

OUMAN H23



Controller for the three circuits

- control for 2 heating circuits
- 1 domestic hot water control

USER MANUAL

The H23 is a heat controller for 3 circuits (two heating circuits and one hot water circuit). Wiring and configuring selections define what the controller displays on the display screen.

Basic view

| | | |
|--------------------|-------------|-----------|
| 🕒 13:51 30.02.2017 | Selection > | |
| Outdoor temp. | -12.4°C | |
| H1 Supply water | 45.2°C | Automatic |
| H2 Supply water | 32.8°C | Automatic |
| DHW Supply water | 58.0°C | Automatic |

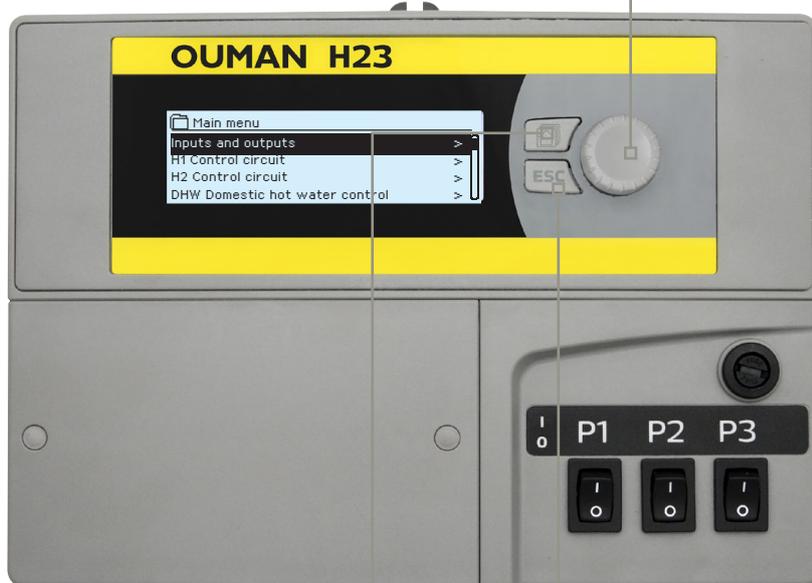
Control knob and OK



Press the control button to enter the menu.



Turn the control button to navigate in the menu.



Favourite view button

You can access favourite views by clicking the favourite view button. It's possible to store 5 menus as favourite views. The info menus of each control circuit are set as default favourite views.

ESC button

Holding the key down for an extended period of time returns the controller to the basic mode. The display shows the basic view, the monitor dims and the keyboard locks if the locking function is in use.

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1 USER INTERFACE

1.1 Basic view

There are several different levels in H23's user interface. The most significant measurement information in regulation process' view is shown in the Basic view.

Central factors related to the current heating control are shown in the Basic view. The Basic view will be shown when the controller is in idle state (keys have not been touched for a while).

The screenshot shows the following data:

| | | | |
|------------------|-----------|-----------|---|
| 13:51 25.01.2017 | Selection | | 2 |
| Outdoor temp. | -12.4°C | | |
| H1 Supply water | 45.2°C | Automatic | |
| H2 Supply water | 32.8°C | Automatic | |
| DHW Supply water | 58.0°C | Automatic | |

Alarms

- A blinking exclamation mark indicates active alarms.
- The number of active alarms is also shown.

Temperature measurements enable quickly determining proper operation of the circuit.

Control mode. This shows the current control of the circuit (auto/forced/manual) or in summer mode (see p. 10).

Alarm indication

Acknowledging alarms: Press OK and the alarm sound will stop. If the reason for the alarm has not been corrected, the exclamation mark in the top right will continue to blink.

! Deviation alarm
PRIO1 GROUP1
H1 Supply water=10.2 °C
Received: 08.01.2016 02:27
Press OK to acknowledge the alarm

Ouman H23 can generate alarms for several different reasons. In the event of an alarm, an alarm window pops up showing detailed alarm information and a beeping alarm signal goes on.

If there are several unacknowledged alarms, the latest activated alarm is always shown in the display. As soon as all active alarms have been acknowledged, the alarm window disappears and the alarm signal goes off.

Alarm signal of all active alarms may also be muted by pressing Esc button. When you press Esc, the alarm signal stops and the last alarm windows disappear from the display.

You may look into the alarms later by going to "Alarms" > "Active alarms". If an alarm has not been acknowledged, an exclamation mark will appear in the beginning of the row.

1.2 Menu structure

Basic menu

| | | |
|------------------|---------------|-----------|
| 13:51 25.01.2017 | Selection > ? | |
| Outdoor temp. | -12.4°C | |
| H1 Supply water | 45.2°C | Automatic |
| H2 Supply water | 32.8°C | Automatic |
| DHW Supply water | 58.0°C | Automatic |

Press the control button to enter the Main menu.



Main menu

| | |
|----------------------|-----|
| Main menu | |
| Inputs and Outputs | 1 > |
| H1 Control circuits | 2 > |
| H2 Control circuits | 3 > |
| DHW Control circuits | 4 > |
| Trend logs | 5 |
| Alarms | 6 |
| System settings | 7 |



Turn the control button to navigate in the menu.

Sub menus

1 INPUTS AND OUTPUTS (See more information p 7).

| | |
|--------------------|------------|
| Inputs and Outputs | |
| Home-Away- control | |
| -----INPUTS----- | |
| Outdoor temp. | -18.2 °C > |
| H1 Supply | 35.1 °C |

2 H1 CONTROL CIRCUIT (See more information p. 8).

| | |
|--------------------|-------------|
| H1 Control circuit | |
| H1 Info | > |
| H1 Heating curve | > |
| H1 Setting values | > |
| H1 Control mode | Automatic > |

3 H2 CONTROL CIRCUIT (See more information p. 8).

| | |
|--------------------|-------------|
| H2 Control circuit | |
| H2 Info | > |
| H2 Heating curve | > |
| H2 Setting values | > |
| H2 Control mode | Automatic > |

Both H1/H2 Control circuit menus has the same structure.

4 DHW DOMESTIC HOT WATER CONTROL (See more information p. 15).

| | |
|---------------------|-------------|
| DHW Control circuit | |
| DHW Info | > |
| DHW Trend display | > |
| DHW Setting values | > |
| DHW Control mode | Automatic > |

By pressing OK button, you can view the trend of the measurement.. Sampling interval is 1 s.

5 TREND LOGS (See more information p. 17).

| | |
|---------------------|---|
| Trend logs | |
| Outdoor temperature | > |
| H1 Supply water | > |
| H1 Return water | > |
| H1 Room temperature | > |

By pressing OK button, you can view the trend log of the measurement. The sampling interval is adjustable.

6 ALARMS (See more information p. 18).

If the GSM-modem (optional accessory) is connected to H23, activated alarms can be sent as SMS to mobile phone. It's possible to define 5 phone numbers and backup number where the alarms are sent.

| | |
|------------------------|--------|
| Alarms | Enable |
| Active alarms | > |
| Acknowledge all alarms | > |
| Alarm history | > |
| Reset alarm history | > |
| Alarm recipient | > |
| General alarms | > |

7 SYSTEM SETTINGS (See more information p. 20).

| | |
|--------------------------|--------------|
| System settings | |
| Time | 17:01 > |
| Date | 31.03.2014 > |
| Daylight saving time | In use > |
| Language | English > |
| SMS settings | > |
| Modbus RTU slave | > |
| Display settings | > |
| Type info | > |
| Lock code | Not in use > |
| Restore factory settings | > |
| Restore backup | > |
| Create backup | > |
| Configuration | > |
| Alarms | Enable > |
| Communication port | GSM > |

By pressing OK you can change the mode of the Home/Away control from the controller.

You can define a fixed value for outdoor temperature by clicking OK-button. This should be used in sensor fault cases only!

| | |
|---------------------------------|----------|
| H1 Info | |
| According to curve | 35.1 °C |
| Effect of temperature drop | -6.0 °C |
| -----H1 MEASUREMENTS----- | |
| Calculated supply water setting | 29.1 °C |
| Supply water | 29.1 °C |
| Outdoor temp. | -12.4 °C |
| -----H1 ACTUATOR CONTROL----- | |
| Control | 16 % |

When system works optimally, the supply water temperature is very close to the calculated supply water temperature setting value. The circuit specific info view shows the temperature measurements and the states of the actuators of the particular control circuit. (more information p.8).

| | |
|------------------|---------------|
| H1 Heating curve | |
| -20 = 33 °C | -10 = 30 °C |
| 0 = 27 °C | +10 = 23 °C |
| +20 = 20 °C | |
| Min.limit: 12 | Max limit: 45 |

A typical heating curve for radiator heating. (More information on the heating curves see page 9.)

| | |
|--------------------------|----------|
| Room temperature setting | |
| 21.5 °C > | |
| min:5.0 | max:35.0 |

Setting values menu includes room temperature setting and settings related to temperature drop (weekly schedule, holiday calendar, see p. 10-14) among other settings.

| | |
|---------------------------|------------------------|
| Temp.drop Weekly schedule | |
| Monday | 0 3 6 9 12 15 18 21 24 |
| Tuesday | |
| Wednesda | |

In this example, you can see a weekly temperature drop program. Temperature drop is on from 9 pm to 6 am from Monday to Friday.

| Day | Time | |
|------------|-------|-------------|
| 31.03.2014 | 11:30 | Drop On > |
| 14.04.2014 | 16:00 | Automatic > |
| Add new > | | |

It's possible to define longer temperature drop periods with Holiday calendar. More information on page 12.

