UVR 63H

Version 7.3 EN

Universal heating controller

Operation
Installation instructions

en

TECHNISCHE ALTERNATIVE

Contents

Safety requirements

These instructions are intended exclusively for authorised professionals. All installation and wiring work on the controller must only be carried out in a zero-volts state.

The opening, connection and commissioning of the device may only be carried out by competent personnel. In so doing, all local security requirements must be adhered to.

The device corresponds to the latest state of the art and fulfils all necessary safety conditions. It may only be used or deployed in accordance with the technical data and the safety conditions and rules listed below. When using the device, the legal and safety regulations apposite to the particular use are also to be observed. Incorrect use will result in the negation of any liability claims.

- ► The device must only be installed in a dry interior room.
- ► It must be possible to isolate the controller from the mains using an all-pole isolating device (plug/socket or double pole isolator).
- ► Before starting installation or wiring work, the controller must be completely isolated from the mains voltage and protected against being switched back on. Never interchange the safety extra-low voltage connections (sensor connections) with the 230V connections. Destructive and life-threatening voltages at the device and the connected sensors may occur.
- ► For safety reasons, the system should only be left in manual mode when testing. In this operating mode, no maximum temperatures or sensor functions are monitored.
- ► Safe operation is no longer possible if the controller or connected equipment exhibits visual damage, no longer functions or has been stored for a lengthy period of time under unsuitable conditions. If this is the case, place the controller and equipment out of service and secure against unintentional use.

Maintenance

The system does not require maintenance if handled and used properly. Use a cloth moistened with soft alcohol (such as spirit) to clean. Harsh cleaning agents and solvents such as chlorethenes or tri-gases are not admissible.

As the components relevant to accuracy are not subjected to loads if used properly, long-term deviation is very low. The unit thus cannot be adjusted. Hence, no calibration is possible.

The design characteristics of the unit must not be changed during repairs. Spare parts must correspond to the original parts used to restore the manufactured condition.

Generally applicable rules

for correct utilization of this control system

- The expression "**heating = active**" in the linking formulae relates only to the release specified in the "**PUMP**" menu or heating pump blockade conditions, but not however to a possible switching off or release of the heating pump via a minimum threshold value.
- If no room sensor is used, the room influence **RI** in the menu **MIXER** must be set to **Zero** and the sensor **S1** in the **SENSOR** menu set to **FIXED VALUE (e.g. 20°C)**.
- For use with floor and wall heating systems a safety thermostat is mandatory as required for conventional heating control units. To avoid consequential damage this has to switch off the heating circuit pump independently of controller output in the event of excess temperature.
- The speed control is only meaningful for certain conditions. One is use it to limit the return temperature of the heating circuit. In some cases it can even replace the mixer by using the speed control to hold the room temperature constant at the temperature specified in the time program. In some cases it can even replace the mixer by using the speed control to hold the room temperature constant at the desired temperature (although without the time program)

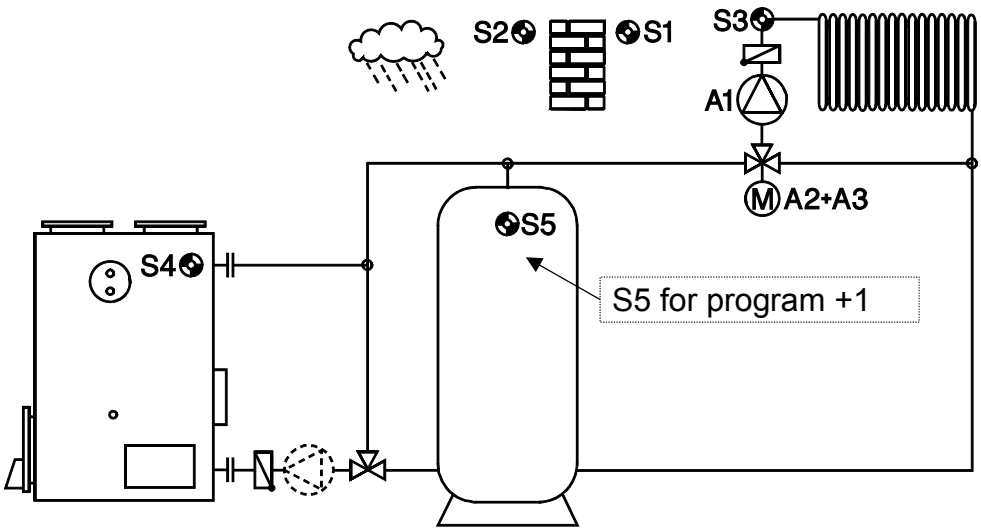
Additional functions

The following functions can be additionally activated via the main menu ***MEN***:

- **Pump speed control *PSC***
- **2 control outputs *COP***
- **3 heat quantity counters *HQC***
- **External sensors *EXT DL***

Hydraulic diagrams

Diagram 0: Heating circuit with up to 2 heat sources



A1 off S4 < min1 - - - - - - - - - - - **A1 on** - - - - - - - - - - - Switch-off cond. **PUMP** **A1 off**	***Required settings:*** **Basic control level** Time Operating mode (preferably **AUTO**) Nominal room temperature for lowering mode **RTL** Nominal room temperature for normal operation **RTN** **Time program for normal operation** **Parameter menu** Program number **PR** **min1...** Boiler **S4** → **A1** (if heating circuit active) **min2 ...** see all programs + 1 Heating curve **TEMP** or **R RISE** Flow maximum and minimum temp. (**PRE**max, **PRE**min) Parameter frost protection mode (**OTF**, **RTF**) **Menu *Men*** **MIXER** (Room influence etc.) and **PUMP** (Switch-off conditions)

A1 = (S4 > min1) & (Heating = active)

If no room sensor is used, the room influence **RI** in menu **MIXER** must be set to zero and the sensor **S1** in the **SENSOR** menu set to **FIXED VALUE (e.g. 20°C)**.
Program 0: Enabling of heating circuit pump **A1**, when the sensor **S4** has exceeded the minimum threshold **min1**. If the sensor **S4** is not used, then it must **not** be switched to **OFF**. To avoid the display **"999"** it is possible to allocate the sensor **S4** in the menu **SENSOR** a fixed temperature, which must be higher than **min1**.

All programs +1: As program 0 however the heating circuit pump **A1** is also enabled by sensor **S5** and minimum threshold **min2** (2 generators for the heating circuit).

A1 = ((S4 > min1) <u>or</u> (S5 > min2)) & (Heating = active)

All programs +2: As program 0 however output of the **nominal flow temperature** via the control output (e.g. for burner modulation).
SCALING: 0°C = 0.0 V
100°C = 10.0 V
Example: The flow set temperature 55°C is output at the control output as 5.5 volts.
If the pump is switched off due to one of the switch-off conditions (menu **PUMP**), then 0V is output to the control output. If switching off is because of condition **S4 < min1** then a voltage is output corresponding to the flow nominal temperature calculated by the controller.

In menu **COP1** in this program there are the following setting options:

OFS Offset value for flow set temperature, adjustment range -50°C … +50°C, fs = 0
0-100 Output mode, 0-100 or 100-0, fs = 0-100
MIN Minimum output value (Adjustment range 0 … 100), fs = 0
MAX Maximum output value (Adjustment range 0 … 100), fs = 100
ACT Actual output value
TST Adjustable test value (adjustment range 0 … 100). Calling **TST** leads automatically to manual mode. As soon as the value above the key ⇩ (= Entry) flashes, the control output indicates the set values.

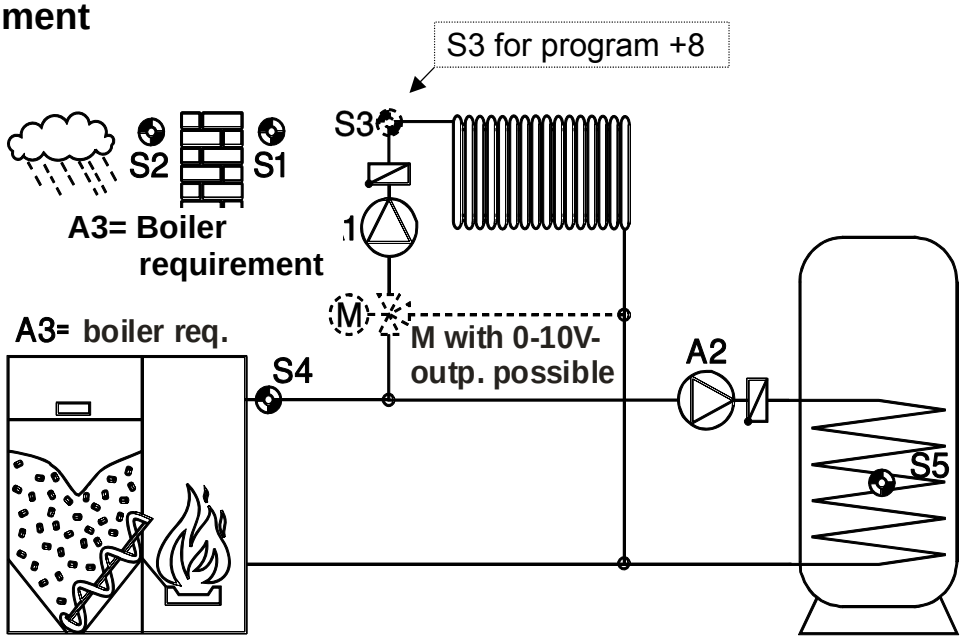
All programs +4: As program 0 however output of **mixer control** via the control output (for mixer with 0-10V control).

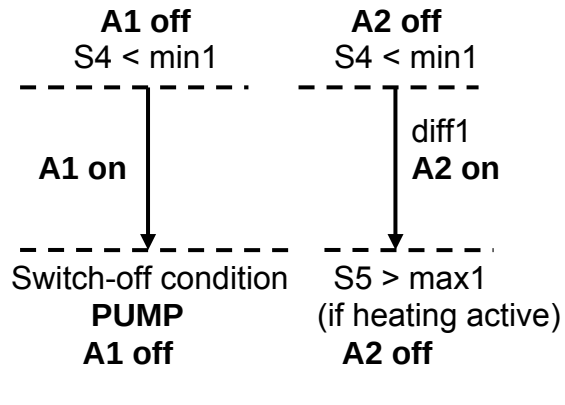
In menu **COP1** in this program there are the following setting options:

PRO Proportional part of the PID controller, fs = 5
INT Integral part of the PID controller, fs = 0
DIF Differential part of the PID controller, fs = 0
0-100 Output mode, 0-100 or 100-0, fs = 0-100
MIN Minimum output value (Adjustment range 0 … 100), fs = 0
MAX Maximum output value (Adjustment range 0 … 100), fs = 100
ACT Actual output value
TST Adjustable test value (adjustment range 0 … 100). Calling **TST** leads automatically to manual mode. As soon as the value above the key ⇩ (= Entry) flashes, the control output indicates the set values.

Note: Only one of the two auxiliary programs ("+2" or "+4") can be used.

Diagram 16: Automatic boiler, tank, heating circuit (without mixer), boiler requirement





Boiler requirement A3
S5 < max1
and
Time program 5

or

Heating active **and** S4 < min2
or
Heating active **and** S4 < NP + diff2
(NP = nominal flow temperature)

Required settings:

Basic control level

Time
Operating mode (preferably **AUTO**)
Nominal room temperature for lowering mode **RTL**
Nominal room temperature for normal operation **RTN**
Time program for normal operation and boiler requirement (time program 1-4), hot water (time program 5)

Parameter menu

Program number **PR**
min1 ... boiler **S4** →**A1**, **A2** **diff1** … boiler **S4** – tank **S5** → **A2**
min2 … boiler **S4** →**A3** **diff2** … boiler **S4** – NP → **A3**
max1 … tank **S5** →**A2, A3**
Heating curve **TEMP** or **R RISE**
Flow maximum and minimum temperature (**PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)

Menu *Men*

MIXER (Room influence etc.) and **PUMP** (Switch off conditions)

If no room sensor is used, the room influence **RI** in menu **MIXER** must be set to zero and the sensor **S1** in the **SENSOR** menu set to **FIXED VALUE (e.g. 20°C)**.

Program 16: Release of **A1** and **A2** via **S4**, boiler requirement **A3**. With **active** heating, the load pump **A2** is switched off, once the set tank temperature **max1** is reached.
Load pump **A2** continues running when the heating is **inactive** until the boiler minimum temperature **min1** or the difference **diff1** between T4 and T5 is undershot, so that the residual energy of the boiler is dissipated (independent of **max1**).

For **adjustable boiler operation without the mixer** it makes sense to set the threshold values **min1** and **min2** to **PRE**min and to activate the pump switch-off condition **PN < PM** in the **PUMP** menu.

A1 = S4 > min1 & (heating = active)

A2 = S4 > min1 & S4 > S5 + diff1 & (S5 < max1 or (heating = not active))

A3 = (S5 < max1 & time prog.5) or ((S4 < min2 or S4 < NP + diff2) & (heating = active))

In this program, the switching mode of the values **diff2↑** and **diff2↓** functions in exactly the opposite way: the value **diff2↓** in conjunction with the calculated flow set temperature gives the switch-on threshold and **diff2↑** the switch-off threshold.

All programs +1: Tank priority – if **S5** is less than the threshold **max1** and the boiler requirement **A3** is enabled by **time program 5**, the heating pump **A1 is disabled**.

A1 = S4 > min1 & (heating = active) & not (S5 < max1 & time program 5)

All programs +2: As program 16, however load pump function **only** in respect of **S5,** independent of the heating

A2 = S4 > min1 & S4 > S5 + diff1 & S5 < max1

All programs +4: As for program 16, however with output of a 0 – 10V voltage via the **control output 1 for burner modulation** as long as **A3** is active.

For activation of A3 via	Output value at control output 1
S5 < max1	max1 + 10.0 K + offset value OFS
Heating active and S4 < min2	min2 + offset value OFS
Heating active and S4 < NP + diff2	NP + diff2 + offset value OFS

Fixed scaling: 0°C = 0.0 V
100°C = 10.0 V
Example: The output value 55°C is output at the control output as 5.5 volts.
With **A3** in operating condition **OFF** control output 1 is set to 0V.
In menu **COP1** in this program there are the following setting options:

OFS Offset value for output value, adjustment range -50K … +50K, fs = 0
0-100 Output mode, 0-100 or 100-0, fs = 0-100
MIN Minimum output value (Adjustment range 0 … 100), fs = 0
MAX Maximum output value (Adjustment range 0 … 100), fs = 100
ACT Actual output value
TST Adjustable test value (adjustment range 0 … 100). Calling **TST** leads automatically to manual mode. As soon as the value above the key ⇩ (= Entry) flashes, the control output indicates the set values.

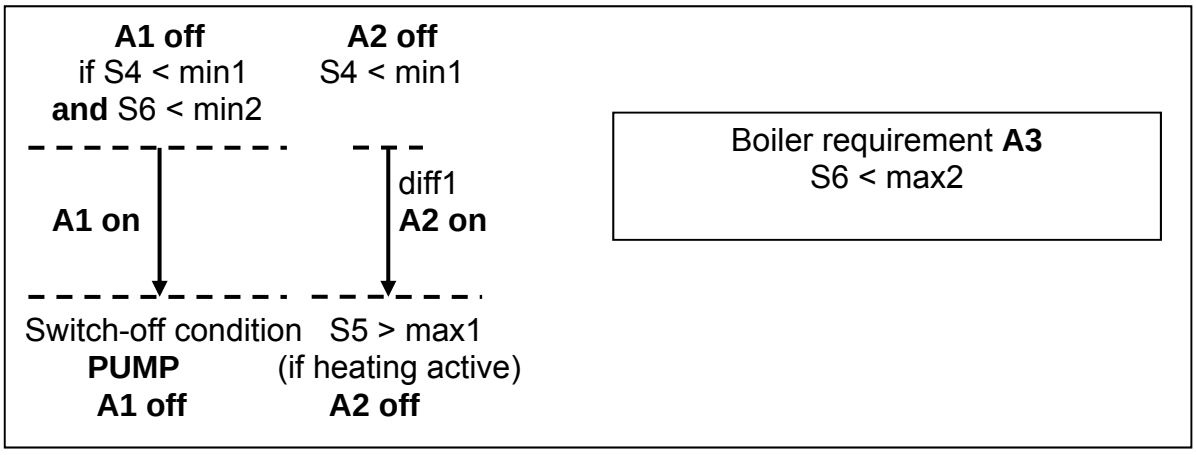
All programs +8: As program 16, but with output of the **mixer control via the control output 1** (for mixer with 0-10V input, together with the additional flow sensor **S3**).
In menu **COP1** in this program there are the following setting options:

PRO Proportional part of the PID controller, fs = 5
INT Integral part of the PID controller, fs = 0
DIF Differential part of the PID controller, fs = 0
0-100 Output mode, 0-100 or 100-0, fs = 0-100
MIN Minimum output value (Adjustment range 0 … 100), fs = 0
MAX Maximum output value (Adjustment range 0 … 100), fs = 100
ACT Actual output value
TST Adjustable test value (adjustment range 0 … 100). Calling **TST** leads automatically to manual mode. As soon as the value above the key ⇩ (= Entry) flashes, the control output indicates the set values.

Note: Only one of the two auxiliary programs ("+4" or "+8") can be used.

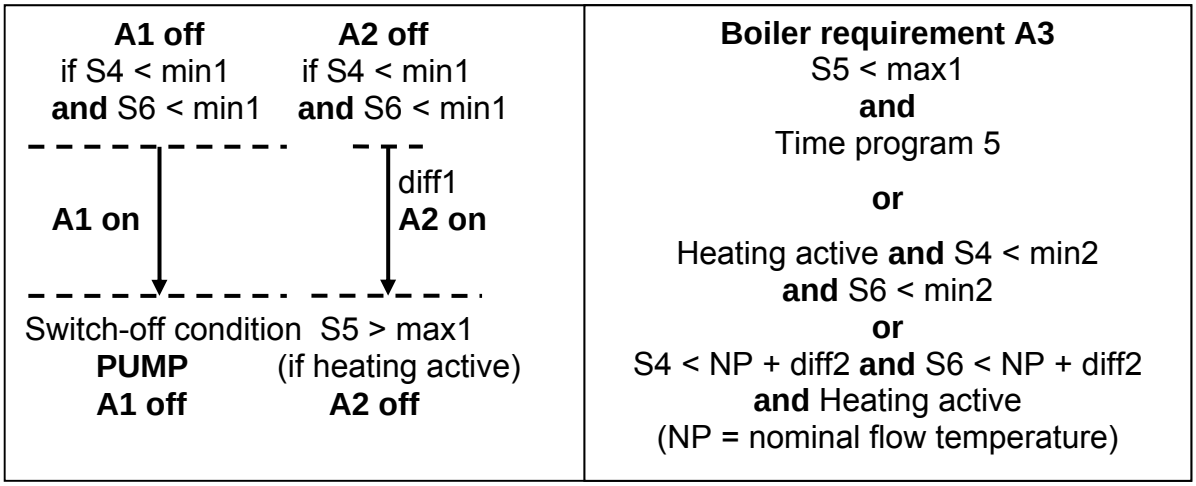
The **time program 5** is reserved for the hot water requirement **A3** (S5 < max1) (but still deactivated ex works). Only the time programs 1 to 4 are therefore available for the heating circuit.

Program 32: As **diagram 16,** including the possibility of selecting all the following programs (+1, +2, +4, +8) but with a second energy source with **S6** and **min2** for the release of the heating circuit pump **A1** (...and only for this!) and simple burner requirement via **S6**. Here the **min2** threshold to **A3** is taken over by **max2**.
Load pump **A2** continues running when the heating is **inactive** until the boiler minimum temperature **min1** or the difference **diff1** between T4 and T5 is undershot, so that the residual energy of the boiler is dissipated (independent of **max1**).



A1 = (S4 > min1 or S6 > min2) & (heating = active)
A2 = S4 > min1 & S4 > S5 + diff1 & (S5 < max1 or (heating = not active))
A3 = (S6 < max2)
Without time program for boiler requirement **A3**!

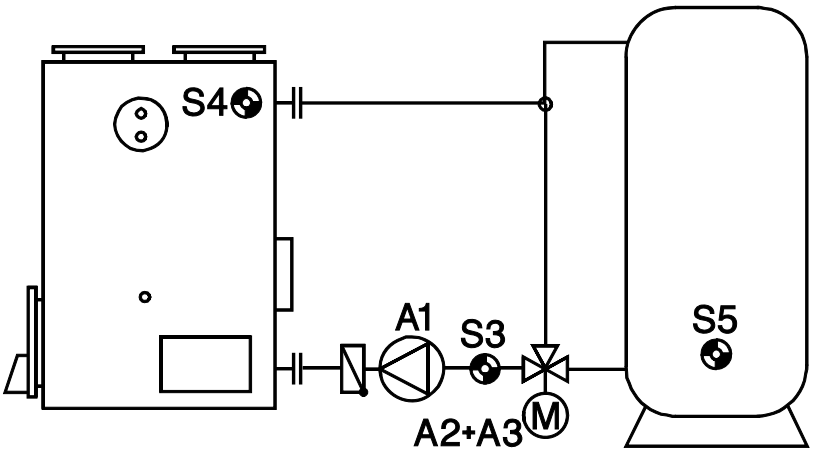
Program 48: As **diagram 16** including the possibility of selecting all the following programs (+1, +2, +4, +8) but **with second energy source** with **S6**. All conditions for **S4** also apply for **S6**. The higher temperature is effective (takes precedence) in all functions.
Load pump **A2** continues running when the heating is **inactive** until the boiler minimum temperature **min1** or the difference **diff1** between T4 & T6 and T5 is undershot, so that the residual energy of the boiler is dissipated (independent of **max1**).



A1 = (S4 > min1 or S6 > min1) & (heating = active)
A2 = (S4 > min1 or S6 > min1) & (S4 > S5 + diff1 or S6 > S5 + diff1)& (S5 < max1 or (heating = not active))
A3 = (S5 < max1 & Timeprogr.5) or ((S4 < min2 and S6 < min2) or (S4 < NP + diff2 and S6 < NP + diff2)) & (heating = active))

The **time program 5** is reserved for the hot water requirement **A3** (S5 < max1) (but still deactivated ex works). Only the time programs 1 to 4 are therefore available for the heating circuit.

Diagram 64: Boiler circuit pump, mixer for return flow booster



Program 64: Release of boiler circuit pump **A1**, if **S4** is greater than the threshold ***min1*** and **S4** is higher than ***S5*** by the difference **diff1** and **S5** has not exceeded the threshold ***max1***.

A1 off
S4 < min1

diff1
A1 on

S5 > max1
A1 off

Mixer control
A2 / A3

Fixed value **FV** at sensor S3
(fs = 60°C)

Required settings:
Basic control level
Time
Parameter menu
Program number **PR**
min1 … Boiler **S4** → **A1**
max1 … Tank **S5** → **A1**
diff1 … Boiler **S4** – Tank **S5** → **A1**
FV … fixed value (value for return flow booster) in return line **S3** → **A2/3**
Menu *Men*
MIXER (Mixer run time **RT**)

All setting parameters necessary for return flow booster (program 64) are hidden in the menus!

A1 = S4 > min1 & S4 > (S5 + diff1) & S5 < max1

Program 65: As program 64, however with additional 10 V burner requirement via **S6** and **S5** at control output 2

Additional required settings:
min3 … COP2 on (10V) **S6** (fs = 40°C)
max3 … COP2 off (0V) **S5** (fs = 65°C)

All setting parameters necessary for program 65 are hidden in the menus!

