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1 About this user guide

This user guide covers all the models in the flexotron®800 series used for heating control.

The functions described here are for users with the **Operator** access level or **lower**.

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1.1 Disclaimer

The information in this user guide has been carefully checked and judged to be correct. Fr. Sauter AG makes no guarantee regarding the content of this manual and requests the reader to report any errors, inaccuracies or unclear formulations so that they can be corrected. The information in this document is subject to change without notice.

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1.2 Trademark

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1.3 Further information



More information on the flexotron®800 can be found in the following documents:

- **flexotron®800 heating user manual** – complete user manual for configuring and operating the flexotron®800 heating controller, available in English, German and French.
- **CASE flexotron® user manual** – user manual for configuring the controllers using the CASE flexotron® PC software, available in English, German and French.
- **Network variables for Modbus** – list of variables for Modbus communication, available in English.
- **CE declaration of conformity for flexotron®800**

This information can be downloaded from <http://www.sauter-controls.com/de>.

About this user guide

2 About flexotron®800

The flexotron®800 devices comprise a series of pre-programmed, configurable controllers for various applications.

The flexotron®800 series is available in three model sizes, with 8, 15 or 28 inputs/outputs.

The controllers are available with or without a display and buttons. Units without a display and buttons can be connected to an external display with buttons (RDB800).

All the standard functions can be carried out using the display and buttons, or with the CASE flexotron® configuration tool. CASE flexotron® is installed on a computer and connected via a cable to the controller.



Fig. 1 Picture of flexotron®800

The following functions are among those included in the heating control:

The controllers have individual control characteristics for the relationship between the supply temperature and the outside temperature. The heating systems have individually adjustable minimum and maximum temperature limits for the supply and return.

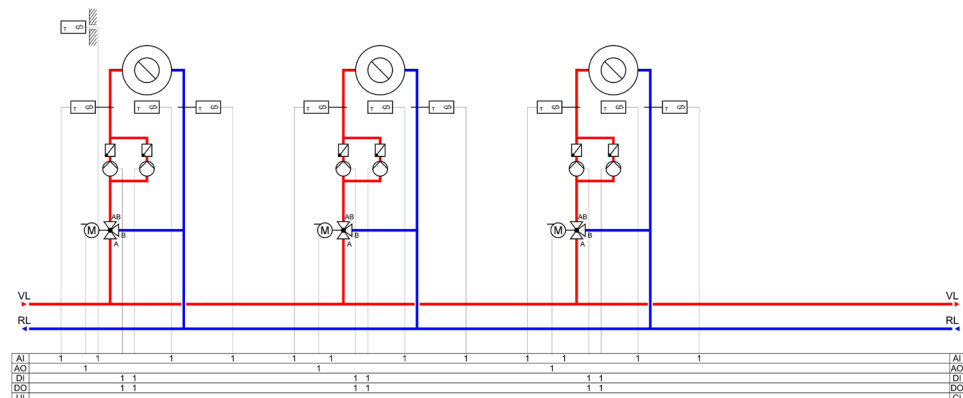


Fig. 2 Heating circuits with the maximum number of available elements

If a controller is in Off or Manual mode and the outside temperature falls below a set value, an adjustable minimum supply temperature is maintained and the pump starts up.

Night reduction

The night reduction is set using the room temperature.

Cooling system

A cooling system can be configured using the controller. The setpoint for the cooling system can be fixed or weather-dependent.