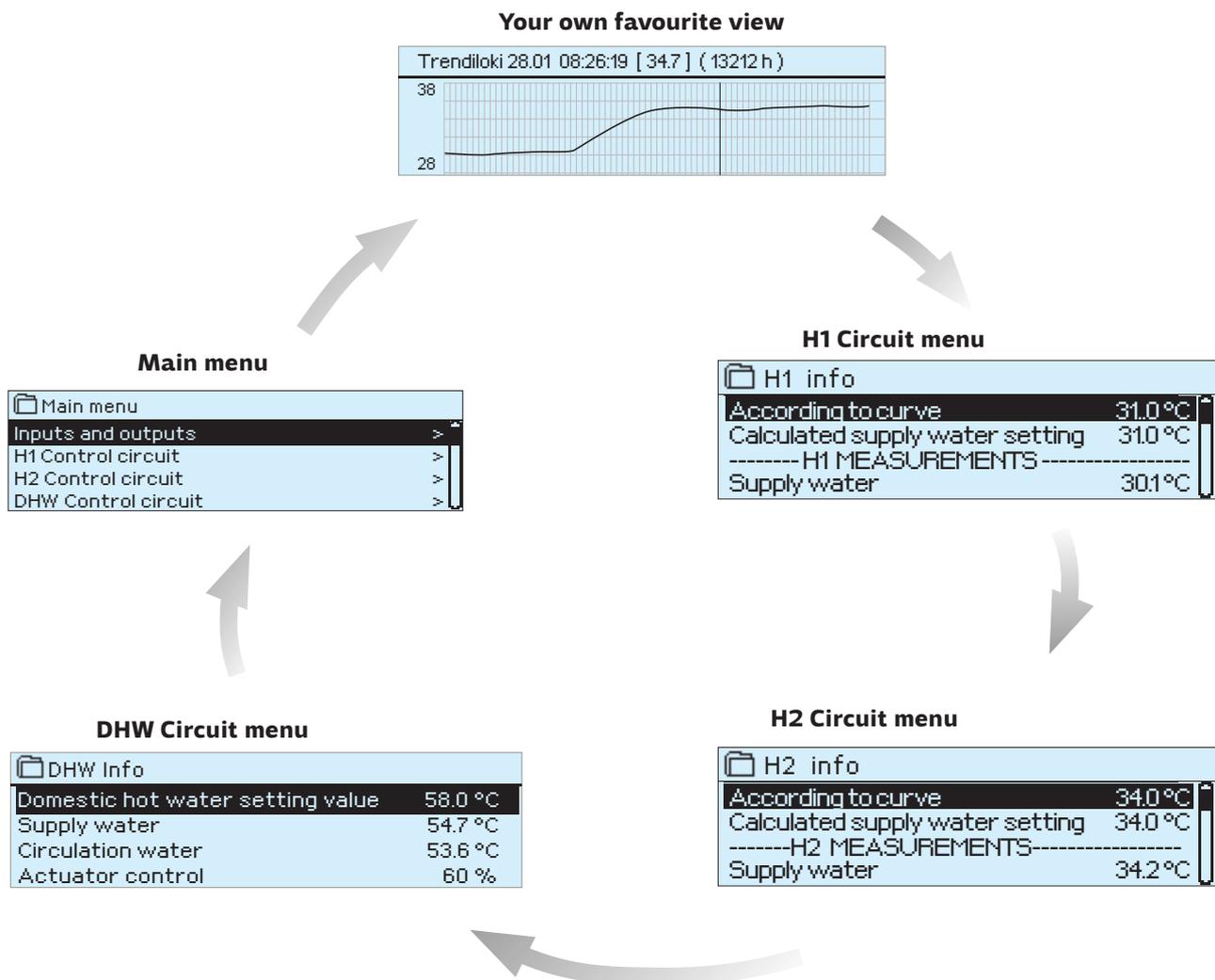
| | |
|--------------------------------------------|--|
| H1 Control mode | |
| Automatic | |
| Manual electr. | |
| Manual mech. (voltage controlled actuator) | |

The favourite views include Info menus of the circuits and the Main view. You can access the favourite views by clicking home-button.

| | |
|---------------------------------|---------|
| Main menu | |
| Inputs and Outputs | > |
| H1 DHW Info | |
| H2 Control | |
| DHW Info | |
| Supply water | |
| According to curve | 35.1 °C |
| -----H1 MEASUREMENTS----- | |
| Calculated supply water setting | 35.1 °C |
| Supply water | 34.2 °C |

1.3 Favourite views

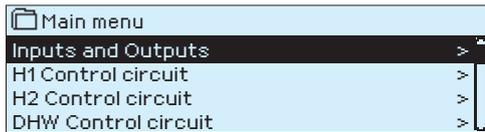
You can easily navigate from the basic view to the desired menu using the favourite view function. You can navigate from one favourite view to another by tapping the  button. There can be a maximum of five of these views. The pre-installed favourite views show the circuits' main menus. You can also save a particular regulator view as your own favourite view. You can return from favourite views to the basic view by tapping the ESC key until the basic view appears.



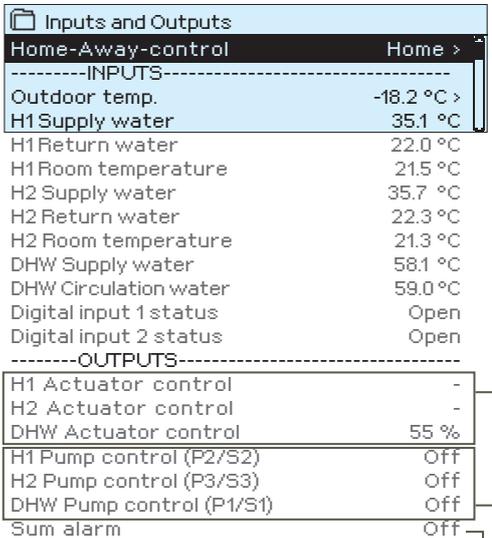
Setting a favourite view

Navigate to the view you want to add to your favourite views. Hold down the  button for an extended period of time until the "Save view in memory location:" menu opens. You can't set service display as your favourite display. You can't set any favourite display as long as the service code is active. Deactivate the service code by pressing Esc -button as long as the controller returns to main menu and the display light will dim. You can save the favourite display after that.

2 INPUTS AND OUTPUTS



Inputs and Outputs



You can see the inputs and outputs linked to the H23.

If the H2 heating circuit isn't taken in use, it's possible to use measurements M5, M6 and M7 as freely nameable temperature measurements (NTC).

The measurement range of the temperature sensors are -50 ... +130 °C. If the sensor is not connected or is defective, the measurement value shown will be -50°C or +130 °C.

The circuit specific measurements are found also from the Info menu of the each circuit (H1/H2/DHW).

-OUTPUTS:

Actuator control: If voltage controlled actuator is used, the current control of the actuator is shown in the menu. By pressing OK you can change the mode of the Home/Away control. The mode can be also changed by Home/Away-switch or by text message "Home" or "Away" when a GSM-modem (optional) is connected into the controller.

Pump control: The control of the pump just now.

Sum alarm: The current state of the alarm.

| INPUTS | More information |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Home-Away-control | Home-Away mode. Normally the controller is in the "Home" -mode. When you set the controller to "Away" -mode, the temperature drop will be activated. By pressing OK you can change the status of the Home/Away mode from the regulator. The mode can be changed by Home/Away-switch or by text message "Home" or "Away" when a GSM-modem (optional) is connected into the controller. |
| Outdoor temp. | It's possible to set the outdoor temperature measurement to manual mode and give a fixed temperature value to it. If the sensor is defective, the controller uses automatically value 0 °C for regulation. Set the outdoor measurement to manual mode if you want to use other temperature value for control in this case. |
| H1/H2 Supply water | Present temperature of water entering the heating network. |
| H1/H2 Return water | Present temperature of water returning from the heating network. |
| H1/H2 Room temperature | Present room temperature. |
| DHW Supply water | Domestic hot water temperature. |
| DHW Circulation water | When there is no consumption, the measurement information will show the temperature of DHW return water. During consumption, the measurement will show the mixed temperature of cold water and return water, in which case the measurement is used in so-called anticipation to improve the regulation result. |

Key word:

INPUTS

OUTPUTS

HOME

AWAY

Inputs:
 Outdoor temp. -18.2 °C /
 H1 Supply water 35.1 °C /
 H1 Return water 22.0 °C /
 H1 Room temperature 21.5 °C /

Outputs:
 H1 = Actuator control = 25 % /
 H2 Actuator control = 26 % /
 DHW Actuator control = 52 % /
 P2 Pump control = 0n

Home:
 Home-Away control = Home/

If a GSM is connected to the controller, you can read measurement information from a mobile phone. (If you have a device ID, write the device ID in front of the key word, e.g., TCO1 Inputs)

Send a message: Inputs

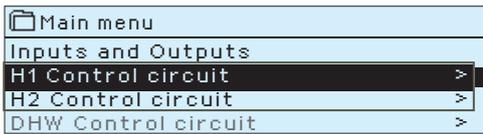
The controller sends the present measurement information to your mobile phone.

You can change Home/Away mode.

Same way send a message: Away.

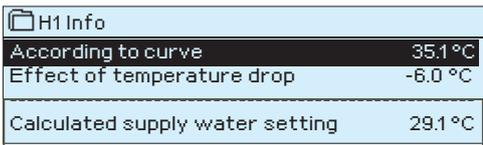
The controller sends a response message, which shows, that Home/Away -control is on Away-mode. Similarly you can send a message: Home.

3 SUPPLY WATER CONTROL IN THE HEATING CIRCUITS



3.1 Info

H1 (H2) Control circuit → H1 (H2) Info



The H23 enables control of two different supply water circuits independently (H1 and H2).

Regulation of the temperature of supply water is controlled by the outdoor temperature. Use of room temperature measurements keeps room temperature more consistent.

The info shows which factors are affecting currently to the supply water temperature. The starting point is the supply water temperature according to the outdoor temperature (according to the heating curve).

When the controller is in summer function mode, the H1 (H2) info says "H1 (H2) Control circuit in summer function mode."

In the example image, the supply water temperature according to curve is 35.1°C. Away-mode lowers the temperature 6.0 °C. As result, the calculated supply water temperature setting is 29.1°C.

| Factors effecting the supply water temp. | Explanation |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| According to curve | Supply water temperature according to the curve at the present outdoor temperature. |
| Effect of temperature drop | The effect of weekly schedule, holiday calendar or Away-mode to supply water temperature. The Away-mode can be triggered from Home/Away-switch, controller's menu or SMS. If the room temperature sensor is taken in use, the temperature drop affects to room temperature. |
| Effect of room compensation | If measured room temperature differs from the room temperature setting, the controller corrects the supply water temperature with room compensation function. |
| Return water compensation | Increase in supply water temperature due to return water compensation. When the temperature of the return water decreases to low limit alarm setting, the controller increases the supply water temperature with return water compensation function. |
| Min limit effect | Supply water temperature increase due to the minimum limit. |
| Max limit effect | Supply water temperature drop due to the maximum limit. |
| Calculated supply water setting | Present supply water temperature determined by the controller. All the factors are considered that affect the supply water temperature. |
| -----MEASUREMENTS----- | |
| Supply water | Present measured supply water temperature. |
| Return water | Present measured return water temperature. |
| Room temperature or Room temperature from the bus | The moving average of room temperature. The controller uses this value, when calculating the room compensation demand (the delay time of room temperature measurement is adjustable, default 0.5 hours). |
| Delayed room temperature or Room temperature from the bus (delayed) | The moving average of room temperature. The controller uses this value, when calculating the room compensation demand (the delay time of room temperature measurement is adjustable, default 0.5 hours). |
| Delayed outdoor temperature or Outdoor temperature from the bus (delayed) | The moving average of outdoor temperature. In supply water control the controller uses delayed measurement as an outdoor temperature. (the delay time of outdoor temperature measurement is adjustable, default 2 hours). |
| Outdoor temp. or Outdoor temperature from bus | The measured outdoor temperature or outdoor temperature from the bus. Outdoor temperature data is displayed if the delayed outdoor temperature is not used in supply water control. |
| -----ACTUATOR CONTROL----- | |
| Control | Current actuator control. |

H1 INFO

H2 INFO

H1 info:
 --- H1 SUPPLY WATER-----
 According to curve 35.1 °C/
 Effect of temperature drop
 -6.0 °C/Calculated supply water
 setting = 29.1 °C.
 --- H1 MEASUREMENTS -----
 Supply water = 35.2 °C
 Outdoor temp.= -10.7 °C
 --- H1 ACTUATOR CONTROL-----
 Actuator control = 20 %

If the controller has a device ID in use, always write the device ID in front of the key word (example. Ou01 KEY WORDS or Ou01 ?).

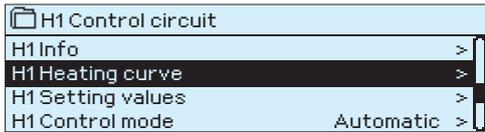
Send a message: H1 Info.