A1 = S4 > min1 & S4 > (S5 + diff1) & S5 < max1
Control output COP2: 10 V = S6 < min3 (burner on)
0 V = S5 > max3 (burner off)

In the menu **COP2** the function can be changed from "***NORMAL***" (=fs) to "***INVERSE***". In the "***INVERSE***" setting, 0 volts is output at the control output, if the threshold **min3** is undercut and 10V, if the threshold **max3** is exceeded.

Subsequently, an auxiliary relay can be connected to the control output **HIREL-STAG**, which forwards the burner requirement in potential-free format.

Program 66: As program 64, however with additional 10 V burner requirement via **S6** and **S2** at control output 2

Additional required settings:
min3 … COP2 on (10V) **S6** (fs = 40°C)
max3 … COP2 off (0V) **S2** (fs = 65°C)

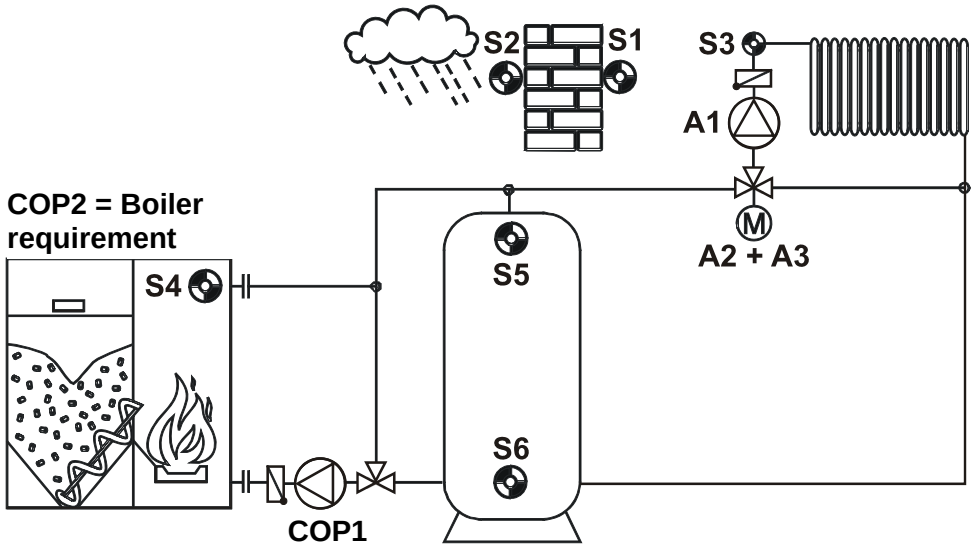
All setting parameters necessary for program 66 are hidden in the menus!

A1 = S4 > min1 & S4 > (S5 + diff1) & S5 < max1
Control output COP2: 10 V = S6 < min3 (burner on)
0 V = S2 > max3 (burner off)

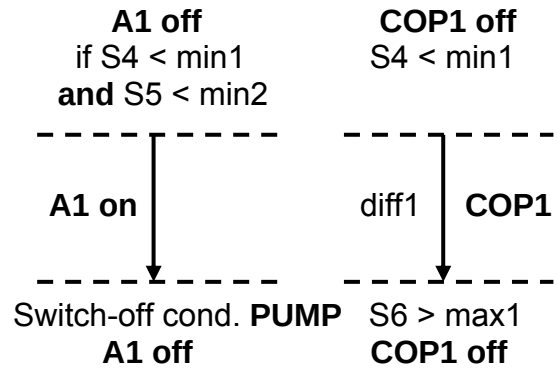
In the menu **COP2** the function can be changed from "***NORMAL***" (=fs) to "***INVERSE***". In the "***INVERSE***" setting, 0 volts is output at the control output, if the threshold **min3** is undercut and 10V, if the threshold **max3** is exceeded.

Subsequently, an auxiliary relay can be connected to the control output **HIREL-STAG**, which forwards the burner requirement in potential-free format.

Diagram 80: Heating circuit, automatic boiler, buffer tank, load pump



Program 80: Enabling of the heating circuit pump **A1** above the minimum thresholds. The load pump is switched on based on the temperature difference between boiler **S4** and buffer **S6** via the control output **COP 1**. The burner requirement at the control output **COP 2** is activated either by a base temperature **min3** or **max3** or by undershooting of the nominal flow temperature **NP** plus the difference **diff2** at the buffer sensor **S5**.



Burner
COP2
on S5 < min3 (fs = 40°C)
off S5 > max3 (fs = 65°C)
or
heating active **and** S5 < **NP** + diff2
(NP = nominal flow temperature)

Required settings:
Basic control level: Time
Operating mode (preferably **AUTO**) Room nominal temp. for lowering mode **RTL**
Room nominal temp. for normal operation **RTN** **time programs for normal operation**

Parameter menu: Program number **PR**
min1... Boiler **S4** →**A1** (heating circuit active), **COP1**
min2 ... Tank **S5** → **A1** (heating circuit active) **min3 ...** Burner req. on **S5** → **COP2**
max1 ... Tank **S6** → **COP1** **max3 ...** Burner req. off **S5** → **COP2**
diff1 ... Boiler S4 – Tk. **S6** → **COP1** **diff2 ...** Offset to flow nominal temp.**NP** → **COP2**
Heat curve **TEMP** or **R RISE**
Flow maximum and minimum temperature **PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)
Menu *Men*
MIXER (Room influence etc.) and **PUMP** (Switch off conditions)

A1 = ((S4 > min1) <u>or</u> (S5 > min2)) & (heating = active)
COP1 10V (on) = S4 > min1 & S4 > (S6 + diff1) & S6 < max1
COP2 10V (on) = S5 < min3 or (S5 < (NP + diff2) & heating = active)
COP2 0V (off) = S5 > max3 and (S5 > (NP + diff2) & heating = active)

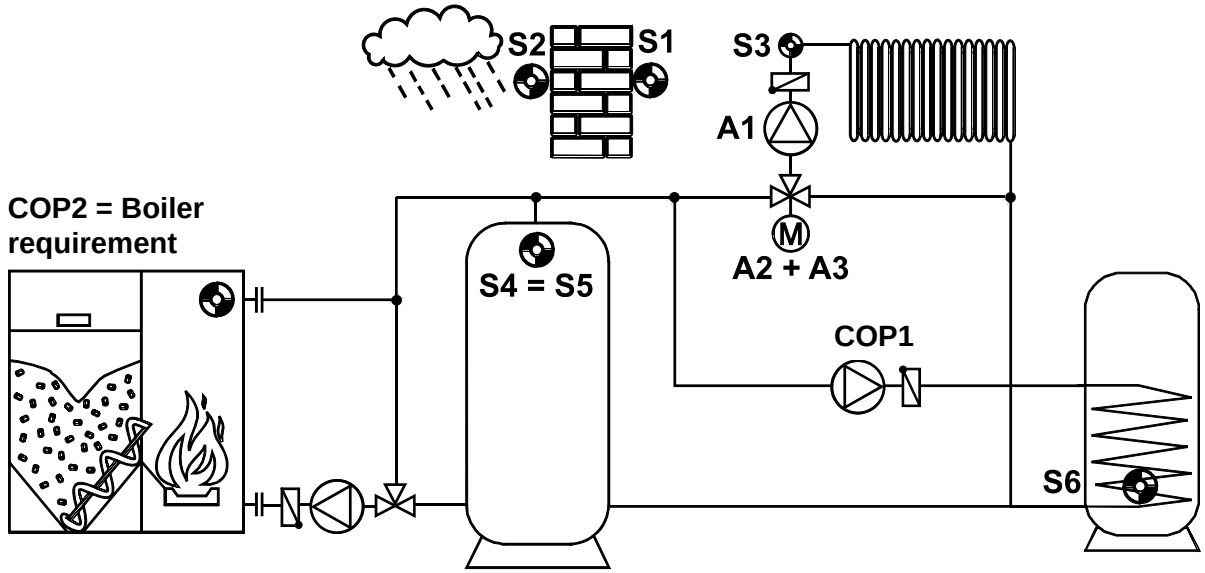
If no room sensor is used, the room influence in the menu **MIXER** must be set to **zero** and the sensor **S1** set to **a fixed value (e.g. 20°C)**.

The load pump and the burner requirement are switched using 2 additional auxiliary relays **HIREL-STAG** (special accessories).
The auxiliary relay for the control output 1 (load pumps) must be installed it its own, suitable housing for space reasons and due to the separation low voltage/mains voltage.

If the burner requirement is directly controlled via the burner modulation (no relay) then within the "COP2" menu, there is the possibility to set the mode of the control output form "NORMAL" to "INVERSE", so that the burner requirement request occurs with output of 0V instead of 10V.

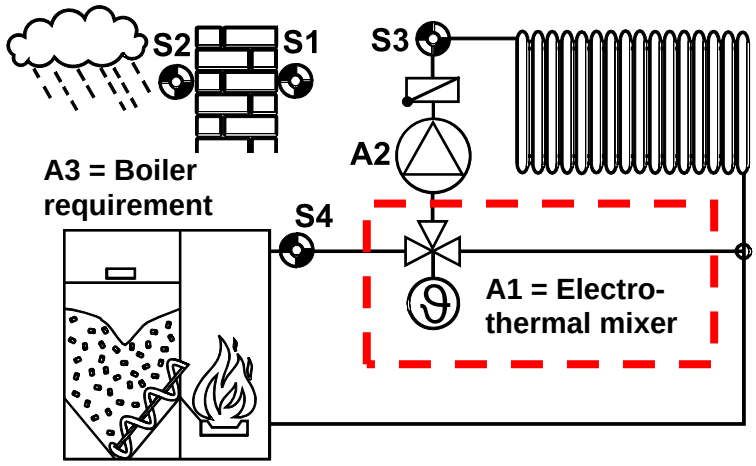
In this program, the switching mode of the values **diff2↑** and **diff2↓** functions in exactly the opposite way: the value **diff2↓** in conjunction with the calculated flow set temperature gives the switch-on threshold and **diff2↑** the switch-off threshold.

Alternative: Diagram 80 with hot water tank load pump



S4 = S5 Transfer of value from S5.
Instead of a measured value the input **S4** receives its (temperature) information from input **S5** (Menu SENSOR).

Diagram 96: Automatic boiler, heating circuit (with electrothermal mixer), boiler requirement



Warning!

This diagram is not suitable for 3-point mixer motors!

A2 off
S4 < min1

A2 on

Switch-off condition **PUMP**.
A2 off

Boiler requirement **A3**

Heating active **and** S4 < min2
or
Heating active **and** S4 < NP + diff2
(NP = nominal flow temperature)

Required settings:
Basic control level: Time,
Operating mode (preferably **AUTO**) Nominal room temperature for lowering mode **RTL**
Nominal room temperature for normal operation **RTN**
Time program for normal operation and boiler requirement (time program 1-4)
Parameter menu: Program number **PR**
min1 … boiler **S4** → **A2** **min2** … boiler **S4**→ **A3**
diff2 … boiler **S4** – NP → **A3** Heat curve **TEMP** or **R RISE**
Flow maximum and minimum temperature **PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)
Menu *Men*
MIXER (Room influence etc.) and **PUMP** (Switch off conditions)
PSC (Pump speed control) settings: **AC I3**, **DVA = PN**
if necessary, readjustment of the values **PRO**, **INT** and **DIF**

If no room sensor is used, the room influence **RI** in the menu **MIXER** must be set to **zero** and the sensor **S1** set to **a fixed value (e.g. 20°C)**.

Program 96: Release of **A2** via **S4**, boiler requirement **A3**.
For **adjustable boiler operation without the mixer** it makes sense to set the threshold values **min1** and **min2** to **PREmin** and to activate the pump switch-off condition **PN < PM** in the **PUMP** menu.
A1 = Thermal mixer
A2 = S4 > min1 & (heating = active)
A3 = (S4 < min2 or S4 < NP + diff2) & heating = active

In this program, the switching mode of the values **diff2↑** and **diff2↓** functions in exactly the opposite way: the value **diff2↓** in conjunction with the calculated pre-run set temperature gives the switch-on threshold and **diff2↑** the switch-off threshold.

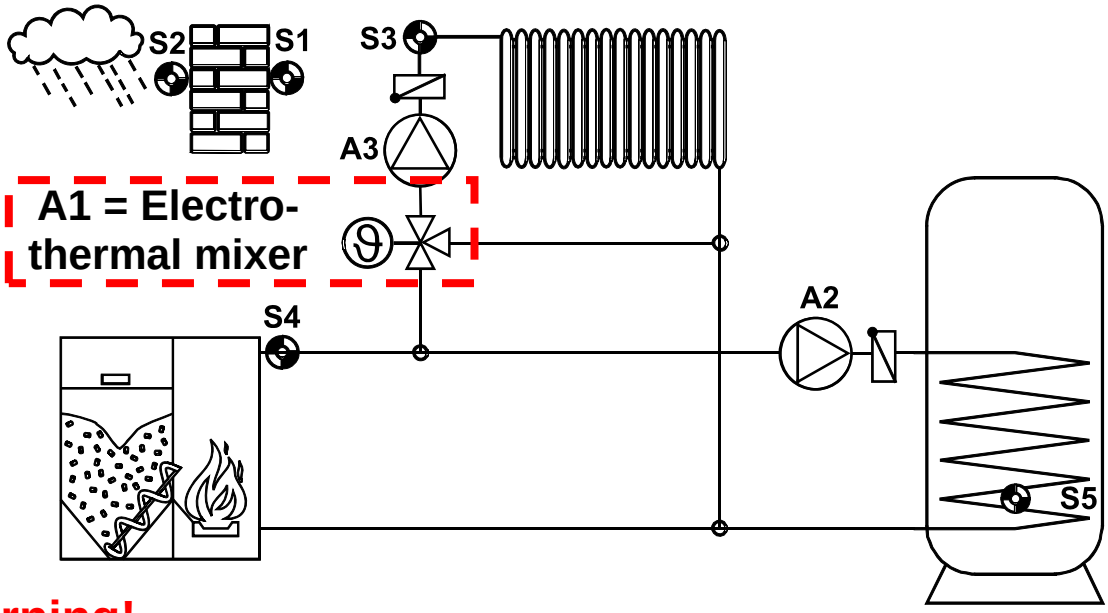
All programs +4: As for program 96, however with output of a 0 – 10V voltage via the **control output 1 for burner modulation** as long as **A3** is active.

For activation of A3 via	**Output value**
Heating active and S4 < min2	min2 + offset value OFS
Heating active and S4 < NP + diff2	NP + diff2 + offset value OFS

Fixed scaling: 0°C = 0.0 V
100°C = 10.0 V
Example: The output value 55°C is output at the control output as 5.5 volts.
With **A3** in operating condition **OFF** control output 1 is set to 0V.

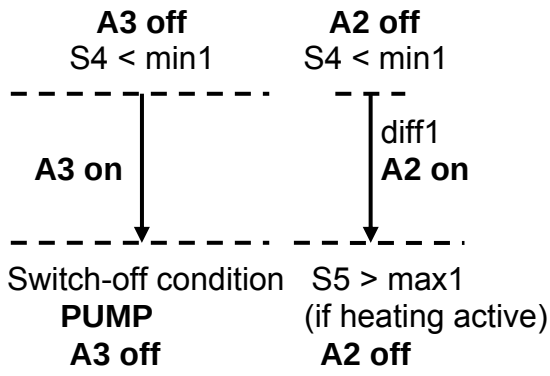
In menu **COP1** in this program there are the following setting options:
OFS Offset value for output value, adjustment range -50K … +50K, fs = 0
0-100 Output mode, 0-100 or 100-0, fs = 0-100
MIN Minimum output value (Adjustment range 0 … 100), fs = 0
MAX Maximum output value (Adjustment range 0 … 100), fs = 100
ACT Actual output value
TST Adjustable test value (adjustment range 0 … 100). Calling **TST** leads automatically to manual mode. As soon as the value above the key ⇩ (= Entry) flashes, the control output indicates the set values.

Diagram 112: Heating circuit (with electrothermal mixer), DHW tank



Warning!

This diagram is not suitable for 3-point mixer motors!



Required settings:

Basic control level

Time
Operating mode (preferably **AUTO**)
Nominal room temperature for lowering mode **RTL**
Nominal room temperature for normal operation **RTN**
Time program for normal operation and boiler requirement time (program 1-4), hot water (time program 5)

Parameter menu

Program number **PR**
min1 … boiler **S4** → **A2**, **A3** **diff1** … boiler **S4** – tank **S5** → **A2**
max1 … tank **S5** → **A2**
Heat curve **TEMP** or **R RISE**
Flow maximum and minimum temperature **PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)

Menu *Men*

MIXER (Room influence etc.) and **PUMP** (Switch off conditions)
PSC (Pump speed control) setting: **AC I3**, **DVA = PN**
if necessary: readjustment of the values **PRO**, **INT** and **DIF**

If no room sensor is used, the room influence **RI** in the menu **MIXER** must be set to **zero** and the sensor **S1** set to **a fixed value (e.g. 20°C)**.

Program 112: Release of **A2** and **A3** via **S4**
With **active** heating, the load pump **A2** is switched off, once the set boiler temperature **max1** is reached.
Load pump **A2** continues running when the heating is **inactive** until the boiler minimum temperature **min1** or the difference **diff1** between T4 and T5 is undershot, so that the residual energy of the boiler is dissipated (independent of **max1**).

For **adjustable boiler operation without the mixer** it makes sense to set the threshold values **min1** to **PREmin** and to activate the pump switch-off condition **PN < PM** in the **PUMP** menu.

A1 = Thermal mixer
A2 = S4 > min1 & S4 > S5 + diff1 & (S5 < max1 or (heating = not active))
A3 = S4 > min1 & (heating = active)

All programs +1: Boiler priority – if **S5** is less than the threshold **max1**, the heating pump **A3 is blocked**.
A3 = S4 > min1 & (heating = active) & S5 > max1

All programs +2: As program 16, however load pump function **only** in respect of **S5,** independent of the heating
A2 = S4 > min1 & S4 > S5 + diff1 & S5 < max1

Diagram 128: Heating circuit with burner requirement, switchover to cooling with cooler requirement

The burner and the cooler requirement are switched in a potential-free manner using 2 additional auxiliary relays **HIREL-STAG** (special accessories).

Sensors:

S1 Room sensor RASPT or RAS
S2 External sensor
S3 Flow sensor
S4 Sensor in the buffer tank, only all programs **+2**
S5 External switchover heating/cooling operation, only all programs **+1**
S6 external burner or cooler requirement, dependent on the S5 switch state, only all programs **+1**

Outputs:

A1 Pump
A2 & A3 Mixer motor ON/OFF
COP 1 Burner requirement 0V = OFF, 10V = ON
COP2 Cooler requirement 0V = OFF, 10V = ON

Required settings:
Basic control level
Time
Parameter menu
Program number **PR**
Heat curve **TEMP** or **R RISE**
Flow maximum and minimum temperature **PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)
Nominal flow temperature for cooling operation **TNC** (fs = 18°C)
Menu *Men*
MIXER (Room influence etc.) and **PUMP** (Switch off conditions)

Program 128:
The cooling operation functions only in combination with the RASPT or RAS room sensor.
The operating mode is set using the room sensor with the aid of the slider switch:

Switchover between the various operating modes:

- ***Heating automatic mode***
- ***Heating normal mode***
- ***Cooling mode***
- **Standby mode**
- ***Room temperature change by +/- 4°C (only possible in heating mode)***

Heating mode: Setting of the room sensor to "Automatic" or "Normal mode". The heating circuit pump **A1** and the burner requirement via the **COP 1** control output are only switched off by the pump switch-off parameter (menu **PUMP**).

Cooling mode: Room sensor setting to "Cooling mode". The pump **A1** and the cooler requirement via the **COP 2** control output are always active. The mixer control via the outputs **A2** and **A3** takes place **inversely** (mixer opened upon increasing temperature) and the set nominal temperature **TNC** (parameter menu).

All programs +1:

Like program 128, but the switchover does not take place via the slider switch of the room sensor rather via the external switch **S5** and the heating/cooling requirements via the external switch **S6**.
In the **SENSOR** menu, the sensors **S5** and **S6** must be set to "**DIG**".
The digital sensor **S5** (external potential-free switching contact) determines whether heating or cooling operation is required. If the switch is set to "**ON**", then heating operation applies, if it is set to "**OFF**", then cooling operation applies.
Using digital sensor **S6** (external potential-free switching contact) in heating mode, the burner requirement is activated via control output 1 while in cooling mode the cooler requirement is activated via control output 2. If the switch is switched on, the requirement is active.
The cooling operation functions only in combination with the RASPT or RAS room sensor.

All programs +2:

Like program 128, however a buffer tank sensor **S4** is used. This sensor delivers separate switching thresholds for the release of the pump and the burner or cooler requirement.

Required settings:
Basic control level
Time
Parameter menu
Program number **PR**
min 1 ... Buffer **S4** → **A1** (if heating circuit active) WE = 45°C
min 2 ... Buffer **S4** → control output 2 for cooler requirement WE = 65°C
max1 ... Buffer **S4** → control output 1 for burner requirement WE = 75°C
max2 ... Buffer **S4** → **A1** (if RAS set to "Cooling mode") WE = 75°C
Heat curve **TEMP** or **R RISE**
Flow maximum and minimum temperature **PRE**max, **PRE**min)
Parameter frost protection mode (**OTF**, **RTF**)
Nominal flow temperature for cooling operation **TNC** (WE = 18°C)
Menu *Men*
MIXER (Room influence etc.) and **PUMP** (Switch off conditions)

Heating mode:
A1 = S4 > min1 & (heating = active)
COP 1 = S4 < max1 & (heating = active)
The flow nominal temperature is calculated according to the **heat curve**.
Cooling mode:
A1 = S4 < max2 & (Room sensor = "Cooling mode")
COP 2 = S4 > min 2 & (Room sensor = "Cooling mode")
The flow nominal temperature corresponds to the parameter value **TNC**.

Installation instructions

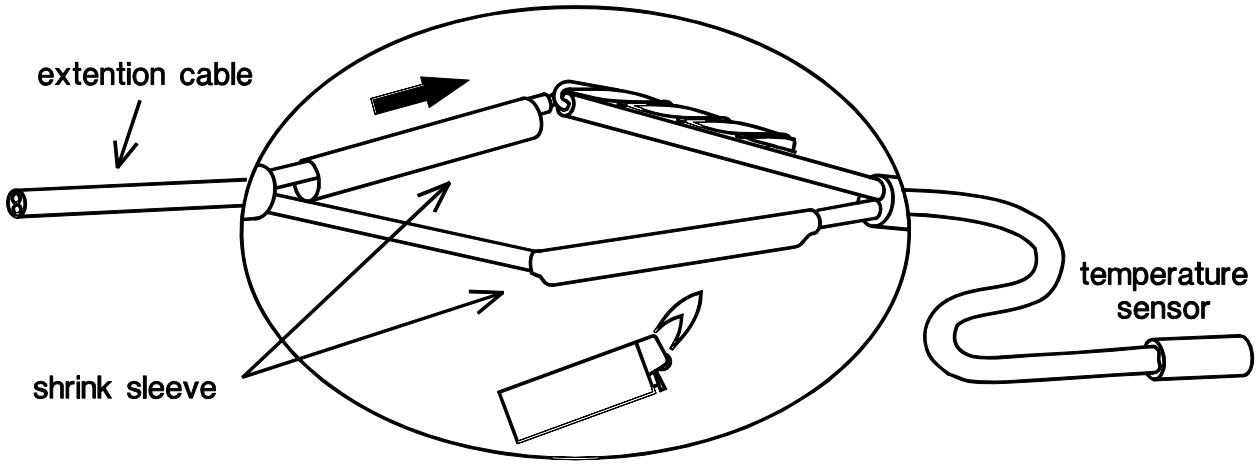
Sensor installation

Correct arrangement and installation of the sensors is extremely important for correct functioning of the system. It should be ascertained that the sensors are completely inserted in the immersion sleeves. The threaded cable connections can serve as strain relief. Fundamentally sensors should not be exposed to moisture (such as condensation) since this can diffuse through the cast resin and damage the sensor. If this happens, heating the sensor to 90°C for an hour might help. When using immersion sleeves in NIRO tanks (inoxydable) or pools particular attention must be given to their **corrosion resistance**.