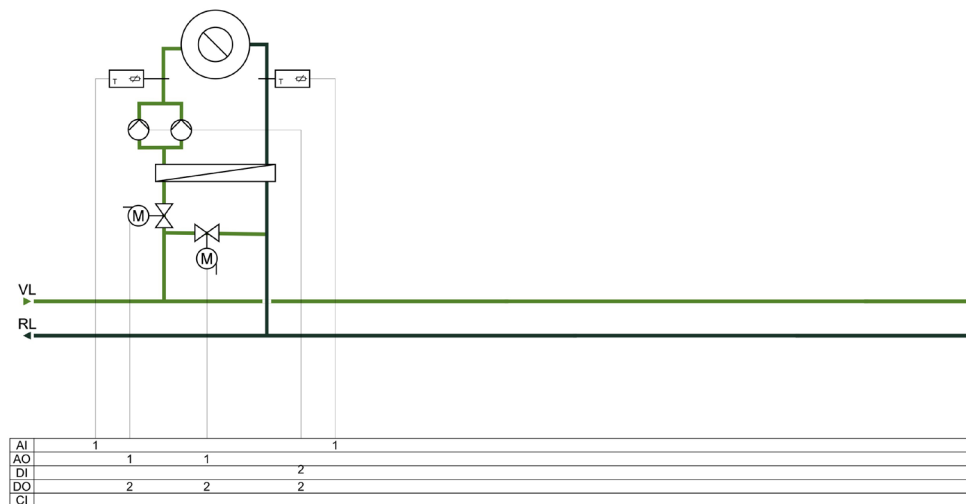


Fig. 3 Cooling circuit with the maximum number of available elements

Pump control

A digital output can be used in the cooling system to control the pump. The pump can be configured either for continuous operation or with pump stops.

Temperature limiter

The supply temperature can be assigned a value as a fixed upper limit. It is also possible to set upper and lower limits for the return temperature.

Domestic hot water

The flexotron®800 can be configured for either one or two domestic hot water circuits, HW1 and HW2. These are regulated using a constant supply temperature.

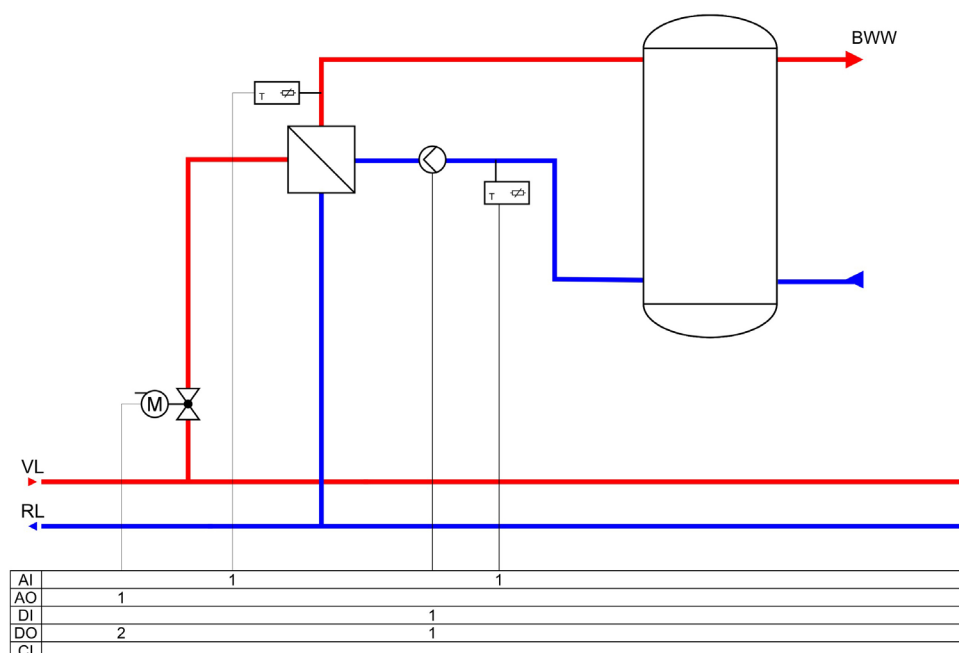


Fig. 4 Domestic hot water with the available elements

The circulation pump of the first circuit can be controlled using a digital output signal.

To prevent the risk of legionella bacteria, the anti-legionellae function for the first circuit, HW1, can be activated.