The controller sends a supply water info from the H1 heating circuit to your mobile phone that shows you the controller determined supply water temperature at the present and the factors effecting supply water control.

The message also includes the measurements which are affecting the supply water control and the actuator control. The message cannot be changed or sent back to the controller.

3.2 Heating curve

H1 (H2) Control circuit→ H1 (H2) Heating curve

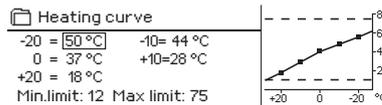


The supply water temperature for different outdoor temperatures is set in heating curve settings.

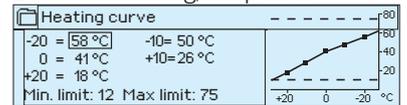
| Setting | Factory setting | Explanation |
|------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |
| Min. limit | 12.0 °C | Minimum allowed supply water temperature. A higher minimum temperature is used in damp rooms and tiled rooms than in, e.g., rooms having a parquet floor to ensure a comfortable temperature and removal of moisture in the summer. |
| Max. limit | 45 °C | Maximum allowed supply water temperature. The maximum limit prevents the temperature in the heating circuit from rising too high, preventing damage to pipes and surface materials. If, e.g., the characteristic heating curve setting is incorrect, the maximum limit prevents excessively hot water from entering the network. |

The preset heating curves are typical average curves for the heating mode in question. The curve may need to be adjusted to suit your building. The setting should be done during the cold period and if the room compensation is in use, it should be switched off during the setting. The curve is appropriate when the room temperature is maintained constant although the outdoor temperature changes.

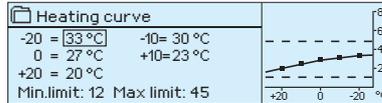
1. Radiator heating, normal



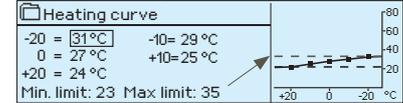
2. Radiator heating, steep curve



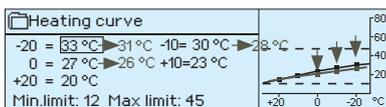
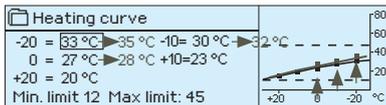
3. Floor heating, normal curve



4. Floor heating, moist rooms



Edit heating curve



If room temperature drops, make the curve steeper.

(Set higher values for supply water temperature at the outdoor temperatures -20 °C and 0 °C).

If room temperature rises, make the curve less steep.

(Set lower values for supply water temperature at the outdoor temperatures -20 °C and 0 °C).

Note! Changes influence room temperature slowly. Wait at least 24 hours before readjusting the settings. Especially in buildings with floor heating, the delays in room temperature changes are quite long. The supply water minimum limit setting ensures that pipes will not freeze. The maximum limit setting ensures that excessively hot water that could damage structures (e.g. parquet in case of floor heating) does not enter the heating system.

Key word:

H1 Heating curve

H2 Heating curve

H1 Heating curve

Suppl.w. (-20) = 50°C/

Outd.t. 2 = -10°C/

Suppl.w. 2 = 44°C/

Outd.t. 3 = 0 °C/

Suppl.w. 3 = 37°C/

Outd.t. 4 = 10°C/

Suppl.w. 4 = 28°C/

Suppl.w. (+20) = 18

Minimum limit = 12

Maximum limit = 42

H2 Heating curve

Suppl.w. (-20) = 35°C/

Outd.t. 2 = -10°C/

Suppl.w. 2 = 32°C/

Outd.t. 3 = 0 °C/

Suppl.w. 3 = 28°C/

Outd.t. 4 = 10°C/

Suppl.w. 4 = 23°C/

Suppl.w. (+20) = 20 °C

Minimum limit = 12°C/

Maximum limit = 42°C/

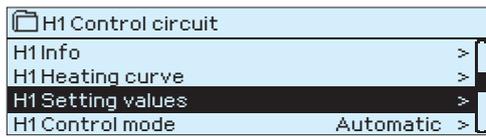
Send message: H1 Heating curve

The controller sends a message showing curve settings.

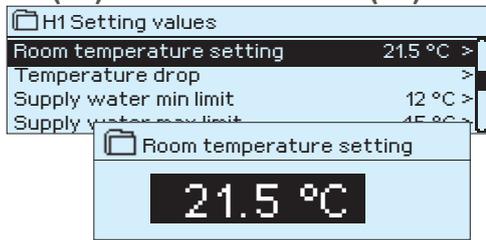
You can change the supply water setting values and outdoor temperature 2, 3 and 4 setting values by replacing the setting value with a new one and sending a message back to the regulator.

H23 will make the requested changes and send a new message showing the changes made.

3.3 Setting values



H1 (H2) Control circuit → H1 (H2) Setting values



The regulator has two types of setting values: those that are always visible and those that can only be changed using a service code.

Changing a setting:

- Choose the desired setting by turning the control knob.
- Press OK to go to the view where editing is possible. Change the setting.
- Press OK to accept the change.

Both circuits (H1 and H2) have the same circuit-specific setting values.

| Setting | Factory setting | Range | Explanation |
|-------------------------------|-----------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Room temperature setting | 21.5 | 5... 35 °C | Basic room temperature setting for the controller set by the user. This setting value is not visible unless room compensation is in use. Taking it into use is done from the "H1 (2) Setting values" → "Room temperature settings". |
| Supply water min limit | 12 | 5... 95 °C | Minimum allowed supply water temperature. A higher minimum temperature is used in damp rooms and tiled rooms than in, e.g., rooms having a parquet floor to ensure a comfortable temperature and removal of moisture in the summer. |
| Supply water max limit | 45 | 5... 95 °C | Maximum allowed supply water temperature. The maximum limit prevents the temp. in the heating circuit from rising too high, preventing damage to pipes and surface materials. |
| Summer function outdoor limit | 19 | 10... 35°C | Summer function outdoor temperature limit. When the measured outdoor temperature exceeds the outdoor temperature limit of the summer function, the valve will be closed and the circulation water pump will stop when summer function is active. When the summer function is active, the control mode is "Summer stop" in basic view. |

3.3.1 Temperature drop

Both heating circuits have the same circuit-specific settings

H1 (H2) Control circuit → H1 (H2) Setting values → Temperature drop

| Setting | Factory setting | Range | Explanation |
|-------------------------------------------|-----------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature drop or Room temperature drop | 0 | 0... 20 °C | Temperature drop of supply water, which can start due to weekly schedule, exception schedule, Home/Away switch, "Away" text message command or when selecting "Away" as the Home/Away control status from the controller (Inputs and outputs). If room temperature measurement has been taken into use, the temperature drop is given directly as a room temperature drop. |
| Temp.drop Weekly schedule | | | You can define a weekly schedule for temperature drops. More information on the weekly schedule can be found from the next page. |
| Temp.drop Exception schedule | | | Exception schedule is used for temperature drops which deviate from normal weekly schedule. The exception schedule overrides always the weekly schedule. More information can be found from the page 12. |
| Temperature drop status | No drop | Nodrop, Away control, Time program, Away control/ Time program | The Home/Away control and time program can change the temperature level. |

Key words:

H1 Setting values

H2 Setting values

H1 Setting values:
Room temperature =
Temperature drop =

H1 Setting values:
Room temperature = 21.5°C/
Temperature drop = 3.0°C/

Send a message: H1 Settings.

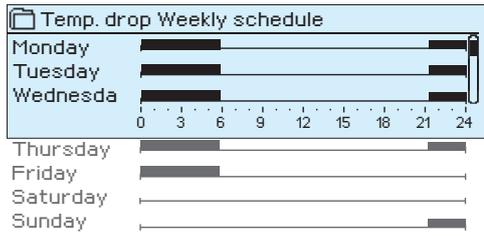
The controller sends the main settings to your mobile phone.

Editing the setting values: write the new setting in place of the old setting and send a message back to the controller. The controller sends the setting as a return message.

3.3.1.1 Weekly schedule

H1 (H2) Control circuit → H1 (H2) Setting values → Temperature drop → Temp. drop Weekly schedule

Graph view



Weekly programmes have a standard graph view as well as a change view showing the exact time when the new mode command will be executed. In the graph view, exceptions to normal temperature reductions are shown as bars.

Browsing a weekly schedule:

Turn the control knob to browse a weekly schedule. If you wish to see the exact switch times or you wish to change, delete or add switch times, press OK at any weekday.

Editing view

| Time | Mode | M | T | W | T | F | S | S |
|-------|----------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 21:00 | Drop On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 06:00 | Drop Off | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 00:00 | Add new | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

In this example, you can see a weekly temperature drop program. Temperature drop is on from 9 pm to 6 am from Monday to Friday.

Adding a new temperature drop period:

1. Press OK at the "Add new" row.
2. Set the time, when the temperature drop is activated (set hours and minutes separately). Press OK to accept.
3. Press OK and then turn the control knob to select "Drop On". Press OK to accept.
4. Press OK at each weekday you wish to choose.
5. Press OK at the end of the row to accept the new time program.
6. Press OK at the "Add new" row.
7. Set the time, when the temperature drop goes off (set hours and minutes separately). Press OK to accept.
8. Press OK and then turn the control knob to select "Drop Off". Press OK to accept.
9. Press OK at each weekday you wish to choose.
10. Press OK at the end of the row to accept the new time program.
11. Press Esc to exit.

Editing view

| Time | Mode | M | T | W | T | F | S | S |
|-------|----------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 21:00 | Drop On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 06:00 | Drop Off | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Annotations: Set switch time (at 21:00), Set state (=desired temp. level) (at Drop On), Select day(s) (at M-T-F), Accept (at OK).

Editing a weekly schedule:

1. Turn the control knob to move to the value you wish to change and press OK.
2. Turn the control knob to make the time and temperature drop mode changes. Press OK to accept.
3. Press the OK button to change the day of the week.
4. Press Esc to exit.

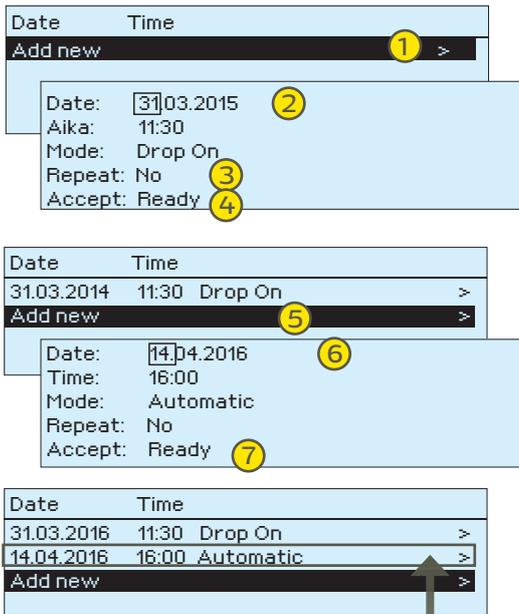
Deleting a switch time:

1. Turn the control knob to move to the switch time you wish to delete and press OK.
2. Press OK at temperature mode and select "Delete switch time".
3. Press OK at the end of the row.

| Time | Mode | M | T | W | T | F | S | S |
|-------|--------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| 21:00 | Drop On | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 06:00 | Delete switch time | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 00:00 | Add new | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3.3.1.2 Exception schedule

H1 (H2) Control circuit → H1 (H2) Setting values → Temperature drop → Temp.drop Exception schedule



The picture shows an exception schedule program. Heat reduction is on from 31 March 2016, 11:30 to 14 April 2016, 16:00

NOTE! Remember to also set the end time for the holiday calendar program! When you set the date and time, the mode will change to "Automatic". In this case, the control returns back to the weekly schedule.

