the mains supply. Only qualified electricians may perform work that requires opening the counter (such as electrical connection work).

- ▶ When laying cables, ensure that no damage occurs to any of the constructional fire safety measures in the building.
- ▶ Make sure that the permissible ambient conditions at the installation site are not exceeded (see chapter 13 "Technical data").
- ▶ Be sure to comply with the specified ingress protection.
- ▶ Labels and markings applied in the factory may not be altered, removed or rendered unreadable.
- ▶ Before connecting the device, make sure that the power supply matches the specifications on the type plate.

- Make sure that all sensors connected to the counter conform to the technical specifications of the counter.
- Secure the device against unintentional start-up.
- The mains supply must be disconnected before any work is done on an open counter.
- Protect the counter against overloading and short-circuiting.

1.3 Detecting faults

- Check the display regularly.
- In case of faults, isolate the cause (see chapter 11.1 "Causes of faults").
- As soon as it becomes evident that safe operation is no longer guaranteed (e.g. visible damage), remove the device from the mains supply immediately.
- Have trained professional personnel remedy the fault.

1.4 Disposal

Dispose of the counter in accordance with the regional regulations.

1.5 Exclusion of liability

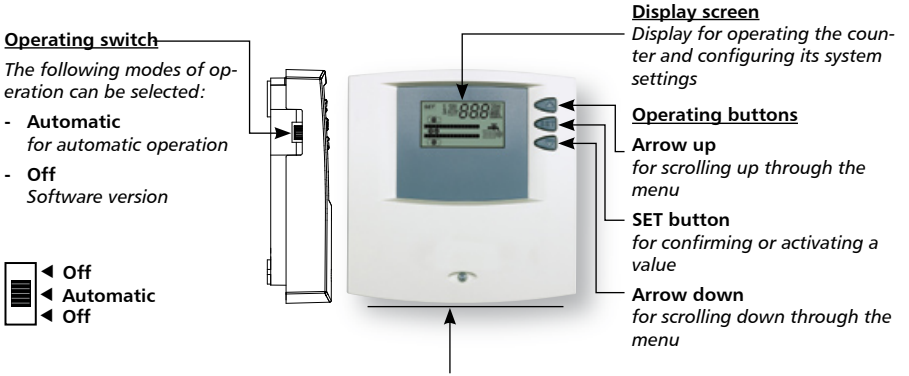
The manufacturer can neither monitor the compliance with this manual nor the conditions and methods during the installation, operation, usage and maintenance of the counter. Improper installation of the system may result in damage to property and, as a consequence, bodily injury.

Therefore, the manufacturer assumes no responsibility and liability for loss, damage or costs which result from or are in any way related to incorrect installation, improper operation, incorrect execution of installation work and incorrect usage and maintenance.

Similarly, the manufacturer assumes no responsibility for patent right or other right infringements of third parties caused by usage of this product.

The manufacturer reserves the right to make changes to the product, technical data or installation and operating instructions without prior notice.

2 Case overview



NOTE

The counter can only measure the heating/cooling quantity in automatic mode. Make sure the operating switch is set to automatic after commissioning.

3 About these operating instructions

3.1 Applicability

These instructions describe the installation, commissioning, function, operation, maintenance and dismantling of the electronic counter (referred to as "counter" in the following). When installing the remaining components, e.g. the Grundfos Direct Sensors™ [1], be sure to observe the appropriate installation instructions provided by each manufacturer.

3.2 Users

Installation, commissioning, maintenance and dismantling of the counter may only be performed by trained professional personnel. Before commissioning, the device must be assembled and installed by professional personnel in accordance with the applicable regional and transregional regulations and the safety instructions and general instructions within these installation and operating instructions. The professional personnel must be familiar with these operating instructions.

The product is maintenance-free.

Use the device only after thoroughly reading and understanding these operating instructions and safety instructions. Adhere to all safety instructions and consult professional personnel in the event of any ambiguities.

[1] Grundfos Direct Sensors™ is a registered trademark of the Grundfos group.

This device is not intended for persons (or children) with physical, sensory, or mental disabilities, or who have inadequate experience and knowledge, unless they are instructed in the use of the device, and initially supervised, by a person responsible for their safety. Children should not be left alone with the device, to ensure that they do not play with it.

3.3 Description of symbols

3.3.1 Structure of the warning notices

⚠ SIGNAL WORD

Type, source and consequences of the danger!

▶ Measures for avoiding danger.

3.3.2 Danger levels in warning notices

Danger level	Likelihood of occurrence	Consequences resulting from non-compliance
⚠ **DANGER**	Imminent threat of danger	Death, serious bodily injury
⚠ **WARNING**	Possible threat of danger	Death, serious bodily injury
⚠ **CAUTION**	Possible threat of danger	Minor bodily injury
CAUTION	Possible threat of danger	Property damage

3.3.3 Note

NOTE

Note on easier and safer working habits.