Boiler control

The flexotron®800 can be configured to control up to 4 boilers. The burners for each boiler can be set to 1-step, 2-step or modulating regulation, depending on the type of boiler control.

The boiler control setpoint can be adjusted to a fixed value or according to the heating/domestic hot water control loop.

To minimise the risk of condensation in the boiler, the return temperature can be regulated.

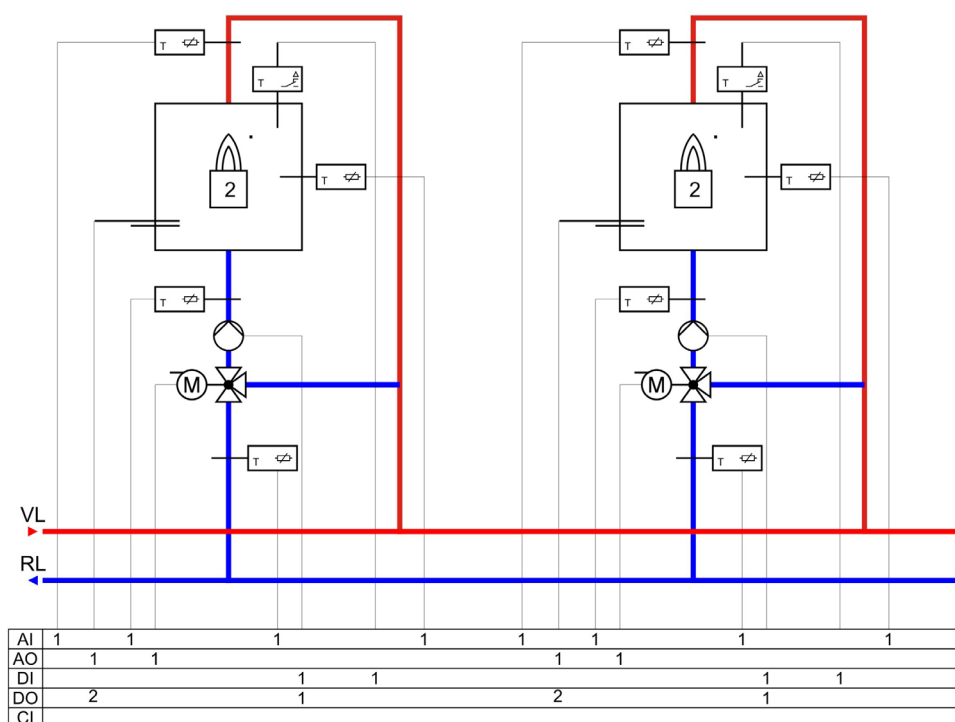


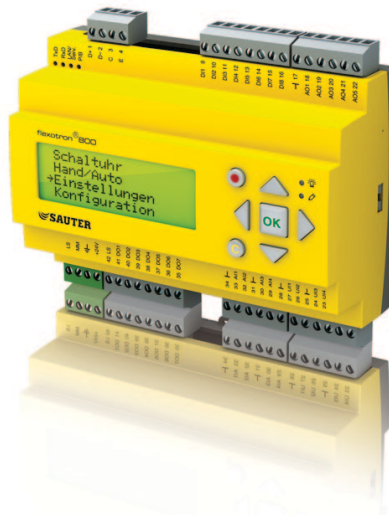
Fig. 5 Boiler circuits with two of the maximum four available boilers.

Consumption measurements

Measurements and monitoring of cold water consumption, energy consumption, leak monitoring and electricity meters can be configured using pulse inputs.

3 Display, buttons and LEDs

This section applies to flexotron®800 controllers with a display and buttons, as well as the RDB800 external display. The external display can be connected to flexotron®800 models without a display and buttons.