You can easily make changes that differ from normal routine use by using the holiday schedule. The date, time and mode to which heating will be changed in the period in question are entered in the holiday schedule. To switch from an Exception schedule to weekly schedule mode, select automatic mode.
Temperature drop by using Exception schedule:

1. Navigate to "Exception schedule" and press OK. The display will read "Add new." Press OK.
2. Press OK and set the start date for the temperature program, then the time and "Drop On" mode.
3. Select, if the exception schedule repeats or not. If you select repeat, it can be repeated every month same time or every year same time.
4. Accept the holiday schedule you created by pressing "Ready."
5. Navigate to "Add new" and press OK.
6. Press OK and set the end date for the temperature drop program, then the time. Select "Automatic" mode. If you chose earlier (paragraph 3) "repeat every year" or repeat every month", select now same way.
7. Accept the Exception schedule you created by pressing "Ready."

Temperature drop prevention:

The Exception schedule overrides the Weekly schedule. You can bypass the temperature drops for specific time with Exception schedule. Define the program as above (see steps 1-6), but set the mode to "Drop off" in step 2.

Deleting an activation time from an Exception schedule:

1. Navigate to the row with the activation time you want to delete.
2. Select "Delete switch time."
3. Accept the deletion by pressing "Ready."

3.3.2 Service setting values

H1 (H2) Control circuit → H1 (H2) Setting values → Service setting values



The access to the Service setting values requires entering the service code. The service settings are typically needed only when the controller is configured and taken in use.

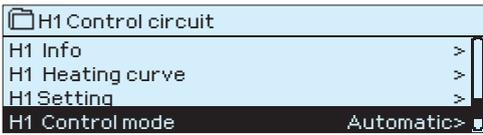
In addition to service settings, there are also other settings for configuration (navigate to "System settings" → "Connections and configuration")

| Setting | Factory setting | Range | Explanation |
|------------------------------------|-----------------|--------------------------------|---------------------------------------------------------------------------|
| --- ACTUATOR CONTROL --- | | | |
| Actuator selection | 3-point | 3-point, 0(2)-10V, 10 - 0(2) V | 3-point or voltage controlled actuators can be used for heating circuits. |
| Actuator running time open | 150 | 5...500 s | The running time indicates how many seconds go by if the actuator |
| Actuator running time close | 150 | 5...500 s | runs a valve nonstop from a closed position to an open position |

| Setting | Factory setting | Range | Explanation |
|-------------------------------------------------------------------------------------------------|-------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| --- TUNING VALUES--- | | | |
| P-area | 200 | 2...600 °C | Supply water temperature change at which the actuator runs the valve at 100%. Eg. If the supply water temperature changes 10 °C and the P area is 200 °C the position of the actuator changes 5 % ($10/200 \times 100 \% = 5 \%$). |
| I-time | 50 | 0 ... 300 s | The deviation in the supply water temperature from the set value is corrected by P amount in I time. For example, if deviation is 10°C, P-range is 200°C and I time is 50 s, the motor will be run at 5 % for 50 seconds. |
|  D-time | 0 | 0 ... 10 s | Regulation reaction speed up in the event of a temperature change. Beware of constant waver! |
| --- ALARM SETTINGS --- | | | |
| Supply water deviation alarm: | | | |
| Max. deviation from setting | 10.0 | 2...100 °C | Amount of difference between measured supply water temperature and the supply water temperature set by the controller that causes an alarm when the deviation has continued for the return delay time. If the summer function is active, the setting for deviation alarm is 2 x defined setting (with default setting it's 2 x 10.0 °C = 20 °C). |
| Alarm delay | 60 | 0...120 min | The alarm goes off if the deviation has lasted for the set time. |
| Return water low limit alarm: | | | |
| Alarm min limit | 8.0 | 2...100 °C | The return water low limit alarm and return water compensation is activated when return water temperature has remained below the low limit for longer than the allowed delay time. The exit delay for low limit alarm is 5 seconds. (see p. 14) |
| Alarm delay | 10 | 0...120 min | |
| --- MEASUREMENTS / BUS MEASUREMENTS --- | | | |
| Outdoor temp. measurement | In use | Not in use, In use, In use (bus) | A outdoor temperature measurement can be read either from bus or through UI11 or plug connector. |
| Room measurement | Not in use | Not in use, In use, In use (bus) | A room temperature measurement specific to H1 control circuit can be read either from bus or through UI14. |
| --- ROOM COMPENSATION --- | | | |
| Room compensation ratio | 2.0 | 0...10 | Coefficient used in applying the difference between room measurement and the room setting value to the supply water setting value. For example, if room temperature is one degree below the setting value, supply water is raised by two degrees. ($1.0 \text{ °C} \times 2.0 = 2.0 \text{ °C}$). |
| Minimum limit | -20.0 | -50...+50 | The minimum limit defines how much the compensation can decrease the supply water temperature. |
| Maximum limit | 20.0 | -50...+50 | The maximum limit defines how much the compensation can increase the supply water temperature. |
| --- RETURN WATER COMPENSATION --- | | | |
| Return water compensation ratio | 2.0 | 0 ... 10.0 | If return water temperature falls below the setting value of the "Low limit alarm for return water" supply water temperature is raised by the value: amount of the deficit multiplied by the compensation ratio. |
| --- OTHER SETTINGS --- | | | |
| Outdoor temperature delay | 2.0 | 0 ... 6.0 h | Amount of slowing of outdoor temperature measurement (time constant). Regulation of supply water is based on delayed measurement. |
| Room temp. measurement delay | 0.5 | 0 ... 6.0 h | Amount of room temperature measurement delay (time constant). Different buildings react to temperature changes at different rates. This setting value can reduce the effect of the building on room regulation. |

3.4 Control mode

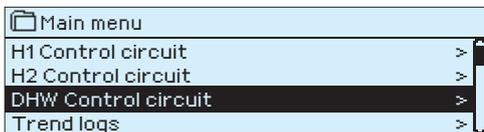
H1 (H2) Control circuit → H1 (H2) Control mode



Automatic control is the mode that is used normally. You may change automatic control to manual control here, and drive the valve to the desired position.

| Control mode | Explanation |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic | H23 controls the supply water temperature automatically according to the need for heating and possible time programs (weekly schedule and holiday calendar) or according to the home/away control. |
| Manual | The actuator remains in the position defined in manual mode until the control mode changed to automatic. The actuators position in manual mode is changed with "Actuator manual control" -setting. If 3-state actuator is in use, the direction of the control of the valve is shown (open/close).If voltage controlled actuator is in use, the position of the valve is shown as percent value. |
| Manual mech. (voltage controlled actuator) | When the control mode is manual mechanic, the supply voltage from H23 to actuator is cut and the position of the valve can be changed straight from the actuator. |

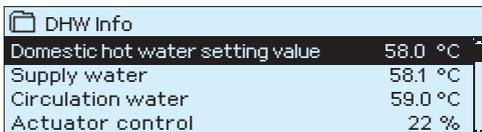
4 DOMESTIC HOT WATER



The H23 keeps the temperature of domestic hot water at the designated setting value.

4.1 DHW Info

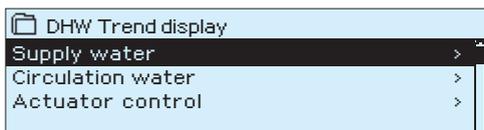
DHW Control circuit → DHW Info



Info-menu shows the domestic hot water settings, the measurements and actuator control related to the domestic hot water.

4.2 Trend display

DHW Control circuit → DHW Trend display



You can read the real-time trends of the temperatures of supply water and circulation water. Also the real-time trend of actuator control in domestic hot water circuit can be read. The sampling interval is 1 s.

4.3 Setting values

DHW Control circuit → DHW Setting values

| |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="border: 1px solid black; padding: 2px;"> <div style="background-color: #e0f0ff; padding: 2px;">DHW Setting values</div> <div style="background-color: #e0f0ff; padding: 2px;">Domestic hot water setting value ></div> <div style="background-color: #e0f0ff; padding: 2px;">Domestic hot water setting value ></div> </div> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The end user can change the domestic hot water setting value. The settings of the control of the actuator, tuning values and high limit alarm settings can be found from the Service setting values menu.

| Setting | Factory setting | Range | Explanation |
|---------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Domestic hot water setting value | 58.0 | 0.0 ... 100.0 | Because of the danger of bacteria, it is recommended that the domestic hot water temperature is not permanently set below +55 °C. |
| Service setting values | |  | The viewing and setting the Service setting values requires service code. The Service setting values are such settings which are not typically needed to be changed after H23 has been configured and taken in use. |
| --- ACTUATOR CONTROL --- | | | |
| Actuator selection | 3-point | 3-point, 0(2)-10V, 10 - 0(2) V | Type of actuator. |
| Actuator running time open | 15 | 10...500 s | The running time indicates how many seconds go by if the actuator runs a valve nonstop from a closed position to an open position. |
| Actuator running time close | 15 | 10...500 s | The running time indicates how many seconds go by if the actuator runs a valve nonstop from an open position to a closed position. |
| Actuator offset | 0 | 0...15 % | The actuator dead zone. The controller starts to open the valve zero point onwards. |
| --- TUNING VALUES --- | | | |
| P-area | 70 | 2 ... 600 °C | Supply water temperature change at which the actuator runs the valve at 100%. |
| I-time | 14 | 0 ... 300 s | The deviation in the supply water temperature from the set value is corrected by P amount in I time. |
|  D-time | 0 | 0 ... 10 s | Regulation reaction speed up in the event of a temperature change. Beware of constant waver! |
| Anticipation | 120.0 | 1...250 °C | Uses anticipation sensor measurement information to speed up regulation when DHW consumption changes. Increase the anticipation value to decrease reaction to changes in consumption. |
| DHW Quick run | 60 | 0 ... 100 % | Functions during consumption changes. Decrease this value to decrease reaction to quick temperature changes. |
| --- ALARM SETTINGS --- | | | |
| Supply water high limit alarm | | | |
| Alarm max limit | 75 | 0...100 °C | Supply water high limit alarm. |
| Alarm delay | 10 | 0...120 min | The high limit alarm is activated when the supply water temperature has exceeded the high limit longer than the defined delay time. |

Key word:

DHW Setting values

DHW Setting values
Domestic hot water setting value (58.0) °C/

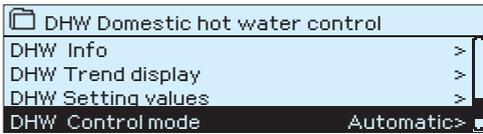
Send a message: DHW Settings.

The controller sends the domestic hot water temperature setting to your mobile phone.