- **Boiler sensor (boiler flow)**: This sensor is either screwed into the boiler using an immersion sleeve or attached to the flow line at a short distance to the boiler (see also "clip-on sensors").
- **Buffer sensor**: It is recommended to install the sensor in the upper part of the tank as a reference sensor using the immersion sleeve supplied. The best position as reference sensor for the load pump between the boiler and buffer is just above the return outlet. For tanks without a screw-in facility for the immersion sleeve the sensor can be inserted under the insulation against the wall of the tank if necessary. In this case attention should be paid to achieving a long-term secure seating (e.g. cable fastening).
- **Clip-on sensor**: Optimally secured using roll springs, pipe clamps or hose band clips to the line. Make sure the material used is suitable (corrosion, temperature resistance, etc.). Finally the sensor must be well insulated so that the exact pipe temperature is recorded without being influenced by the ambient temperature.
- **Outdoor temperature sensor:** This sensor is installed on the coldest wall (usually the north side) approx. one to two meters above ground level. Temperature influences from nearby air shafts, open windows, etc. are to be avoided.

Sensor lines

All of the sensor lines with a cross-section of 0.5mm2 can be extended up to 50m. With this length of line and a Pt1000 temperature sensor, the measurement error is approx. +1K. Longer lines or a lower measurement error require an appropriately larger cross-section. The sensor and the probe can be connected by putting the heat-shrinkable sleeve truncated to 4 cm over a wire and twisting the bare ends. If one of the wire ends is tinned then the connection must be made through soldering. Then the heat-shrinkable sleeve is put over the bare, twisted ends and carefully heated (such as with a lighter) until it has wrapped the connection tightly.



In order to prevent measurement fluctuations, the sensor cables must not be subject to negative external influences to ensure fault-free signal transmission. When using non-screened cables, sensor cables and 230V network cables must be laid in separate cable channels and at a minimum distance of 5 cm.

Installing the device

WARNING! Always pull the mains plug before opening the casing!

Only work inside the controller with the power cable disconnected.

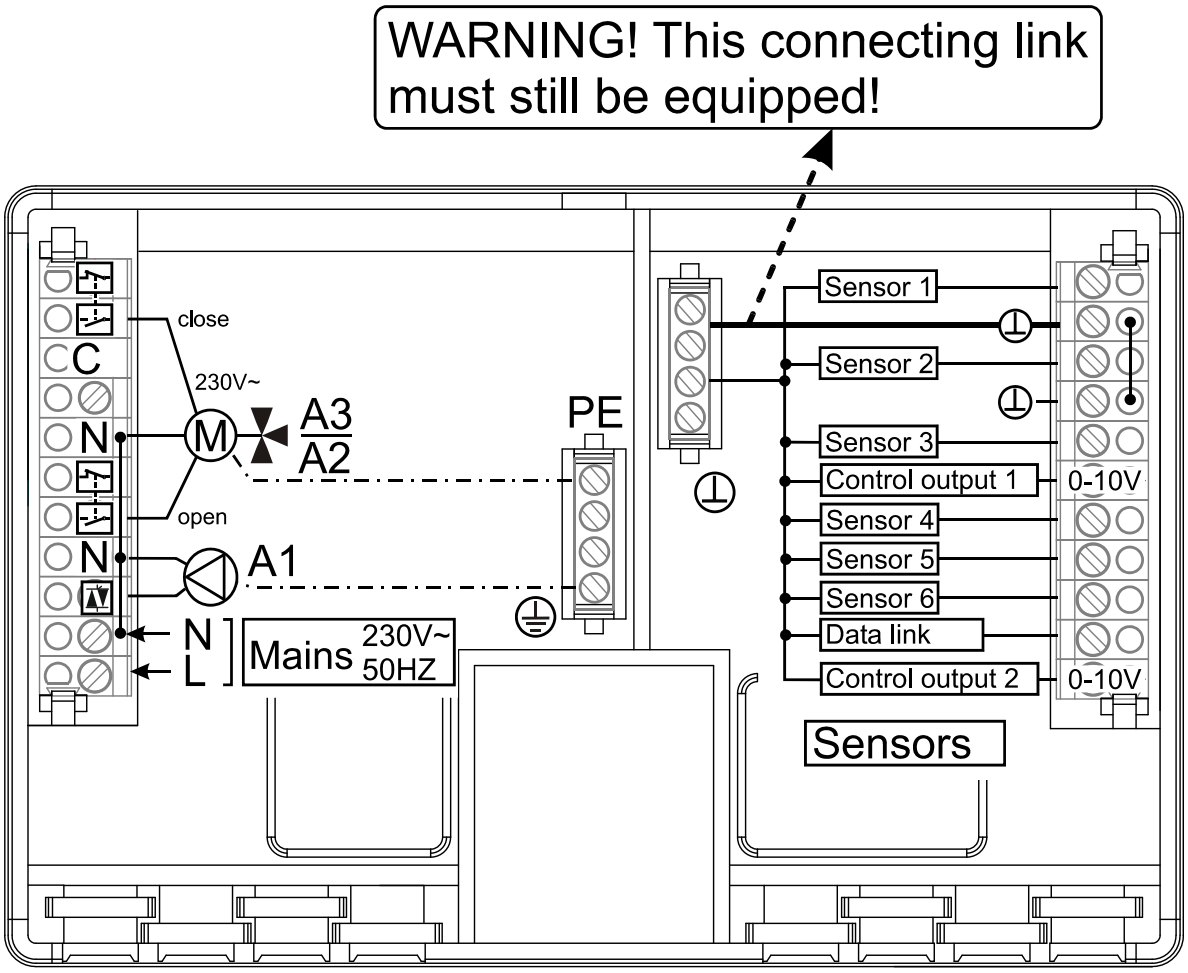
Unscrew the screws on the top of the case and lift the cover. The control electronics are in the cover. The connection to the terminals in the lower case is made by contact pins when the cover is later replaced. The body of the case can be screwed securely to the wall through the two holes using the fastening materials provided (**with the cable glands downwards**).

Electrical connection

Warning: Electrical connection may only be carried out by a technician according to the pertinent local regulations. The sensor lines must not be laid in the same cable channel as the supply voltage. The maximum load of output A1 equals 1.5A while that of outputs A2 and A3 each equals 2.5A! All outputs are fused together with the device itself with 3.15A. For the direct connection of filter pumps therefore it is essential to refer to the performance rating plate. Increasing the fuse protection to max. 5A (medium time lag) is permitted. The appropriate strip terminal **PE** is to be used for all protective conductors.

Notice: The system has to be grounded properly and furnished with surge arresters to protect it from damage due to lightening. Sensor failures due to storms and static electricity are usually the result of faulty construction.

All sensor grounds ⏚ are interconnected and fully interchangeable.



Special connections

Control output (0 to 10V / PWM)

These outputs are intended for the speed control of electronic pumps, to control the burner output for switching tasks with the relay HIREL-STAG in certain programs. They can be operated via respective menu functions parallel to the outputs A1 to A3.

Sensor input S6

As described in the menu SENSOR all six inputs have the possibility to operate as a digital input. Compared to the other inputs S6 has the special feature of being able to record fast signal changes of the type supplied by volume flow encoders (type VSG...).

The data line (DL-Bus)

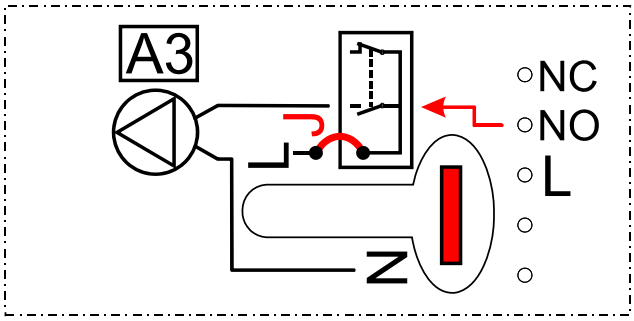
The bi-directional data link (DL-Bus) was developed for the ESR/UVR series and is only compatible with products of the Technische Alternative company. Any cable with a cross section of 0.75 mm² can be used for the data link (e.g. twin-strand) having a max. length of 30 m. For longer cables, we recommend the use of shielded cable.

Interface to PC: The data is cached via the data converter **D-LOGG**, Bootloader **BL-NET** or **C.M.I.** interface and transferred to the PC on request. **BL-NET** and **C.M.I.** require a separate 12V power unit for power supply

External sensors: Reading the values from external sensors with DL connector.

Switch output 3 to potential-free

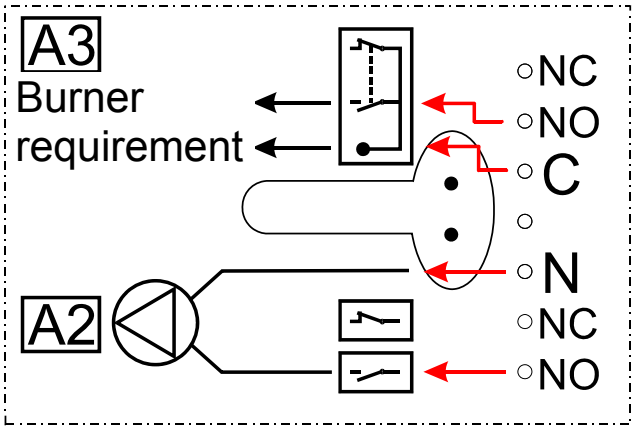
By removing the jumper **J** the relay output A3 can be made potential-free.



With the jumper **J** in place, output 3 is **not** potential-free.

Example: Connection of a pump

L ... phase conductor
NO .... Closer (make contact)
NC .... Opener (break contact)



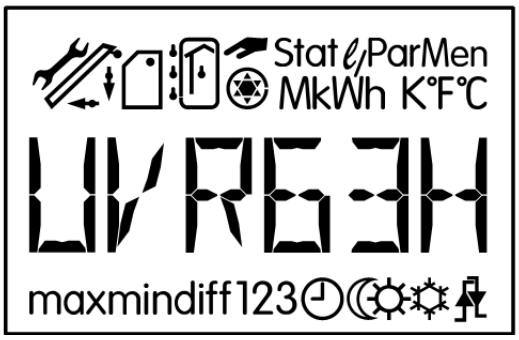
If the jumper is removed, then output 3 is potential-free.

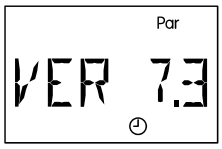
Example: **Diagram 16**
Burner requirement A3 + Pump A2

C .... Root C
NO .... Closer (make contact)
NC .... Opener (break contact)

Operation

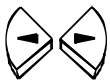
The large display contains the symbols for all important information and a plaintext area. Navigation with the coordinate keys is matched to the display sequence.





All display segments are momentarily displayed when the device is started up.
Subsequently the type designation and version number are displayed (important for support queries).

The ex factory default setting is loaded by pressing the key during plugging in.



Navigation keys within a level and for changing parameters.

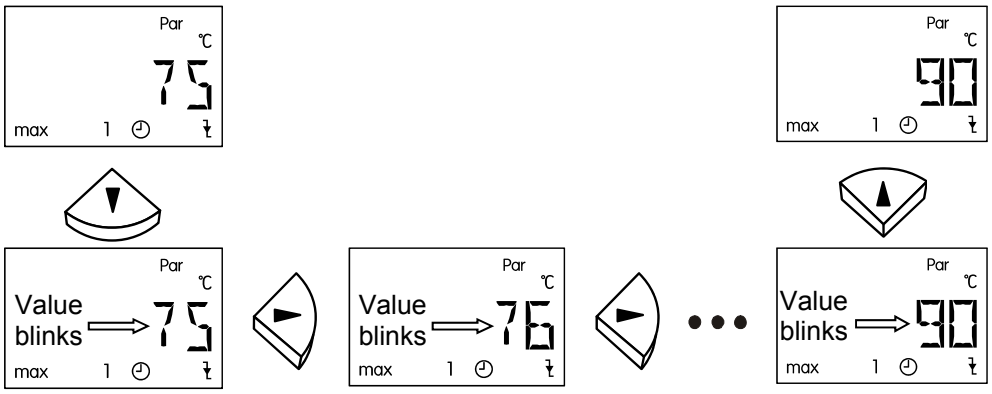
Entry to a menu, release of a value for changing with the navigation keys (enter key).

Return from the last menu level selected, exit the parameterizing of a value (return key).

To the side of the display, the currently active outputs are identifiable on the green illuminated figures 1 - 3. If the speed control is active, the output 1 display flashes according to the speed stage.

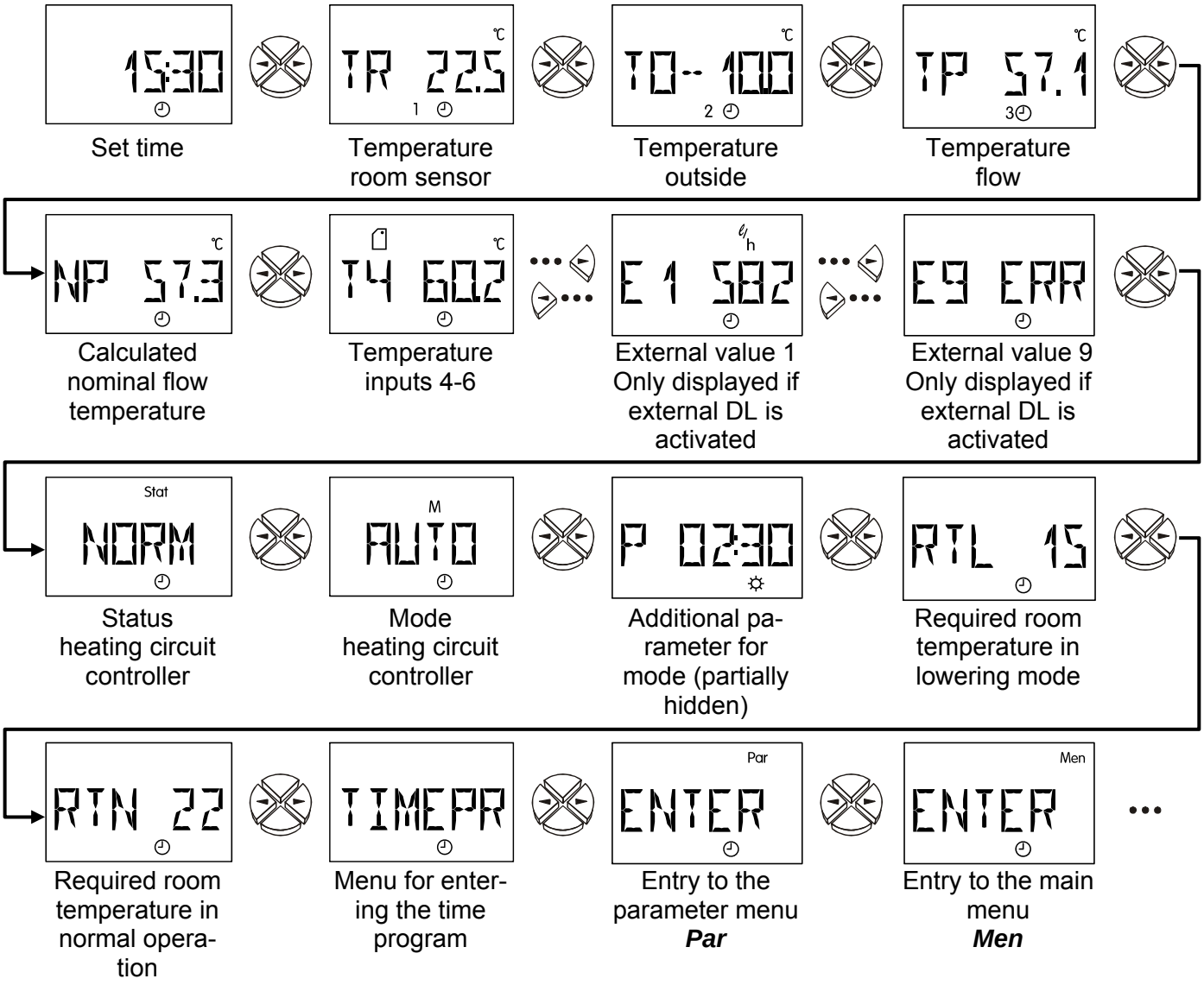
3
2
1

Change a value (parameter)



When a value is to be changed the arrow key must be pressed in a downward direction. This value now blinks and can be changed using the navigation keys.
By pressing the arrow key in an upward direction it is saved.

The basic control level



15.30 Set time.
The time is set by pressing enter ⇩ and the navigation keys ⇦⇨. Press the key again to switch between minutes and hours.
Power reserve in the event of a power failure: at least 1 day, typically 3 days.

TR Temperature room sensor. If the room sensor RPT or RAS is used then it is important that the type is set to S1 RPT (or S1 RAS) in the sensor menu. Only then can the position of the room sensor switch (operating mode) be processed correctly.
Notice of an incorrectly set type of sensor: The correct temperature is only displayed in automatic operation. Other switch settings display excessive temperature values (Factory settings fs = RPT).

TO Outdoor temperature. The nominal flow temperature is calculated using the outdoor temperature and on the basis of the heat curve.

TP Flow temperature. In the ideal case the measured value exactly matches the nominal value NP. If TP is less than NP the mixer is opened, if TP is greater than NP the mixer is closed.

NP Calculated flow temperature. The nominal flow value is calculated on the basis of the heating curve, the outdoor temperature recorded and where appropriate taking the influence of a room sensor into account.
The heating circuit controller attempts to reach this temperature at the flow sensor TP through mixer OPEN/CLOSE.

T4-6 Allocation of the sensor inputs S4 to S6 is dependent on the program. T4, T5 and T6 therefore indicate the actual measured temperature as long as the inputs have been allocated.

NORM Stat Status display of the heating circuit controller with the possible displays:
NORM – normal operation, **LOW** – lowering mode, **STB** – standby mode
MALF – malfunction, **FRO** – frost protection mode, **STAT** – display for programs 64 – 66, **COOL** – Cooling operation for programs 128 – 131.
Additionally the lower display area contains the symbol-based Status display.

PARTY Operating mode of the heating circuit controller. Capable of being set with the arrow keys are:
AUTO – automatic operation
NORMAL – permanent control of the room temperature set for normal operation
LOWER – permanent control of the room temperature set for lowering mode
PARTY – heating is carried out up to a pre-set time P XX.XX
LEAVE – from the current date up to the date MXX XX 24:00 the controller operates only in lowering mode
HOLID(AY) – public holiday mode; from the current day the controller takes over the Saturday heating times until the date MXX XX and for this date the Sunday heating times
STB (Standby) – the control function is switched off; the frost protection function is activated

For the modes of operation **PARTY**, **LEAVE** and **HOLID** the controller switches back to automatic operation after the time indicated has expired.

P 02.30 Additional parameter for mode: party, holiday or leave. Here the time for party mode (in example up to 2:30 AM) or the date set for leave and holiday modes.

RTL Required room temperature for **lowering mode**. Nominal value for the room temperature outside the time window. If no time program is setup, then RTL is used as the nominal value. (fs = 15°C), setting range 0 to 30°C

RTN Required room temperature in **normal operation**. This value is used as the nominal value for the room if the time program does not specify a different one (fs = 22°C), setting range 0 to 30°C.

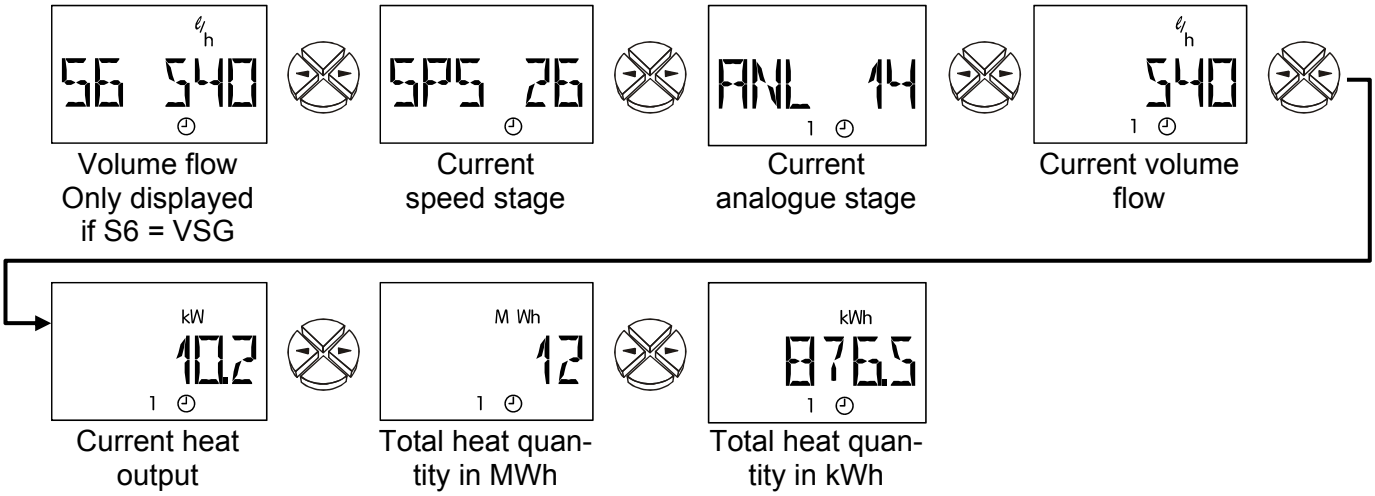
TIMEPR Entry to the time programs menu

ENTER *Par* Entry to the parameters menu

ENTER *Men* Entry to the main menu

Optional displays in the basic control level

These displays appear between display T6 and STATUS if the appropriate functions (speed control, control output and/or heat quantity counter) are activated.



Volume flow Only displayed if S6 = VSG

Current speed stage

Current analogue stage

Current volume flow

Current heat output

Total heat quantity in MWh

Total heat quantity in kWh

S6 Volume flow, shows the flow rate of the volume flow encoder in litres per hour

SPS Current speed stage (example 14). This display is only shown when the speed control is activated.

Display range: 0 = output is switched off
30 = speed control runs at highest level

ANL Current analogue stage; is displayed only if the control output is activated.

Display range: 0 = output voltage = 0V or 0% (PWM)
100 = output voltage = 10V or 100% (PWM)

l/h Current volume flow (heat quantity counter 1-3) used to calculate the heat quantity. Displays the flow rate of the volume flow encoder or the fixed volume flow in litres per hour.