3.1 Display

The display has four rows of 20 characters and is backlit. The lighting is normally off. The lighting is activated when the buttons are pressed, and is switched off again after a certain period with no activity.

```
Heating controller
2013-11-27 14:10
HS1
Sp: 52.0 Act: 52.5
```

Display, buttons and LEDs

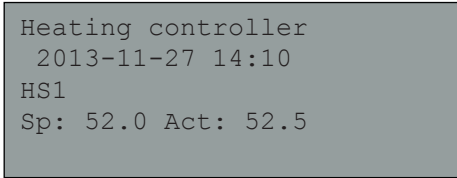
3.2 Buttons and LEDs

	ARROW up (Up button): Scroll up the menu. (Increase parameter value)		Alarm: List of alarms.
	ARROW down (Down button): Scroll down the menu. (Decrease parameter value)		Correction: Reset or cancel a change to parameter values if it has not been confirmed with OK.
	ARROW right (Right button): Open submenu. (Set cursor to the right of the parameter)		Alarm LED: The alarm indicator flashes red for unacknowledged alarms. The alarm indicator lights up constantly for alarms that have been acknowl- edged but not reset.
	ARROW left (Left button): Quit submenu. (Set cursor to the left of the parameter)		Input LED: Some menus have adjustable values. These are indicated by the flashing yellow LED. The value can be changed by pressing the OK button.
	OK: Opens/activates the selected menu or setting. (Confirms a parameter value)		

4 The menu system

4.1 Menu navigation

Depending on the user/access level, the corresponding menu is displayed.



```
Heating controller
2013-11-27 14:10
HS1
Sp: 52.0 Act: 52.5
```

The start menu is on the basic level of the menu tree. The appearance of the start menu depends on the settings in the configuration. The text in the first line can also be changed with CASE flexotron®.

The abbreviations Sp and Act stand for the setpoint and actual value of the controller.

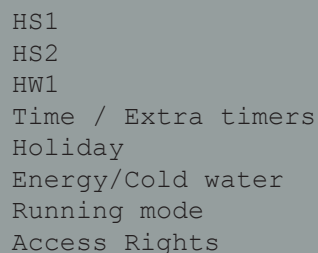
Actual value = the currently measured temperature.

Setpoint = the desired/set temperature.

Press the Down button to go through the menus to the lowest level. Press the Up button to go back up.

Depending on your access level, various menus are displayed (see the “Access levels” section for more information on logging into a higher access level).

On the basic level, which is displayed without a user logging in, a limited number of menus and submenus are displayed. The operating mode of the device can be changed and alarms can be acknowledged.



```
HS1
HS2
HW1
Time / Extra timers
Holiday
Energy/Cold water
Running mode
Access Rights
```

Sometimes there are further submenus linked to a menu or menu item.

Additional menus are indicated by an arrow symbol in the right corner of the display. Use the Right button to select them. Use the Left button to go back one menu level.

The menu system

HS1..HS3, HW1..2, CS1, ... (controller systems)

The setpoints and actual values can be viewed in the various controller systems, the controller properties can be set, and manual mode can be activated.

Time / Extra timers

The time, date and set periods of use are shown here. Values can only be changed with Operator or Admin access level.

Holiday

Holiday times are displayed here. Up to 24 separate holiday periods can be configured for a whole year in advance. Values can only be changed with Operator, or Admin access level.

Running mode



Access to the alarm tab for reading the current values and the alarm log.

The Inputs/Outputs submenu displays the raw values from the sensors, the signals at the analogue outputs and the current status of the digital inputs and outputs.

Access rights

In this menu you can change to a higher access level. In addition, you can change the password or log out of the current access level and continue on the basic level.

4.1.1 Editing parameters

You can edit parameters in some menus. This option is indicated by the flashing yellow LED  .

If the LED flashes rapidly (twice per second), the parameters can be changed using the current access level.

If the LED flashes more slowly (once per second), a higher access level is required to edit the parameter.

To edit a parameter, first press the OK button. If you need a higher access level to edit the parameters, a corresponding login menu appears (see below). Otherwise, the cursor appears next to the editable values. Press the Up and Down buttons to edit the value.

In numbers containing several digits you can move between the digits using the Left and Right buttons.

