

installation

imax **modulating sequencer kit**

Your Ideal installation and servicing guide

**imax W45, W60, W80, W100,
W45P, W60P, W80P**

**imax xtra F80, F120, F160, F200, F240
F280, F320, F400, F480, F560**

When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Ideal Boilers.

i BOILERS **Ideal**
The High Efficiency Pioneers

GENERAL

This kit is suitable only for the following boilers:








- | | | | | |
|-------------|-------------|------------------|------------------|------------------|
| - imax W45 | - imax W45P | - imax xtra F80 | - imax xtra F240 | - imax xtra F480 |
| - imax W60 | - imax W60P | - imax xtra F120 | - imax xtra F280 | - imax xtra F560 |
| - imax W80 | - imax W80P | - imax xtra F160 | - imax xtra F320 | |
| - imax W100 | | - imax xtra F200 | - imax xtra F400 | |

CONTENTS


Appendices (Wiring Diagrams)	59
Configuration	18
Features	33
Functions	29
Installation and Fitting	14
INSTALLATION PROCESS	4
Introduction	3
Operating Instructions	5
Technical Specifications	58
Troubleshooting	49
User Setup and Operation	8
User Troubleshooting	13

SYMBOLS USED

The following symbols are used in this document:

-  'Next menu item' key
-  'Previous menu item' key
-  'Access menu' key
-  'Exit (sub)menu' and 'Restore setting' key
-  'On/off'
-  **Hazard caused by electric voltage.**
-  **A procedure or circumstance which requires extra attention.**

The following symbol is used on the Controller:

-  **This symbol must not be covered or removed and must be present and legible for the entire lifetime of the Controller.**

USING THIS DOCUMENT

This document contains information for both the end user and the installer. It consists of the following three parts:

- User Instructions
- Installation Instructions
- References

INTRODUCTION

The modulating sequence controller is designed to control imax condensing boilers operating in cascade. An OpenTherm® interface is used for the exchange of data between the controller and the boilers. Consequently each imax boiler operating in cascade must be fitted with an imax Control Interface Kit, (UIN 158632), to facilitate boiler operation with the sequencer. The required load is determined from the setpoint and the measured flow temperatures. The requested load is transmitted to each boiler separately. The setpoint flow temperature is determined from a heating curve, or from the setpoint flow temperature from an OpenTherm® room thermostat. The Controller is also capable of being used in combination with a imax Programmable Room Thermostat Kit, (UIN 158492) or an On/Off room thermostat. In addition to this, the Controller can also actuate a hot water storage circuit or a pump circuit.

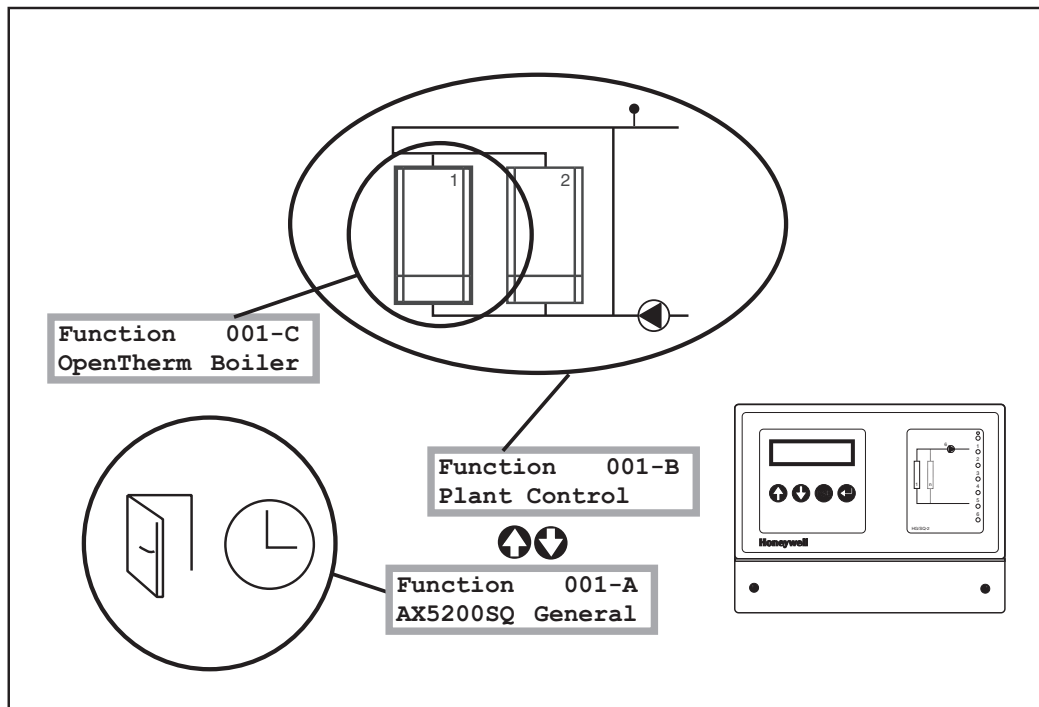
The universal design of the system, the consistent menu structure and the simple operation enables the installer to commission the controller quickly.

Note. Interface is pre-fitted on imax xtra F320, F400, F480 and F560 variants. As a consequence, fitment of the controls interface kit is not required on these models.

MODULAR DESIGN

A Controller consists of various Functions. Each Function actuates a specific installation component or a group of linked installation components (see fig. 0.1) and has its own defined tasks and features.

Figure 0.1 Modular Design of Modulating Sequence Controller

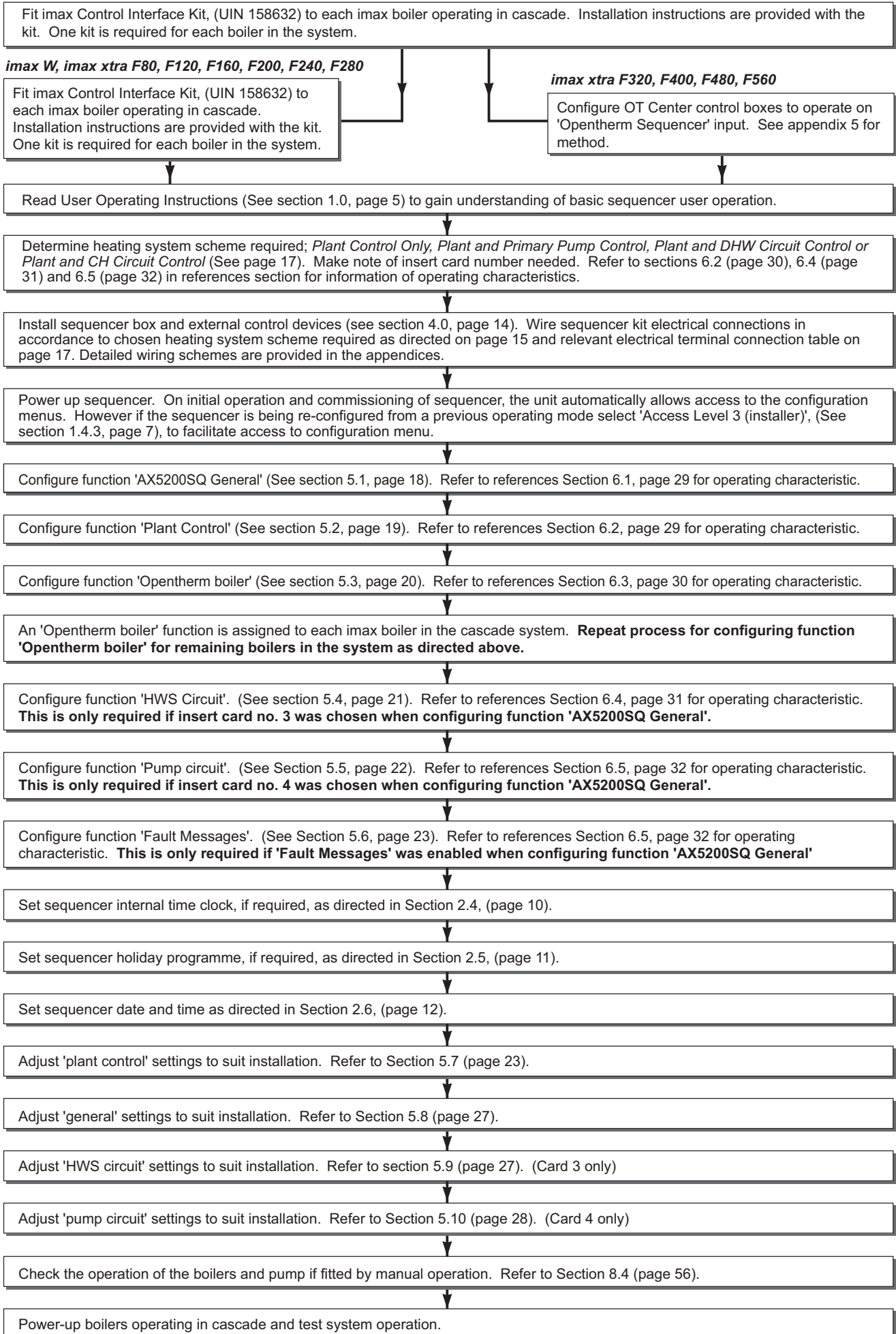


In order to carry out these tasks in optimum fashion, the Functions must be able to exchange data (such as settings and readings) with each other. This exchange of data takes place between functions within the Controller. Each Function must have a unique address to make this possible.

This unique address is automatically assigned during configuration (see Chapter 5) and consists of a number and a letter (e.g. 001-A)

The letter (A = first Function, B = second Function etc.) designates the specific Function within a Controller. The letters are assigned during configuration of a Controller. Thus 001-C is the address of the third Function in the Controller.