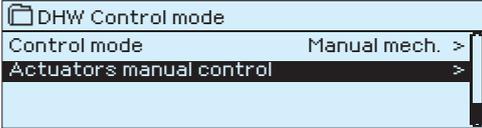
Editing the setting value: write the new setting in place of the old setting and send a message back to the controller. The controller sends the setting as a return message.

4.4 Control mode

DHW Domestic hot water control → Control mode

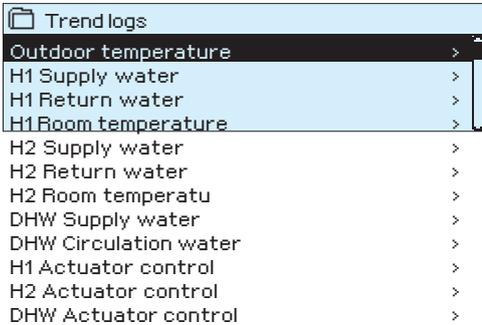
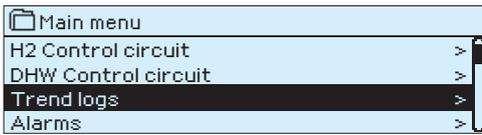


Automatic mode is normally used in regulating domestic hot water. Here you can switch from automatic to manual mode and move the valve into the desired position. You can use manual mode for example when a sensor malfunctions.

| Control mode | Explanation |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic | H23 maintains the temperature of domestic hot water at the setting value set by the user. |
| Manual  | The actuator remains in the position defined in manual mode until the control mode changed to automatic.  The actuators position in manual mode is changed with "Actuator manual control" -setting. |
| Manual mech. (voltage controlled actuator) | In mechanical manual mode the valve's position is set from the actuator. To prevent the regulator from changing the position of the valve, the actuator's power supply is prevented by this selection. |

5 TREND LOGS

Trend logs

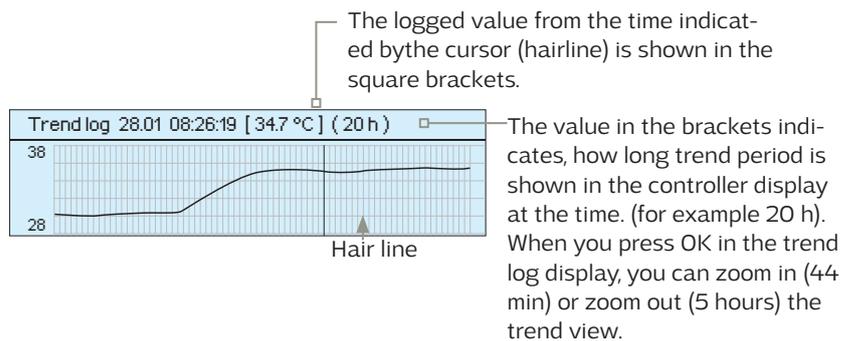


H23 controller automatically logs trend from the measurements. Select the measurement which log you want to view. The trend log will be shown in the controller's display. It's also possible to change the logging interval.

| Measurement | Factory setting | Range | Attention! |
|-----------------------|-----------------|--------------|--------------------------------------------------------------------|
| Outdoor temperature | 600 s | 10 ... 600 s | |
| H1/H2 Supply water | 60 s | 10 ... 600 s | |
| H1/ H2 Return water | 60 s | 10 ... 600 s | |
| H1/ H2 Room temp. | 10 s | 10 ... 600 s | |
| DHW Supply water | 10 s | 10 ... 600 s | |
| DHW Circulation water | 60 s | 10 ... 600 s | |
| H2 Actuator control | 60 s | 10 ... 600 s | The trend is available only with the voltage controlled actuators. |
| DHW Actuator control | 10 s | 10 ... 600 s | |

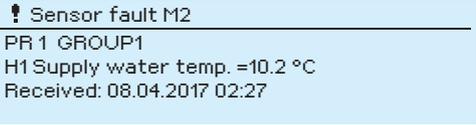
A different sampling interval can be set for different measurements.

You can browse the trend log by turning the control knob.



6 ALARMS

Acknowledging alarms: press OK and the alarm sound will mute. If the reason for the alarm is still present, the exclamation mark in the top right will continue to blink.



H23 can send an alarm for a number of different reasons. Information about the alarm is shown on the display. The alarm also sounds a beeping noise.

If the regulator has a number of unacknowledged alarms and you acknowledge the last one, the one before it will appear on the monitor.

When all active alarms have been acknowledged, the alarm window closes and the alarm sound stops.

You can also use ESC button. The alarm sound then stops and the alarm windows close when you press the Esc button once.

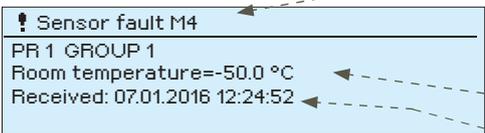
In the alarm menu of H23 device, you can check the active alarms and what alarms have been active. The number of active alarms will be shown in the right corner of the main view.

The disabling of alarms can be activated. If the alarms are disabled, the next symbol is shown in the main display.

The disabling is taken out of use in System settings → Alarms: Disabled/Enabled.

Active alarms

Alarms > Active alarms



Every active alarm is shown in a separate row, where you can see when the alarm has become active. Press OK to get more information about the alarm.

- An exclamation mark in front of the date shows that the alarm has not been acknowledged.
- The heading of the alarm view shows the reason for the alarm.
- What location the alarm is coming from
- Time the alarm was received.

Key word:

ACTIVE ALARMS

Send message: Active alarms

The regulator sends a message showing all active alarms. Message is informational.

Acknowledge all alarms

Alarms > Acknowledge all alarms

You can acknowledge all alarms by pressing OK.

Alarm history

Alarms > Alarm history

| | |
|-------------------------------------------------|---|
| Alarm history | 2 |
| 19.10.2014 15:55:10 Sensor fault H1 Supply w. > | |
| 02.12.2013 11:22:40 Sensor fault H1 Return w. > | |

From alarms you can see the cause of the alarm, where the alarm has come from and when the alarm has become inactive. (e.g., 19.10.2014 at 10:11:42). The last 10 alarms can be seen in inactive alarms.

Key word:

Alarm history

Send message: Alarm history

The controller sends a message showing the last alarms. Message is informational.

Reset alarm history

Alarms > Reset alarm history

| |
|---------------------------------------|
| Confirm |
| Reset alarm history |
| Yes <input type="button" value="No"/> |

H23 requests confirmation before deleting alarm history.

Alarms receivers

Alarms → Alarms receivers

| |
|-------------------|
| Alarms receivers |
| 1. Phone number > |
| 2. Phone number > |
| 3. Phone number > |
| 4. Phone number > |
| 5. Phone number > |
| Backup user > |

| |
|---------------------------------------|
| 1. Phone number |
| + 3 5 8 4 0 8 4 0 0 0 0 0 |
| Approve: Press OK a number of seconds |
| Cancel: Press ESC a number of seconds |

A GSM modem can be connected to the H23 for alarm sending as a text message to the alarm receivers.

The alarm will be routed to defined alarm numbers (phone numbers 1-5). The alarm will be sent also to backup number (if defined), if the alarm isn't acknowledged within 5 minutes after its activated.

Entering the telephone numbers:

1. Turn the control knob. Press OK to accept a number/sign.
2. Press OK to move to the next square.
Press Esc to return to the previous square. OK
3. Press OK for a number of seconds to accept the number.
Press Esc for a number of seconds to cancel.



Removal of the defined phone number:

1. Clear the first digit of the phone number.
2. Press down OK an extended period of time.

General alarms

Alarms > General alarms

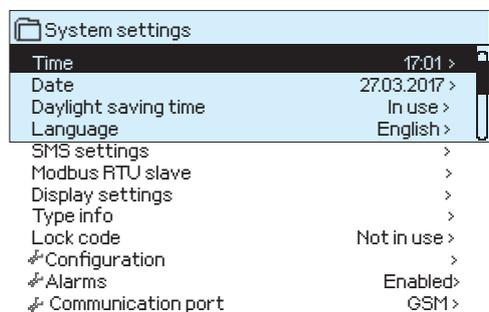
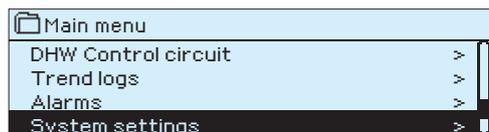
| |
|--------------------|
| General alarms |
| M1 General alarm > |
| M2 General alarm > |
| M3 General alarm > |
| M4 General alarm > |

| |
|----------------------------------|
| M1 General alarm |
| Alarm min limit -51.0 °C> |
| Alarm max limit 131.0 °C> |
| Alarm delay 1 min> |
| Name of the alarm Outdoor temp.> |

It's possible to configure general alarms to measurement inputs. The low and high limits and delay can be defined for alarms. In addition, the alarms can be named as desired. The default settings for alarms are: low limit -51 °C, high limit 131 °C and delay 1 min. Note that with default settings, the alarms will never activate due to measurement range of the sensors. The measurement range is -50 ... 130 °C (5.0 ... 131 °C for measurements 4 and 7).

If digital inputs are configured for alarm use, you can modify the alarm delay and rename the alarm. The default value for alarm delay is 1 min (setting range 0...120 min).

7 SYSTEM SETTINGS



System settings include date and time, language, SMS and network settings, display settings and device type information.

If you want to connect the H23 unit to an Ethernet network, you will need an Oulink Ethernet adapter (additional equipment).

7.1 Setting date, time and language

Time

System settings → Time



It is important that date and time are correct. The date and time are used e. g. in time programs (weekly schedule and holiday calendar) as well as alarm indication and routing.

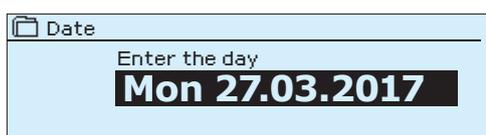
The H23 clock takes daylight savings and leap years into account automatically. The clock has a backup for power outages lasting at least three days.

Hours and minutes can be set separately.

1. Set hours and press OK to accept.
2. Set minutes and press OK to accept.

Date

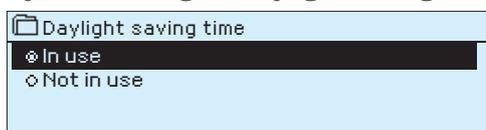
System settings → Date



1. Set day and press OK to accept (name of weekday is updated automatically).
2. Set month and press OK to accept.
3. Set month and press OK to accept.

Daylight saving time

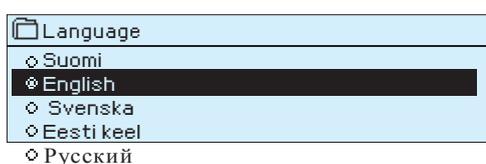
System settings → Daylight saving time



The controller will automatically be switched to daylight saving time and to standard time, if the selection "In use" is made.

Language

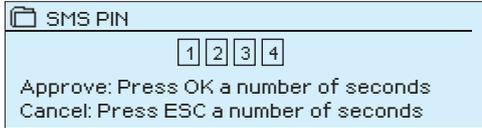
System settings → Language



The language of the user interface can be change here.

7.2 Text message (SMS) settings

System settings → SMS settings



Use of text messaging requires that the H23 is connected to a GSM modem (additional equipment, see p. 28). SMS settings are shown in the controller when GSM is selected in communication port (see 7.13 on page 26).