When the required value is displayed, press OK.

If there are other editable values, the cursor automatically moves to the next one.

To skip a value without editing it, press the Right button.

To reverse a change and return to the original setting, press and hold the C button until the cursor disappears.

The following section contains some of the menus which display controller systems, timer outputs, holidays, alarms and the status of inputs and outputs.

4.2 HS1..HS3, HW1..2, CS1, ...

```
Actual/setpoint
Temp control
Manual/auto
HS1 ECO/comf mode
```

If you select one of the various controller systems, four submenus are displayed, with the exception of the additional control loop and HP, where only two submenus (Actual/setpoint and Manual/auto) are available.

The systems that you can then access depend on which inputs and outputs are configured.

4.2.1 Actual/setpoint

HS1, HS2 and HS3

```
Outside temp: -5 °C
HS1
Act: 49.8 °C Setp.→
Setp.: 55.0 °C
```

Weather-dependent setpoint submenu:

Here you can set the supply temperature for a particular outside temperature. You can set 8 schedule start points for each system.

The values in between must be calculated by linear interpolation. Only the values for the supply temperature can be changed on the flexotron®800. The outside temperature values can be changed using CASE flexotron®.

```
Outd comp setp HS1
-20 °C = 67 °C
-15 °C = 63 °C
-10 °C = 59 °C
```

The menu system

The heating systems have individual pump stop temperatures for day and night.

```
Pump stop HS1:On
Stop temp day: 17°C
Stop temp night: 17°C
Hysteresis: 2.0 °C
```

Submenu: Room-temperature sensor

Room temperature setpoint configuration. This menu is only available if the room temperature sensor is configured.

```
Room sensor HS1
Act: 20.8 °C
Setp: 21.0 °C
```

Submenu: Return temperature

```
Return temp
HS1: 28.0 °C
```

CS1

The setpoint for the cooling system can be fixed or weather-dependent. With a constant setpoint:

```
CS1
Act: 13.0 °C
Setp:13.0 °C
```

With a weather-dependent setpoint:

```
Outside temp: 21.8°C
CS1
Act: 13.2°C Setp. ->
Setp: 13.0°C
```

Press the Right button to go to set the supply temperatures for particular outside temperatures when a weather-dependent setpoint is selected. You can set up to eight schedule start points.

```
Outd comp setp CS1
20 °C = 15 °C
22 °C = 14 °C
24 °C = 13 °C
```

The cooling system has individual pump stop temperatures for day and night.

```
Pump stop CS1:On
Stop temp day: 15°C
Stop temp night 15°C
Hysteresis: 2.0 °C
```

HW1 and HW2

Actual value and setpoint for domestic hot water.

```
Supply temp. HW1
Act: 53.0 °C
Setp: 55.0 °C
```

HP1

Actual value and setpoint for hot water preparation

```
Supply HP1
55.0°C
```

Boiler

Different screen displays appear, depending on the type of setpoint selected for boiler control.

Alternative 1 – constant setpoint:

```
HB setp:
36 °C
HB act.:
36.5 °C
```

The menu system

Alternative 2 – control loop setpoint:

```
HS-depending setp
+ 5.0 °C
HB setp: 43.0 °C
HB act.: 43.2 °C
```

Alternative 3 – weather-dependent setpoint:

```
Outside temp: 5 °C
HB
Act.: 43.3 °C Setp ->
Setp: 43.0 °C
```

To set the weather-dependent characteristic, eight points:

```
Outd comp setp HB
-20 °C = 67 °C
-15 °C = 63 °C
-10 °C = 59 °C
```

4.2.2 Temperature control

P-band and I-time settings of the various controllers.

```
HS1
P-band: 100.0 °C
I-time: 100.0 s
```

Submenu: Only available for HS1 and HS2.

```
HS1 Return temp.
P-band: 100.0 °C
I-time: 100.0 s
```

4.2.3 Manual/auto

All configured control loops can be manually controlled between 0 and 100%. All configured pumps can be set to Auto, On or Off.