INSTALLATION PROCESS



imax504

1.0 USER OPERATING INSTRUCTIONS

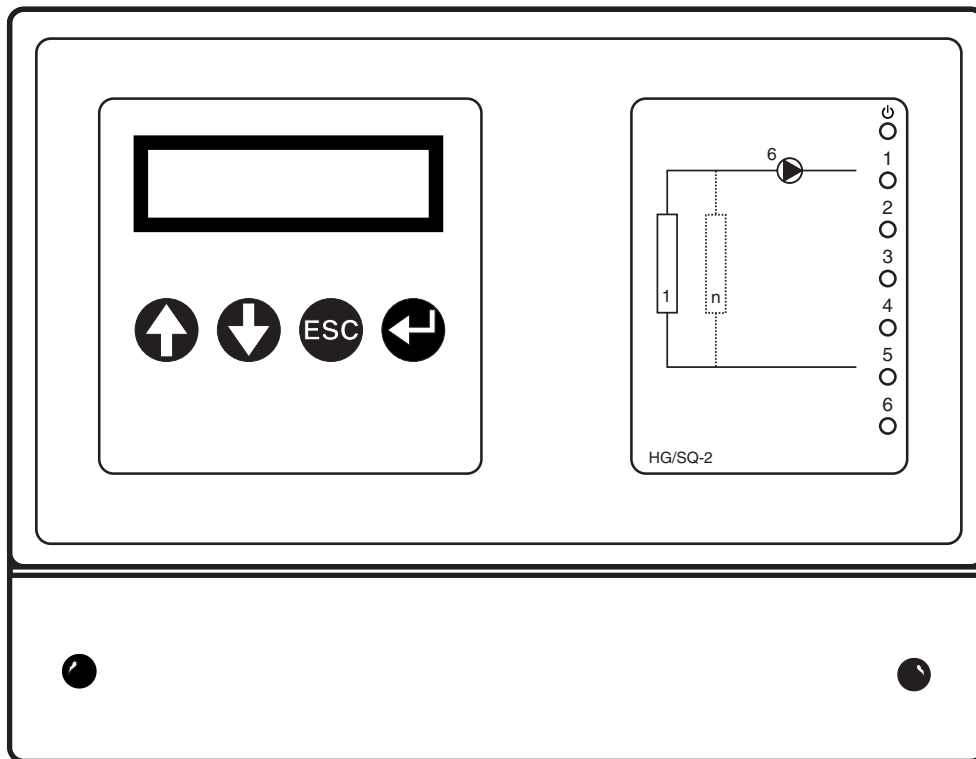
1.1 USER INTERFACE

The Controller is equipped with a control panel (see fig. 1.3) with an LCD display (2 lines each of 16 characters) and 4 keys (⬆️, ⬇️, ESC and ⬅️).

The control panel can furthermore be equipped with an insert card with a plan of the hydraulic system and also contains recesses for a number of LEDs. The function of these LEDs is:

- The LED marked '⏻' has several purposes. The LED flashes when the Controller is connected to a power source but has not yet been configured. Once the Controller has been configured, the LED lights up continuously. During a fault situation, however, the LED flashes again.
- The numbering of the other LEDs matches the numbering in the hydraulic plan, as shown on the insert card. These LEDs light up when the relevant part of the system has been activated or flash if a fault has occurred.

Figure 1.1 Front view of the Modulating Sequence Controller, equipped with insert card 2



1.2 OPERATION AND FUNCTION OF THE KEYS

Operation is entirely menu-driven. Four keys (⬆️, ⬇️, ESC and ⬅️) enable the various main and sub menus of the Controller to be displayed and/or modified, depending on the configuration and access level. A key's function is determined in part by the menu item that can be seen at the time when the key is used.

The following apply in general

- ⬆️: up in the (sub)menu and/or increase setting.
- ⬇️: down in the (sub)menu and/or decrease setting.
- ESC: back to previous (sub)menu and/or restore old setting.
- ⬅️: access the (sub)menu and/or confirm setting.

⚠️ Settings can only be changed once the correct access level has been set. The higher the access level, the more information is displayed and the more settings can be modified. Each access level has its own access code which consists of a combination of 4 keys (see § 1.4).

USER

The keys have a more limited function during configuration, i.e.

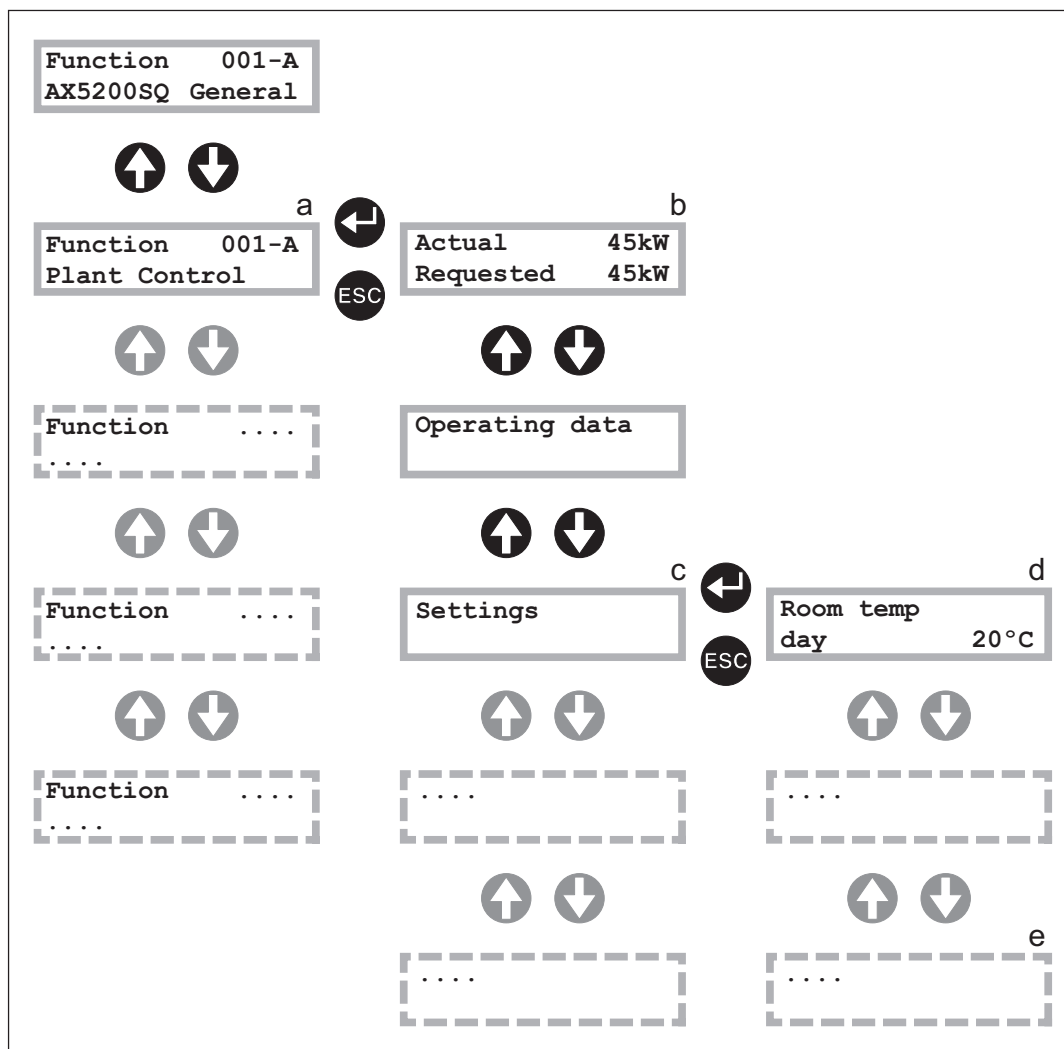
- : change selection or increase setting..
- : change selection or decrease setting.
- : no function.
- : confirm selection or setting and go to next configuration menu item

The Configuration Menu can only be scrolled in one direction. After , the system automatically jumps to the next item. If you (later) wish to change a selection or setting which you have made, you must scroll through the entire Configuration Menu again.

1.3 SELECTION OF FUNCTIONS AND MENUS

Function General appears on the display as soon as the Controller is connected to a power source. Depending on the access level and configuration, the main menus, sub menus and the menu items of the various Functions can now be displayed and/or modified (see fig. 1.4).

Figure 1.2 Selecting Functions and Menus







1. Using and , select the Function whose data are to be displayed and/or modified (a).
2. Press to access the selected Function. In most cases the Status display can now be seen (b).
3. Then select the required sub menu, using and (c).
4. Press to access the selected sub menu. The menu items can now be seen (d).
5. Using and , select the menu item that is to be displayed or modified (e).
6. Press to modify a set value. If the value can be modified, it now flashes.
7. Using and , set the required value.
8. Press . The set value stops flashing to indicate that the setting is now complete.
9. The various sub menus can be exited by (repeatedly pressing).

1.4 Choosing an Access Level





1.4.1 Access level 1 (user)

- Only display output is possible. Settings cannot be changed.
- A number of menu items, such as the operating mode, are visible.
- The access code is any code apart from that assigned to access level 2 or 3 (the access level for the installer).