Message center number: A H23 device can identify the operator in use from the modem's SIM card.

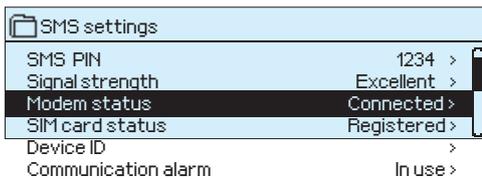
SMS PIN: If the SIM card has PIN inquiry in use, H23 device asks you to enter the PIN (default 1234).

Entering the code:

1. Turn the control knob and press OK to accept each number. Press ESC to return to the previous square.
2. Press OK for a number of seconds to accept the code. Press ESC for a number of seconds to cancel.

Signal strength:

Signal strength is expressed with description: "Excellent", "Good", "Moderate", "Low", "Very low" and "No network". If signal strength indicates "No network," try changing the modem's location or use an additional antenna. If the signal strength is "Very low" you should also move the modem to another location to try to improve signal strength. If the unit displays "Initialisation failed," check that the SIM card is correctly installed.



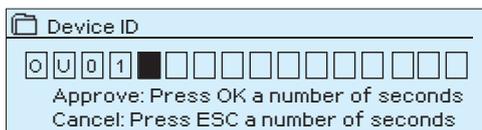
Modem status:

H23 detect whether the modem is connected or not. The device automatically initializes the GSM modem.

| Mode | Explanation |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connected | Modem is ready for use. |
| Not connected | The modem is not connected or the connection is incorrect. Connect the modem to the communication port 1 of H23. The power supply for modem can be taken from the controller strip connector 1 (red) and 4 (black) or through a network device. |

SIM card status

| Mode | Explanation |
|--------------|----------------------------------------------------------------------|
| Unregistered | The subscription is not valid. |
| Registered | The SIM card is ready to use |
| PIN error | Enter H23 controller the same PIN as as the GSM modem's SIM card PIN |
| PUK | SIM card is locked (PUK code). |



Device ID:

It's possible to define device ID to H23. Device ID works as a password for SMS communication. When device ID is in use, it should be added in front of the keyword in every SMS (e.g. TC01 INPUTS).

No response alarm:

The no response alarm is activated in the controller if the SMS-communication isn't working. The entry delay for alarm is 600s and exit delay is 5s.

If the no response alarm is activated, please check SIM-card's settings, network's availability and GSM-modem's state (for possible malfunctions). If the signal strength is weak, it's possible to add an external antenna for GSM-modem (optional accessory).

7.3 Network settings



| System settings | |
|------------------|--------------|
| Time | 17:01 > |
| Date | 27.06.2016 > |
| Language | English > |
| SMS settings | > |
| Network settings | > |
| Modbus RTU Slave | > |

| Network settings | |
|-------------------------|-----------------|
| DHCP | Off > |
| Gateway-address | 0.0.0.0 > |
| Subnet mask | 0.0.0.0 > |
| IP address | 0.0.0.0 > |
| Nameserver address | 0.0.0.0 > |
| Update network settings | > |
| ----- | |
| Modbus TCP/IP | > |
| SNMP | > |
| Access | Off > |
| Access IP | 0.0.0.0 > |
| ----- | |
| OULINK | v. 1.5 |
| Serial number | |
| Device state | Uninitialized > |
| WEB user interface | Off > |

If you want to connect the H23 unit to an Ethernet network, you will need an Oulink (optional accessory).

Oulink is connected to RJ-45-I communication port located in the side of the H23. The network settings will appear in the menu once the communication port is configured to Oulink's use (see section 7.12 on p. 25). After the network settings are changed, H23 will reboot.

System settings > Network settings

There are two alternative ways to set the H23 device IP address and network settings:

1. IP address is retrieved via DHCP function. This requires that DHCP service is in use in the network and network cables have been connected.
2. IP address is set manually.

Setting the IP address via DHCP function:

1. Go to DHCP and press OK.
2. Select "On" and press OK to accept selection.
3. Select "Update network settings" and press OK to accept selection.
4. Wait approximately one minute.
5. If DHCP is "On", setting the IP address and other network settings was successful. The device now functions in the network.
6. Otherwise, make sure the connections and the fact that the network has a DHCP server.

Setting the IP address manually:

1. Go to DHCP and press OK.
2. Select "Off" and press OK to accept selection. If DHCP function is on, manual changes in "Subnet mask", "Gateway address", "Name server address" and "IP address" will be ignored.
3. Request correct network settings (IP address, Gateway address, Subnet mask, Nameserver address) from the network administrator.
4. Select "Update network settings".

Modbus TCP/IP

System settings > Network settings > Modbus TCP/IP

| Modbus TCP/IP | |
|--------------------------------------|-----------|
| Modbus TCP port (internal registers) | 502 > |
| Max connections | 20 > |
| Idle timeout | 300 > |
| Allowed address | 0.0.0.0 > |
| Function active | On > |

ModbusTCP/IP communication settings

Modbus TCP port (internal registers): Port definition for Modbus TCP/IP -communication. The default port is 502.

Max connections: It is possible to decrease server load by changing this setting that defines the maximum number of simultaneous connections from different IP addresses to the server.

Idle timeout: This setting defines the time after which the server closes an inactive connection.

Allowed address: It is possible to improve the information security of the system by taking permitted connection address into use. If the value is 0.0.0.0, connections to the server are permitted from any IP address. If you define one permitted connection address, connections to the server are not permitted from any other IP address.

Function active: This selection either enables or disables the entire Modbus/TCP communication.

SNMP

System settings > Network settings → SNMP



SNMP
IP address 10.1.1.23 >
Function active On >

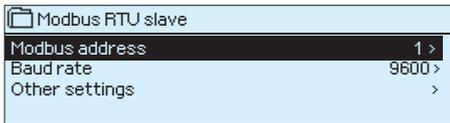
SNMP: SNMP function can be used to send notifications about alarms activating, inactivating and being acknowledged via SNMP protocol to a desired server.

IP address: The IP address of the target server to which messages are sent.

Function active: This selection either enables or disables the entire SNMP function.

7.4 Modbus RTU slave

System settings → Modbus RTU Slave



Modbus RTU slave
Modbus address 1 >
Baud rate 9600 >
Other settings >



Other settings
Data bits 8 >
Stop bits 1 >
Parity No parity >

Ouman H23 can be connected as a slave device to Modbus RTU bus (Modbus RTU slave). Note that there must not be several devices with the same address in the bus. The communication baudrate must be the same in every device in the same bus.

All the Modbus RTU –communication settings can be found from the Modbus RTU slave menu.

7.5 Display settings

System settings → Display settings



Display settings
Display version 2.0
Contrast 74 >

You can adjust contrast. If you wish the display to be brighter, set a smaller numerical value. The setting range is 50... 100. The display changes after you have confirmed the setting change.

7.6 Type information

System settings → Type information



Type information
Serial number xxxxxx
H23 2.0.0
Ouman Ouflex 2.0 RC9
Display 2.9 RC9

Type information shows the hardware configuration and the software versions that have been used to create the application. This information is useful especially in case of maintenance or upgrade.

7.7 Lock code

System settings → Lock code

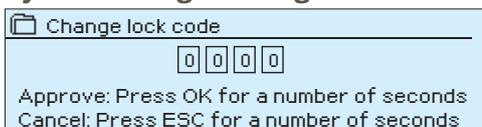


System settings
Display settings >
Type information >
Lock code Not in use >
Configuration >

When lock code is taken in use, it's not possible to change any settings without entering lock code. It is recommended that you take lock code into use if the device is located so that anyone could reach it and change settings. Locking the device and changing the lock code prevents unauthorized use of the device.

| Lock code function | Explanation |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Not in use | You can read H23 device information and change settings. |
| In use | You can read H23 device information but you can not change settings without entering the lock code. The factory setting of lock code is 0000. If you take lock code into use, change the code for security reasons. |

System settings > Change lock code



Change lock code
0 0 0 0
Approve: Press OK for a number of seconds
Cancel: Press ESC for a number of seconds

If you have taken lock code into use, you may change the code. The factory setting of lock code is 0000.

1. H23 device asks you to enter the current code. The factory setting of lock code is 0000.
2. Turn the control knob and press OK to accept each number. Press ESC to return to the previous square.
3. Press OK for a number of seconds to accept the code. Press ESC for a number of seconds to cancel.

NOTE! When you enter a locking code when changing the default, the code will not be required again until the unit has been untouched for 10 minutes, when the unit goes into hibernation mode. You can also place the unit in hibernation mode by pressing the ESC button for a long period of time

7.8 Restore factory settings

| | |
|---------------------------|--------------|
| System settings | |
| Lock code | Not in use > |
| #Restore factory settings | > |
| #Restore backup | > |
| #Create backup | > |

When you return the factory settings, the controller takes into use those control circuits, which were in use before factory reset. The restoring factory settings is done in System settings by pressing the OK-button down for an extended period of time (Backup-menu appears to System settings).

7.9 Create backup and Restore backup

Create backup

| | |
|----------------------|---|
| Create backup | |
| To the device memory | > |
| To the memory card | > |

Backup is done in System settings by pressing the OK-button down for an extended period of time (Backup-menu appears to System settings).

Create a backup, when H23 has been configured and the device-specific settings have been set.

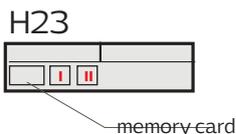
If desired, also the factory settings can be restored to the device. All the parameters which are saved in the non-volatile memory will be included in the backup. Such parameters are e.g. all the setting values and time programs. The backup can be saved to the internal memory or to micro SD memory card. Memory card backups can be copied from one device to another.

Restore backup

| | |
|---------------------------------|---|
| Restore backup | |
| From the device internal memory | > |
| From the memory card | > |

Restoring backup is done in System settings by pressing the OK-button down for an extended period of time (Backup-menu appears to System settings). If you created a backup, you can restore the backup by pressing OK. You can restore the backup from the memory card or from the internal memory.

Software updates

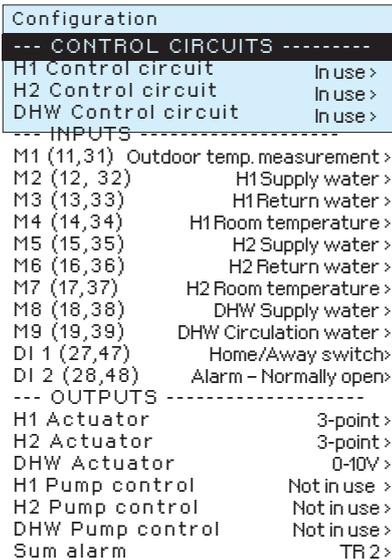
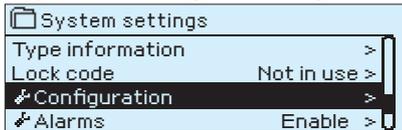


It is recommended to create a backup of the system before software update. The software update is done with following steps:

1. Remove microSD memory card from H23.
2. Wait until error message "Memory card error!" is shown in the display
3. Insert new microSD memory card which includes new software to H23.
4. H23 asks if you want to save existing device configuration to be taken in use after the update.
5. H23 requests reboot to start the update of the new software. The updating of the software takes few minutes. The display will flash during the update process.