If an output is manually controlled, it means that normal regulation is disabled. For this reason, an alarm is generated whenever an output is set to an operating mode other than Auto.

The menu display depends on the configuration, which is why not all the screens are shown here.

HS1..3, HW1..2, CS1

Manual operation / reading control signals for the actuators.

```
Manual/auto  
HS1  
Auto  
Manual mode: 37
```

Submenu: For manual operation or reading the pumps

```
Manual/auto HS1  
PlA: Auto  
PlB: Auto
```

Boiler

Menu for setting the burners, circulation pumps, return valves and transport pumps to manual mode. The menu structure depends on the configuration.

Alternative 1, Off/On:

Boilers 1 to 4 can be set to Auto/Manual Off/Start1/Start2 with 2-step burners and to Auto/Manual Off/Manual On with 1-step burners.

```
Manual/auto  
Boiler 1: Auto
```

The menu system

Alternative 2, Off/On/modulating regulation:

If a modulating burner has been selected for boiler 1:

```
Manual/auto  
Modulating boiler  
Auto  
Manual set: 2 %
```

Alternative 3, modulating regulation:

```
Manual/auto  
Modulating boiler  
Auto  
Manual set: 56 %
```

The Auto/Manual Off/Manual On setting is for manual operation of boiler pumps 1 to 4.

```
Manual/auto  
Boiler pump1:  
Auto
```

The Auto/Manual Off/Manual On setting is for manual operation of the transport pump.

```
Manual/auto  
Transport pump:  
Auto
```

The Auto/Manual Off/Manual On setting is for manual operation of return valves 1 to 4.

```
Manual/auto  
HB1 return temp  
Auto  
Manual mode: 0.0
```

4.2.4 ECO/comfort function

Two comfort temperature periods can be set for every day. When the heating system is outside its comfort periods, it is put into ECO (economy) mode.

HS1, HS2, HS3, HW1, HW2 and CS1

```
HS1 ECO/comf mode
On →
5°C (room temperature)
```

Submenu: Setting the comfort periods.

Each controller system has 8 separate setting menus – one for every day of the week and an additional one for the holiday programme. The holiday programme has priority over the other programmes.

For all-day operation, set a period of 00:00 – 24:00. To deactivate a period, set it to 00:00 – 00:00.

```
HS1 Comfort time
Monday
Per 1: 07:00 – 16:00
Per 2: 00:00 – 00:00
```

4.3 Time / timer outputs

General information

The controller has a calendar programme where weekly schedules and holidays can be set for the whole year.

The switch between summertime and wintertime is performed automatically. To see timer outputs 1-5 in the display, they must first be configured.

```
Time/Date
Timer output 1
Timer output 2
Timer output 3
Timer output 4
Timer output 5
```

The menu system

Time/Date

This menu enables you to view and change the time and date.

The time is shown in the 24-hour format.

The date is shown as YY:MM:DD.

```
Time: 18:21
Date: 13:11:25
Weekday: Wednesday
```

Timer outputs

Up to five separate digital timer outputs can be configured. Each has a weekly programme with two activation periods per day. Each channel has 8 separate setting menus – one for every day of the week and an additional one for the holiday programme. The holiday programme has priority over the other programmes.

```
Timer output 1
Monday
Per 1: 07:00 - 16:00
Per 2: 00:00 - 00:00
```

4.4 Holiday

Up to 24 separate holiday periods can be configured for a whole year in advance.