1.4.2 Access level 2 (user with setup authorization)

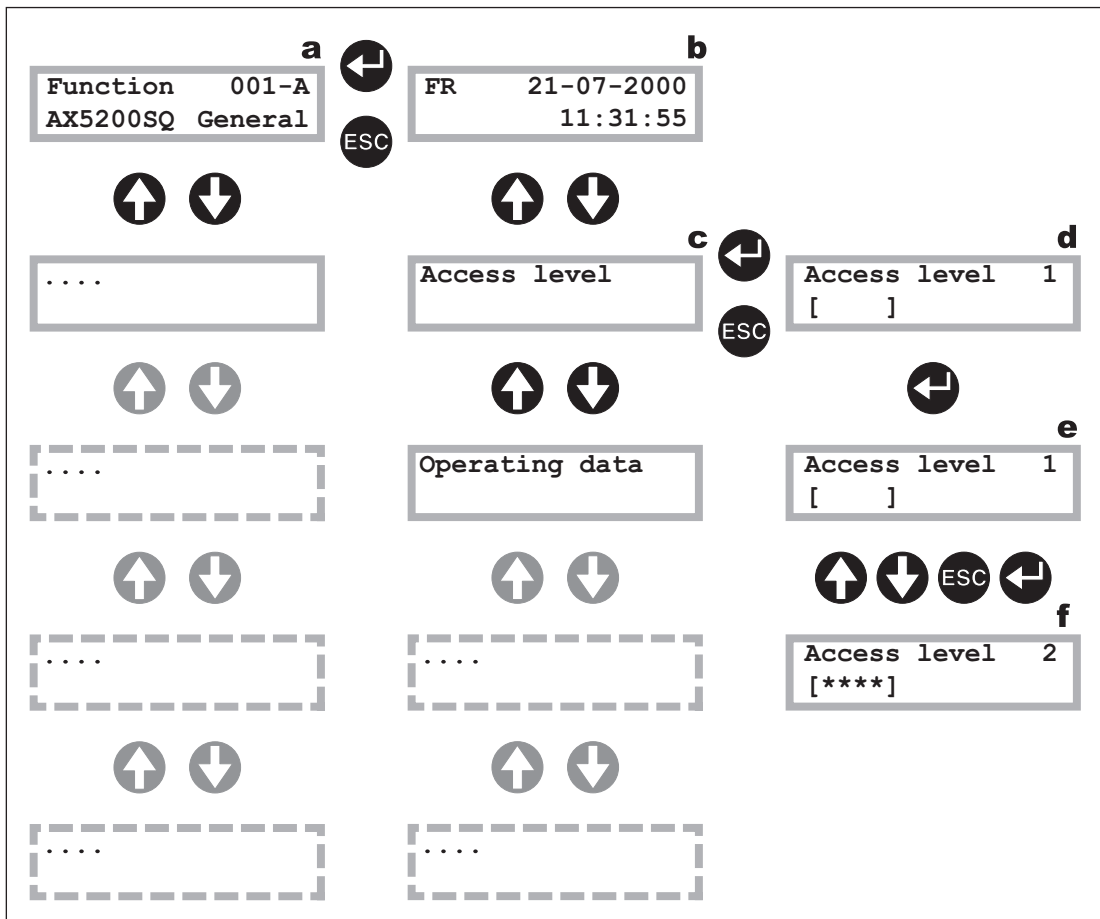
- Basic operating data (e.g. measured readings and setpoints) are visible. The time clock, holiday programme and user settings (e.g. setpoint room temperature day, night and holiday) are visible and user-definable.
- The access code is , ,  and  in that order.

1.4.3 Access level 3 (installer)






- There are extensive setup and configuration options.
- All main and sub menus with their menu items are visible. All settings and configuration items are adjustable.
- The access code is , ,  and  in that order.


1.5 CHANGING THE ACCESS LEVEL

Figure 1.3 Changing the access level



Proceed as follows:

1. Select Function General in the main menu of the Controller with a user interface (a).
2. Press  (b) and then press  or  until 'Access level' appears on the display (c).
3. Press , the current access level (in this example 'Access level 1') appears on the display (d).
4. Press , the figure 1 flashes (e).
5. Enter the required access code, e.g. for access level 2 (see § 1.4). 'Access level 2' appears on the display. The access level has now been changed to level 2 (f).

 **The Status Display Menu of the currently selected Function is shown if the access level is 1 or 2 and the Controller is not operated for two minutes.**

 **The system automatically switches back to access level 1 if the Controller is not operated for 1 hour.**

6. Press  to exit from the access level to sub menu.

2.0 SETUP AND OPERATION

A Controller comprises various Functions. The presence of the specific Functions is determined by the type of Controller and the configuration of Function General which is always present in a Controller. The Function General is only used by a user to change the access level. If the Fault Messages Function is installed, its use is reserved for the installer. For these reasons the Function General and the Fault Messages Function are not discussed further here (see Parts II and III in this regard).

The following sub menus may be contained in a Function:

- Status Display Menu
- Operating Data Menu
- Settings Menu
- Time Clock Menu
- Holiday Programme Menu
- Faults Menu

2.1 STATUS DISPLAY

In most cases when accessing a Function a menu item is available which displays the most important data with regard to the working of the Function.

The texts that can appear in the Status Display of a Function are summarized below.

Status Display Menu

Actual 0kW Requested 0kW	The total measured capacity currently in operation and the current total setpoint capacity.
Flow temp 0°C Setpoint 0°C	The currently measured and setpoint flow temperature.
HWS sec-T 0°C Setpoint 0°C	The currently measured and setpoint HWS (Hot Water Storage) secondary temperature.
Not configured	Every Function shows this message on the Status Display if the Function has not yet been configured.
Staus display fault	Every Function shows this message on the Status Display if there is a fault situation.

2.2 OPERATING DATA

The Operating Data Menu contains sub menus which provide information on the current operating mode of a Function. The sub menus of most importance for the user are listed and briefly described below. Any sub menus not described here are not of importance for the user and are therefore described in the references section of this manual.

Heat demand ext	The setpoint flow temperature is determined by the status of the 'Heat demand ext' input.
Hot water mode	The boiler is currently in operation for the hot water supply.
Setpoint input XIB	The setpoint flow temperature is determined by another function.
Setpoint Input thermostat	The setpoint flow temperature is determined by a Programmable Room Thermostat Kit (UIN 158492) or an On/Off room thermostat.
Timed override: Day operation	The function is in day mode because the timer is activated.
Time program: Day operation	The function is in day mode as a result of the set time clock programme. The time clock programme can set the function to day or night mode. The holiday programme can set the function to holiday mode.

USER

In addition to information on the operating mode of the function, information is also provided on readings (e.g. temperature, load).

Operating Data Menu


Flow temp 0 °C The current flow temperature in °C.

HWS primary-T 0 °C The current HWS primary temperature (flow temperature) in °C.

HWS secondary-T 0 °C The current HWS secondary temperature in °C.

Outside temp 0 °C The current outside temperature in °C.

Room temp 20 °C The current room temperature in °C.

 **Some of the above menus may not be displayed depending on the selections made during configuration of the controller.**

2.3 SETTINGS

Some Functions allow the user to change one or more set values. In most cases these are required setpoints, e.g. the setpoint room temperature. The values can be changed in the Settings Menu. All the items which can be changed are shown below. Which items are actually shown depends on the chosen Function.


Settings Menu

Room temp 20 °C The setpoint room temperature in day mode.

Room temp night 15 °C The (minimum) setpoint room temperature in night mode.

Room temp holiday 10 °C The (minimum) setpoint room temperature in holiday mode.

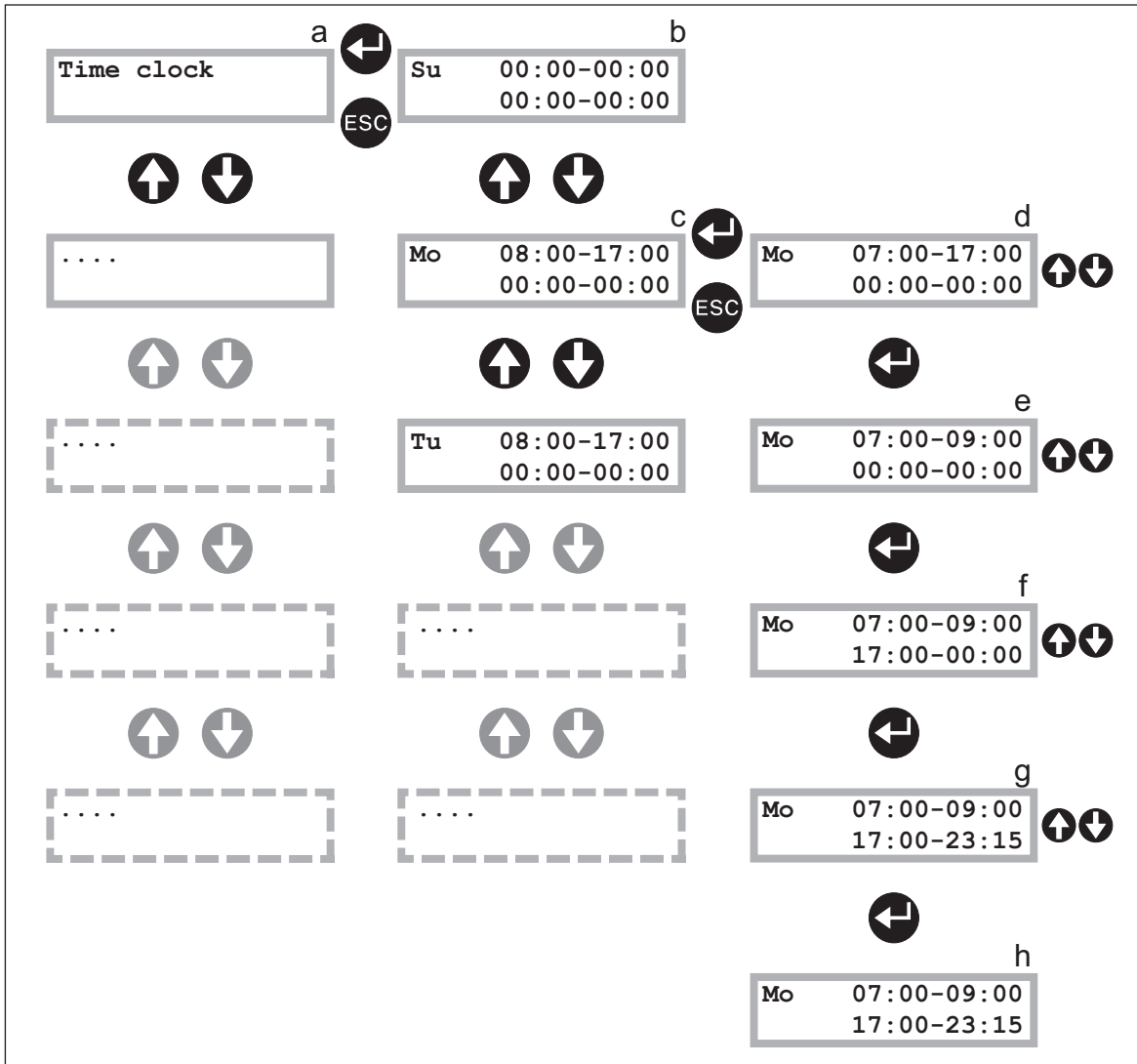
 **If the Settings Menu cannot be selected, this means that the user cannot change any settings.**

 **Some of the above menus may not be displayed depending on the selections made during configuration of the controller.**

2.4 TIME CLOCK

The Time Clock can be used to set two operating periods in advance for each day of the week.