7.10 Configuration

System settings → Configuration



In Configuration menu the heating circuits and the inputs and outputs are configured and taken in use. The service code is needed for the access to the Configuration menu.

The minimum and maximum alarm limits and entry delay can be defined for every **input**. The default values are: minimum limit -51 °C, maximum limit 131°C and entry delay 1 min.

The inputs M5 (supply water temperature measurement), M6 (return water temperature measurement) and M7 (room temperature measurement) are reserved for H2 heating circuit. If these inputs are not used for the control of the H2 heating circuit, they can be used as freely nameable general temperature measurements (NTC-10).

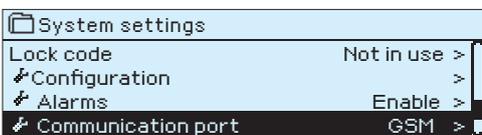
It's possible to use digital inputs for Home/Away switch or for alarm purposes (open/close). Note! It's possible to use Home/Away -feature without physical Home/Away switch. The change of the state can be done from the controller's user interface (Inputs and outputs → Home/Away control) or with SMS (keywords HOME and AWAY). (more information see page 30)

7.11 Disable/enable alarms



-When alarms are enabled in H23, the alarm signal goes on and information of the alarm is shown in user interface if alarm activates. It's possible to disable all the alarms if needed (e.g. for installation or service).

7.12 Communication port



A GSM-modem or Oulink ETH ethernet adapter can be connected to H23's communication port.

GSM-modem enables SMS-communication to H23 and sending alarm messages to mobile phone.

Oulink ETH provides Modbus TCP/IP interface to H23.

TEXT MESSAGE QUICK GUIDE

If a GSM modem is connected to the H23 you can communicate with the controller by text message using command words.

Send the following text message to the controller: KEY WORDS.

You can send the text message question mark to the controller to get a list of key words. If the controller has a device ID in use, always write the device ID in front of the key word (example. Ou01 KEY WORDS or Ou01 ?). **Capital and small letters are different characters in the device ID!**

The controller sends a list of key words as a text message that gives you information about the controllers' function. The key word is separated by a /. You can write the key word using capital or small letters. **Write only one key word/message.**

| Key word | Explanation |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ? or Key words | Send the text message question mark or word "Key word". Reply messages show all key words for the controller. |
| Home | H23 goes into "Home" mode. |
| Away | H23 goes into "Away" mode. |
| Inputs | The most important measurement information and state of the input is shown in the reply message. |
| Outputs | The state of actuators and pumps controls and sum alarm is shown in the reply message. |
| H1 Info H2 Info DHW Info | The reply message shows the computational setting value of supply water. Data are informational. |
| H1 Setting values H2 Setting values | The room temperature and temperature drop setting values are shown in the reply message. You can change the setting values. Send a changed message back to the controller, and it will make the change to the setting value and send you another message showing the changes to the setting values. |
| H1 Heating curve H2 Heating curve | you can set temperatures for supply water for 5 outdoor temperatures. Of the outdoor temperatures two are fixed values (-20 and +20°C). You can change the three outdoor temperature setting values between these. You can also change the minimum and maximum limits of supply water. |
| DHW Setting values | The reply message will show the setting value for domestic hot water and control mode. |
| Active alarms | The reply message will show all active alarms. |
| Alarm history | The reply message will show information about the last alarms. |
| Type info | The reply message will show information about the device and software. |

ADDITIONAL INFORMATION OF THE ALARMS

Sensor fault alarms and functionality in malfunction cases.

Fixed delays

| Input | Sensor type | Sensor | Alarm text | Operation when a sensor is defective | Entry delay | Exit delay | Alarm group | Alarm priority |
|-------|-------------|---------|-----------------|----------------------------------------------------------------------|-------------|------------|-------------|----------------|
| M1 | NTC-10 | TMO | Sensor fault M1 | The control system uses the value of the outdoor temp. at 0 °C. | 10 s | 5 s | 1 | 2 |
| M2 | NTC-10 | TMW/TMS | Sensor fault M2 | H1 Valve remains in the position it was in before the sensor defect. | 10 s | 5 s | 1 | 2 |
| M3 | NTC-10 | TMW/TMS | Sensor fault M3 | H1 Return water control is disabled. | 10 s | 5 s | 1 | 2 |
| M4 | NTC-10 | TMR | Sensor fault M4 | H1 Room compensation is taken away of use. | 10 s | 5 s | 1 | 2 |
| M5 | NTC-10 | TMW/TMS | Sensor fault M5 | Valve remains in the position it was in before the sensor defect. | 10 s | 5 s | 1 | 2 |
| M6 | NTC-10 | TMW/TMS | Sensor fault M6 | H2 Return water control is disabled. | 10 s | 5 s | 1 | 2 |
| M7 | NTC-10 | TMR | Sensor fault M7 | H2 Room compensation is taken away of use. | 10 s | 5 s | 1 | 2 |
| M8 | NTC-10 | TMW/TMS | Sensor fault M8 | Valve is closed. (DHW Supply water). | 10 s | 5 s | 1 | 2 |
| M9 | NTC-10 | TMW/TMS | Sensor fault M9 | Does not affect regulation. (DHW Circulation). | 10 s | 5 s | 1 | 2 |

Measurements 5, 6 and 7 can be configured as informative measurements. Sensor fault alarms are not available for informative measurements.

General alarms

If the home/away –switch is not connected into digital inputs 1 and 2, the contact alarm can be taken from the inputs. You can select in start-up, if the alarm comes from normally open (NO) contact or from NC (normally closed) contact. The alarm delay can be set. As a default the delay is 1 min.

Sensor fault alarms, A (Alarm)

Delays setting range: 0...120 min

| Input | Alarm text | Min alarm limit | Max alarm limit | Cause of the alarm | Entry delay | Exit delay | Alarm group | Alarm priority |
|-------|----------------------------|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|-------------|----------------|
| M1 | M1 Alarm | X | X | Outdoor temperature sensor or bus | 1 min | 5 s | 1 | 1 |
| M2 | M2 Alarm | X | X | H1 Supply water water | 1 min | 5 s | 1 | 1 |
| M3 | M3 Alarm/ Freezing risk | X | X | H1 Return water. The freezing risk alarm and return water compensation function are activated on the low limit. | 1 min | 5 s | 1 | 1 |
| M4 | M4 Alarm/ Freezing risk | X | X | H1 Room temp. sensor. The freezing risk alarm is activated on the low limit. | 1 min | 5 s | 1 | 1 |
| M5 | NTC-10 | X | X | H2 Supply water sensor or free temperature measurement | 1 min | 5 s | 1 | 1 |
| M6 | M6 Alarm/ Freezing risk | X | X | H2 Return water sensor or free temperature measurement. The freezing risk alarm and return water compensation function are activated on the low limit. | 1 min | 5 s | 1 | 1 |
| M7 | M7 Alarm/ Freezing risk | X | X | H2 Room temperature sensor or free temperature meas. The freezing risk alarm is activated on the room temp. meas. | 1 min | 5 s | 1 | 1 |
| M8 | M8 Alarm | X | X | DHW Supply water sensor | 1 min | 5 s | 1 | 1 |
| M9 | M9 Alarm | X | X | DHW Circulation water sensor | 1 min | 5 s | 1 | 1 |
| D1 | D1 Alarm | | | Digital input 1 switch alarm | | | | |
| D2 | D2 Alarm | | | Digital input 2 switch alarm | | | | |

Deviation alarms

The deviation alarm is used in H1 and H2 Supply water. The entry delay is 10 sec and exit delay is 5 sec.

GSM-modem fault alarm

The alarm entry delay is 600 sec and exit delay is 5 sec.

OPTIONAL EQUIPMENTS



OULINK ETH

Adapter for H23 for networking. If Oulink ETH adapter is taken in use in H23, it's not possible to use GSM-mode simultaneously.

Modbus TCP/IP interface to H23 device.

- Integrated Ouman Access-connection
- Modbus TCP/IP
- Modbus TCP/IP ↔ RTU Gateway
- SNMP alarm transfer

GSMMOD5

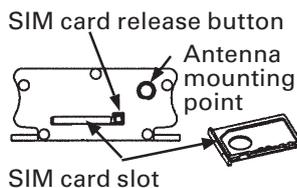


By connecting the modem to the H23 regulator, you can communicate with the regulator text messages and pass this information on alarms to your mobile via SMS.

If Oulink ETH adapter is taken in use in H23, it's not possible to use GSM-mode simultaneously.

The modem has a fixed antenna that can be changed to an external antenna with a 2,5m cord (optional equipment) if needed. The modem's indicator light shows what mode it is in.

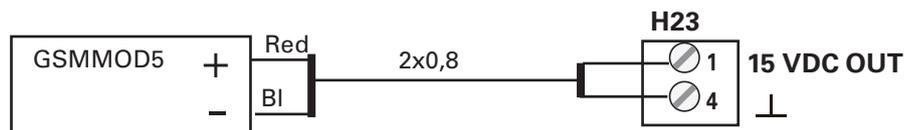
| LED indicator light | Modem mode/instructions |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LED is not lit: | Modem is not on. Connect network device to modem. |
| LED is lit: | Modem is on, but it is not ready for use. Make sure that H3 and GSM modem SIM card have the same PIN code, if PIN inquiry is in use. |
| LED is blinking slowly: | Modem is ready for use. |
| LED is blinking rapidly: | Modem is either sending or receiving a message. If you do not receive an SMS from H23, check the SMS you sent to see if device ID and keyword were spelt correctly. Device ID is case sensitive. H23 can identify the operator in use from the modem's SIM card. Identification does not occur until PIN code has been entered. If H23 does not identify the operator even though PIN is correct, enter message center number. You can find message centre number, PIN code and device ID in "System settings" > "SMS settings" in your H23 device. |



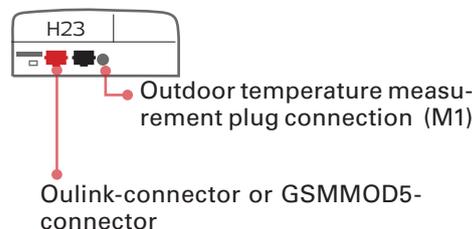
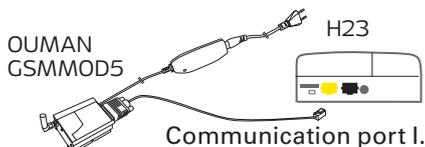
Inserting the SIM card

Press the small black SIM card release button with, for example, a pen tip. Part of the SIM card slot will stick out of the modem. Pull the slot out of the modem. Do not pull the slot out of the modem without pressing the SIM card release button first!

Insert SIM card into the slot and make sure it settles properly. Push the slot back to its place. Set the SIM card PIN code as H23 device PIN code. Make sure PIN inquiry is in use in the SIM card.



Operating voltage for the GSM-modem can be taken from the external power supply or from H23 (15VDC output, connectors 1 and 4). The GSM-modem is connected to H23's communication port I.