▶ Measure for easier and safer working habits

3.3.4 Other symbols and markings

Symbol	Meaning
✓	Condition for action
▶	Call to action
⇨	Result of action
•	List
Emphasis on issue at hand	Emphasis on issue at hand
△▽:	Press "Arrow up/down" for scrolling
▽:	Press "Arrow down" for scrolling through the menu or to adjust a value
△:	Press "Arrow up" for scrolling through the menu or to adjust a value
SET:	Press "SET" button to confirm or activate a value
ESC:	Press "ESC" button to cancel

4 Description

4.1 How the counter functions

The electronic counter is a measuring device for recording the amount of heating / cooling energy ($\dot{Q}$) fed to a consumer device via a heating / cooling circulation system. This is calculated from the measured volume flow of the heating / cooling fluid (water or water / antifreeze mixture) and the temperature difference between supply (ϑ_V) and return (ϑ_R). Temperature-dependent thermophysical properties such as density (ρ) and heat capacity (c_W) are also taken into account. The counter automatically calculates the quantity of heat / cooling energy ($\dot{Q}$) by performing a mathematical integration of the supplied heat / cooling quantity (Q) over time. This is denoted in the display using the units kilowatt, megawatt and gigawatt hours (kWh / MWh / GWh).

$$\dot{Q} = \dot{V} \cdot \rho \cdot c_W \cdot (\vartheta_V - \vartheta_R)$$

$$Q = \int \dot{Q}\, dt$$

The counter sums positive heat / cooling quantity $(\vartheta_V - \vartheta_R)$ and also negative heat / cooling quantity (ϑ_R - ϑ_V). To achieve a more exact calculation of the heat / cooling quantity, the counter allows automatic reconciliation of the temperature sensors. The set parameters and the measured heat / cooling power are retained if the power fails.

$\dot{Q}$ = heat / cooling output (kW)

$\dot{V}$ = volume flow (l/s)

c_W [(1)] = specific heat capacity of water

ϑ_V = temperature supply (°C)

ϑ_R = temperature return (°C)

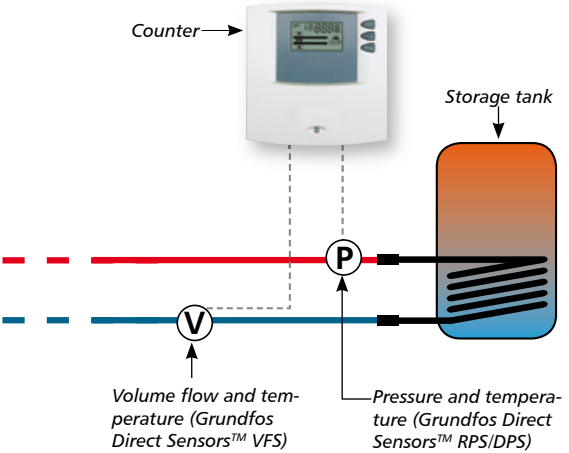
ρ = density (kg/l)

Q = heat / cooling quantity (kWh)

t = time (h)

[(1)] If water/anti-freeze mixtures are used, a different specific heat capacity is taken into account on the basis of the mixing ratio.

Example application of the counter



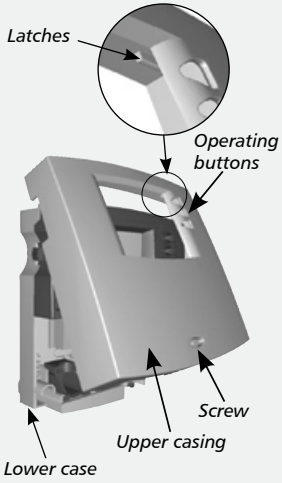
5 Installation

5.1 Opening / closing the casing

⚠ DANGER

Risk of fatal injury due to electric shock!

- ▶ Disconnect the counter from the power supply before opening the case.
- ▶ Make sure that the power supply cannot be unintentionally switched on.
- ▶ Do not damage the case.
- ▶ Only switch the power supply back on after the case has been closed.



The upper case is connected to the lower case by two latches, and fastened with a screw.

5.1.1 Opening the case

- ▶ Loosen the screw and remove the upper casing in an upwards direction.

5.1.2 Closing the case

- ▶ Place the upper casing over the lower case at an angle. Insert the latches into the recesses of the lower casing.
- ▶ Pivot the upper casing down and feed the operating buttons through the matching holes.
- ▶ Fasten the case tightly with the screw.

5.2 Installation

⚠ WARNING

Risk of electrical shock and fire if mounted in a damp environment!

- ▶ Only mount the device in an area where the ingress protection is sufficient.

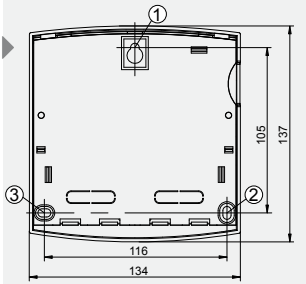
5.2.1 Mounting the counter

⚠ CAUTION

Risk of injury and damage to the casing when drilling!

- ▶ Do not use the casing as a drilling template.

- ▶ Choose a suitable installation site.
- ▶ Drill the upper fastening hole.
- ▶ Screw in the screw.
- ▶ Remove the upper casing.
- ▶ Hang the case in the recess ①.
- ▶ Mark the position of the lower fastening holes ②, ③.
- ▶ Remove the case again.
- ▶ Drill the lower fastening holes.
- ▶ Hang the case in the recess ①.
- ▶ Screw the case firmly using the lower fastening holes ② and ③.
- ▶ Mount the upper casing.



5.3 Electrical connection

⚠ DANGER

Risk of fatal injury due to electric shock!

- ▶ Disconnect the counter from the power supply before opening the casing.
- ▶ Observe all guidelines and regulations of the local electricity supplier.