Figure 2.1 Procedure for Changing the Switch Times

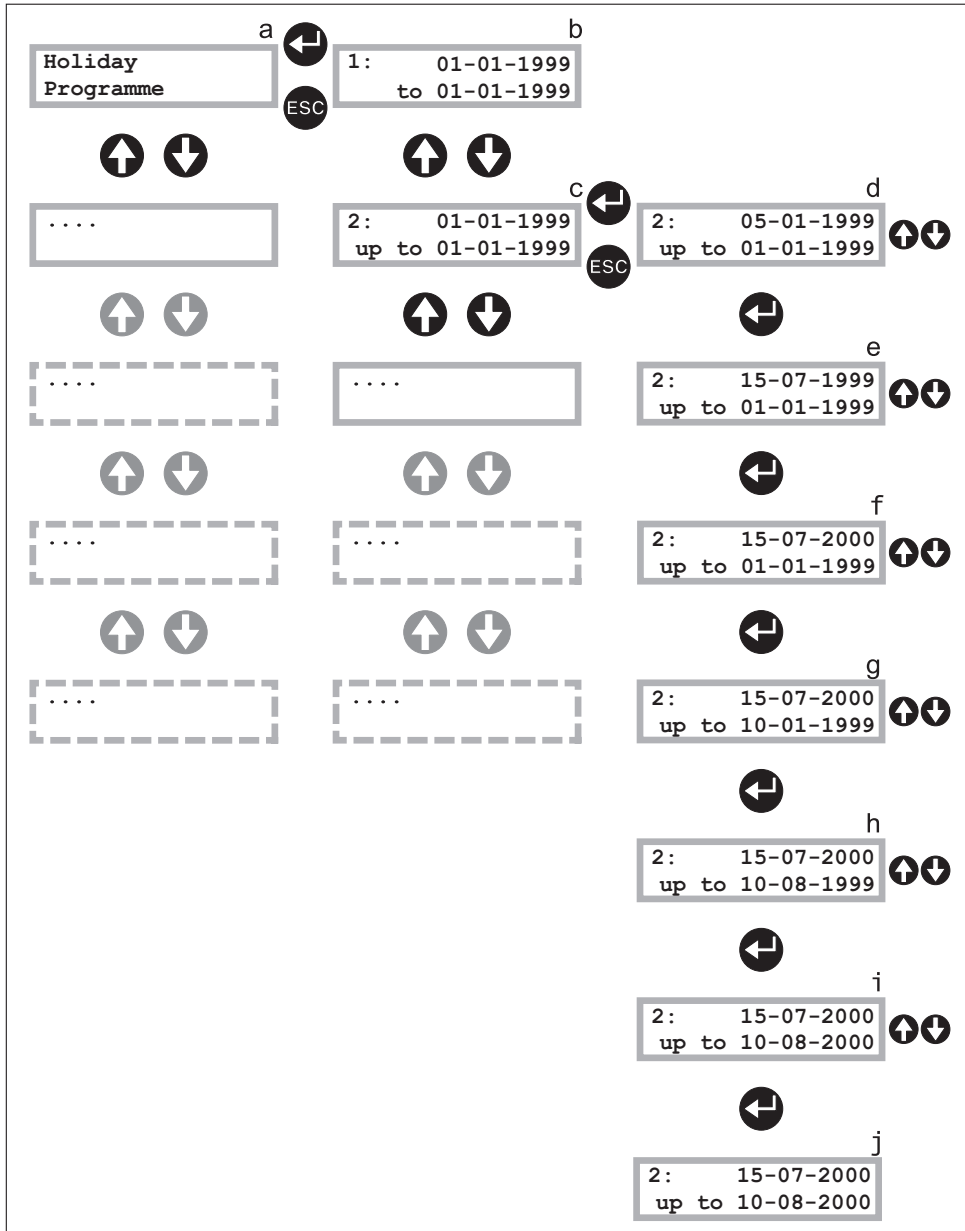


1. Set access level 2, then press **ESC** repeatedly to exit access level menu.
 2. Select the Function Plant Control to set heating times on the plant circuit or Function Pump Circuit to set heating times on the Pump Circuit or Function HWS Circuit to set hot water times.
 3. Press **←** to access the Function Plant Control/HWS Circuit/ Pump Circuit.
 4. Press **↑** or **↓** until the Time Clock Menu appears on the display (a).
 5. Press **←** to access the Time Clock Menu (b).
 6. Press **↑** or **↓** to select the desired day (c).
 7. Press **←**, the start time of the first period flashes. Then press **↑** or **↓** to set the required start time of the first period (d).
 8. Press **←**, the finish time of the first period begins to flash. Press **↑** or **↓** to set the required finish time of the first period (e).
 9. Press **←**, the start time of the second period flashes. Press **↑** or **↓** to set the required start time of the second period (f).
- Note.** If only one day period is required, leave the second period set at 00:00 - 00:00.
10. Press **←**, the finish time of the second period begins to flash. Press **↑** or **↓** to set the required finish time of the second period (g).
 11. Press **←**, the flashing stops and the operating periods for the chosen day are now set (h).
 12. Repeat the procedure for the other days.
- ⚠ The start and finish times are restored to their previous values if you press before setting the finish time of the second period.**
- ⚠ Not every Function has a time clock. It is also possible that no time clock was selected when configuring the Function or that the time clock of another Function is being used.**

2.5 HOLIDAY PROGRAMME

The Function can be set in advance to holiday mode for particular periods by means of a Holiday Programme. Eight different holiday periods can be set in the Holiday Programme. A start and finish date must be set for each holiday period.