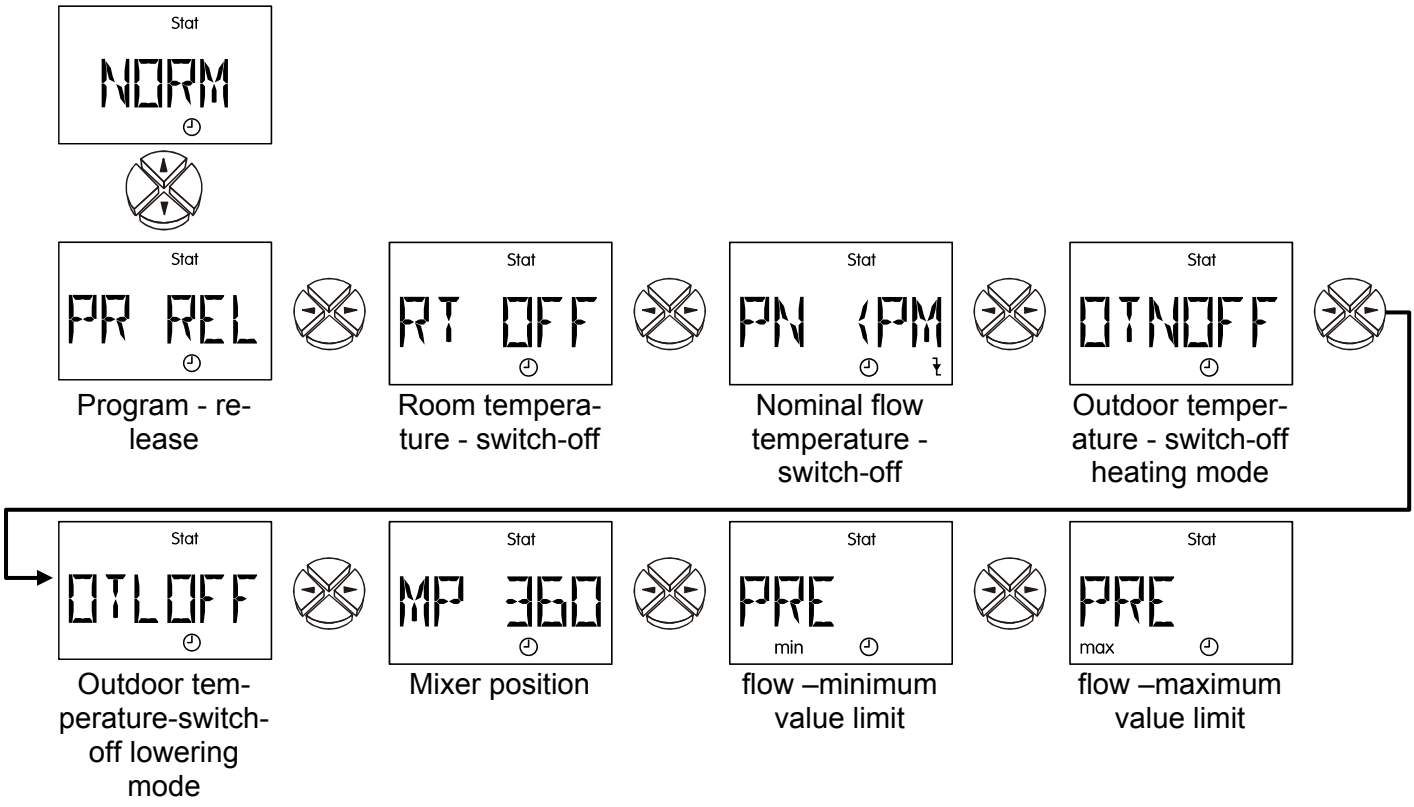
kW Momentary determined performance (heat quantity counter1-3). This value is calculated from the flow temperature, return temperature and volume flow in the heat quantity counter.

kWh/MWh Total heat quantity since start-up or last reset (heat quantity counter 1-3).

The menu items **l/h**, **kW** and **kWh**/**MWh** are only displayed when at least one heat quantity counter has been activated.

The status display

This menu displays the status of the heating circuit. For example, it can be seen which switch off condition is currently responsible for switching off the heating pump. The switch-off conditions are set in submenu **PUMP** in the **ENTER/*Men*** menu.
If the condition results in switching off the heating circuit the symbol is shown in the lowest display line. In the following example the calculated flow temperature has fallen below the minimum temperature **PREmin** and the switch-off condition **PN<PM** is activated:



The above-mentioned displays mean:

PR REL The minimum threshold has been exceeded (= minimum temperature boiler reached)

RT OFF The room temperature switch-off is not activated

PN<PM The calculated nominal pre-run (flow) temperature has fallen below the flow minimum temperature therefore pump switch-off (symbol in the lower display line)

OTNOFF The outdoor temperature switch-off is not activated in normal operation

OTLOFF The outdoor temperature switch-off is not activated in normal operation

MP 360 Mixer position (remaining run time in seconds)

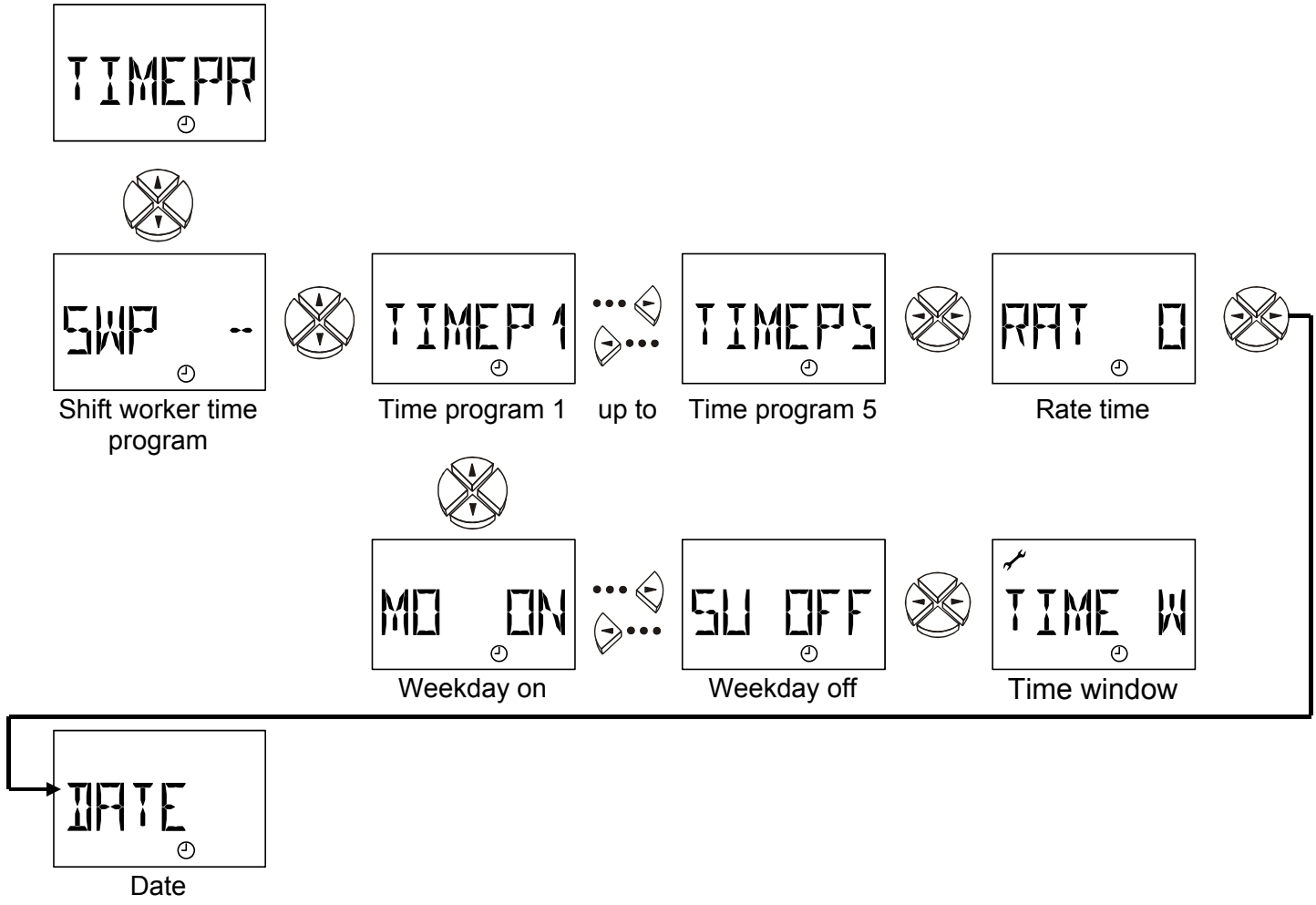
PRE min The calculated pre-run (flow) temperature has fallen below the minimum allowable temperature (setting in *Par* menu). The display of the symbol means that the actual flow temperature is limited by the minimum value.

PRE max The calculated pre-run (flow) temperature has not exceeded the permitted temperature (setting in *Par* menu). If the symbol is displayed the actual flow temperature is limited by this maximum value.

The display **MALF** (malfunction) in the status display means that the external sensor is defective (unrealistic, high or low values, short circuit or interruption). In the event of a fault, the controller calculates the nominal flow temperature **NP** for an out-side temperature of 0°C.

The time program menu

In this menu up to 5 time programs (P1-P5), a rate time and the date can be configured.



For every time program 3 windows with the possible allocation of a nominal value (**NV**) are available. During the switch-on times the heating mode with the allocated nominal values applies for the heating circuit. If no individual nominal values are assigned **RTN** (= room temperature in normal operation) is used. Outside the time programs (lowering mode) **RTL** (= room temperature in lowering mode) applies as nominal value. If no time program is setup, then **RTL** is used as the nominal value. RTN and RTL are adjustable in the basic control level. Every time program can be assigned to any weekdays.

Shift worker time program SWP (from version1.7)**:**

With this it is possible to create several time programs with differing heating periods and to specifically enable time windows simply by setting the parameters **SWP**.

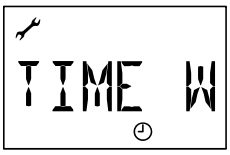
SWP = -- All 5 time programs are used for the heating
SWP = 1 Currently only time program 1 is permitted for the heating
SWP = 15 Currently only the time programs 1 and 5 are permitted for the heating.
Adjustment range: SWP 15 to SWP 45

Application example: For a combination of time program **TIMEP1** with **TIMEP5** (setting: **SWP 15**) **TIMEP1** is the time program during shift work and **TIMEP5** the program for the weekend.

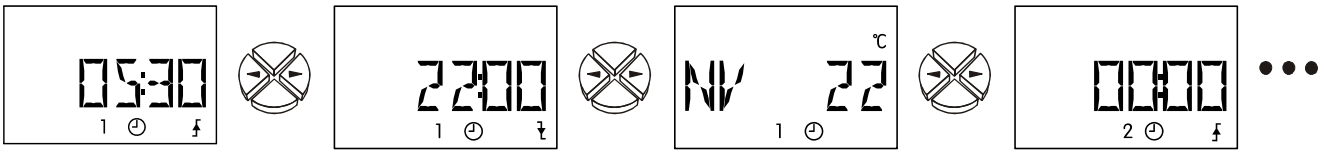
TIMEP*x* Selection of time programs 1 to 5 and entry with the lower arrow key

MO until **SU** By setting ON and OFF for each day it is determined whether on this day the time program is activated.

TIME W Entry with the lower arrow key after which the switch-on and switch-off times for the time window 1 can be entered.



Time window

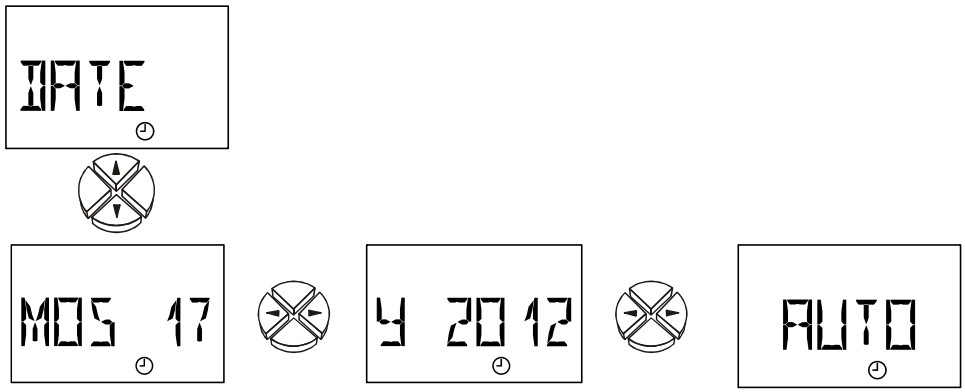


Switch-on time 1 | Switch-off time 1 | Nominal value room temperature time window 1 | Switch on time 2 (not yet programmed)

NV Nominal value room temperature for time window 1
NV -- = no nominal value for the time window; **RTN** is used.
The time windows 2 and 3 can be set in the same way; the appropriate digits are shown in the lower line of the display.

RAT Rate time in minutes. Adjusts the switch-on point fixed in the time window according to outdoor temperature. This entry refers to an outdoor temperature of -10°C and is 0 at plus 20°C. For example, if the rate time is 30 minutes and the outdoor temperature is 0°C, the system will switch on 20 minutes earlier under normal operation. Adjustment range 0-255 min

Date setting *DATE*



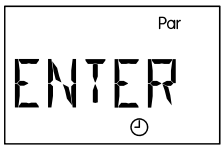
Date **M**onth **05** Day **17** | Year | Changeover Summertime/normal time

M05 17 Setting of month and day. Change between month and day using the downward arrow key. Select with the lateral arrow key and confirm with upward arrow.

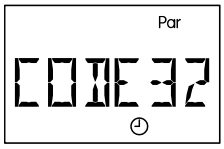
Y 2012 Setting the year

AUTO Automatic changeover from normal to summertime. With the selection NORMAL fixed setting of the normal time is made.

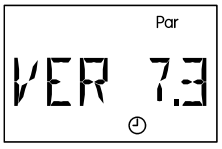
The parameter menu *Par*



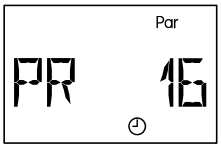
In the following example the ***Par*** menu has been selected for program 16 so that all setting parameters (max, min, diff) can be displayed.



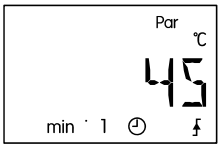
Access code



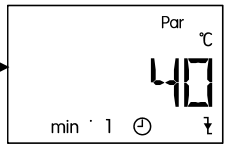
Software version



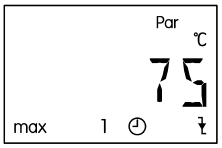
Program number



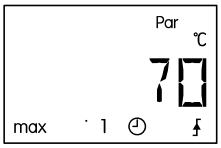
Min. temp. 1 switch-on value (2 times)



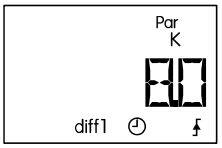
Min. temp. 1 switch-off value (2 times)



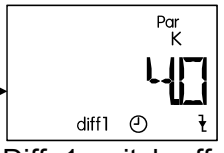
Max. limit 1 switch-off threshold



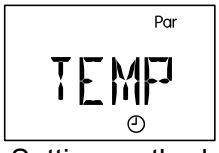
Max. limit 1 switch-on threshold



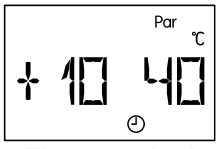
Differential 1 switch-on threshold (2 times)



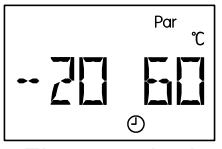
Diff. 1 switch-off threshold (2 times)



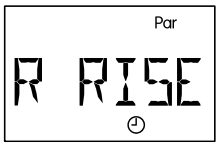
Setting method temperature



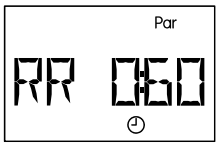
Flow nominal temp. at +10°C



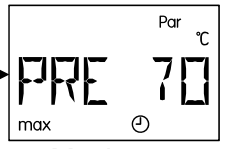
Flow nominal temp. at -20°C



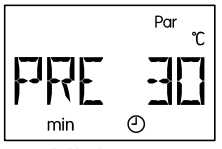
Setting method rate of rise



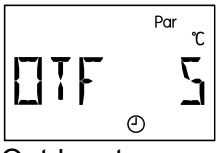
Rate of rise acc. to diagram



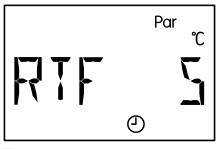
Maximum allowable flow temp.



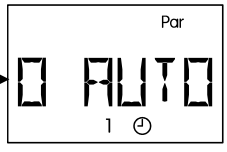
Minimum allowable flow temp.



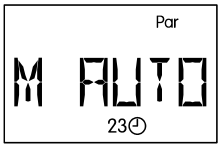
Outdoor temperature threshold frost protection mode



Room temperature at frost protection mode



Output 1 automatic/ manual mode



Output 2 + 3 automatic/ manual mode

Automatic / manual mode (2 times) for the control outputs

CODE The other menu items of the parameter menu are displayed only after the correct code (**code 32**) has been entered.

VER Indicates software version. As indication of the intelligence of the device cannot be altered and must be specified with every query.

PR **Pr**ogram selection according to the selected hydraulic diagram (fs = 0)
Further functions can be added to the described programs. The described functions apply together. "All programs +1 (+2, +4, +8)" indicates that the selected program number can be increased by the sum total of these numbers.
Example: Program 0 +1 + 2 = program number 3 = two generators and output of the nominal feed temperature to the control output.

min ↑ From this temperature at the sensor the output is enabled. (fs_1 = 45°C, fs_2 = 65°C, fs_3 = 40°C))

min ↓ The previously via **min ↑** enabled output is disabled again from this temperature. **min** prevents boiler sooting. Recommendation: The switch-on point should be selected 3 to 5K higher than the switch-off point. The software does not allow a differential less than 1K. (fs_1 = 40°C, fs_2 = 60°C))

Setting range: -20 to 150°C in 1°C increments (applies to both thresholds, **min↑** must however be at least 1K greater than **min↓**)

max↓ **Max**imum limit – switch-off threshold (fs_1 = fs_2 = 75°C, fs_3 = 65°C))

max↑ **Max**imum limit – switch-on threshold (fs_1 = fs_2 = 70°C))

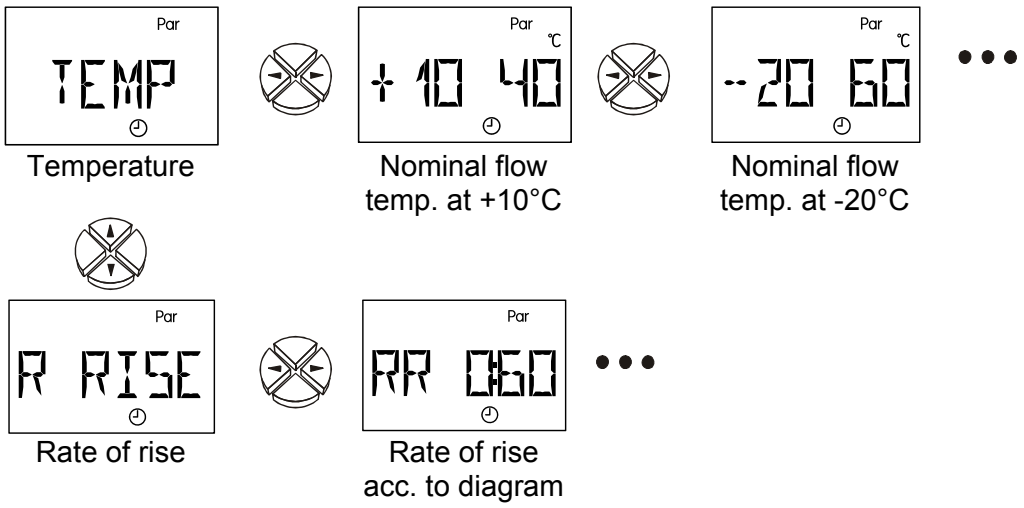
Setting range: -20 to 150°C in increments of 1°C (for both thresholds, but **max↓** has to be at least 1K greater than **max↑**)

diff↑ **Diff**erential – switch-on threshold (fs = 8K)

diff↓ **Diff**erential – switch-on threshold (fs = 4K)

Setting range: 0.0 to 9.9K in increments of 0.1K
10 to 99K in increments of 1K (for both thresholds, but **diff↑** has to be at least 0.1K / 1K greater than **diff↓**)

Setting method heat curve *TEMP / R RISE*



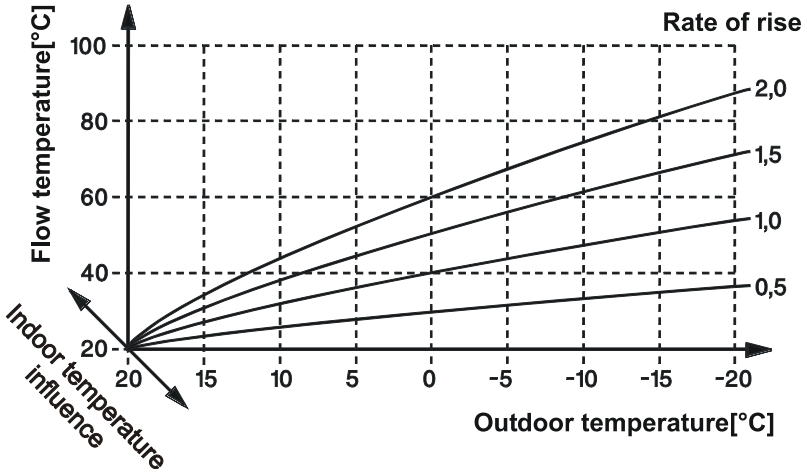
The feed-line temperature is usually calculated from the outdoor temperature and the heating curve (Setting: menu **MIXER**, type of control: **OT CON**). The heat curves are calculated for a nominal room temperature of +20°C and are correspondingly shifted in a parallel direction for other room nominal temperatures using the set room temperature influence.
An exception is the fixed value control (Setting: menu **MIXER**, type of control: **FV CON**). The feed-line is set in **lowering mode** to the listed temperature of **+10°C** and in **heating mode** to that of **-20°C**.

TEMP Parameterizing the heat curve via the correlation of outdoor temperature (at +10°C and -20°C) to flow temperature. Here, another reference point is set at +20°C outdoor temperature = +20° flow temperature. The values for +10°C and -20°C are to be allocated in the next display windows (fs +10 = 40°C, fs -20 = 60°C).

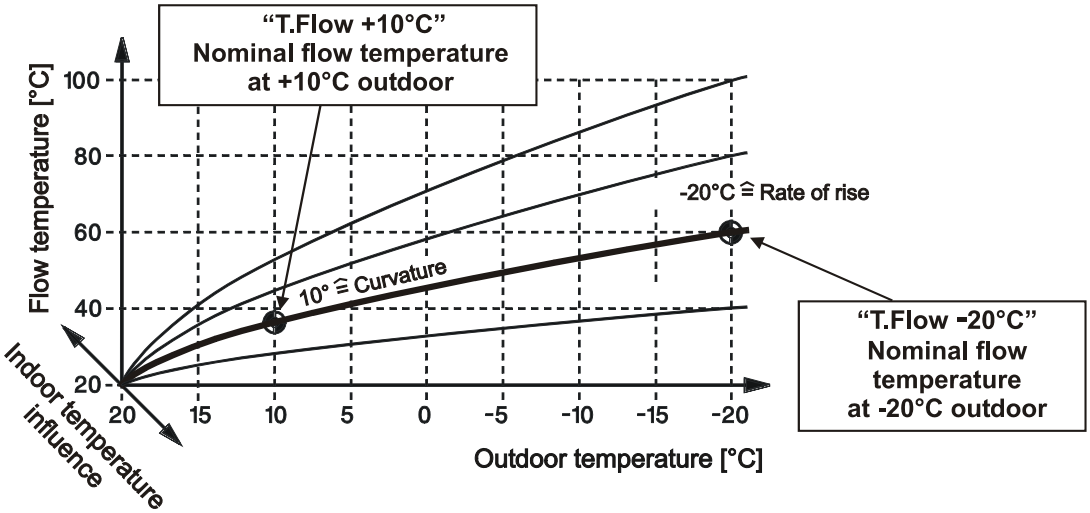
R RISE Parameterizing the heat curve via the rate of rise as is common with many heating controllers. For this purpose in the next window RR the rate of rise is to be selected according to the diagram (fs=0.60).