NOTE

The device is to be connected to the grid by means of a plug with grounding contact, or in the case of a fixed electrical installation via a disconnection device for complete disconnection in accordance with the installation guidelines.

5.3.1 Preparing the cable feed

Depending on the type of installation, the cables may enter the device through the rear of the case or the lower side of the case.

Feeding the cable through the rear of the case

⚠ WARNING

Risk of electrical shock and fire due to cables coming loose!

- ▶ Install an external strain relief for the cables.

▶ Remove the plastic flaps ⑦ from the rear side of the case using an appropriate tool (fig. 1).

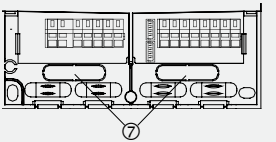


Fig. 1: cable feed from the rear

Feeding the cable through the lower side of the case

⚠ WARNING

Risk of electrical shock and fire due to cables coming loose!

▶ Fasten the flexible cabling to the case using the strain-relief clamps provided.

▶ Cut the left and right plastic flaps ⑥ using an appropriate tool and break them out of the case (fig. 2).

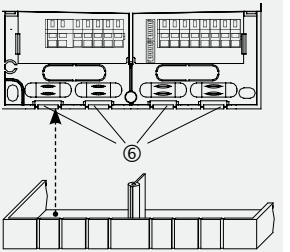


Fig. 2: cable feed from below

5.3.2 Connecting the cables

▶ Mains cable:
- Each terminal may only be connected to a single connecting wire (max 2.5 mm^2).
- The terminals are suitable for connection without core end sleeves; stranded wires are to be twisted (1 twist per 20 mm).

- Sensors:
  - Use only original Grundfos Direct Sensors™ that are approved for use with the device.
  - Lay the Grundfos Direct Sensors™ cables away from 230 V or 400 V cables (minimum clearance: 100 mm).
  - If inductive effects are expected, e.g. from high-voltage cables, overhead train cables, transformer substations, radio and television devices, amateur radio stations, microwave devices etc., then the Grundfos Direct Sensors™ cables must be adequately shielded.
  - Observe the technical data of the Grundfos Direct Sensors™.
- In general:
  - Connect the cables in accordance with the terminal diagram, see chapter 5.5.

5.4 Deinstallation

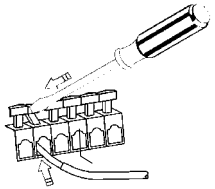
⚠ DANGER

Risk of fatal injury due to electric shock!

- Disconnect the counter from the power supply before commencing with deinstallation.
- To deinstall the controller, follow the installation instructions in the reverse order.

5.5 Terminal plan

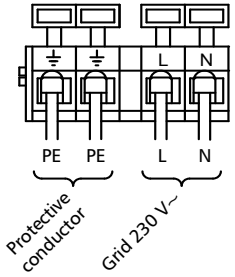
5.5.1 Actuating the connecting terminals



NOTE

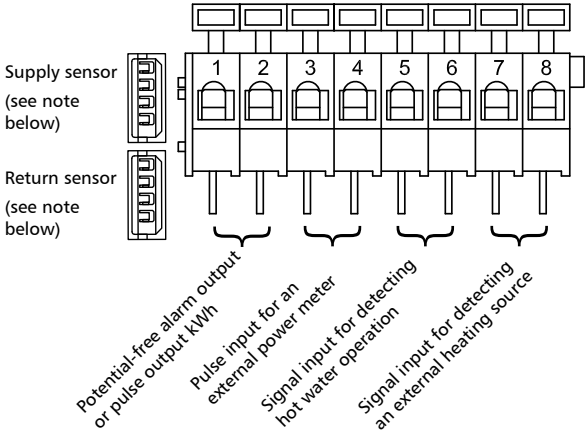
The connecting terminal may only be actuated with an appropriate tool. An unsuitable tool or too much mechanical pressure can damage or even destroy the connecting terminal.

5.5.2 Power connection



L: phase
N: neutral conductor
⏚: protective conductor

5.5.3 Connecting the inputs / outputs



⚠ CAUTION

Please ensure that you comply with the technical data for the inputs, see chapter 13.

NOTE

A flow sensor or a pressure sensor can be used for the supply and return sensors. However, the same type may not be used for both sensors. Possible combinations:
Supply sensor: RPS/DPS – Return sensor: VFS
Supply sensor: VFS - Return sensor: RPS/DPS.

6 Commissioning

The counter can only function properly if all the settings are defined.

Note that all settings have been preset to the factory defaults before the device is commissioned. All settings must therefore first be checked when commissioning.

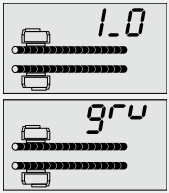
6.1 Automatic recognition of the sensor type

During commissioning the counter performs automatic recognition of the sensor type. For this to take place, the Grundfos Direct Sensors™ must be connected before power is applied to the device for the first time.

After automatic recognition of the sensor type, the "Select supply and return sensor type" settings menu is displayed, see chapter 10.1.3. The automatically recognised sensor types can be checked here and modified if necessary.

7 Modes of operation

7.1 "OFF" mode



Slide the operating switch up or down to see the software version of the counter in the display.

NOTE

No heat quantity recording takes place in this operating mode.