A holiday period can be both a single day and up to 365 consecutive days. Holiday schedules take precedence over other schedules.

```
Holidays (mm:dd)
1: 01:01 - 02:01
2: 09:04 - 12:04
3: 01:05 - 01:05
```


4.5 Energy/Cold water

This menu displays the readings from the pulse meter inputs. The pulse constants (pulses per unit) are defined in the Configuration/Pulse constants menu.

```
Heating meter
Cold water meter 1
Cold water meter 2
Electricity meter
Leakage monitoring
```

Heating meter

```
Energy total
1532.3 MWh
Hot water total
387.02 m3
```

The values below can be reset.

```
Energy
Today: 28.15 kWh
Yesterday: 123.45 kWh
D B Y-day: 132.11 kWh
```

```
Usage
Today: 28.15 l
Yesterday: 123.45 l
D B Y-day: 132.11 l
```

```
Power usage
Instant: 2100.0
Average/h: 3200.0
Max aver.: 5300.0
```

The menu system

Cold water meters CW1 and CW2

```
CW1 Usage total
276.22 m3
CW2 Flow
156.4 l/min
```

```
CW1 Usage
Today: 88.1 l
Yesterday: 4123.4 l
D B Y-day: 5012.1 l
```

```
Lowest CW1 usage
Today: 0.1 l/h
Yesterday: 0.2 l/h
```

Electricity meter

```
Energy total
1866.54 MWh
```

This value can be reset.

Leakage monitoring

```
Leakage monitoring
1.31 kW
```

4.6 Running mode

You cannot make changes in the Running mode menu. It is simply for viewing the current values and alarm log.

```
Alarms
Inputs/Outputs
Extra Sensors
```

Alarms

The alarm log of the flexotron®800 contains the 40 most recent alarms. The latest event is at the top of the list. The alarm log is solely for viewing alarms in order to assist troubleshooting.

```
14 Jul 18:57 B
Sensor error CS1
Return

Acknowledged
```

Inputs/Outputs

The Inputs/Outputs menu displays the raw values from the sensors, the signals at the analogue outputs and the current status of the digital inputs and outputs.

```
AI
DI
UI
AO
DO
```

```
AI1: -3.5 Outd temp
AI2: 53.7 HS1 Supply
AI3: 54.8 HW1 Supply
AI4: 50.6 HS1 Return
```

The menu system

```
DO1: On HS1-PumpA
DO2: Off HS1-PumpB
DO3: Off Inc HS1-Act.
DO4: On Dec HS1-Act.
DO5: On HW1-Pump
DO6: On HS2-PumpA
DO7: On Sum alarm
```

Extra sensors

Up to five extra temperature sensors can be connected. They are only used to display the temperature. You can give the sensors any name you want. To do this, press the OK button and then use the Up and Down buttons.

```
Extra Sensor1
Act: 51.2 °C
```

4.7 Access rights

There are various access levels:

- Basic (the lowest level, where no login is required)
- Operator
- Admin

Admin is the highest level with the most access rights. The access level determines which menus and editable parameters are displayed.

Basic level permits changes in the operating mode and read-only access to a limited number of menus.

Operator level gives access to all menus except "Configuration".

Admin level gives full read/write access to all settings and parameters in all menus.

To log into the various access levels, repeatedly press the Down button in the start display until the arrow in the left of the display points to "Access rights". Then press the Right button.

```
Log on
Log off
Change code
```

Log on

In this menu it is possible to log into any access level by entering the appropriate 4-digit password (code). The menu is also displayed if you try to access a menu or carry out a function that requires a higher access level.

```
Log on
Enter code:****
Actual level: None
```

When you press the OK button, the cursor jumps to the first digit. Repeatedly press the Up button to set the digit.

Press the Right button to go to the next digit.

Repeat the procedure for all four digits of the password. Press OK to confirm. An info text with the current access level appears in the display. Use the Left button to quit this menu.



The code for the Operator access level is 3333.

Log off

Use this menu to log out from the current access level to the Basic level that does not require a login.

```
Log off?
No
Present level:Admin
```

Automatic logout

If the access level is Operator, Service or Admin, the user is automatically logged out and returned to Basic level after a period of inactivity. The time for this can be set.