In both of these methods, the influence of the outdoor temperature on the flow temperature is not linear. Via the parameterizing mode “Rate of rise” the curvature is set according to the standard. Via the parameterizing mode “Temperature” designation of the required flow temperature creates a "bending of the heat curve". By this means the differing heat emissions of various heating systems (under floor, wall heating, radiators, etc.) are allowed for.

Heat Curve “Rate of rise”



Heat Curve “Temperature”



PREmax Flow temperature maximum value
This protection function should prevent overheating of temperature sensitive parts (e.g. floor heating pipes). The mixer control does not permit a higher flow temperature than **PREmax**.
fs = 70°C, setting range: 31 to 99°C

PREmin Flow temperature minimum value
Even if the calculated flow temperature is below this threshold, a flow temperature below it is nevertheless not permitted.
fs = 30°C, setting range: 0 to 69°C

Frost protection OTF / RTF

If frost protection is activated, the flow nominal temperature is maintained at at least **PRE**min according to the set room temperature for frost protection **RTF** (setting in the parameter menu), until the temperature which has triggered the frost protection function increases to 2 K above the frost protection limit.
The frost protection is activated even if a switch-off condition would disable the pump.

Operation mode	**Room sensor S1 active or at fixed temperature**	**Frost protection activation** (when the temperature falls below the temperature protection limit**)**
Automatic/Lowered/Normal	Active	Only via room sensor **S1** (RTF), independent of external sensor **S2**
Automatic/Lowered/Normal	Fixed temperature	No frost protection
Standby, controller setting	Active	Via room sensor **S1**(RTF) **and** external sensor **S2** (OTF)
Standby, controller setting	Fix	Via external sensor **S2** (OTF)
Standby, setting at the room sensor RAS	Active or fixed temperature	Only via external sensor **S2** (OTF)

The status display displays FRO and the symbol ☼ .

OTF Outdoor temperature threshold for frost protection mode (fs = +5°C).
Setting range: -20 to +20°C

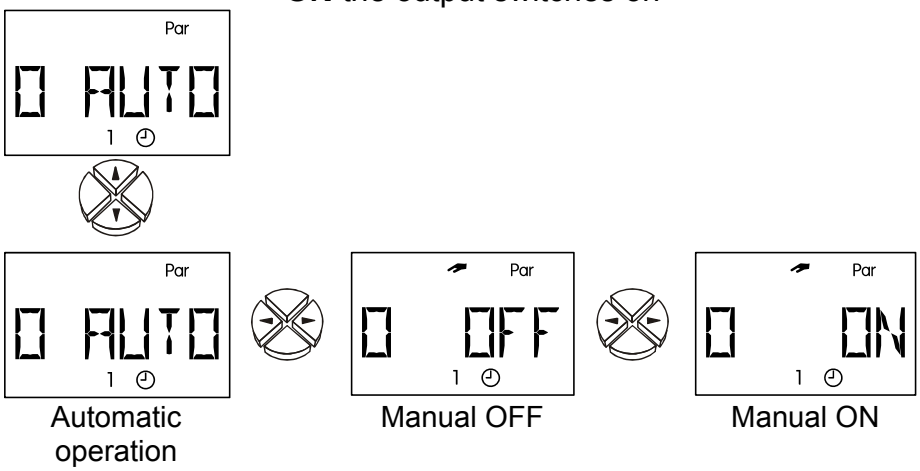
RTF Room temperature threshold for frost protection mode (fs = +5°C).
Setting range: 0 to 30°C

Automatic / manual mode

O AUTO

The outputs can be set to manual mode (**O ON**, **O OFF**) for test purposes. To indicate manual mode a hand symbol appears. The active output (pump running) is indicated by illumination of the digit 1 (LED) beside the display. (fs = AUTO)

Settings: **AUTO** the output switches in accordance with the program diagram
OFF the output is switched off
ON the output switches on



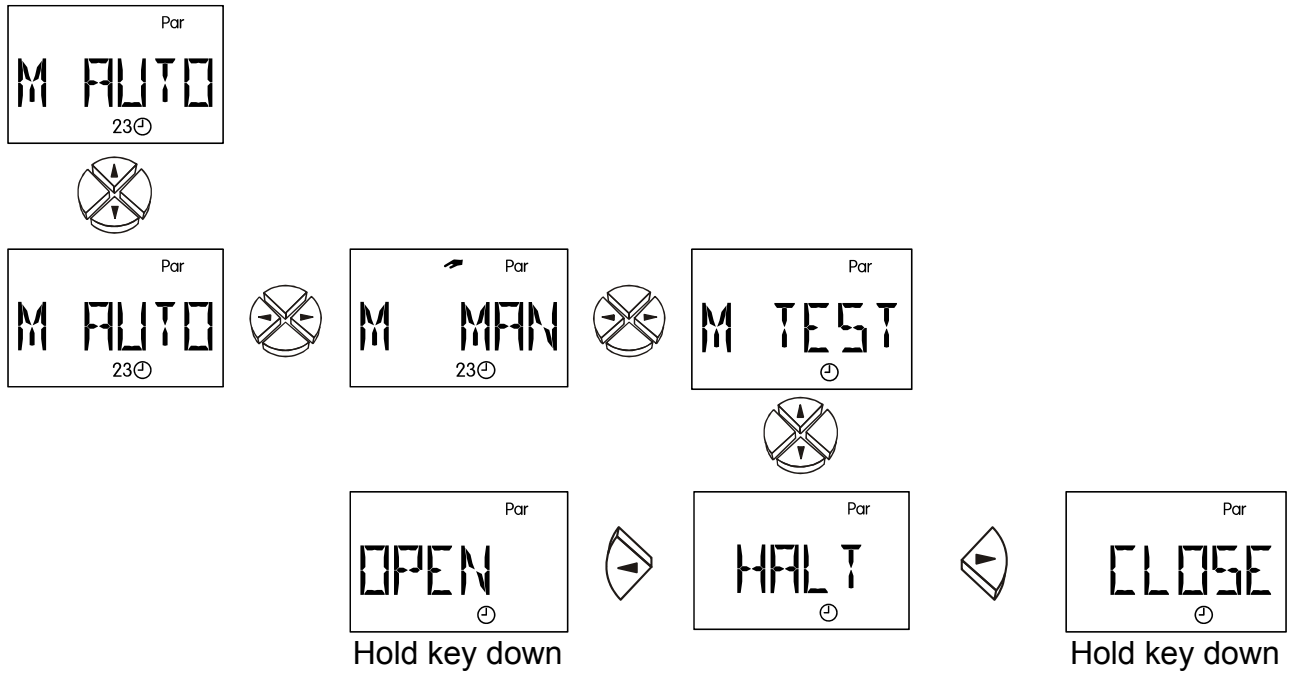
Automatic operation | Manual OFF | Manual ON

IMPORTANT: If the output is manually switched ON or OFF, the program diagram no longer affects the output.

M AUTO

As with output 1 the mixer (outputs 2+3) can also be switched to manual mode for testing. As soon as switching to **M MAN** has been done an additional display window **M TEST** is released which can be reached by pressing the right-hand arrow key. The lower arrow key releases the test level; **HALT** appears in the display. By continuously pressing the left-hand or right-hand arrow key the mixer is manually transferred to **OPEN** or **CLOSE**. The respective digit beside the display is illuminated.

In this case too, the outputs are no longer controlled from the program level in manual mode.

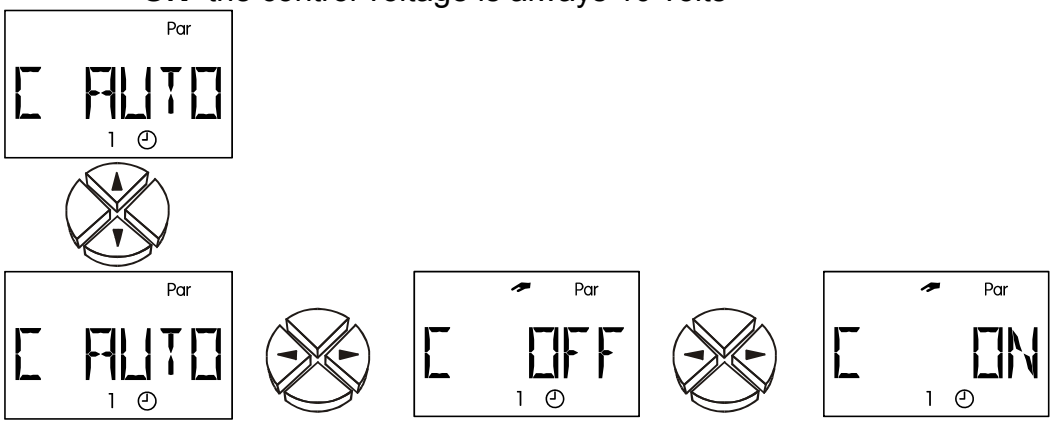


Hold key down | Hold key down

C AUTO

The 2 control outputs are set to automatic mode and can be changed over to manual mode (**C ON**, **C OFF**) for test purposes. To indicate manual mode a hand symbol appears.

Settings: **AUTO** the control output delivers a control voltage between 0 and 10 volts dependent on the settings in the **COP** menu.
OFF the control voltage is always 0 volts
ON the control voltage is always 10 volts

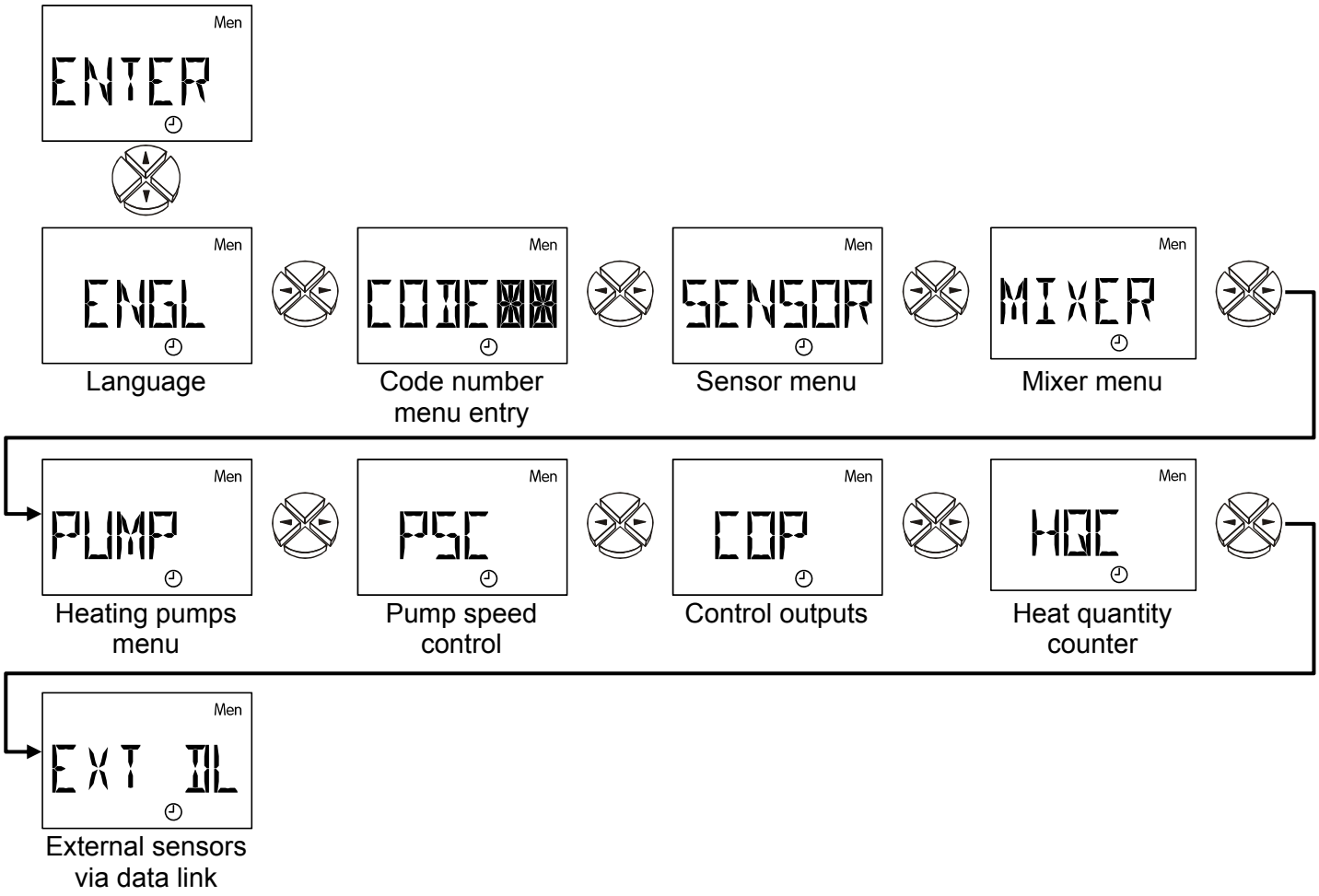


Automatic operation

Manual 0 volts

Manual 10 volts

The main menu *Men*



Language

Code number menu entry

Sensor menu

Mixer menu

Heating pumps menu

Pump speed control

Control outputs

Heat quantity counter

External sensors via data link

Summary

ENGL Actually chosen menu language = **Engl**ish. Factory settings are made in **DEUT** (German).

CODE **Code** number for entering the menu. The rest of the menu items are only displayed once the correct code number is entered.

SENSOR **Sensor** settings: Selection of type of sensor, averaging of sensor values and allocation of symbols for the sensors.

MIXER **Mixer menu:** Selection of type of control (outdoor temperature or fixed value), setting of room influence, increase in switch-on power and mixer running time, as well as averaging of the outdoor temperature.

PUMP Heating **pump**s menu: Stipulation of switch-off conditions.

PSC **P**ump **s**peed **c**ontrol: Stabilizing a temperature by speed control.

COP **C**ontrol **o**ut**p**ut available twice (0-10V / PWM)

As analogue function (0 to 10 V): output of a voltage between 0 and 10 V.

As fixed value of.

As PWM (pulse width modulation): output of a frequency. The duty cycle (ON / OFF) conforms to the control signal.

HQC **H**eat **q**uantity **c**ounter: Operation with volume flow encoder

Operation with fixed volume flow

EXT DL **Ext**ernal sensor values from the **d**ata **l**ink

Language *DEUT, ENGL*

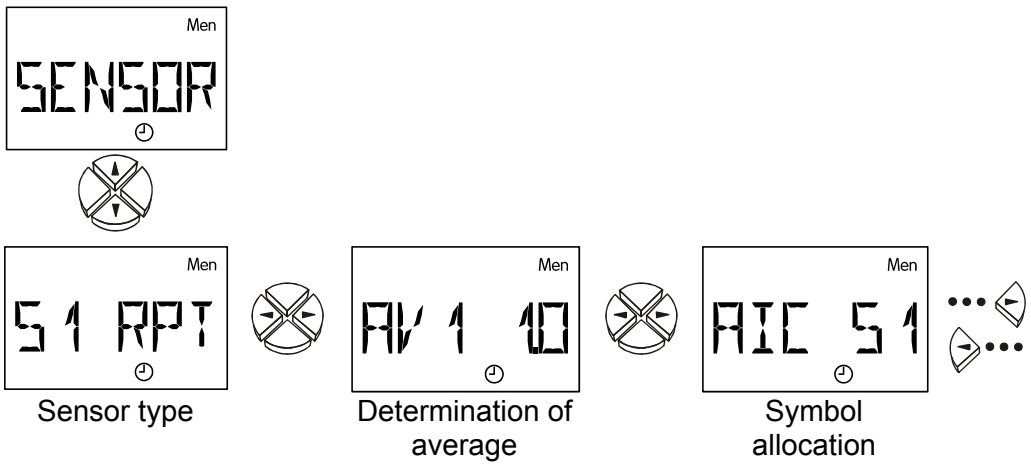
Language selection: The entire menu can be switched to the desired user language even before the code is provided. The following languages are available: German (***DEUT***) and English (***ENGL***).

Factory settings are made in German (***DEUT***).

Code number *CODE*

The other menu items of the menu ***MEN*** are displayed only after the correct code has been entered. Since the settings in the menu change the basic properties of the controller entry is restricted by code number which is only available to the technician.

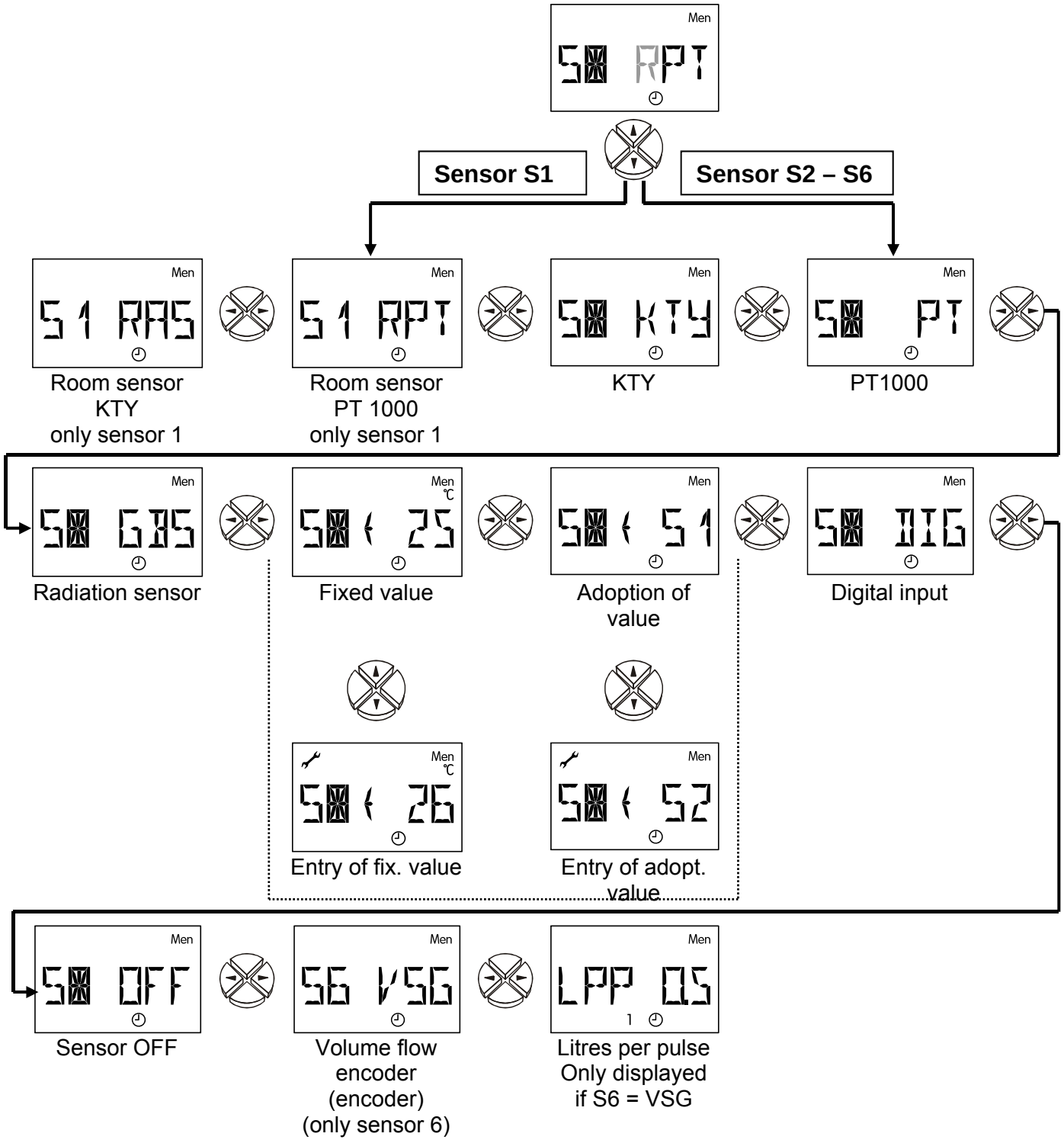
Sensor menu *SENSOR*



Sensor type | Determination of average | Symbol allocation

These 3 menu items are available for every sensor.

Sensor type


Men
S0 RPT
Sensor S1
Sensor S2 – S6
S1 RAS
Room sensor
KTY
only sensor 1
S1 RPT
Room sensor
PT 1000
only sensor 1
S0 KTY
KTY
S0 PT
PT1000
S0 GBS
Radiation sensor
S0 t 25
Fixed value
S0 t S1
Adoption of
value
S0 DIG
Digital input
S0 t 26
Entry of fix. value
S0 t S2
Entry of adopt.
value
S0 OFF
Sensor OFF
S6 VSG
Volume flow
encoder
(encoder)
(only sensor 6)
LPP 0.5
Litres per pulse
Only displayed
if S6 = VSG

RPT, RAS Room sensor **RPT** (= RASPT / Pt1000) or **RAS** (KTY), only on input **S1**

Inputs 2 - 6 are set to PT1000 type in the factory settings.

PT, KTY Temperature sensors

SX ⇦25 Fixed value: e.g. **25**°C (use of this adjustable temperature for controlling instead of the measured value)

Setting range: –20 to 149°C in increments of 1°C

S2⇦S3 **Example:** Instead of a measured value the input **S2** receives its (temperature) information from input **S3**. Reciprocal allocation (according to this example additionally: **S3⇦S2**) to cancel information is not permissible.

In addition it is possible to assign values from **external sensors** (**E1** to **E9**).

DIG **Dig**ital input: e.g. when using a flow switch.

Input short-circuited (ON): Display: **D 1**

Input interrupted (OFF): Display: **D 0**

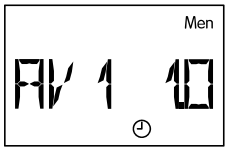
OFF Sensor is hidden in the main level

VSG Volume flow encoder: **Only on input S6** to read the impulses from a volume flow encoder (determining the flow rate for the heat quantity counter)

LPP **L**itres **p**er **p**ulse = the volume flow encoder's pulse rate (only when sensor type S6 = VSG). (ex works = 0.5)

Setting range: 0.0 to 10.0 litres/pulse in increments of 0.1 litre/pulse

Determination of average *AV*

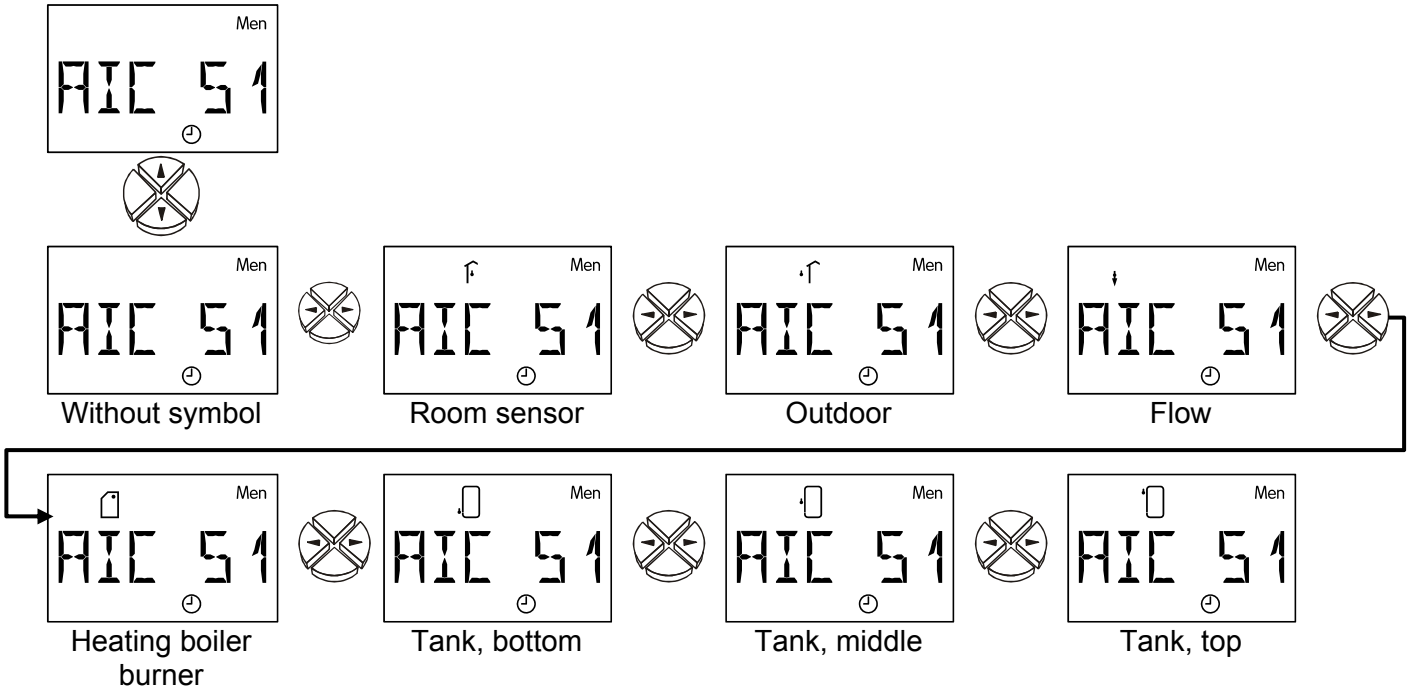


Setting of the time in seconds over which an averaging of the measured value should be carried out (fs = 1.0s).
Example: AV1 1.0 **Av**eraging sensor S**1** over **1.0** seconds

For simple measuring operations approx. 1.0 - 2.0 should be selected. A high average slows everything down and is only recommended for the sensors for the heat quantity counter.
The measuring of the ultra-fast sensor for the hygienic hot water preparation makes a fast evaluation of the signal necessary. The averaging of the respective sensor should therefore be reduced to 0.3 to 0.5 although that means that slight fluctuations of the display should be expected.
No averaging is possible for the volume flow encoder VSG.