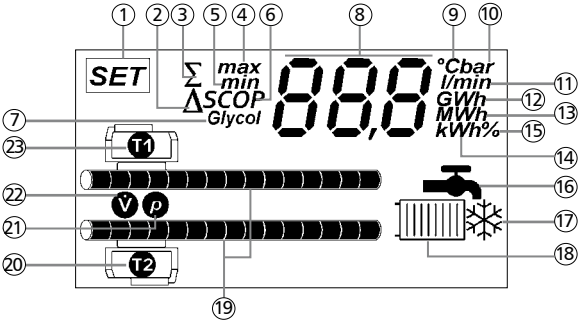
7.2 "Automatic" mode

Slide the operating switch to the middle position to set the counter to the "Automatic" operating mode.

NOTE

In normal operation the operating switch must always be set to "Automatic".

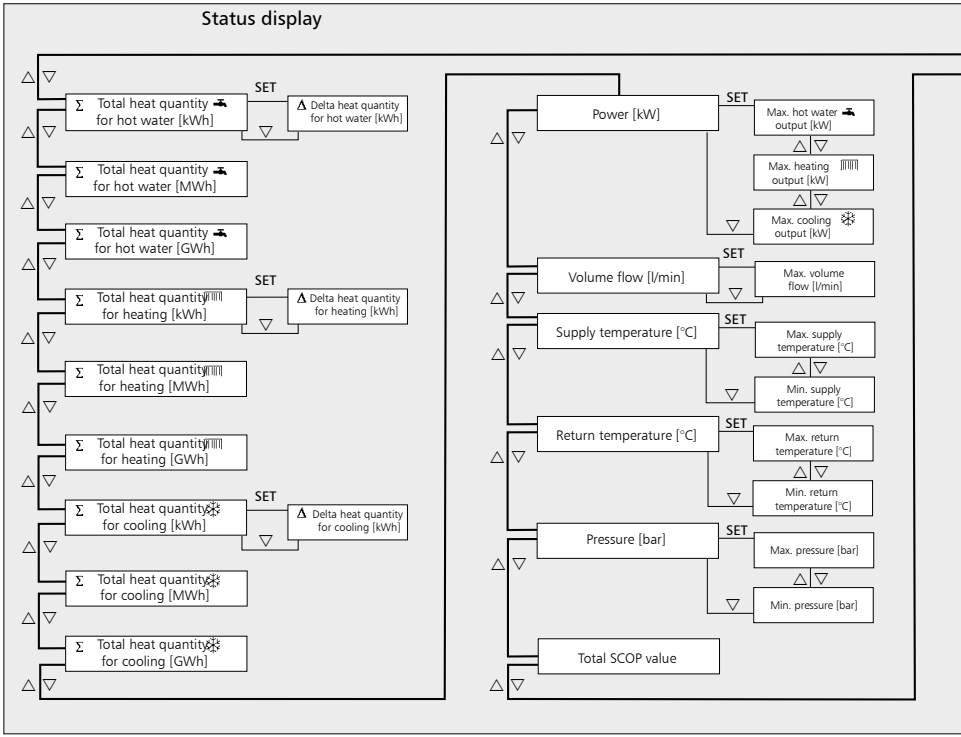
8 Display overview

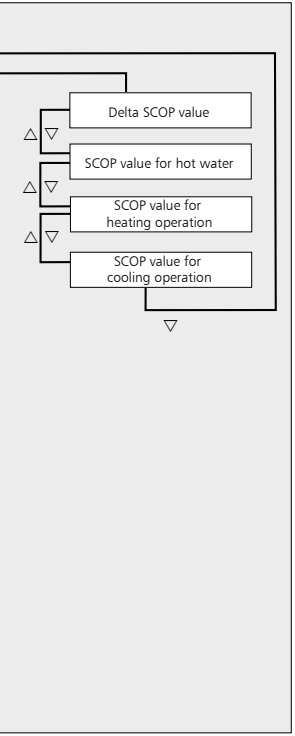


1. SET menu
2. Delta sign for resettable heat quantity
3. Sum sign for total heat quantity
4. Symbol **max** for maximum value
5. Symbol **min** for minimum value
6. Correction factor SCOP
7. Glycol proportion
8. Measurement display
9. Unit of temperature [°C]
10. Unit of pressure [bar]
11. Unit of volume flow [l/min]
12. Energy unit gigawatt hours [GWh]
13. Energy unit megawatt hours [MWh]
14. Energy unit kilowatt hours [kWh]
15. Percentage [%]
16. Symbol for hot water operation
17. Symbol for cooling operation
18. Symbol for heating operation
19. Graphic animation of supply and return
20. Temperature sensor T2 (return)
21. Pressure measurement
22. Volume flow measurement
23. Temperature sensor T1 (supply)

9 Operation

9.1 Main menu overview




Delta SCOP value
SCOP value for hot water
SCOP value for heating operation
SCOP value for cooling operation

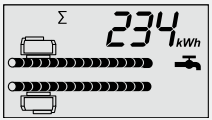
9.2 Status display

The counter distinguishes between three different types of heat quantity measurement.

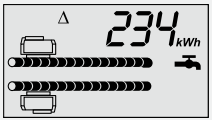
9.2.1 Hot water heat quantity

The measured heat quantity is added to the total hot water heat quantity as long as a signal is present at input terminals 5 and 6 (e.g. from an external switching valve).

- The △▽ buttons can be used to display the total hot water heat quantity. In order to display the measured heat quantity with as much detail as possible, the counter divides the total output into three different output units (GWh, MWh, kWh).