Change code

The code can only be changed for the current access level or a lower one.

```
Change code for: Operator
New code: ****
```

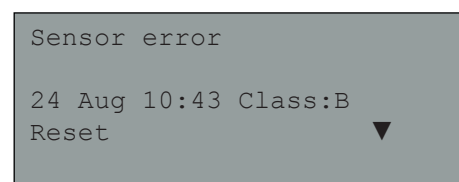

5 Other functions

5.1 Alarm handling

If an alarm occurs, the red alarm LED  flashes either on the front panel of controllers with a display or on an external display. The LED flashes as long as there are unacknowledged alarms.

Alarms are logged in the alarm list. The list shows the type of alarm, the date and the time, and the alarm class (A, B or C).

Press the alarm button on the front panel to see the alarm list.



If there are several alarms, two arrows (up/down) appear on the right of the display.

Use the Up and Down buttons to scroll to the other alarms.

The alarm status is shown in the bottom left of the display. For active, unacknowledged alarms this field is blank. Unacknowledged alarms that have been reset are marked as returned. Acknowledged alarms or alarms that are blocked but still active are indicated as acknowledged or blocked.

In order to acknowledge an alarm, you must first press OK. You can then either acknowledge the alarm or block it.

Acknowledged alarms remain on the alarm list until the cause of the alarm has been eliminated.

Blocked alarms remain on the alarm list until the cause of the alarm has been eliminated and the block has been removed. New alarms of the same type will not be activated as long as the block remains.



Because blocking alarms can be potentially hazardous, you need a high user access level to do this.

Class A and B alarms activate alarm outputs if these have been configured.

Class C alarms do not activate the alarm outputs.

Class C alarms are removed from the alarm list when the alarm inputs are reset, even if they are not acknowledged.

5.2 Individual text field

If you press the Right button in the start menu, a display appears with a text that you can customise.

You can use the text for the name of the installing company, for service contacts and telephone numbers or other information.

The easiest way is to enter the text using CASE flexotron®, but you can also use the buttons. Up to four lines, each with 20 characters, can be individually edited.

5.3 Version number

Press the Right button twice in the start menu to see the version number of the program and the ID number in the display.

5.4 Language

If you press the Right button three times in the start menu, a menu for setting the language appears in the display.

The various languages are stored in the controller application memory and are loaded to the RAM.



If a newer version than the factory setting has been loaded to the flexotron®800 controller using CASE flexotron®, no language can be loaded from the application memory. The language file may not be compatible with the newer version. This means you are restricted to the two languages loaded from CASE flexotron®.

5.5 Indicator LEDs

The status is shown in the upper left corner of the controller. On controllers with a display, the alarm indicator and mode selection LEDs are beside the buttons.

5.5.1 Status indicator

Information	Colour	Description
Tx	Green	Interface 1, send
Rx	Green	Interface 1, receive
Serv	Yellow	Not used
LAN (web models)	Yellow/green	Green: Connection to other network devices
Network data transfer	Flashing green	
For identification	Flashing yellow:	
P/B (power supply / battery)	Green/red	Power supply on / battery fault

Controller with built-in display:		
	Red	Alarm display
	Yellow	Input mode

5.6 Changing the battery

The flexotron®800 controller has a back-up battery for the memory and real-time clock in the event of a power failure.

If the “internal battery” alarm is triggered and the battery LED lights up red, the battery must be replaced. A back-up capacitor protects the content of the memory for at least 10 minutes without power.



The battery may only be changed by trained staff.

5.7 Start assistant

When the controller is switched on for the first time, it runs through a special procedure:

1. Select one of the following applications by pressing the Down button:
 - Ventilation
 - Heating
2. Continue using the Right button.
3. Select the application using the OK button.
➡ The cursor jumps to “Accept changes: No”.
4. Press the Up or Down button until the display changes to Yes.
5. Press OK to confirm.
➡ The program loads and the default display appears.

The controller switches to normal operation. This procedure will not be repeated the next time that the application is launched.

5.8 Basic configuration for heating

The start assistant (see previous section) selects a configuration for each type of device. This configuration can be applied without changes, or can be used as a starting point for individual customisations.

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