Figure 2.2 Procedure for Changing Holiday Periods

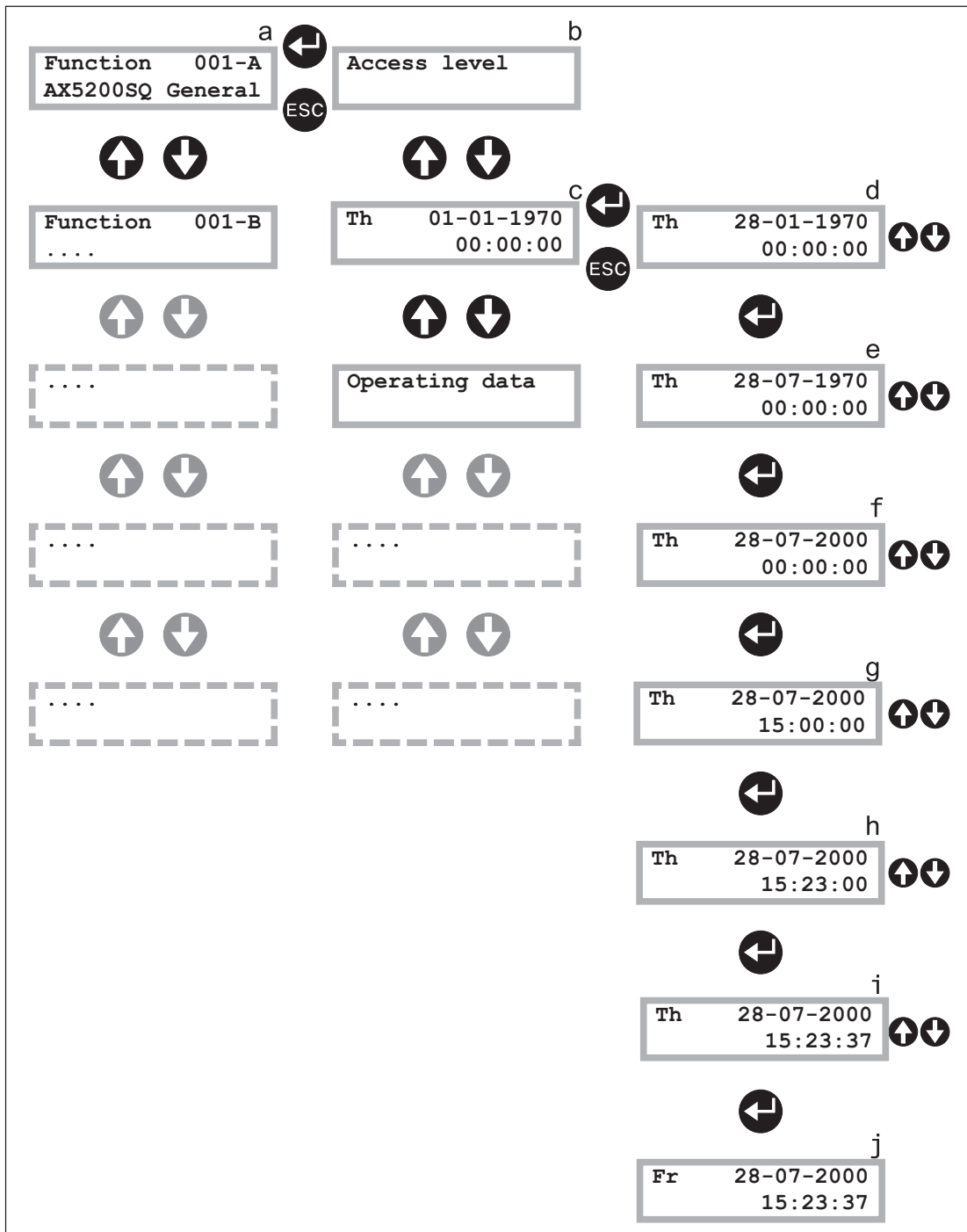


- Set access level 2, then press **ESC** repeatedly to exit access level menu.
 - Select the Function whose holiday timings require setting: Plant Control, Pump Circuit or HWS Circuit.
 - Press **←** to access the Function Plant Control/HWS Circuit/ Pump Circuit.
 - Press **↑** or **↓** until the Holiday Programme Menu appears on the display (a).
 - Press **←**. Select the required period using **↑** or **↓** (b-c).
 - Press **←**, the day of the start date flashes. Set the required day using **↑** or **↓** (d).
 - Press **←**, the month of the start date flashes. Set the required month using **↑** or **↓** (e).
 - Press **←**, the Year of the start date flashes. Set the required year using **↑** or **↓** (f).
 - Set the required finish date in the same way (g - i).
 - Once the required finish date has been set (confirm the year by pressing **←**), the flashing stops to indicate that the holiday period has been set (j).
 - Repeat the procedure for the other holiday periods.
- The start and finish dates are restored to their previous values if you press **ESC** before setting the finish date of a holiday period.**
- If the start and finish dates of a period are the same, the holiday period only applies to the relevant day.**
- Not every Function has a holiday programme. It is also possible that no holiday programme was selected when configuring the Function or that the holiday programme of another Function is being used.**

2.6 DATE AND TIME

The Controller has a clock that updates the time and date.

Figure 2.3 Procedure for changing the date and time



1. Select the Function General (a)
2. Press to access the Function.
3. Select the Access Level Menu using or (b).
4. Set access level 2.
5. Press to exit the Access Level Menu.
6. Select the menu item that shows the date and time using or (c).
7. Press to set the day. The digits indicating the day flash. Set the correct day using or (d).
8. Then press . The digits indicating the month flash. Set the correct month using or (e).
9. Then press . The digits indicating the year flash. Set the correct year using or (f).
10. Then set the hours, minutes and seconds in the same way (g-i).
11. Once the seconds have been set, press . There are no longer any digits flashing. This means that the date and time are set. The two-letter code in the menu, e.g. 'Th' for 'Thursday', is automatically adjusted by the Controller (j).

If you press while setting the date and time, the initial values of the date and time are restored.

3.0 USER TROUBLESHOOTING

The Controller is designed to provide a long, trouble-free life. Should problems occur nonetheless, please consult the troubleshooting guidelines below.

Display is blank/black, no LEDs are lit up on the Controller.

Switch off the power supply to the Controller if possible, wait for a few seconds and then switch the power supply back on.

Temperature complaint

Check the Function for the room or the system section where the complaint has occurred. Use the information in the Status Display Menu.

- The Status Display Menu indicates a fault. The type of fault can be read off the Faults Menu of the relevant Function.
- The Status Display Menu indicates a large deviation between the load required and the load in operation. No boiler was switched on once the delay time had elapsed.
 - Check the boiler(s).
 - Check the relevant Function.
- The Status Display Menu indicates a large deviation between the temperature required and the current temperature.
 - Check the boiler(s).
 - Check the relevant Function.

INSTALLATION

4.0 INSTALLATION AND FITTING

4.1 MODULATING SEQUENCE CONTROLLER

4.1.1 Safety instructions

- The earth connection is located next to the L and N connections, for the mains cable. The earth connection must always be connected to comply with EMC regulations. This is not a safety earthing.
- Connecting the supply voltage and/or earth through to a pump, for example, is not permitted.
- At relay outputs which switch an unfused voltage the connection wires must have an insulation sleeve.
- All cable connections must be fitted with a strain relief. Use the clips supplied for this purpose.

4.1.2 Positioning instructions

- Mount the Controller (with the user interface) at an easily accessible location. Install the Controller at eye level so that the display is easy to read.
- Take account of the requirements relating to the Controller with reference to the ambient temperature and the permitted relative humidity (see Chapter 9). Take steps to prevent the Controller from coming into contact with water splashes or spray.
- Connect each Controller to the 230 VAC mains. Ensure that there is a mains socket close by.
- Limit the number of cables. Mount the Controller(s) as close as possible to the installation components to be controlled.

4.1.3 Wiring instructions

- Mains connection: each Controller must be connected to the 230 VAC mains.

4.1.4 Mounting instructions

4.1.4.1 Unpacking

Check the contents of the box. This contains the following:

Controller with MMI.

- Insert cards (4).
- One outside sensor
- One insertion/tape-on sensors
- One piece of tape
- Water flow header sensor pocket
- Bag of screws, wall plugs, jumper and strain relief.
- Drilling template.
- Manual

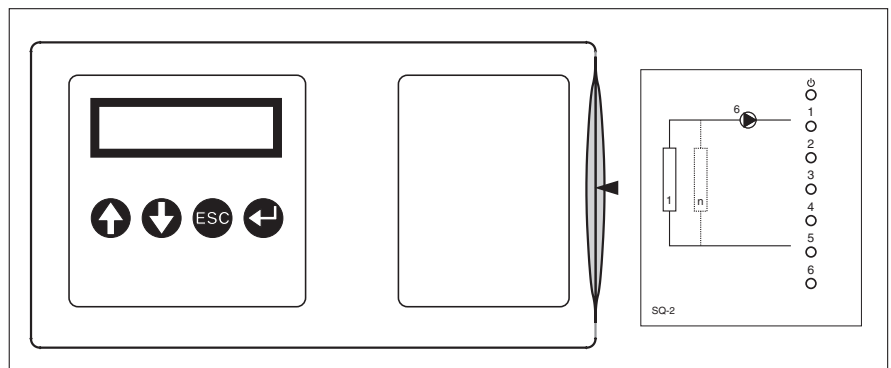
4.1.4.2 Fitting an insert card

The label on the front of the Controller has a pocket enabling an insert card to be fitted.

Proceed as follows:

1. Select the right card if several insert cards are supplied.
2. Raise the label on the right and slide the insert card into the pocket.
3. Remove the protective strip from the right half of the label and stick the label firmly down.

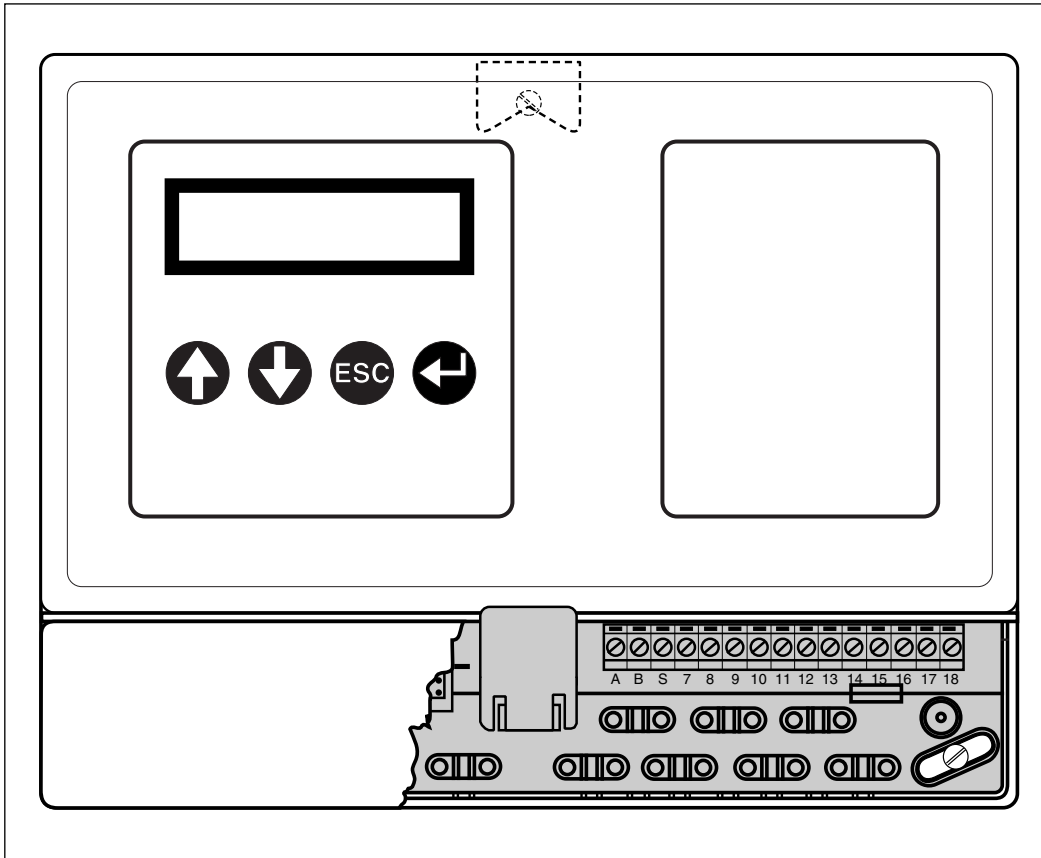
Figure 4.1 Fitting an insert card



INSTALLATION

4.1.4.3 Fastening the Controller

Figure 4.2 Fastening the Controller



The Controller is mounted using three screws (see fig. 4.2). The top screw is used to suspend the Controller and can no longer be turned once the unit has been suspended from it. The two lower screws serve to fasten the unit in place.

Use the cardboard drilling template printed on the inlay card of the box to determine the position of the holes. The size of the bit on the template corresponds to the wall plugs supplied for mounting the unit on a masonry wall. Different fixing materials and methods are generally required to attach the unit to substrates made of non-masonry materials.