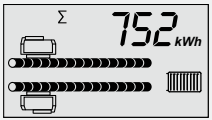
- The delta value of the heat quantity can be displayed via the **SET** button. Pressing and holding the **SET** button for 2 seconds resets the delta value.

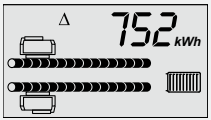


9.2.2 Heating heat quantity

The measured heat quantity is added to the total heating heat quantity as long as a flow signal is present at the VFS input and the supply temperature (T1) is higher than the return temperature (T2).

- The △▽ buttons can be used to display the total heating heat quantity. In order to display the measured heat quantity with as much detail as possible, the counter divides the total output into three different output units (GWh, MWh, kWh).

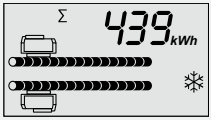




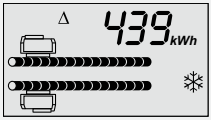
▶ The delta value of the heat quantity can be displayed via the **SET** button. Pressing and holding the **SET** button for 2 seconds resets the delta value.

9.2.3 Cooling heat quantity

The measured heat quantity is added to the total cooling heat quantity as long as a flow signal is present at the VFS input and the supply temperature (T1) is lower than the return temperature (T2).

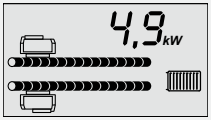


▶ The △▽ buttons can be used to display the total hot water heat quantity. In order to display the measured heat quantity with as much detail as possible, the counter divides the total output into three different output units (GWh, MWh, kWh).

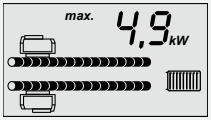


▶ The delta value of the cooling heat quantity can be displayed via the **SET** button. Pressing and holding the **SET** button for 2 seconds resets the delta value.

9.2.4 Output



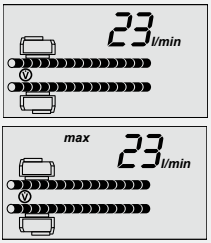
▶ The current output of the respective heat quantity category is displayed.



▶ The **SET** button displays the maximum output. The △▽ buttons display the next or previous heat quantity category. Press and hold the **SET** button for 2 seconds to reset the maximum output value for the current heat quantity category. Pressing the ▽ button displays the current output once more.

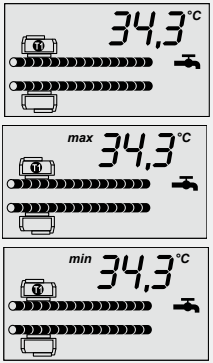
9.2.5 Volume flow

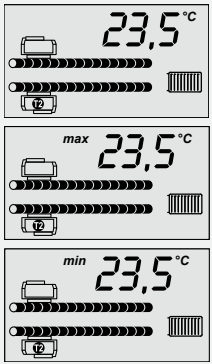
- The volume flow is displayed.
- The maximum volume flow is displayed via the **SET** button. Pressing **SET** for 2 seconds resets this to the current value. Pressing the ▽ button displays the current volume flow once more.



9.2.6 Supply temperature

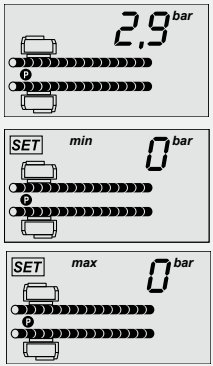
- The supply temperature is displayed.
- The maximum supply is displayed via the **SET** button. Pressing **SET** for 2 seconds resets this to the current value. The minimum value of the supply temperature is displayed via the △▽ buttons. Pressing **SET** for 2 seconds also resets this value to the current value. Pressing the ▽ button displays the current supply temperature once more.





9.2.7 Return temperature

- ▶ The return temperature is displayed.
- ▶ The maximum return temperature is displayed via the **SET** button. Pressing **SET** for 2 seconds resets this to the current value. The minimum value of the return temperature is displayed via the △▽ buttons. Pressing **SET** for 2 seconds also resets this to the current value. Pressing the ▽ button displays the current return temperature once more.

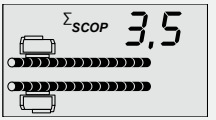


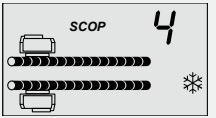
9.2.8 Pressure

- ▶ The pressure is displayed.
- ▶ The maximum pressure is displayed via the **SET** button. Pressing **SET** for 2 seconds resets this to the current value. The minimum pressure can be displayed via the △▽ buttons. Pressing **SET** for 2 seconds also resets this value to the current value. Pressing the ▽ button displays the current pressure once more.

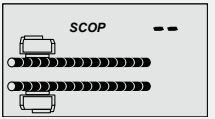
9.2.9 SCOP value

- ▶ The following displays can be selected:
  - Total display: total SCOP of the system
  - Delta display: total SCOP of the system including the SCOP correction factor
  - Hot water display: SCOP value relating exclusively to hot water operation (including the SCOP correction factor).
  - Heating display: SCOP value relating exclusively to heating operation (including the SCOP correction factor).
  - Cooling display: SCOP value relating exclusively to cooling operation (including the SCOP correction factor).
- ▶ The △▽ buttons can be used to switch between the different displays.