Setting range: 0.0 to 6.0 seconds in increments of 0.1 sec.
0.0 = no averaging

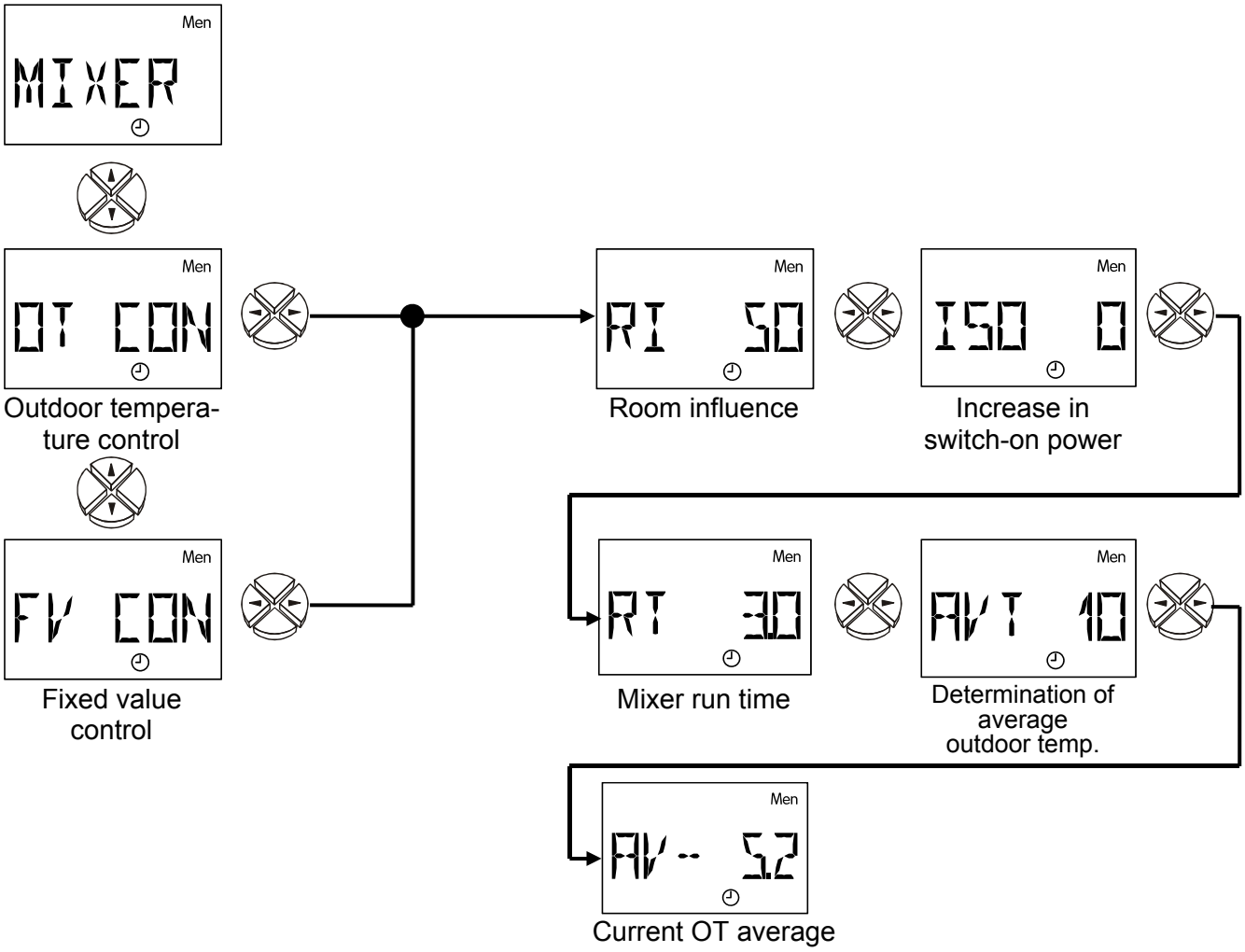
Symbol allocation *AIC*



Every input can be assigned any of the above symbols. Although it doesn't make a great deal of sense it is also possible to assign several inputs (sensors) the same symbol.

Symbol allocation has no influence on the control function.

Mixer menu *MIXER*



OT CON Type of control: Outdoor temperature. Calculation of flow nominal temperature from the outdoor temperature and a pre-determined correlation (Temperature or rate of rise, setting in parameter menu **Par**).

FV CON Type of control: Fixed value control. The flow is controlled to the specified temperature of +10°C in lowering mode and to that of -20°C in heating mode (setting in parameter menu Par).

Important instruction for fixed value control: As room influence is still active, then if a room sensor is being used, the room influence **RI** must be set to zero.

RI Room influence. The respective room temperature is taken into consideration for calculating of the flow. (fs = 50%) Setting range: 0 – 90%

ISO Increase in switch-on power in % relative to a lowering time of 10 hours. The previous lowering period leads to an excessive increase (receding over time) of the flow temperature to shorten the dwell time.(fs = 0%) Setting range: 0 – 9%

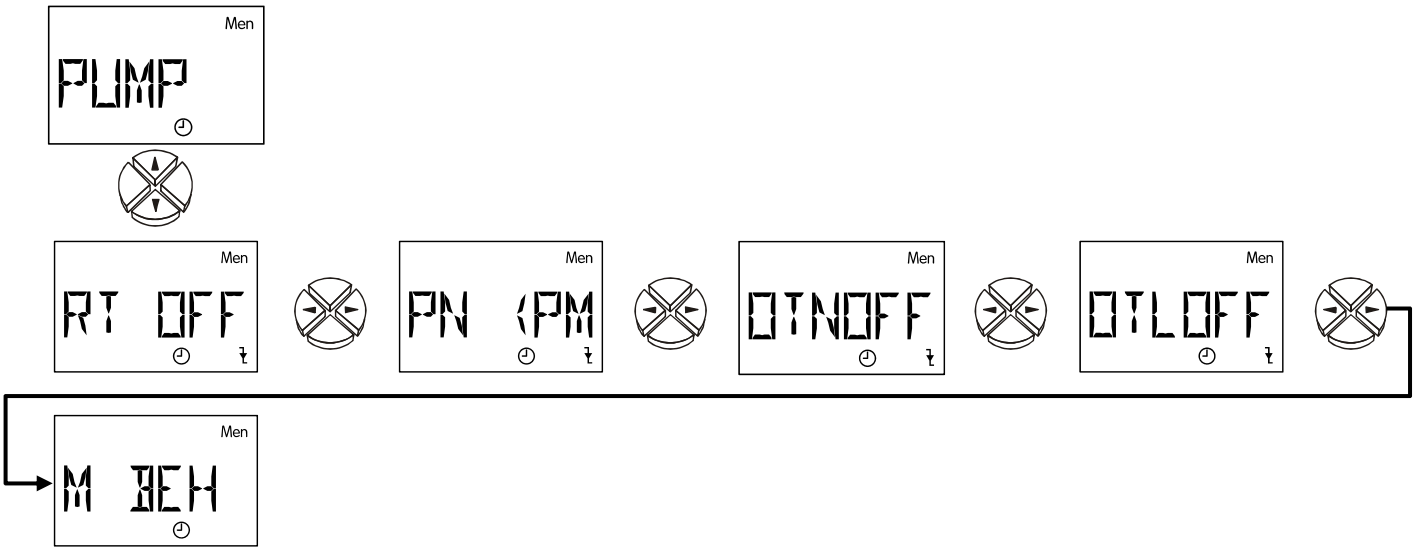
RT Total mixer run time in minutes. (fs = 3.0)

Setting range: 0 to 30 min

AVT Averaging time of the outdoor temperature for the calculation of the nominal flow in minutes. Compensation of the fluctuating outdoor temperatures for the calculating the flow temperature. (fs = 10) Setting range: 0 to 255 min

AV Actual average value for the outdoor temperature.

Heating pumps menu *PUMP*



In this menu the **switch-off conditions for the heating pump** and the mixer behaviour with switched-off pump are specified.

RT OFF Switch off when nominal room temperature has been reached.

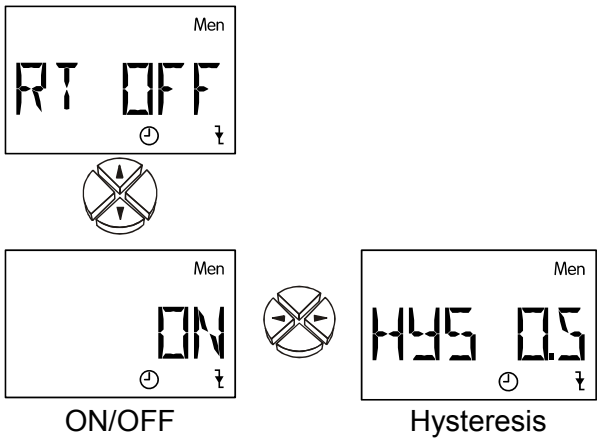
PN < PM Switch off when the calculated nominal flow temperature falls below the minimum flow temperature.

OTNOFF Switch off when the average outdoor temperature exceeds a specified value in normal operation.

OTLOFF Switch off when the average outdoor temperature exceeds a specified value in lowering mode.

M BEH Mixer behaviour when switching off the heating pump.

Switch-off when the nominal room temperature is reached



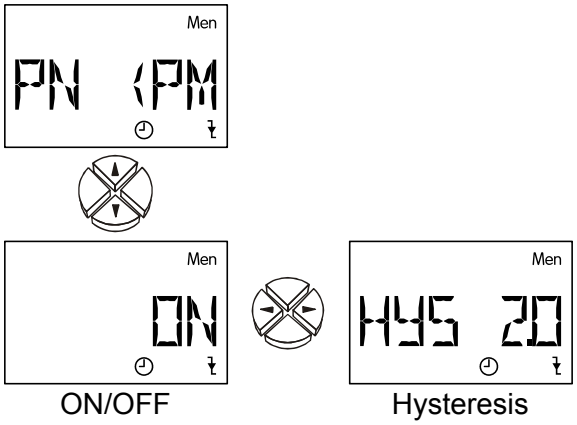
ON/OFF Hysteresis

ON/OFF Switch-off condition activate/deactivate. (fs = OFF)
Base temperature is the set nominal room temperature for normal or lowering mode in the basic control level (**RTN** / **RTL**).

HYS Switching hysteresis of the base temperature. (fs = 0.5 K) Setting range: 0 to 25 K

The switching hysteresis has an upward effect. **Example**: with a set room temperature of 20°C and a hysteresis of 0.5K the pump is switched off at 20.5°C as the temperature increases and switched on again at 20.0°C as the temperature falls.

Switch-off when fallen below the minimum pre-run (flow) temperature



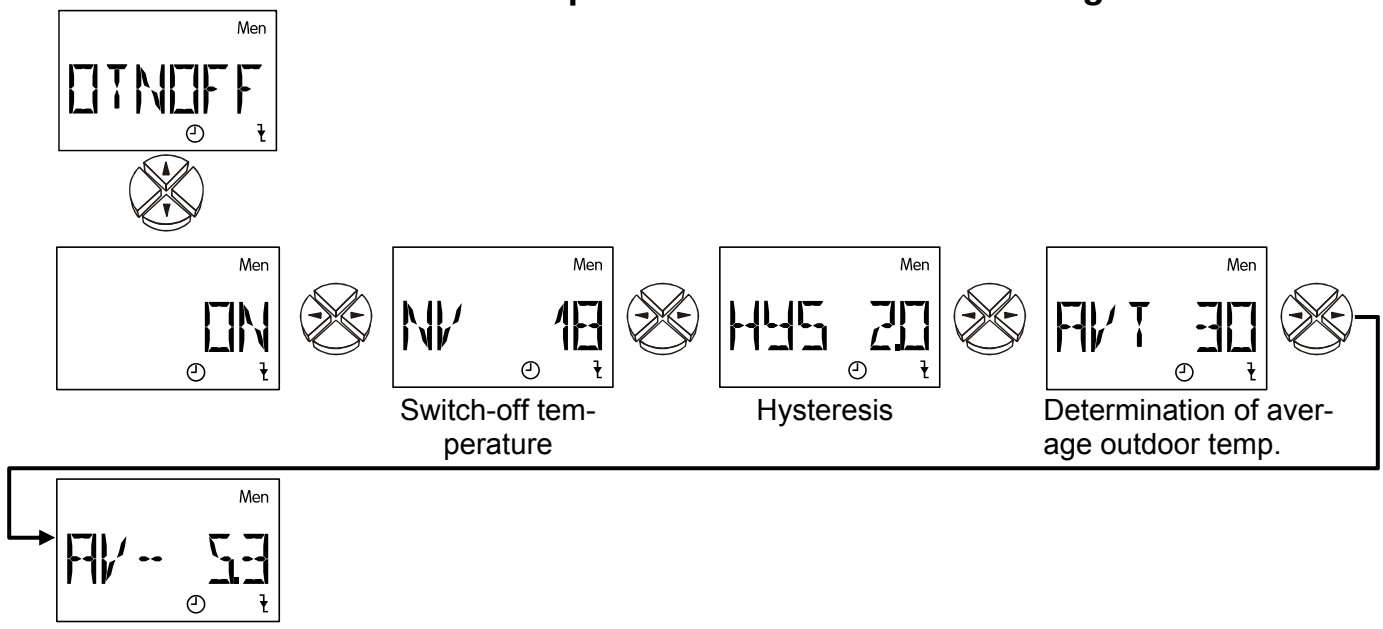
ON/OFF Hysteresis

ON/OFF Switch-off condition activate/deactivate. (fs = OFF)
Base temperature is the minimum flow temperature PREmin specified in the parameter menu.

HYS Switching hysteresis of the base temperature. (fs = 2.0 K) Setting range: 0 to 25 K

The switching hysteresis has a downward effect. **Example**: For a **PREmin** of 30°C and a hysteresis of 2.0K the pump is switched off with a falling flow nominal temperature at 28°C and switched on again with an increasing flow nominal temperature at 30.0°C.

Switch-off when outdoor temperature is exceeded - heating mode



Switch-off temperature | Hysteresis | Determination of average outdoor temp.

Current OT average

ON/OFF Switch-off condition activate/deactivate. (fs = ON)

NV Nominal outdoor temperature for switch-off (fs = 18°C) Setting range: -20 to 99°C

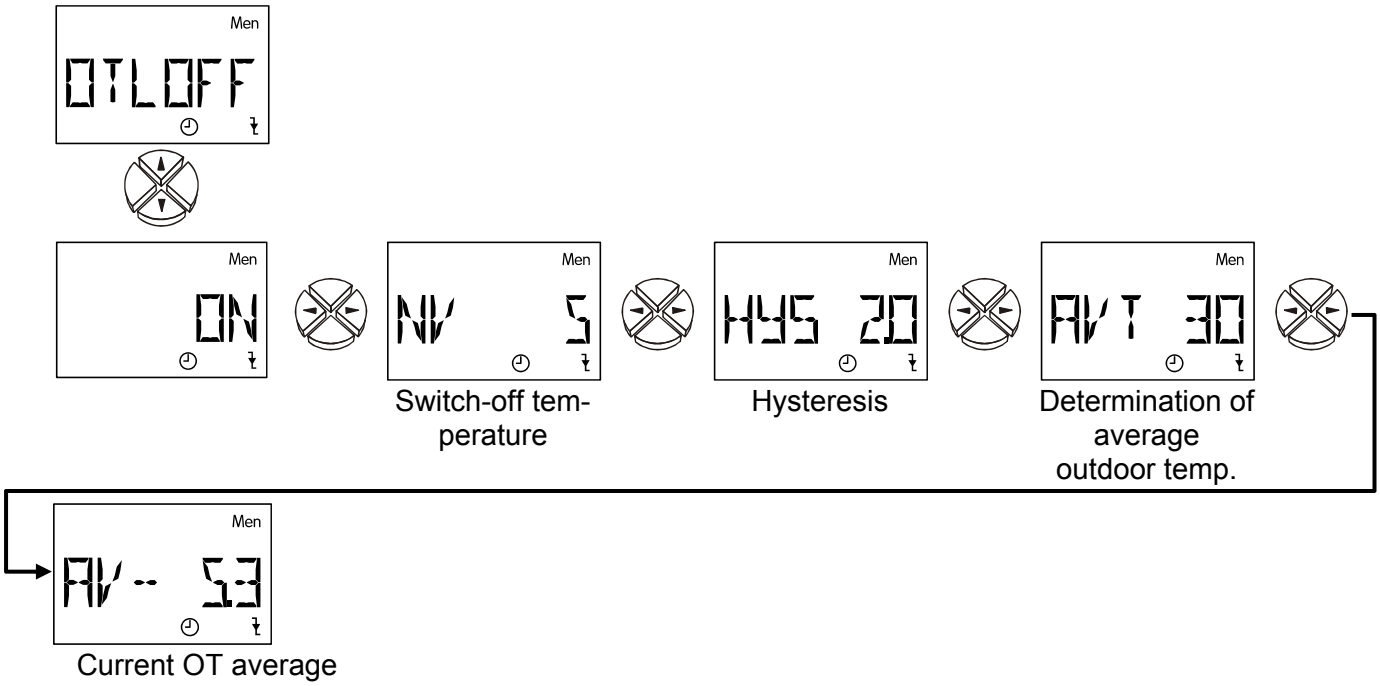
HYS Switching hysteresis (fs = 2.0 K) Setting range: 0 to 25 K

The switching hysteresis has an upward effect. **Example**: with a switch-off temperature of **NV** 18°C and a hysteresis of 2.0K the pump is switched off at 20.0°C as the temperature increases and switched on again at 18.0°C as the temperature falls.

AVT Averaging time of the outdoor temperature for the switch-off the pump in minutes. Compensation of fluctuating outdoor temperatures. This value is identical to the (mean time) AVT value under the switch off condition OTLOFF.
(fs = 30 min) Setting range: 0 to 255 min

AV Actual average value for the outdoor temperature.

Switch-off when outdoor temperature is exceeded - lowering mode



ON/OFF Switch-off condition activate/deactivate. (fs = OFF)

NV Nominal outdoor temperature for switch off. (fs = 5°C) Setting range: -20 to 99°C

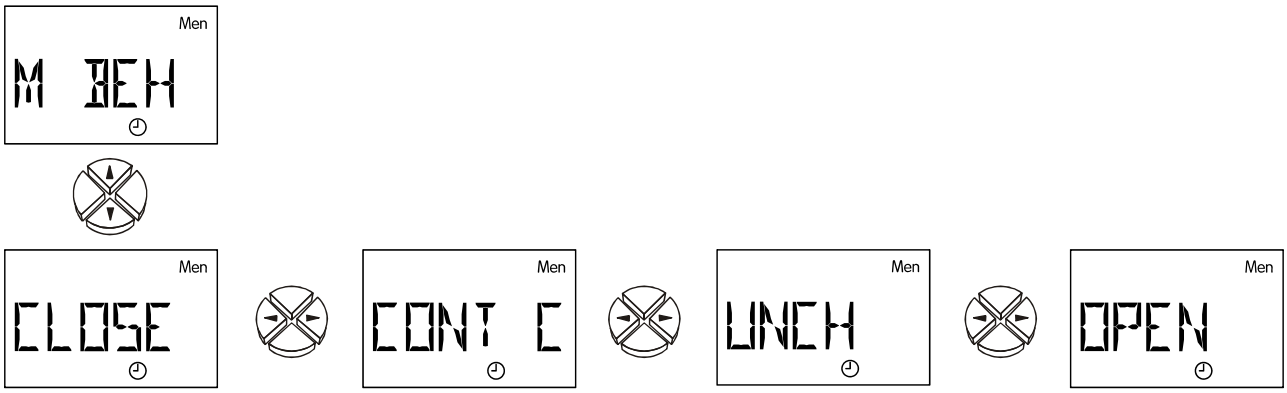
HYS Switching hysteresis (fs = 2.0 K) setting range: 0 to 25 K

The switching hysteresis has an upward effect. **Example**: with a switch-off temperature of **NV** 5°C and a hysteresis of 2.0K the pump is switched off at 7°C as the temperature increases and switched on again at 5.0°C as the temperature falls.

AVT Averaging time of the outdoor temperature for the switch-off the pump in minutes. Compensation of fluctuating outdoor temperatures. This value is identical to the (mean time) AVT value under the switch off condition OTNOFF.
(fs = 30 min) Setting range: 0 to 255 min

AV Actual average value for the outdoor temperature.