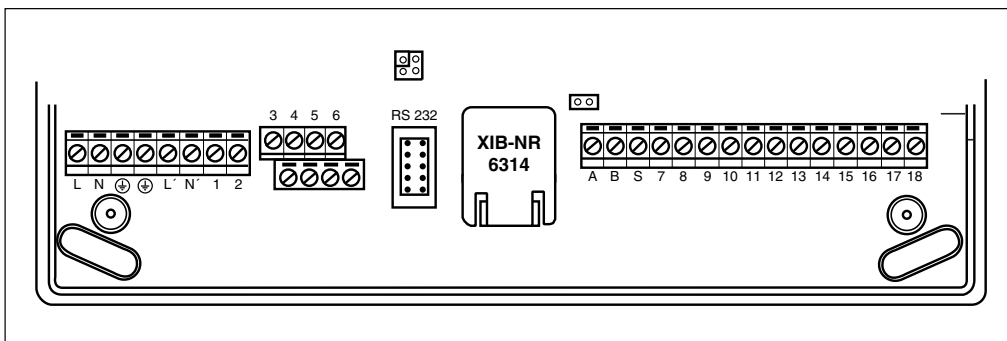
⚠ If fitting in a switchgear cabinet, first switch off the mains power.

Proceed as follows:

1. Determine the exact location of the Controller and press the template against the wall.
2. Drill the three holes in the locations indicated on the template.
3. Screw the top screw in far enough that the Controller can be suspended with as little play as possible.
4. Remove the small cover so that the lower screw holes are accessible.
5. Locate both screws and fasten the Controller after alignment.
6. Fit the small cover.

4.1.4.4 Fitting sensors and cables

Figure 4.3 Terminal connections for sensors and cables




INSTALLATION

Proceed as follows:

1. Remove the small cover, to reveal internal connection trail
2. Locate the required sensors and fit the cable from the sensors and installation components to the Controller. The connection tables for the inputs and outputs are in § 4.1.4.5. The water flow sensor should be located in the flow leg of the boilers operating in cascade. This can be undertaken by either by use of the 1/2" pocket, (supplied), screwed into the water flow pipe-work. Alternatively the sensor can be taped tightly to the flow pipe using the silver foil tape supplied. The water sensor cable can be extended using a suitable junction box and twin core cable.

The air sensor should be located on an external wall of the building to be heated. Fix the sensor to a north/north-east facing wall to avoid direct radiation from the sun. The air sensor should also be located to avoid any heating effect from the boiler flue. To fix the air sensor, unscrew the sensor plastic cover and screw/plug the sensor body to the wall. Wire the sensor via the cable gland using twin core 0.5mm² cable. Cable length should be no greater than 20m.

3. Connect all the switching and communications cables to the Controller.
4. Connect the mains cable supplied.
5. Fit all strain relief clips and check that all the cables are securely held.
6. Fit the small cover.
7. Switch the mains power on.

 **The cables that are used for unfused currents must be fitted with insulation sleeves before attaching them.**

4.1.4.5 Connecting inputs and outputs Modulating Sequence Controller

In the following tables, more than one Function is sometimes referenced in the "Description" column. This means that the relevant connection is used, or can be used, (simultaneously) by the specified Functions.

The meaning of the figures in the "Note" column is explained below.

EXPLANATION OF NOTES IN TABLES

1. Use of the connection is mandatory.
2. Use of the connection is not mandatory.
3. Use of the connection depends on the number of boilers.
4. Whether the component is used or not can be specified during configuration.
5. Connection is mandatory

Note.

Before connecting the controller to the imax boilers operating in cascade, each individual imax boiler must first be fitted with an imax Control Interface Kit, (UIN 158632). This will then facilitate boiler communication with the controller using the OpenTherm protocol.

INSTALLATION

Table 4.1 Inputs and Outputs Modulating Sequence Controller with Insert Card 1 and 2

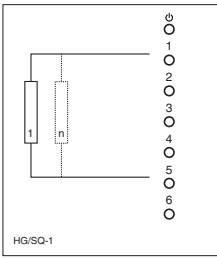
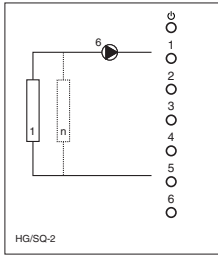
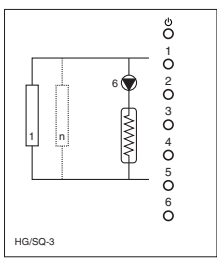
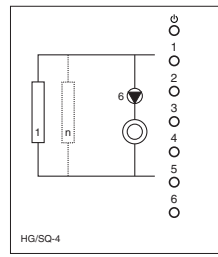
Terminal				
	 <p>Plant Control Only Insert card no. 1 (See Appendix 1 for wiring scheme)</p>		 <p>Plant and Primary Pump Control Insert card no. 2 (See Appendix 2 for wiring scheme)</p>	
No	Description	Note	Description	Note
1/2	Fault report (potential free, break contact Fault Messages)	2	Fault report (potential free, break contact Fault Messages)	2
3/-	Flow temp sensor (Plant Control)	5	Flow temp sensor (Plant Control)	5
4/-	Outside temp sensor (Plant Control)	5	Outside temp sensor (Plant Control)	5
5/-	Room temp sensor (Plant Control)	2, 4	Room temp sensor (Plant Control)	2, 4
6 / -	Timed override or Heat demand extern (Plant Control)	2, 4	Timed override or Heat demand extern (Plant Control)	2, 4
7 / 8	Room Thermostat (OpenTherm or On/Off)	2, 4	Room Thermostat (OpenTherm)	2, 4
9 / 10	Boiler 1 (Open Therm)	1	Boiler 1 (Open Therm)	1
11 / 12	Boiler 2 (Open Therm)	3	Boiler 2 (Open Therm)	3
13 / 14	Boiler 3 (Open Therm)	3	Boiler 3 (Open Therm)	3
15 / 16	Boiler 4 (Open Therm)	3	Boiler 4 (Open Therm)	3
17 / 18	Boiler 5 (Open Therm)	3	Boiler 5 (Open Therm)	3
L / N	230 VAC supply		230 VAC supply	
L' / N'	-		Pump (230 VAC, Plant Control) (max. 3A)	1
ABS	-		-	
RS232	-		-	

Table 4.2 Inputs and Outputs Modulating Sequence Controller with Insert Card 3 and 4

Terminal				
	 <p>Plant and DHW Circuit Control Insert card no. 3 (See Appendix 3 for wiring scheme)</p>		 <p>Plant and CH Circuit Control Insert card no. 4 (See Appendix 4 for wiring scheme)</p>	
No	Description	Note	Description	Note
1/2	Fault report (potential free, break contact Fault Messages)	2	Fault report (potential free, break contact Fault Messages)	2
3/-	Flow temp sensor (Plant Control & HWS Circuit)	5	Flow temp sensor (Plant Control & Pump Circuit)	5
4/-	Outside temp sensor (Plant Control)	5	Outside temp sensor (Plant Control)	5
5/-	Room temp sensor (Plant Control)	2, 4	Room temp sensor (Plant Control)	2, 4
6 / -	HWS secondary temperature sensor (HWS Circuit)	1	Room temp sensor (Plant Circuit)	2, 4
7 / 8	Room Thermostat (OpenTherm or on/off)	2, 4	Room Thermostat (OpenTherm or On/Off)	2, 4
9 / 10	Boiler 1 (Open Therm)	1	Boiler 1 (Open Therm)	1
11 / 12	Boiler 2 (Open Therm)	3	Boiler 2 (Open Therm)	3
13 / 14	Boiler 3 (Open Therm)	3	Boiler 3 (Open Therm)	3
15 / 16	Boiler 4 (Open Therm)	3	Boiler 4 (Open Therm)	3
17 / 18	Boiler 5 (Open Therm)	3	Boiler 5 (Open Therm)	3
L / N	230 VAC supply	1	230 VAC supply	1
L' / N'	Pump (230 VAC, HWS Circuit) (max. 3A)	1	Pump (230 VAC, Pump Circuit) (max. 3A)	1
ABS	-		-	
RS232	-		-	

INSTALLATION

5.0 CONFIGURATION

This chapter advises procedure for configuration of the Controller. It is possible, depending on the actual configuration, that certain screen texts and/or descriptions in this chapter are not applicable. *Such screen texts and descriptions are printed in italics in this document. These texts are not shown on the Controller display.*

All the Functions have a Configuration Menu and must be configured separately.

The Function General is the Function with the more general features. This Function must be configured first because the system specifies during configuration which other Functions are used. The access level must be 3 (see § 1.4.3). If the Controller has not been configured, the Configuration Menu is automatically displayed after Function General has been accessed, and configuration can be started immediately. The access level is automatically set to level 3. If the Function General has already been configured earlier, access level 3 must first be set. After setting access level 3 go to the Configuration Menu. A description of how each function operates complete with operating characteristics is provided in the references section of this manual.

⚠ The configuration procedure must be completed right to the end. If the procedure is cancelled, the Function will not work.

⚠ Incorrect configuration and/or settings can impair the functioning of the Controller.

5.1 CONFIGURATION INSTRUCTIONS - AX5200SQ GENERAL

Function 001-A
AX5200SQ General

Select Function General. If this screen is displayed, press **⏪**. The Configuration menu will automatically appear if this Function is being configured for the first time. If this Function has already been configured, you should first set access level 3.

Configuration

Configuration

Press **⏪** to access the Configuration Menu.

Configure
Function No

Choose Yes using **⏩** or **⏭** and then press **⏪**.

Card number

Set the card number to be the same as the number of the insert card on the Controller.

1

Configuration

Total number of
boilers 1

Enter the total number of boilers used in the cascade configuration.

XIB bus
No

Select:
- No : the system comprises only one Controller.