Sample display: Cooling display



Calculation of the SCOP value:

The SCOP (Seasonal Coefficient Of Performance) is a measurement of the thermal degree of efficiency. The SCOP value is updated every 24 hours. The display shows "--" for the first 24 hours. The SCOP value represents a quality criterion of the system and expresses the ratio of heat output to consumed electrical energy.

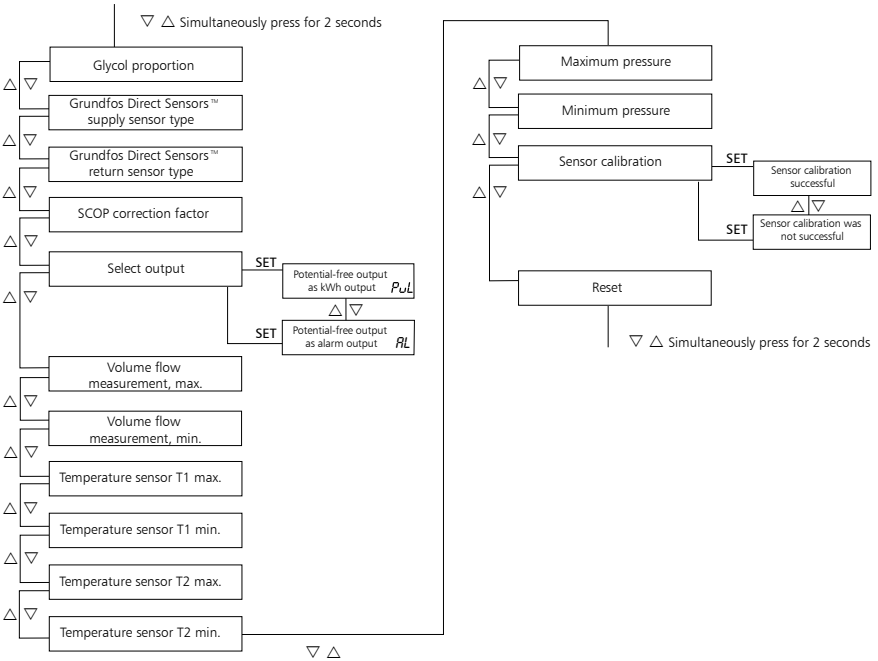
For example, a SCOP value of 4 means that four times as much heat was generated as the electrical energy required for the circulation system.

NOTE

The amount of electrical energy consumed must be measured in order to determine the SCOP value. This is obtained via a suitable energy meter (power meter) that delivers one impulse per electrical kWh. This impulse is passed to the pulse input (terminals 3 and 4) of the counter.

10 Setting the counter

10.1 Settings menu overview



10.1.1 Using the settings menu

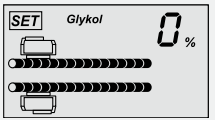
To change settings, press and hold both △▽ buttons at the same time for about 2 seconds. The **SET** symbol then appears in the upper left of the display.

- ▶ Press the ▽ button to switch to the next settings menu.
- ▶ Press **SET** to change a setting.
- ▶ Use the △▽ buttons to select the desired value for the setting.
- ▶ Save the setting value by pressing **SET**.
- ▶ To exit the settings menu, press the ▽ button until the total heat quantity is displayed (main menu).

The following settings can be defined on the counter:

- Glycol proportion
- Grundfos Direct Sensors™ supply sensor type
- Grundfos Direct Sensors™ return sensor type
- SCOP correction factor
- Alarm/pulse output
- Max./min. volume flow
- T1 max./min. temperature
- T2 max./min. temperature
- Max. and min. pressure
- Sensor reconciliation
- Reset

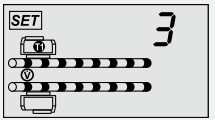
10.1.2 Glycol proportion



When using an anti-freeze mixture (Glycol) the mixing ratio must be set in order to correctly calculate the heat quantity.

	Factory setting	Adjustable down to min.	Adjustable up to max.
Glycol proportion	0 %	0 % (100% water)	60 % (40% water, 60% Glycol proportion)

10.1.3 Selection of supply and return sensor type



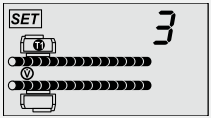
The two menu items described below allow assignment of the type of Grundfos Direct Sensors™ used for the supply and return. Please observe the technical documentation of the Grundfos Direct Sensors™ .

NOTE

A flow sensor or a pressure sensor can be used for the supply and return sensors. However, the same type may not be used for both sensors. Possible combinations:

Supply sensor: RPS/DPS – Return sensor: VFS

Supply sensor: VFS – Return sensor: RPS/DPS.

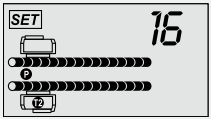


Sample display:
Selection of Sensor type VFS 2-40

Grundfos Direct Sensors™ flow sensor type:

	Factory setting	1	2	3
Type	Automatic recognition of the sensor type	VFS 1-12	VFS 1-20	VFS 2-40

4	5	6
VFS 5-100	VFS 10-200	VFS 20- 400



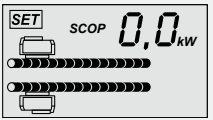
Sample display:
Selection of Sensor type RPS/DPS 0-6

Grundfos Direct Sensors™ pressure sensor type:

	Factory setting	11	12	13
Type	Automatic recognition of the sensor type	RPS/DPS 0-0.6	RPS/DPS 0-1	RPS/DPS 0-1.6

14	15	16	17	18
RPS/DPS 0-2.5	RPS/DPS 0-4	RPS/DPS 0-6	RPS/DPS 0-10	RPS/DPS 0-16

10.1.4 SCOP correction factor [kW]



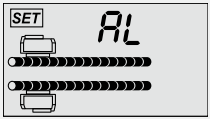
The SCOP correction factor accounts for an additional external energy source such as (e.g.) an electrical heating element.