Mixer behaviour



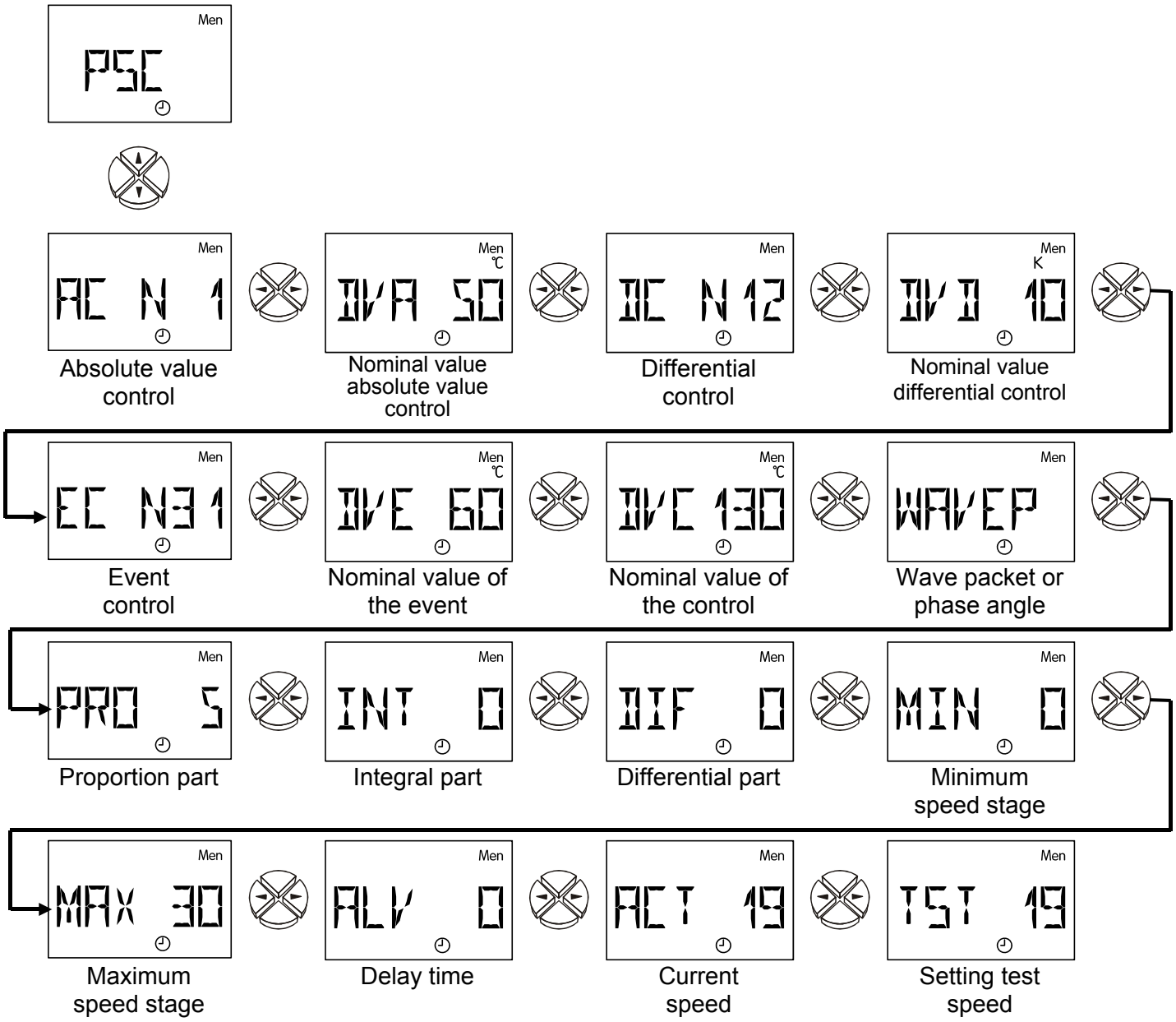
Specifying how the mixer should behave after the pump has been switched off:

Close, continue control, stand still unchanged, open.
Factory setting: Close

Pump speed control *PSC*

Pump speed control PSC is not suitable for electronic or high efficiency pumps.

Warning! The values in the following description are by way of example only; they must, in all cases, be matched to the system!



With the assistance of the pump speed control changing the delivered quantity – i.e. the volume flow from standard circulating pumps is possible in 30 increments.

The reduction of flow rate e.g. in a boiler causes an increase outlet temperature due to the longer dwell period. Hence the boiler and the tank are able to be heated quickly to a useful temperature level.

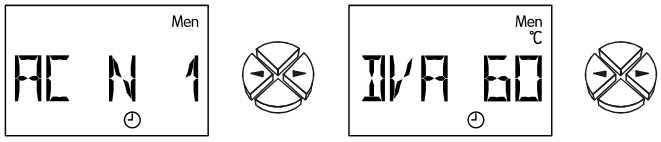
The system forms a control circuit from the sensor, the electronics, the pump and the hydraulic line system, which enables the temperature at the sensor point to be kept constant by varying the speed. Three control functions are available which are fully capable of being activated simultaneously:

Absolute value control

= stabilization of a sensor

A temperature sensor can easily be held at a constant temperature by controlling the speed (e.g.: controlling a heating circuit via a fixed value control together with a pump speed control). Alternatively in many systems it can be useful to have a constant return. This requires an inverse control characteristic. If the return temperature increases the flow rate is reduced.

The absolute value control is specified using two parameter windows.



AC N 1 **A**bsolute value **c**ontrol in **n**ormal operation whereby sensor S**1** is kept constant.

Normal operation N means that the speed increases with the increasing temperature and is applicable for keeping a "flow" sensor constant (e.g. boiler).

Inverse mode I means that the speed reduces with increasing temperature and is necessary for keeping a return constant. (fs = --)

Setting range: AC N 1 to AC N6, AC I 1 to AC I 6

AC -- = Absolute value control is deactivated.

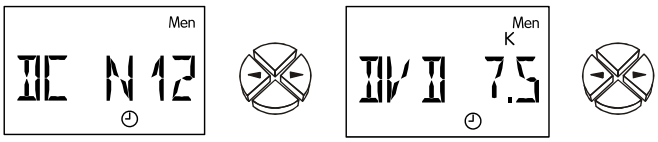
DVA 60 The nominal value of the absolute value control is **60**°C. According to the example therefore S1 is stabilized at 60°C. As a nominal value **DVA** the flow nominal temperature **PN** can also be selected (the set position is between 99°C and 0°C.). (fs = 50°C)

Setting range: 0 to 99°C in increments of 1°C

Differential Control

= stabilization of the temperature between two sensors.

Stabilization of the temperature difference between e.g. S1 and S2 provides 'smooth' operation.



DC N12 Differential control in normal operation between sensor S1 and S2. (fs = --)

Setting range: DC N12 to DC N65, DC I12 to DC I65)

DC -- = Differential control is deactivated.

DVD 7.5 The nominal value of the differential control is **7.5**K. According to the example therefore the temperature difference between S1 and S2 is stabilized at 7.5K.

Warning: SWD must always be greater than the switch-off differential of the basic function. With a smaller SWD the basic function blocks the release of the pump before the speed control has reached the nominal value. (fs = 10K)

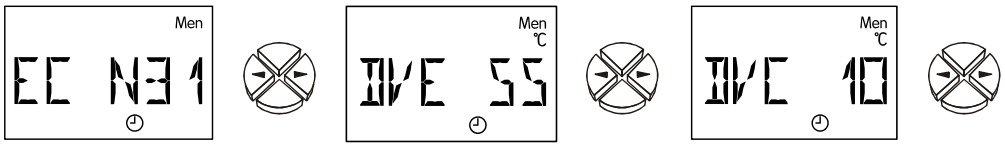
Setting range: 0.0 to 9.9K in increments of 0.1K; 10 to 99K in increments of 1K

If the absolute value control (stabilization of a sensor) and the differential control (stabilizing the differential between two sensors) are both active at the same time, the “slower speed wins out”.

Event control

= If a set temperature event occurs, the speed control starts, thus keeping a sensor constant.

When S3 has reached 55°C (activation threshold) for example S1 is kept at a certain temperature. The respective stabilization of the sensor functions as it does for the absolute value control.



EC N31 Event control in normal operation; an event occurring at sensor S**3** leads to stabilization of the sensor S**1**. (fs = --)

Setting range: EC N12 to EC N65, EC I12 to EC I65

EC -- = Event control is deactivated.

DVE 55 The threshold value of the event control is **55**°C. Above a temperature of 55°C at S3 the speed controller is activated. (fs = 60°C)

Setting range: 0 to 99°C in increments of 1°C

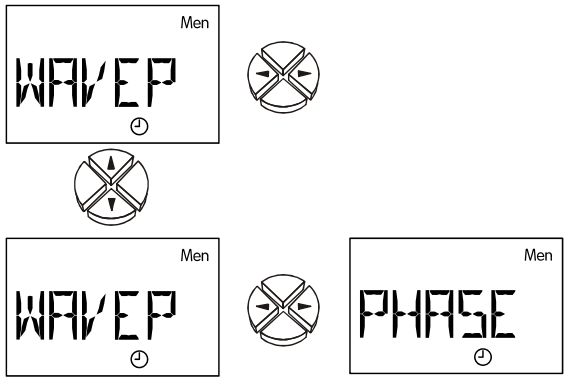
DVC 10 The nominal value of the event control is **10**°C. As soon as this event occurs, S1 is stabilized at 10°C. (fs = 130°C)

Setting range: 0 to 199°C in increments of 1°C

The event control “overwrites” the speed results from other regulation methods. Hence, a set event can block the absolute value control or differential control.

Waveform

Two waveforms are available for motor control. (fs = WAVEP)



WAVEP Wave packet - Only for circulating pumps with standard motor dimensions. Here, individual half-waves are blended in to the pump motor. The pump is run via pulses, and “smooth running” is only created by the moment of inertia of the rotor and the heat carrier.

Benefit: Great dynamics of 1:10, well suited for usual commercial pumps without internal electronics and a motor length of around 8 cm.

Drawback: Linearity depends on the pressure loss; there is some noise; not suitable for pumps of which the motor diameters and/or length deviate markedly from 8 cm.

PHASE **Phase** angle - For pump and fan motors without internal electronics. The pump is switched to the mains within each half-wave at a certain point in time (phase).

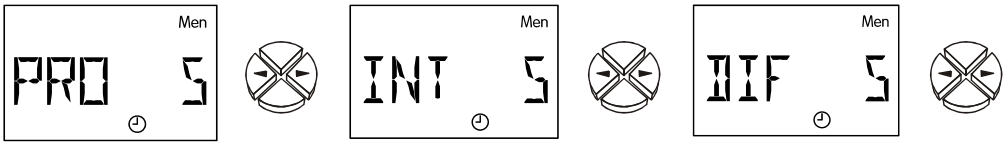
Benefit: Suitable for almost all types of motors

Drawback: Low dynamics of 1:3 for pumps. **A filter has to be inserted upstream from the unit with at least 1.8mH and 68nF to fulfil the CE standards for interference suppression.**

NOTICE
The menu allows a choice between wave packet and phase angle however in the standard version the output of waveform "phase angle" is not possible!
Special versions on request.

Stability problems

The speed control contains a "PID controller". It guarantees exact and fast matching of the actual value to the nominal value. In applications such as solar systems or load pumps the parameters of the factory setting guarantee stable behaviour. In special cases though comparison is imperative.



Nominal value = desired temperature Actual value = measured temperature

PRO 5 **Pro**portion part of the PID controller **5**. It represents the reinforcement of the deviation between nominal and actual value. The speed is changed one increment per 0.**5**K deviation from the nominal value. A high number leads to a more stable system but also to greater deviation from the temperature set.

(fs = 5) Setting range: 0 to 100

INT 5 **Int**egral part of the PID controller **5**. Periodically adjusts the speed relative to the deviation remaining from the proportional part. For **1**K of deviation from the nominal value, the speed is changed one increment every **5** seconds. A larger number makes the system stable, but the adjustment to the nominal value is slower.

(fs = 0) Setting range: 0 to 100

DIF 5 **Dif**ferential part of the PID controller **5**. The faster a deviation between nominal and actual value occurs the greater the tendency to short-term "overreaction" in order to achieve compensation as fast as possible. If the nominal value deviates at a speed of 0.**5**K per second, the speed is changed by one increment. Higher values provide a more stable system but adjustment to the nominal value is slower. (fs = 0) Setting range: 0 to 100

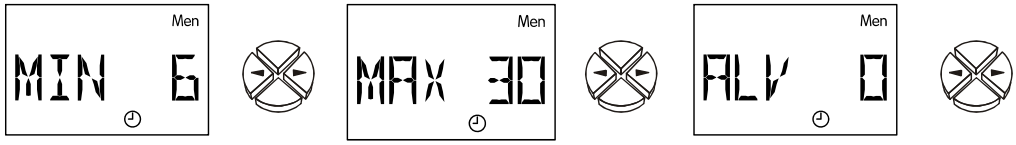
The parameters PRO, INT, and DIF can be determined by a test:

The pump should be running in automatic operation with the system ready for operation with the appropriate temperatures. With INT and DIF set to zero (= switched off), PRO is reduced from 10 every 30 seconds until the system becomes unstable i.e. the pump speed changes its rhythm; it can be read off in the menu under command ACT. The proportional part at which instability begins is noted as P_{krit}, with the duration of the oscillation (= time between the two highest speeds) noted as t_{krit}. The correct parameters can be determined with the following formulae.

$$PRO = 1{,}6 \times P_{krit} \qquad INT = \frac{PRO \times t_{krit}}{20} \qquad DIF = \frac{PRO \times 8}{t_{krit}}$$

Pump standstill

The wave packet method (standard) allows the volume flow to be changed by a factor of 10 in 30 increments. Flow rates which are too low together with the use of return flaps can cause a system standstill. Furthermore at low performance levels in the lower speed range a rotor standstill can occur. This can sometimes even be desirable which is why the lower limit of 0 is admissible. The following parameters specify the upper and lower speed limits:



MIN Lower speed limit (fs = 0)

MAX Upper speed limit (fs = 30)

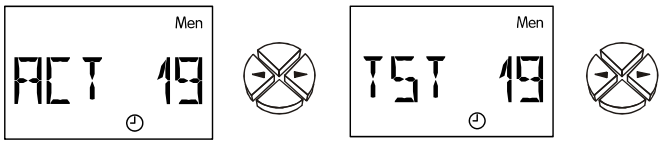
A reasonable speed limit is determined by a simple test. Through the command TST any speed stage can be set on a trial basis. The rotor can be observed with its hood removed. The speed is then reduced until the rotor comes to a standstill. Three stages above this limit will provide safe pump operation.

ALV If the output is switched by the difference the speed control is deactivated for the specified period and the output switches fully across (speed stage = 30). The output speed is only controlled after this time has elapsed.

Setting range: 0 to 9 minutes in 10 second increments (fs = 0)

Control commands

Using the following commands a system test (see pump standstill) or monitoring of the actual speed (see stability problems) is possible:

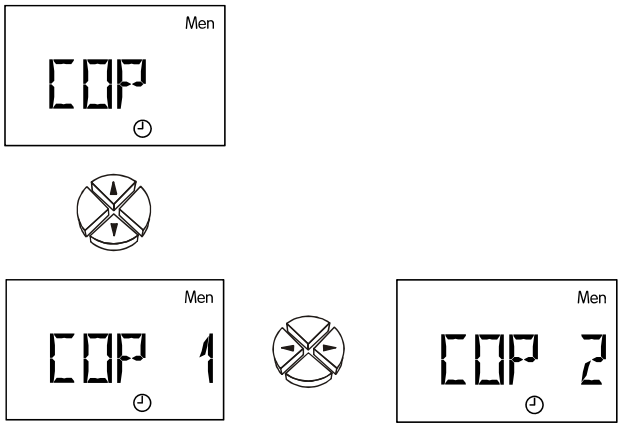


ACT 19 Currently the pump is running (actual value) at speed stage **19**.

TST 19 Currently the speed stage **19** is issued on a **test** basis. Invoking TST automatically results in manual mode. As soon as the value above the key ⇩ (= Entry) blinks the pump is controlled at the speed stage displayed.

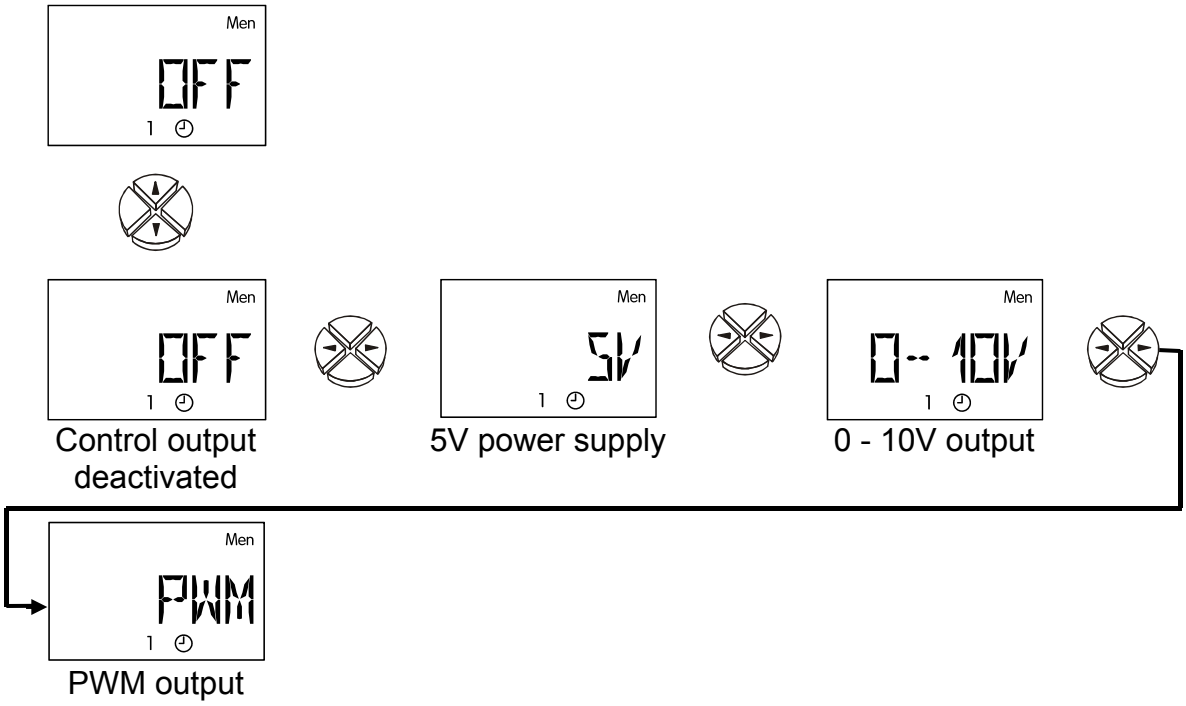
Setting range: 0 to 30 with keys ⇦⇨

Control output *COP* 0 to 10 V / PWM (twice)



Control output 1 Control output 2

Different functions of the control output

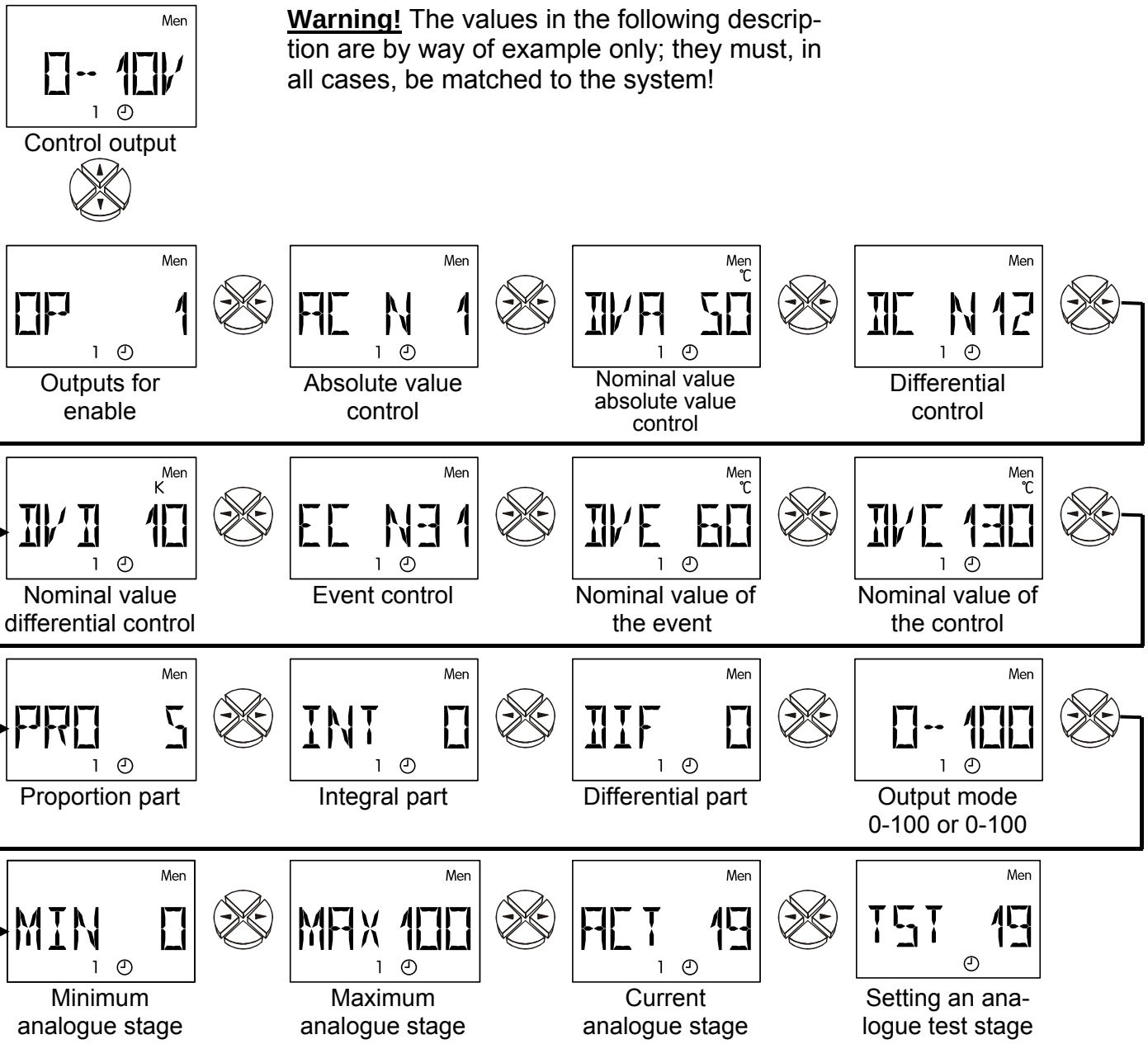


Control output deactivated | 5V power supply | 0 - 10V output

PWM output

OFF	Control output deactivated; output = 0V
5V	Power supply; output = 5V
0 to10V	PID – controller; output = 0 to 10V in 0.1V increments
PWM	PID – controller; output = duty cycle 0 to 100% in 1% increments

The following settings are only possible in **0 to 10V** and **PWM** modes:



Warning! The values in the following description are by way of example only; they must, in all cases, be matched to the system!

In this menu the parameters for the control output are specified. As analogue output it can put out a voltage of 0 to 10V in 0.1V increments. As PWM a digital signal with a frequency of **500 Hz (level approx. 10 V)** and a variable duty cycle from 0 to 100% is created.