Fault Messages
No

Choose Yes if the Fault Messages Function is being used.

Daylight saving
Yes

Choose Yes if automatic switching between summertime and wintertime is to be used.

Configuration of the Controller (i.e. Function AX5200SQ General) is now complete. The date and time are shown on the display. As a result of the configuration each Function within the Controller has been assigned a specific address (e.g. 001-A, 001-B).

⚠ Not only Function AX5200SQ General, but also all other Functions within the Controller have to be configured.

INSTALLATION

5.2 PLANT CONTROL FUNCTION CONFIGURATION

Function 001-B
Plant Control

Select Function Plant Control. If this screen is displayed, press **↩**. If this Function is being configured for the first time, the Configuration Menu is displayed. If configuration of this Function has already been carried out, set access level 3 first.

Configuration

Configuration

Press **↩** to access the Configuration Menu.

Configure
Function No

Choose Yes using **↑** or **↓** and then press **↩**.

Thermostat

Thermostat
Not used

When this screen appears, select:

- Not used: No room thermostat is connected to the controller.
- Opentherm: A Programmable Room Thermostat Kit (UIN 158492) is connected to the controller.
- On/Off: An On/Off room thermostat is connected to the controller.

Outside Temperature

Outside Temp
Yes

Choose Yes if at least one function within the system uses the outside temperature.

The above menu item is only displayed if Thermostat On/Off is selected. In all other cases the choice will automatically be set to Yes.

Frost Prot Due to Outside Temperature

Frostprot due to
outside temp Yes

Choose Yes if the setpoint flow temperature, in the case of a low outside temperature, must be at least equal to a user-defined minimum.

The above menu item is only displayed if Outside temp Yes is selected.

Room Temperature

Room temp
Yes

Choose Yes if the Function measures the Plant circuit room temperature via a sensor connected to the Controller.

The above menu item is only displayed if Outside temp yes and thermostat not used are selected.

Option Terminal 6 (only available with Card 1 or 2, see page 59 & 60)

Option term. 6
Overtime

When this screen appears, select:

- Overtime : the Function uses the input for the overtime feature, see Section 7.1.5, page 34.
- Holiday programme : the function uses the input for the holiday programme feature, see Section 7.1.6, page 34.
- Heat demand ext : the function uses the input for the external heat demand feature. See Page 39, 7.3.2.
- Not used : the Function does not use the input. The overtime, holiday programme and external heat demand features are not used.

The above menu item is only displayed if Thermostat Not used is selected.

Option Terminal 6 (only available with Card 1 or 2, see page 59 & 60)

Option term. 6
Not used

When this screen appears, select:

- Heat demand ext : the function uses this input for the external heat demand feature, see page 39, 7.3.2.
- Not used : the Function does not use the input. The external heat demand feature is not used.

The above menu item is only displayed if Thermostat Opentherm or Thermostat On/Off is selected.

Circulating Pump

Pump during DHW
On

Choose Off if the circulating pump should be switched off in case input Heat Demand Extern is closed.

The above menu item is only displayed if Thermostat On/Off and Option term. 6 Heat demand Ext are selected.

INSTALLATION

Time Clock

Time clock
Internal

Select:

- None : the Function works without a time clock. The setpoint flow temperature is not determined by means of a heating curve.
- Internal : the Function has its own time clock

The above menu item will only appear if OpenTherm thermostat No was selected.

Holiday Programme

Holiday programme
Internal

Select:

- None : the Function works without a holiday programme.
- Internal : the Function has its own holiday programme.

The above menu item will only appear if Time Clock Internal was selected.

Heating Curve

Heating curve
Continuous Yes

Select:

Yes - The setpoint flow temperature is always (day and night) calculated based on outside temperature.

No - The setpoint flow temperature is calculated based on outside temperature in day mode but only in night mode when the room temperature drops below the set point room temperature.

Note. When calculated the setpoint flow temperature is never lower than 'Flowtemp minimum'.

Switching Method

Switching method
2

Select:

- 1 : a boiler will be switched on as late as possible and switched off as soon as possible.
- 2 : a boiler will be switched on as late as possible and switched off as late as possible

The above menu is only displayed if there is more than one boiler.

Sequence Change

Sequence change
over Automatic

Select:

- Automatic : the switching sequence is determined once a week on the basis of the number of operating hours.
- Fixed : the switching sequence is fixed (depending on the wiring sequence).

The above menu item is only displayed if there is more than one boiler.

Seizure Protection

Seizure protection
Yes

Choose Yes if the Function has a pump and/or valve which has to be actuated at least once daily for several minutes to prevent seizure.

Reset Counters

Reset counters
No

Choose Yes, for example when commissioning the system, to reset all the hour counters and impulse counters in the Function to zero. The current date is automatically entered as the start date.

Configuration of Function 'Plant Control' is now complete.

5.3 OPENTHERM BOILER FUNCTION CONFIGURATION

Function 001-D
OpenTherm Boiler

Select OpenTherm Boiler Function. If this screen is displayed, press . If this Function is being configured for the first time, the Configuration Menu is displayed. If configuration of this Function has already been carried out, set access level 3 first.

Configuration

Configuration

Press to access the Configuration Menu.

Configure Function
No

Choose Yes using or and then press .

Boiler Maximum Rating

Boiler max rating
45kW

Enter the boiler maximum rating. If connecting any boiler in excess of 200kW enter ALL boiler ratings down by a factor of 10. i.e. 320kW = 32kW, 160kW = 16kW. Subsequent operating data must be read accordingly. i.e. 32kW = 320kW.

INSTALLATION

Boiler Minimum Rating

Boiler
min rating 30%

Enter the boiler minimum rating as a percentage of the boiler maximum rating

Reset Counters

Reset counters
No

Choose Yes, for example when commissioning the system, to reset all the hour counters and impulse counters in the Function to zero. The current date is automatically entered as the start date.

Configuration of Function 'Opentherm Boiler' is now complete for the first boiler. Repeat for all remaining boilers.

5.4 HWS CIRCUIT FUNCTION CONFIGURATION (This function is enabled if card no. 3 is selected when configuring 'AX5200SQ General')

Function 001-C
HWS Circuit

Select HWS Circuit Function. If this screen is displayed, press **↩**. If this Function is being configured for the first time, the Configuration Menu is displayed. If configuration of this Function has already been carried out, set access level 3 first.

Configuration

Configuration

Press **↩** to access the Configuration Menu.

Configure
Function No

Choose Yes using **↑** or **↓** and then press **↩**.

Time Clock

Time clock
Internal

Select:
- None : the Function works without a time clock.
- Internal : the Function has its own time clock.

Holiday Programme

Holiday pro-
gramme Internal

Select:
- None : the Function works without a holiday programme.
- Internal : the Function has its own holiday programme.

The above menu item is only displayed if Time Clock internal is selected.

Continuous Operation

Continuous
operation Yes

Select Yes if the setpoint HWS secondary temperature is to stay the same during both day and night.

The above menu item is only displayed if Time Clock None is selected.

Legionella Protection

Legionella
protection Yes

Select Yes if the HWS secondary temperature is to be raised every day, at a user-defined time, to a user-defined level in order to prevent or to combat legionella bacteria.

Pump Release

Pump release
delay on: time

Select:
- Prim-T : the primary HWS pump is switched on as soon as the flow temperature exceeds a user-defined minimum value.
- Time : the primary HWS pump is switched on at the end of a user-defined period of time, regardless of the flow temperature.

In case the Plant Control Function does not control a circulating pump, Time has to be selected to ensure circulation in the system in case of storage demand. The delay on time has to be set to zero and the run on time of the primary HWS pump has to be set to such a value that the boilers can be switched off while the pump is still running.

INSTALLATION

HWS Priority

HWS priority
Yes

Select Yes if storage demand has high priority. This means that heat supply to the Mixing Circuit Function, Pump Circuit Function and Air Heater Function, if present, may be restricted in case of storage demand. The heat supply to this Functions is not restricted in case the actual flow temperature is high enough.

Seizure Protection

Seizure protection
Yes

Choose Yes if the Function has a pump and/or valve which has to be actuated at least once daily for several minutes to prevent seizure.

Reset Counters

Reset counters
No

Choose Yes, for example when commissioning the system, to reset all the hour counters and impulse counters in the Function to zero. The current date is automatically entered as the start date.

Configuration of Function 'Plant Control' is now complete.

5.5 PUMP CIRCUIT FUNCTION CONFIGURATION (This function is enabled if card no.4 is selected when configuring 'AX5200SQ General')

Function 001-B
Pump Circuit

Select Pump Circuit Function. If this screen is displayed, press . If this Function is being configured for the first time, the Configuration Menu is displayed. If configuration of this Function has already been carried out, set access level 3 first.

Configuration

Configuration

Press to access the Configuration Menu.

Configure Function
No

Choose Yes using or and then press .

Frost Protection Due to Outside Temperature

Frostprot due to outside temp
Yes

Choose Yes if the setpoint flow temperature, in the case of a low outside temperature, must be at least equal to a user-defined minimum.

Time Clock

Time clock
Internal

Select:
- None: the Function works without a time clock.
- External: the Function adopts the time clock of another Function (via the XIB bus).

Holiday Programme

Holiday programme
Internal

Select:
- None : the Function works without a holiday programme.
- Internal : the Function has its own holiday programme.

The above menu item is only displayed if Time Clock Internal is selected.

Room Temperature

Room temp
Yes

Choose Yes if the Function measures the CH circuit room temperature via a sensor connected to the Controller.

Seizure Protection

Seizure protection
Yes

Choose Yes if the Function has a pump and/or valve which has to be actuated at least once daily for several minutes to prevent seizure.

Reset Counters

Reset counters
No

Choose Yes, for example when commissioning the system, to reset all the hour counters and impulse counters in the Function to zero. The current date is automatically entered as the start date.