The electrical energy consumed by the heating element is subtracted from the respective SCOP value (SCOP hot water, SCOP heating operation, SCOP cooling operation) when a signal is present at input terminals 7 and 8. Please check the technical documentation of the heating element and program the counter with the electrical consumption in kW.

	Factory setting	Adjustable down to min.	Adjustable up to max.
SCOP correction factor	0 kW	0,0	99,9

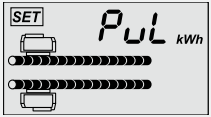
10.1.5 Alarm output or kWh pulse output

The counter has a potential-free contact connected to terminals 1 and 2. This can be used as either an alarm output or a pulse output for a kWh signal.



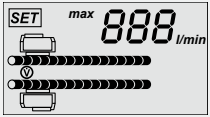
Alarm output: The potential-free relay contact closes when a sensor fails or when a minimum / maximum value (pressure / temperature / volume flow) is exceeded / not reached.

	Factory setting	Pul (kWh output)	Al (alarm output)
Type	Pul	Pul	AL



Pulse output as kWh: When the potential-free relay contact is used as a kWh output then the contact closes after each generated kWh.

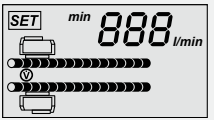
10.1.6 Volume flow maximum



A maximum volume flow can be set in this menu item. If the volume flow exceeds the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

	Factory setting	Adjustable down to min.	Adjustable up to max.
Volume flow max.	0 l/min.	0 l/min.	999 l/min.

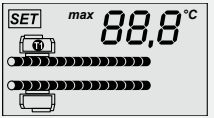
10.1.7 Volume flow minimum



A minimum volume flow can be set in this menu item. If the volume flow drops below the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

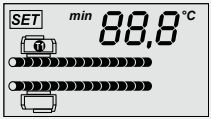
	Factory setting	Adjustable down to min.	Adjustable up to max.
Volume flow min.	0 l/min.	0 l/min.	999 l/min.

10.1.8 Temperature T1 maximum



A maximum temperature can be set in this menu item. If the temperature exceeds the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

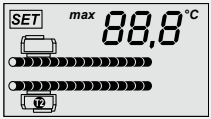
	Factory setting	Adjustable down to min.	Adjustable up to max.
T1 max.	0.0 °C	0.0 °C	99.9 °C



10.1.9 Temperature T1 minimum

A minimum temperature can be set in this menu item. If the temperature drops below the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

	Factory setting	Adjustable down to min.	Adjustable up to max.
T1 min.	0.0 °C	0.0 °C	99.9 °C

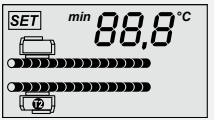


10.1.10 Temperature T2 maximum

A maximum temperature can be set in this menu item. If the temperature exceeds the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

	Factory setting	Adjustable down to min.	Adjustable up to max.
T2 max.	0.0 °C	0.0 °C	99.9 °C

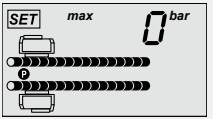
10.1.11 Temperature T2 minimum



A minimum temperature can be set in this menu item. If the temperature drops below the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

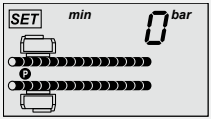
	Factory setting	Adjustable down to min.	Adjustable up to max.
T2 min.	0.0 °C	0.0 °C	99.9 °C

10.1.12 Maximum pressure



A maximum pressure can be set in this menu item. If the pressure exceeds the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

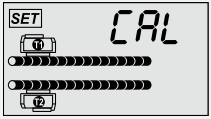
	Factory setting	Adjustable down to min.	Adjustable up to max.
Maximum pressure	0.0 bar	0.0 bar	25.5 bar



10.1.13 Minimum pressure

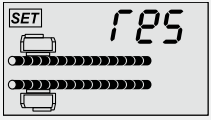
A minimum pressure can be set in this menu item. If the pressure drops below the set limit then the counter indicates this in the display. The backlighting colour also changes to red. If the alarm output is enabled then this is switched on.

Codification	Factory setting	Adjustable down to min.	Adjustable up to max.
Minimum pressure	0.0 bar	0.0 bar	25.5 bar



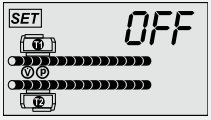
10.1.14 Sensor reconciliation (CAL):

Pressing the **SET** button for 2 seconds starts the automatic sensor reconciliation. "rdy" is shown on the display when the reconciliation is finished. "Err" is shown on the display if a fault occurred during calibration.



10.1.15 Reset (res):

Pressing the **SET** button for 2 seconds resets all settings to the factory defaults.



The display shows "OFF" after performing a reset. "Automatic recognition of the sensor type" is performed in the same way as with first commissioning by switching off the power supply and then switching it on again.