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Product disposal

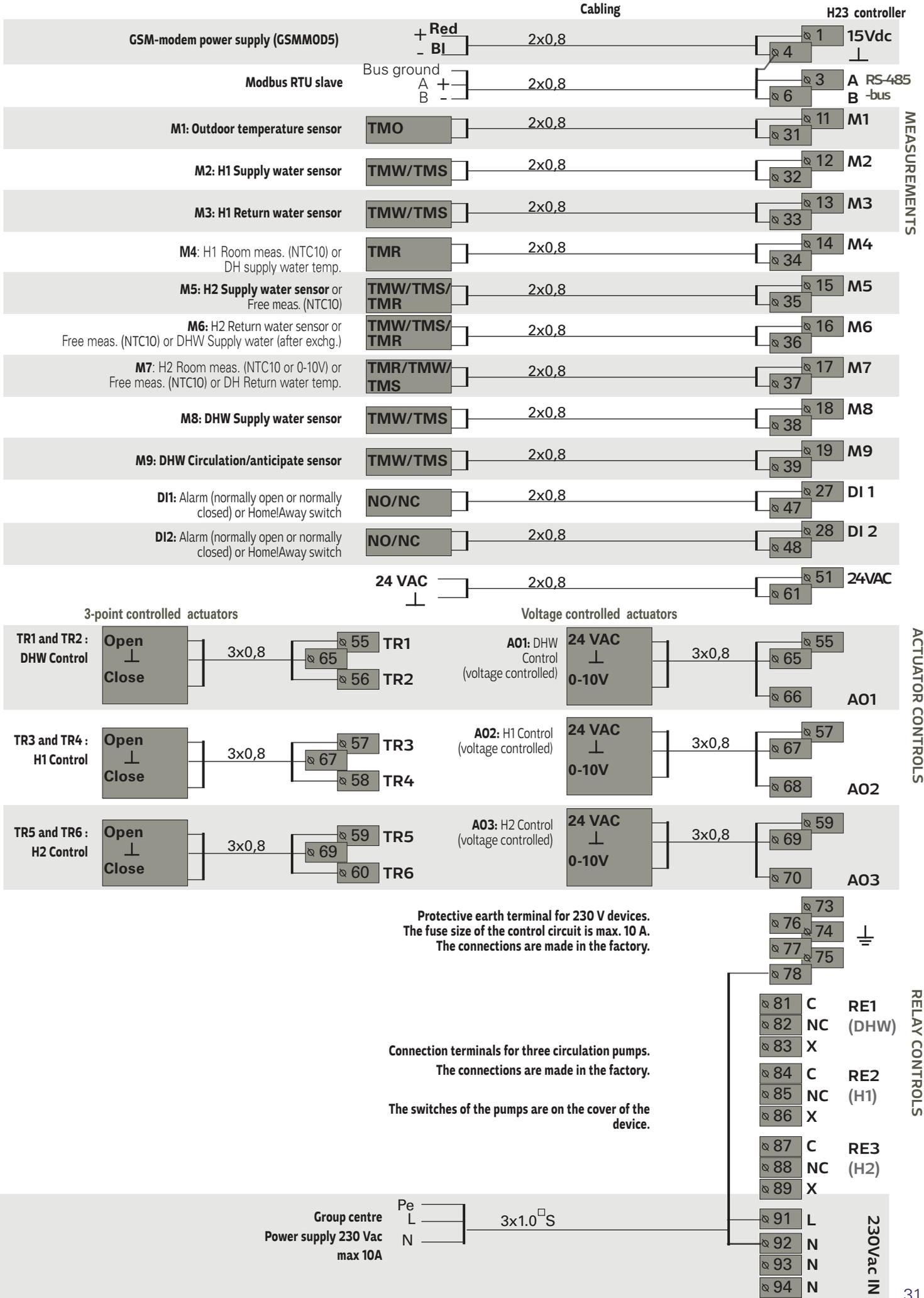


The enclosed marking on the additional material of the product indicates that this product must not be disposed of together with household waste at the end of its life span. The product must be processed separately from other waste to prevent damage caused by uncontrolled waste disposal to the environment and the health of fellow human beings. The users must contact the retailer responsible for having sold the product, the supplier or a local environmental authority, who will provide additional information on safe recycling opportunities of the product. This product must not be disposed of together with other commercial waste.

CONFIGURATION

X Check the functions on the screen that have been initialised.

| Conne- tion place | Input/ Output | Alternative measurement options | Alarm setting values (factory setting) | Split connectors M/DI |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| INPUTS: | | | | |
| M 1 | <input type="checkbox"/> Outdoor temperature <input type="checkbox"/> Outdoor temperature from bus | Outdoor temperature delay 2.0 h (setting range 0...6 h) Manual control option (Inputs and outputs) | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 11 31 |
| M 2 | <input type="checkbox"/> H1 Supply water | | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 12 32 |
| M 3 | <input type="checkbox"/> H1 Return water | Return water compensation ratio ____ 2.0 (setting range 0...10) | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 13 33 |
| M 4 | <input type="checkbox"/> H1 Room temperature <input type="checkbox"/> H1 Room temp. from bus <input type="checkbox"/> DH supply water temp. | Room temp. measurement delay 0.5 h (0...6 h) Room compensation ratio 2.0 (0...10) | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 14 34 |
| M 5 | <input type="checkbox"/> H2 Supply water <input type="checkbox"/> Free meas. (NTC-10) | Name_____ | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 15 35 |
| M 6 | <input type="checkbox"/> H2 Return water <input type="checkbox"/> DHW Supply water (after exchg.) <input type="checkbox"/> Free meas. (NTC-10) | Return water compensation ratio __2.0 (setting range 0...10) Name_____ | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 16 36 |
| M 7 | <input type="checkbox"/> H2 Room temp. <input type="checkbox"/> H2 Room temp. from bus <input type="checkbox"/> DH Return water temp. <input type="checkbox"/> Free meas. (NTC-10) | Room temperature delay ____ 0.5 h (0...6 h) Room compensation ratio__2.0 (0...10) Name_____ | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 17 37 |
| M 8 | <input type="checkbox"/> DHW Supply water | | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 18 38 |
| M 9 | <input type="checkbox"/> DHW Circulation water | | Alarm min limit -51°C (-51°C ... 131 °C) Alarm max limit 131°C (-51°C ... 131 °C) Alarm delay 1 min (0...120) | 19 39 |
| DI 1 | <input type="checkbox"/> Alarm Normally open <input type="checkbox"/> Alarm Normally closed <input type="checkbox"/> Home/Away switch | Name_____ | Switch alarm Alarm delay 1 min (0...120) | 27 47 |
| DI 2 | <input type="checkbox"/> Alarm Normally open <input type="checkbox"/> Alarm Normally closed <input type="checkbox"/> Home/Away switch | Name_____ | Switch alarm Alarm delay ____1 min (0...120) | 28 48 |
| OUTPUTS: | | | | |
| <input type="checkbox"/> H1 Actuator | <input type="checkbox"/> 3-point | Running time open 150 s (5...500 s) Running time closed 150 s (5...500 s) | H1 3-point control open ↓ H1 3-point control closed | 57 TR 3 67 58 TR 4 |
| | <input type="checkbox"/> 0...10 V <input type="checkbox"/> 2...10 V <input type="checkbox"/> 10...0 V <input type="checkbox"/> 10...2 V | Running time open 150 s (5...500 s) | H1 Actuator 24VAC ↓ Voltage control (0-10V) | 57 67 68 Y2 |
| <input type="checkbox"/> H2 Actuator | <input type="checkbox"/> 3-point | Running time open 150 s (5...500 s) Running time closed 150 s (5...500 s) | H2 3-point control open ↓ H2 3-point control closed | 59 TR 5 69 60 |
| | <input type="checkbox"/> 0...10 V <input type="checkbox"/> 2...10 V <input type="checkbox"/> 10...0 V <input type="checkbox"/> 10...2 V | Running time open 150 s (5...500 s) | H2 Actuator 24VAC ↓ Voltage control (0-10V) | 59 69 70 Y3 |
| <input type="checkbox"/> DHW Actuator | <input type="checkbox"/> 3-point | Running time open 15 s (5...500 s) Running time closed 15 s (5...500 s) | DHW 3-point control open ↓ DHW 3-point control closed | 55 TR 1 65 56 TR 2 |
| | <input type="checkbox"/> 0...10 V <input type="checkbox"/> 2...10 V <input type="checkbox"/> 10...0 V <input type="checkbox"/> 10...2 V | Running time open 15 s (5...500 s) Actuator offset (0...15 %) (Actuator dead zone) | DHW Actuator 24VAC ↓ Voltage control (0-10V) | 55 65 66 Y1 |
| <input type="checkbox"/> DHW Pump control | | The display shows the pump control mode: on/ off. By pressing OK, you can change the pump control to manual control. If the manual control is selected, the hand image appears in the be- ginning of the line Pump control. | | P1/S1 81,82 RE1 |
| <input type="checkbox"/> H1 Pump control | | | | P2/S2 84,85 RE2 |
| <input type="checkbox"/> H2 Pump control | | | | P3/S3 87,88 RE3 |
| <input type="checkbox"/> Sum alarm (24 VAC) | <input type="checkbox"/> TR2 <input type="checkbox"/> TR4 <input type="checkbox"/> TR6 | | | 56,65 TR2 58,67 TR4 60,69 TR6 |



TECHNICAL INFORMATION



| | |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions | width 230 mm, height 160 mm, depth 60 mm |
| Weight | 1.3 kg |
| Protection class | IP 41 |
| Operating temperature | 0 °C...+50 °C |
| Storing temperature | -20 °C...+70 °C |
| Power supply L (91), N (92) | |
| Operating voltage | 230 Vac / 200 mA |
| The internal 24 V power source, total load capacity of max. | 1A/23 VA |
| Supply cable fuse | max 10A |
| Measurements inputs: | |
| Sensor measurements (inputs 11-19) | NTC10-element: $\pm 0,15$ °C between -50 °C...+100 °C Also sensor tolerances and the effect of cables must be considered when calculating total accuracy. Measurement M1 can be connected also from outside of the casing by a plug-connector. |
| Digital inputs (27, 28) | Contact voltage 15 Vdc, switching current 5 mA Transfer resistance max. 250 Ω (closed), min. 350 Ω (open). |
| Analog outputs (66, 68, 70) | Output voltage range 0...10 V Output current max. 10 mA / output |
| 15 VDC output (1) | 15 VDC output maximum load 100 mA |
| 24 VAC output (51) | Total current of 24 VAC output and triac-outputs max. 1A. |
| Pump control contacts (81-89) | Contacts for three circulation pump Pumps are controlled by a switches on the top of the H23 device Relay max. load 3A. |
| Protective earth terminal (73-78) | Protective earth terminal block for 230V devices. Control circuit fuse max. 10A |
| Control outputs (51) Triac (55...60) | 24 VAC -control output Total current of triac-outputs and 24 VAC output max. 1A. |
| Data transfer connections RS-485-bus A (3) and B (6) | Unisolated, supported protocols Modbus-RTU. |
| Options | |
| OULINK | OULINK adapter provides Modbus TCP / IP interface for H23 device. |
| GSMMOD5 | By connecting the GSM modem to the H23 , you can communicate with the text messages to device and receive alarms to GSM phone. |
| APPROVALS | |
| EMC-directive | 2014/30/EU, 93/68/EEC |
| Interference tolerance | EN 61000-6-1 |
| Interference emissions | EN 61000-6-3 |