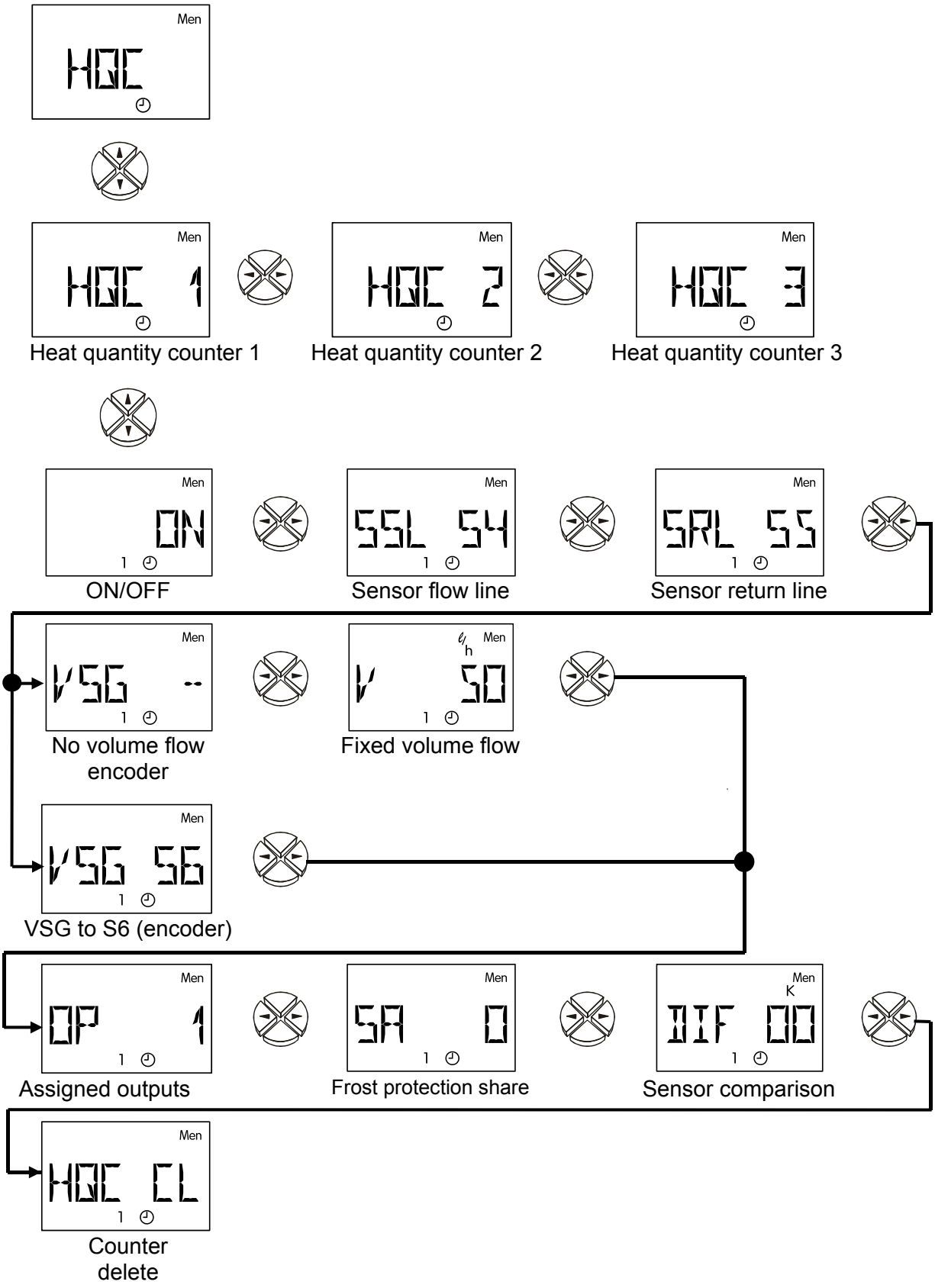
The behaviour of the control circuit is equal to that of the pump speed control (PSC) however instead of 30 (PSC) a maximum of 100 increments is available.

The description of the parameter values follows therefore in the menu "PSC".

OP Setting the outputs to enable the analogue output.
That means that the analogue output is only enabled when the output set here (or at least one of several outputs) is switched on. (fs = --)
Setting range: Combinations of all outputs (e.g. OP1, OP23, OP123)
OP -- = To the analogue output has not been allocated an output.

0-100 Output mode setting: 0-100 corresponds to 0->10V or 0->100% PWM, 100-0 corresponds to 10->0V or 100->0% PWM (inverse). (fs = 0-100)

Heat quantity counter *HQC* (three times)



The device has a function for determining the heat quantity. It is deactivated ex works. A heat quantity counter fundamentally requires three details. These are:

flow temperature, return temperature, flow rate (volume flow)

Furthermore in order to increase the accuracy it is necessary to specify the frost protection share in the heat transfer medium since the frost protection reduces its heat-transporting capacity. The flow rate can be made as a direct entry or via an additional sensor with specified pulse rate.

ON/OFF Heat quantity counter activate/deactivate (fs = OFF)

SSL Sensor input of flow temperature (fs = S4)

Setting range: S1 to S6 Input of the flow sensor
E1 to E9 Value from external sensor via DL

SRL Sensor input of return temperature (fs = S5)

Setting range: S1 to S6 Input of the return sensor
E1 to E9 Value from external sensor via DL

VSG Sensor input for volume flow encoder. (fs = --)

The pulse encoder **VSG** can only be connected to input S6. For this purpose the following settings must be made in the **SENSOR** menu without fail:

S6 VSG Volume flow sensor with pulse encoder

LPP Litres per pulse

Setting range: VSG S6 = volume flow encoder **at input 6**.
VSG E1 to E9 = Value from external sensor **via DL-Bus**
VSG -- = no volume flow encoder → fixed volume flow. For the calculation of the heat amount, the set volume flow is only used if the set output is active

V **V**olume flow in litres per hour. Without a volume flow encoder a fixed volume flow can be set in this menu. If the set output is not active the volume flow is assumed to be 0 litres/hour. Since an activated speed control always results in other volume flows this procedure is not suitable together with the speed control. (fs = 50 l/h)

Setting range: 0 to 20000 litres/hour in 10 litre/hour increments

OP Assigned **o**ut**p**uts. The set/measured volume flow is only used to calculate the heat quantity if the output specified here is active (or at least one of several outputs). (fs = --)

Setting range: OP = -- heat quantity is calculated without any consideration to the outputs.
Combinations of all outputs (e.g. OP1, OP23, OP123)

SA Frost protection share of the heat transfer medium. An average is calculated from the product information of all relevant manufacturers and implemented in the form of a table according to mixing ratios. Under typical conditions this method results in an additional maximum error of one percent. (fs = 0%)

Setting range: 0 to 100% in 1% increments

DIF Current temperature **dif**ference between flow and return sensor (Maximum display ±8.5 K, additionally an arrow is displayed). If both sensors are submersed simultaneously in a bath for test purposes (both therefore measure the same temperature) the device should display "**DIF 0**". As a result of the tolerances of the sensors and the measuring movement of the device however a differential is displayed under **DIF**. If this display is set to zero, the computer saves the differential as correction factor and corrects this natural error in future calculations of the heat quantity. **This menu item therefore represents calibration facility. The display may only be set to zero (or altered) when both sensors have identical measuring conditions (together in the same bath).** For this purpose a medium at a temperature of 40°C to 60°C is recommended.

HQC CL Delete heat quantity counter. The totalled heat quantity can be deleted with this command with the key ⇩ (= entry).

If the heat quantity is zero **CLEAR** is displayed in this menu item.

If the heat quantity counter has been activated the following are displayed in the basic menu:
the current performance in kW
the heat quantity in MWh and kWh
the volume flow in litres/hour

IMPORTANT: If an error occurs on one of the set sensors (flow sensor, return sensor) of the heat quantity counter (short circuit, interruption) the current performance is set to zero and as a result no heat quantity is added.

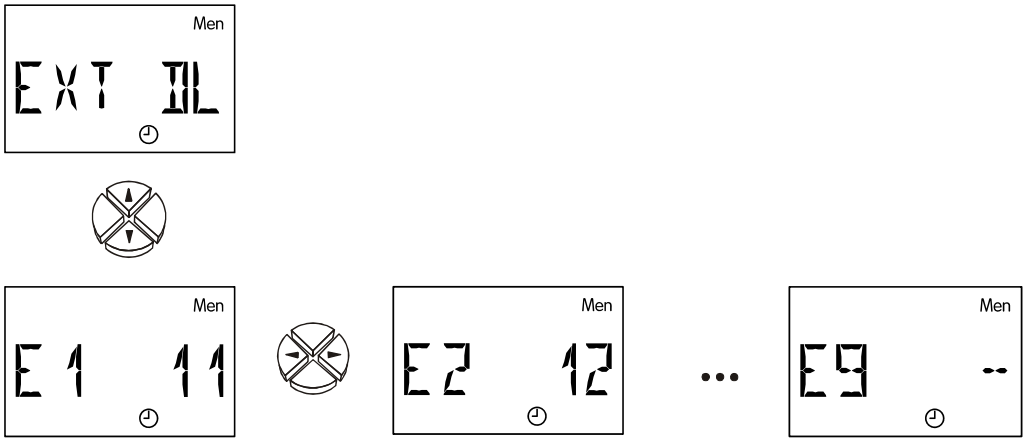
NOTICE: As the internal storage (EEPROM) has only a limited number of write cycles, the totalled heat quantity is saved only once per hour. For this reason, it is possible that a power failure can result in loss of the heat-quantity data for one hour.

Notes on accuracy:

A heat quantity counter can only be as accurate as the sensors and the movement of the measuring device. In the range from 10°C to 90°C the standard solar control sensors (PT1000) have an accuracy of approximately +/- 0.5K. For KTY sensors the equivalent figure is +/- 1K. The measuring movement of the device is accurate to around +/- 0.5K based on laboratory measurements. PT1000 sensors may be more accurate but they supply a smaller signal which increases the error of the measured value. In addition the orderly installation of the sensors is extremely important. Incorrect installation can further substantially increase the margin of error.

If all the tolerances are now added together in the worst case scenario the total error for a typical temperature differential of 10K would be 40% (KTY). In reality however an error of less than 10% can be expected because the error of the measuring movement affects all input channels the same and the sensors are from the same production batch. In part therefore the tolerances cancel each other out. The basic principle applies: The larger the temperature differential the smaller the error. When all factors are taken into account the measurement result should be seen as a guide value only. Through alignment of the measured differential (see **DIF**) the measuring error is less than 5% in standard applications.

External sensors *EXT DL*



Address for external value 1 | Address for external value 2 | Address for external value 9

Electronic sensors for temperature, pressure, humidity, differential pressure, etc. are also available in the **DL** version. In this case, the supply and signal transmission takes place via the **DL bus**.

Up to 9 values from external sensors can be read via the data link.

The values of the electronic sensors can be taken from sensor inputs for further control tasks (adjustment in the SENSOR menu, transfer of values).

E1 -- The external value 1 is deactivated and faded out in the main level.

E1 11 The **front** number indicates the address of the external sensor. This can be set to between 1 and 8 on the sensor according to its operating instructions.

The **rear** number indicates the index of the sensor value. Since external sensors can transmit numerous values the value required from the sensor is defined via the index.

The setting of the address and index can be taken from the respective data sheets.

Due to the relatively high power requirement, the **"bus load"** must be considered:
The controller UVR 63H delivers the maximum bus load 100%. For example, the electronic sensor FTS4-50**DL** has a bus load of 39%, therefore up to a max. 2 FTS4-50**DL** can be connected to the DL bus. The bus loads of the electronic sensors are listed in the technical data of the respective sensors.
Simultaneous power supply to a boot loader and external sensors is not possible. It this case, the boot loader must be supplied via a power pack (CAN-NT).

Tips on troubleshooting

Standard practice for suspected malfunction should be to first of all check all settings in the menus ***Par*** and ***Men*** as well as the terminals.

Malfunction but "realistic" temperature values:

- Check the program number.
- Check the switch-on and switch-off thresholds as well as the temperature differential settings. Have the thermostat and differential thresholds already (or not yet) been reached?
- Have settings been changed in the submenus (***Men***)?
- Is it possible to switch the output on and off in manual mode? - If endurance runs and standstills at the output result in appropriate reactions the device is definitely in order.
- Are all sensors connected to the correct terminals? - Heat the sensors using a lighter and check the display.

Wrongly displayed temperature(s):

- If a value such as -999 is displayed when a sensor short-circuits or 999 if there is a sensor interruption, the cause may not be a material or terminal error. Are the correct sensor types (KTY or PT1000) selected in menu ***Men*** under ***SENSOR***?

  The factory setting sets all inputs to PT (1000).
- The sensor can also be checked without a measuring device simply by changing the sensor that is probably defective with one that works at the strip terminal and checking the temperature display. The resistance measured with an ohmmeter should have following value according to temperature:

Temp. [°C]	0	10	20	25	30	40	50	60	70	80	90	100
R (Pt1000) [Ω]	1000	1039	1078	1097	1117	1155	1194	1232	1271	1309	1347	1385
R (KTY) [Ω]	1630	1772	1922	2000	2080	2245	2417	2597	2785	2980	3182	3392

The factory setting of the parameter and menu functions can be restored at any time by pressing the lower key (Entry) during plugging in. WELOAD appears in the display for three seconds to indicate loading of the factory setting.

If in spite of connection to the supply voltage the device is not working the 3.15A fast-acting fuse which protects the controls and the output should be checked or replaced.

Since the programs are continually being revised and improved it is possible that there are differences in the sensor, pump and program numbering compared with older documentation. Only the accompanying operating manual is valid for the device supplied (identical serial number). The program version of the manual must categorically correspond with that of the device.

Should in spite of inspecting and checking in accordance with the above-mentioned tips a malfunction of the controller be apparent please get in contact with your dealer or directly with the manufacturer. The cause of the malfunction can only be found however when in addition to the description of the malfunction **a fully completed table of the settings** and if possible a hydraulics diagram for the system are provided.

Table of settings

Should an unexpected failure of the controls occur the complete setting must be restored for the start-up. In such cases problems can be avoided if all the set values are entered in the following table. **In the event of queries this table must be provided without fail.** Only then is a simulation and recognition of an error possible.

FS ..... **factory settings** **CS** ..... **Controller settings**

	FS	CS		FS	CS
Values					
Time			External value E1		
Sensor **S1 (TR)**		°C	External value E2		
Sensor **S2 (TO)**		°C	External value E3		
Sensor **S3 (TP)**		°C	External value E4		
Nom.flow temp. **NP**		°C	External value E5		
Sensor **S4**		°C	External value E6		
Sensor **S5**		°C	External value E7		
Sensor **S6**		°C	External value E8		
Speed stage SPS					
Analogue stage 1 ANL					
Analogue stage 2 ANL					

Heating circuit controller			***Desired room temperature***		
Status display			Lowering mode **RTL**	15 °C	°C
Operating mode			Normal operation **RTN**	22 °C	°C
Additional par. mode					

Time programs						
	TIMEP1		**TIMEP 2**		**TIMEP 3**	
MO		ON		OFF		OFF
TU		ON		OFF		OFF
WE		ON		OFF		OFF
TH		ON		OFF		OFF
FR		ON		OFF		OFF
SA		ON		OFF		OFF
SU		ON		OFF		OFF
TIMEW1 on		05.30		00.00		00.00
off		22.00		00.00		00.00
NV		--		--		--
TIMEW2 on		00.00		00.00		00.00
off		00.00		00.00		00.00
NV		--		--		--
TIMEW3 on		00.00		00.00		00.00
off		00.00		00.00		00.00
NV		--		--		--

	TIMEP 4		TIMEP5	
MO		OFF		OFF
TU		OFF		OFF
WE		OFF		OFF
TH		OFF		OFF
FR		OFF		OFF
SA		OFF		OFF
SU		OFF		OFF
TIMEW1 on		00.00		00.00
off		00.00		00.00
NV		--		--
TIMEW2 on		00.00		00.00
off		00.00		00.00
NV		--		--
TIMEW3 on		00.00		00.00
off		00.00		00.00
NV		--		--

Shiftworker-Timeprogram SWP		--	Date/Month		
Rate time RAT		0 min	Date/Year		
			Summer/Wintertime	AUTO	

Basic parameter *PAR*					
Equipment version			Program **PR**	0	
max1 off ↓	75 °C	°C	max1 ein ↑	70 °C	°C
max2 off ↓	75 °C	°C	max2 ein ↑	70 °C	°C
max3 off ↓	65 °C	°C			
min1 on ↑	45 °C	°C	min1 off ↓	40 °C	°C
min2 on ↑	65 °C	°C	min2 off ↓	60 °C	°C
min3 on ↑	40 °C	°C			
diff1 on ↑	8 K	K	diff1 off ↓	4 K	K
diff2 on ↑	8 K	K	diff2 off ↓	4 K	K
TEMP +10	40°C	°C	**TEMP** -20	60°C	°C
R RISE RR	0,60				
PREmax	70°C	°C	PREmin	30°C	°C
OTF	5°C	°C	RTF	5°C	°C
Output 1O	AUTO		Output 2+3 M	AUTO	
Control output C1	AUTO		Control output C2	AUTO	

Sensor type *SENSOR*					
Sensor **S1**	RPT		Average determ. AV 1	1,0 s	s
Sensor **S2**	PT1000		Average determ. AV 2	1,0 s	s
Sensor **S3**	PT1000		Average determ. AV 3	1,0 s	s
Sensor **S4**	PT1000		Average determ. AV 4	1,0 s	s
Sensor **S5**	PT1000		Average determ. AV 5	1,0 s	s
Sensor **S6**	PT1000		Average determ. AV 6	1,0 s	s
S6 = VSG ⇨ LPP	0,5				

Mixer settings *MIXER*					
OT/FV REG	OT REG		Room influence RI	50%	%
Increase switch-on power ISO	0%	%	Mixer run time RT	3,0min	min
Mean time AVT	10 min	min			

	FS	CS		FS	CS
Heating pump *PUMP*					
Room temperature switch off RT OFF	OFF		Hysteresis HYS	0,5K	K
Nominal flow temperature switch off PN< PM	OFF		Hysteresis HYS	2,0K	K
Outdoor temperature switch off heating mode OTNOFF	ON		Hysteresis HYS	2,0K	K
Nom. value outdoor temperature NV	18°C	°C	Mean time AVT	30min	min
Outdoor temperature switch off lowering mode OTLOFF	OFF		Hysteresis HYS	2,0K	K
Nom. value outdoor temperature NV	5°C	°C	Mixer behaviour M BEH	CLOSE	

Pump speed control *PSC*					
Abs.value control. AC	--		Desired value DVA	50°C	°C
Differential control DC	--		Desired value DVD	10 K	K
Event control EC	--		Threshold value TVE	60°C	°C
			Desired value DVE	130°C	°C
Waveform	WAVEP				
Proportional part PRO	5		Integral part INT	0	
Differential part DIF	0				
Minimum speed MIN	0		Maximum speed MAX	30	
Delay time ALV	0				

Control output 0-10V / PWM *COP*					
Control output *COP 1*					
OFF/5V/0-10V/PWM	OFF		Outputs OP	--	
Abs.value control. AC	--		Desired value DVA	50°C	°C
Differential control DC	--		Desired value DVD	10 K	K
Event control EC	--		Threshold value TVE	60°C	°C
			Desired value DVE	130°C	°C
Proportional part PRO	5		Integral part INT	0	
Differential part DIF	0		Output mode	0-100	
Min. analogue stage MIN	0		Max. analogue stage MAX	100	
Control output *COP 2*					
OFF/5V/0-10V/PWM	OFF		Outputs OP	--	
Abs.value control. AC	--		Desired value DVA	50°C	°C
Differential control DC	--		Desired value DVD	10 K	K
Event control EC	--		Threshold value TVE	60°C	°C
			Desired value DVE	130°C	°C
Proportional part PRO	5		Integral part INT	0	
Differential part DIF	0		Output mode	0-100	
Min. analogue stage MIN	0		Max. analogue stage MAX	100	

	FS	CS		FS	CS
Heat counter *HQC*					
Heat counter *HQC 1*					
ON/OFF	OFF				
Feed SSL	S4		Return SRL	S5	
Volume flow encoder VSG	--		**or** Volume flow V	50 l/h	l/h
Outputs OP	--				
Share of antifreeze SA	0%	%			
Heat counter *HQC 2*					
ON/OFF	OFF				
Feed SSL	S4		Return SRL	S5	
Volume flow encoder VSG	--		**or** Volume flow V	50 l/h	l/h
Outputs OP	--				
Share of antifreeze SA	0%	%			
Heat counter *HQC 3*					
ON/OFF	OFF				
Feed SSL	S4		Return SRL	S5	
Volume flow encoder VSG	--		**or** Volume flow V	50 l/h	l/h
Outputs OP	--				
Share of antifreeze SA	0%	%			

External sensors *EXT DL*					
External sensor E1	--		External sensor E2	--	
External sensor E3	--		External sensor E4	--	
External sensor E5	--		External sensor E6	--	
External sensor E7	--		External sensor E8	--	
External sensor E9	--				

Technical data

Power supply: 210 ... 250V~ 50-60 Hz
Power input: max. 3 VA
Fuse: 3.15 A fast-acting (device + output)
Supply cable: 3x 1mm² H05VV-F conforming to EN 60730-1
Case: plastic: ABS, flame resistance: Class V0 to UL94 Norm
Protection rating: II - safety insulated
Protection class: IP40
Dimensions (W/H/D): 152x101x48 mm
Weight: 210 g
Allowed ambient temperature: 0 to 45° C

6 inputs: 6 inputs- optional for temperature sensor (KTY (2 kΩ), PT1000),
radiation sensor as digital input,
or as pulse input for volume flow encoder (only input 6)

3 outputs: output A1 ..... Triac output (minimum load of 20W required)
output A2 ..... Relay output
output A3 ..... Relay output

Rated current load: Output 1: max. 1.5 A ohmic inductive cos phi 0.6
Output 2 and 3: max. 2.5 A ohmic inductive cos phi 0.6

2 control outputs: 0 - 10V / 20mA switchable to PWM (10V / 500 Hz),
supply +5 V DC / 10 mA or connection of the auxiliary relay HIREL-STAG

Tank sensor BF: diameter 6 mm incl. 2 m cable
BF PT1000 – to 90°C continuous load
BF KTY – to 90°C continuous load

Boiler sensor KE: diameter 6 mm incl. 2 m cable
KE PT1000 – to 160°C continuous load (momentary to 180°C)
KE KTY – to 160°C continuous load

The sensor lines on the inputs having a cross-section of 0.505 mm² can be extended to a length of 50 m.

Consumers (e.g.: pumps, valves...) having a cable cross-section of 0.75 mm² can be connected at a distance of up to 30 m.

Differential temperature: adjustable from 0 to 99°C
Minimum threshold / Maximum threshold: adjustable from -20 to 149°C
Temperature display: -40 to 140°C
Resolution: from -40 to 99.9°C in 0.1°C increments; from 100 to 140°C in 1°C increments
Accuracy: Accuracy: type +-0.3%.

We reserve the right to make technical changes.

EC- DECLARATION OF CONFORMITY

Document- Nr. / Date:	TA12002 / 19.11.2012
Company / Manufacturer:	Technische Alternative elektronische SteuerungsgerätegesmbH.
Address:	A- 3872 Amaliendorf, Langestraße 124

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name:	UVR63H
Product brand:	Technische Alternative GmbH.
Product description:	Universal heating controller

The object of the declaration described above is in conformity with Directives:

2006/95/EG	Low voltage standard
2004/108/EG	Electromagnetic compatibility
2011/65/EU	RoHS Restriction of the use of certain hazardous substances

Employed standards:

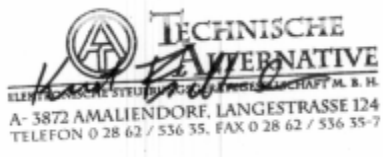
EN 60730-1: 2011	Automatic electrical controls for household and similar use – Part 1: General requirements
EN 61000-6-3: 2007 +A1: 2011	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2: 2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

Position of CE - label: On packaging, manual and type label

CE

Issuer:	Technische Alternative elektronische SteuerungsgerätegesmbH. A- 3872 Amaliendorf, Langestraße 124

This declaration is submitted by



Kurt Fichtenbauer, General manager,
19.11.2012

This declaration certifies the agreement with the named standards, contains however no warranty of characteristics.

The security advices of included product documents are to be considered.

Guarantee conditions

Note: The following guarantee conditions do not in any way limit the legal right to a guarantee, rather expand your rights as a consumer.

1. The company Technische Alternative elektronische Steuerungsgerätegesellschaft m. b. H. provides a two-year guarantee from the date of purchase by the end consumer for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.

2. The guarantee includes the free of charge repair (but not the cost of on site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation. In the event that a repair is not, for reasons of cost, worthwhile according to the assessment of Technische Alternative, the goods will be replaced.

3. Not included is damage resulting from the effects of overvoltage or abnormal ambient conditions. Likewise, no guarantee liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.

4. The guarantee claim will expire if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.

5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. Processing is accelerated if an RMA number is applied for via our home page www.ta.co.at. A prior clarification of the defect with our technical support is necessary.

6. Services provided under guarantee result neither in an extension of the guarantee period nor in a resetting of the guarantee period. The guarantee period for fitted parts ends with the guarantee period of the whole device.

7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

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