NOTE

Make sure that both Grundfos Direct Sensors™ are connected before switching on the power supply once more.

11 Maintenance

The product was designed for many years of continuous maintenance-free operation. Nevertheless, faults may occur. Maintenance may only be performed by professional personnel.

In most cases, however, the fault does not lie with the counter, but rather with the peripheral components. The following description covers the most common problems encountered with the controller.

Contact your sales representative when you are sure that the fault is not one of those described above.

See chapter 12 "Legal guarantee" for more information.

11.1 Causes of faults

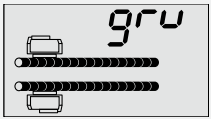
⚠ DANGER

Risk of fatal injury due to electric shock!

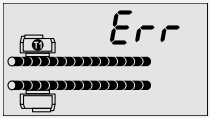
- ▶ Disconnect the counter from the power supply before opening the casing.

The counter does not appear to function at all.

Secondary symptoms	Possible cause / remedy
• The counter display is blank.	No power supply present. ▶ Have professional personnel check the power supply cable.

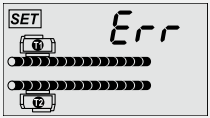


Secondary symptoms	Possible cause / remedy
• The counter displays the software version.	Operating switch is set to **Off**. ▶ Set the operating switch to "Automatic".



Counter displays "Err"

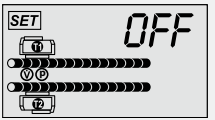
Secondary symptoms	Possible cause / remedy
• "Err" is shown in the display together with the affected sensor.	Check the Grundfos Direct Sensors™ and sensor cables.



Counter displays "Err" during calibration

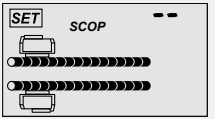
Secondary symptoms	Possible cause / remedy
• The temperature difference between the two sensors is too great.	▶ Ensure that both sensors are situated in the same ambient temperature.

Counter displays "OFF"



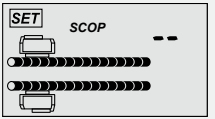
Secondary symptoms	Possible cause / remedy
• "OFF" is shown in the display	▶ A reset has been performed. Make sure that both Grundfos Direct Sensors™ are connected. Switch off the power supply and then switch it on again.

Counter displays SCOP – –



Secondary symptoms	Possible cause / remedy
• "SCOP" is displayed with two overlines	▶ SCOP cannot be calculated. Enter a correct value for the SCOP correction factor.

Counter displays SCOP _ _



Secondary symptoms	Possible cause / remedy
• "SCOP" is displayed with underscores	▶ SCOP cannot be calculated. No pulse for electrical energy or the pulse duration is less than 1 second. Check the connection and technical data of the pulse generator.

12 Legal guarantee

In accordance with German statutory regulations, there is a 2-year legal guarantee on this product for the customer.

The seller will remove all manufacturing and material faults that occur in the product during the guarantee period and affect the correct functioning of the product. Natural wear and tear does not constitute a malfunction. No legal guarantee can be offered if the fault can be attributed to third parties, unprofessional installation or commissioning, incorrect or negligent handling, improper transport, excessive loading, use of improper equipment, faulty construction work, unsuitable construction location or improper operation or use. Legal guarantee claims shall only be accepted if notification of the fault is provided immediately after it is discovered. Guarantee claims are to be directed to the seller.

The seller must be informed before guarantee claims are processed. For processing a guarantee claim an exact fault description and the invoice / delivery note must be provided.

The seller can choose to fulfil the legal guarantee either by repair or replacement. If the product can neither be repaired nor replaced, or if this does not occur within a suitable period in spite of the specification of an extension period in writing by the customer, the reduction in

value caused by the fault shall be replaced, or, if this is not sufficient taking the interests of the end customer into consideration, the contract is cancelled.

Any further claims against the seller based on this legal guarantee obligation, in particular claims for damages due to lost profit, loss-of-use or indirect damages are excluded, unless liability is obligatory by law.

13 Technical data

Electronic counter for recording heat quantity	
Operational voltage	230 VAC, 50 Hz [optional 115 VAC, 60 Hz]
Controller's own consumption	≤ 1.2 W
Inputs	1 x pulse input for an external power meter • for connecting a potential-free NO contact • value weighting: 1 kWh / pulse • max. contact load: 5 V ~ 0.2 A • max. frequency: 0.5 Hz • min. pulse duration: 1 s

Inputs	1 x signal input for detecting hot water operation • for connecting a potential-free NO contact • value weighting: closed – hot water operation; open – heating or cooling operation • max. contact load: 5 V ~ 0.2 A • max. frequency: 0.5 Hz • min. pulse duration: 1 s 1 x input for status of SCOP correction value • for connecting a potential-free NO contact • value weighting: closed – SCOP correction value is taken into account; open - SCOP correction value is not taken into account • max. contact load: 5 V ~ 0.2 A • max. frequency: 0.5 Hz • min. pulse duration: 1 s
Outputs	1 x alarm or pulse output as kWh, potential-free contact for SELV max. 42 V, max. 1 A
Display	animated LCD display (48 segments) with back-lighting
Protection degree	IP 20 / DIN 40050
Permitted ambient temperature	0 to +45 °C
Installation	wall mounting
Weight	250 g
Casing	recyclable 3-piece plastic casing
Dimensions L x W x H [mm]	137 x 134 x 38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