Configuration of Function 'Pump Circuit' is now complete.

INSTALLATION

5.6 FAULT MESSAGES FUNCTION CONFIGURATION (This function is enabled if 'Fault Messages' is selected when configuring

'AX5200SQ General')

Function 001-D
Fault Messages

Select Fault Messages Function. If this screen is displayed, press . If this Function is being configured for the first time, the Configuration Menu is displayed. If configuration of this Function has already been carried out, set access level 3 first.

The above menu item is only displayed on a Master Controller.

Configuration

Configuration

Press to access the Configuration Menu.

Configure
Function No

Choose Yes using or and then press .

Fax Message Controller

Fax message
No

Choose No.

Configuration of Function 'Fault Messages' is now complete.

5.7 FUNCTION PLANT CONTROL 'SETTINGS' MODIFICATION

All of the following settings are factory preset to values which suit most applications. However they can be modified to optimise a particular installation.

Set access level to 3. Depending on the configuration of the controller some settings will not be available for modification.

Function 001-B
Plant Control

Select Plant Control Function. Once this screen is displayed, press .

Settings

Use or to select settings menu. Press to access the settings menu.

Room temp
day 20°C

To modify a setting press and the value in the bottom right corner will flash. Use the or buttons to change the value. Press to confirm the new value.

Press to move to the next setting.

Room temp
day 20°C

Desired room temperature during day operation.
Min. 5°C. Max. 40°C.

Room temp
night 15°C

Desired room temperature during night operation.
Min. 5°C. Max. 20°C.

Room temp
holiday 10°C

Desired room temperature during holiday operation.
Min. 5°C. Max. 20°C.

INSTALLATION

Ä

Outside temp
end-point 20°C

See Figure 5.1 for details. In most cases this value should equal the desired day time room temperature.
Min. 1°C. Max 30°C.

Å

Flow temp
end-point 20°C

See Figure 5.1 for details. For radiator heating this should usually be equal to the outside temp end-point. For convector heaters a higher setting is recommended.
Min. 1°C. Max 130°C.

Ā

Outside temp
start point -10°C

See Figure 5.1 for details. The lowest outside temperature the system is designed to work against.
Min. -20°C. Max 0°C.

Ã

Flow temp
start point 80°C

See Figure 5.1 for details. The flow temperature to the radiators etc. which the system is designed to operate at on the coldest day.
Min. 1°C. Max 130°C.

Ä

Heating curve:
curvature 1.33

See Figure 5.1 for details. The curve factor to the heating curve. 1.33 is for a DIN radiator
Min. 1.0. Max. 1.60
Guide: radiators: 1.25-1.35
convectors: 1.40
under floor heating: 1.1

Å

Flowtemp
minimum 1°C

See Figure 5.1 for details. This value can be used to limit the minimum flow temperature. This is sometimes desirable to prevent condensation forming in the boilers or if the output devices i.e. fan driven cabinets require a minimum flow temperature to operate correctly.
Min. 1°C. Max. 130°C.

Ā

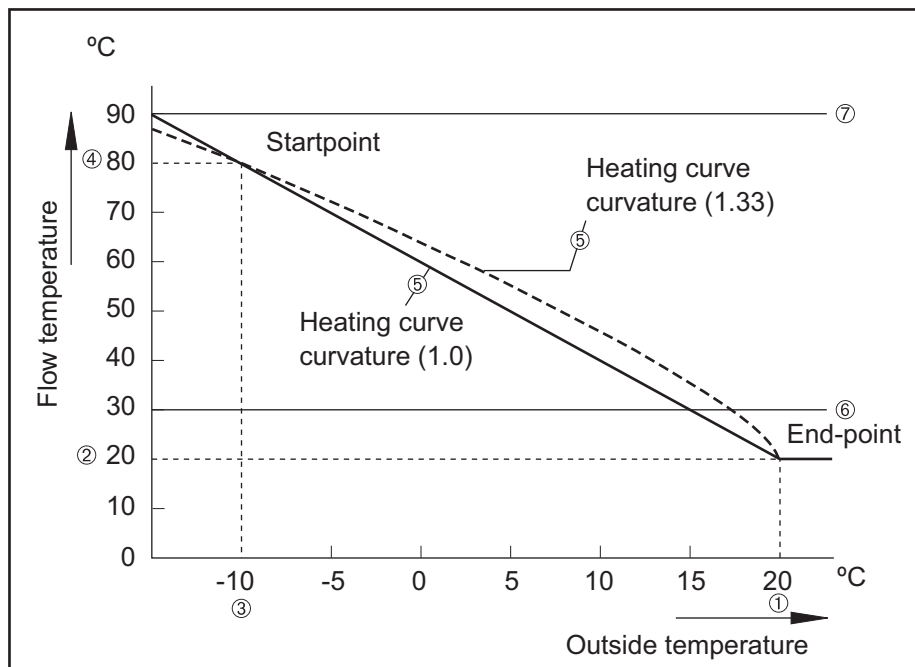
Flowtemp
maximum 90°C

See Figure 5.1 for details. This value can be used to limit the maximum flow temperature. This is sometimes desirable for under floor heating systems and preventing the maximum temperatures of the boilers being reached.
Min. 1°C. Max. 130°C.

Flowtemp
margin OK

This value can be used to increase the set point flow temperature by a number of degrees to compensate for losses in the pipework from the boiler room to the point of use.
Min. -20K. Max. +20K.

Figure 5.1 Heating Curve with Operation Points



INSTALLATION

**Frost protection
min. flow-T 20°C**

The min. flow temperature that will be maintained when a threat of frost is detected (outside temp. 3°C or lower or flow temp. 5°C or lower).
Min. 20°C. Max. 50°C.

**Heat demand ext
setpoint 80°C**

The setpoint flow temperature with a closed 'Heat demand extern' input.

**Room compensa-
tion 3K/K**

If fitted with a room temp. sensor the controller can increase the flow temperature to compensate for a lower than desired room temperature. This value is added to the start point flow temperature for every °C that the measured temperature falls short of the desired.

**Heating limit:
time response 24h**

The period over which the average outside temperature is calculated. Longer periods reduce responsiveness but will avoid unnecessary running of plant due to small temperature fluctuations.

Min. 0 hours. Max. 48hours.

**Heating limit:
differential -2K**

There is no heat demand generated if the outside temperature is greater than the desired room temperature + this value.

Min. -5K. Max. 15K.

**Overrun time
pump 5min**

The overrun time for the pump after the heat demand has ended.

Min. 0 min. Max. 15 min.

**Room temp
switch diff 0.5K**

There is no heat demand generated if the outside temperature is greater than the measured room temperature (room sensor fitted) + this value.

Min. 0K. Max. 5K.

**Building constr
medium**

The set building construction (Light, Medium or Heavy). Building construction Light means that the room temperature trails the outside temperature with a short delay. Building construction Heavy means that the room temperature trails the outside temperature with a long delay.

**Minimum preheat
time 15min**

The function can start the heating cycle earlier than the time set in the time clock. The starting time will be earlier by at least this value.

Min. 0 mins. Max. 10,080 mins.

**Maximum preheat
time 360min**

The Function will start the heating cycle no earlier than this value before the one set in the time clock.

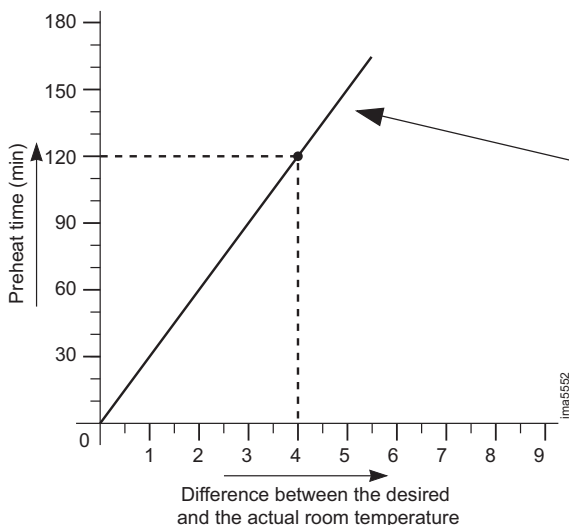
Min. 0 mins. Max. 10,080 mins.

The time the heating cycle starts before the time set in the time clock is calculated from the following 2 values, see graphs and examples for guidance.

**Room preheat
factor 30min/K**

The time taken to raise the room temperature by 1°C independent of outside temperature.

Min. 0 mins. Max. 10,000 mins.



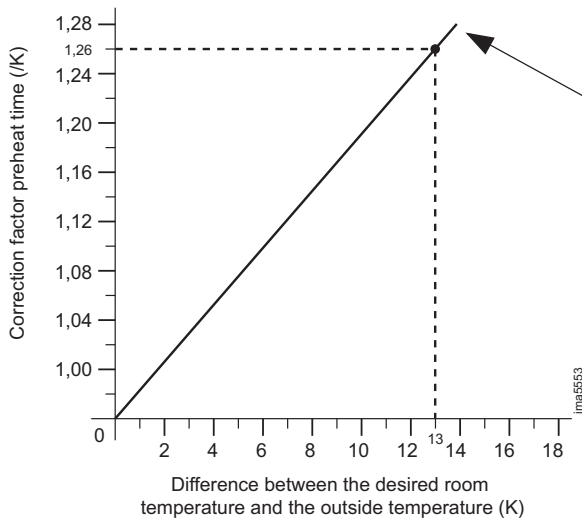
Line shown is for 30min/K. Therefore if the desired room temp. is 20°C but the actual temp is 16°C then the preheat time calculated by the controller is:

$$(20-16) \times 30\text{min} = 120 \text{ min}$$

INSTALLATION

Outside preheat factor 0.02/K

The correction to the room preheat factor to compensate for the impact of a low outside temperature.



Line shown is for 0.02/K. Therefore if the outside temp. was 7°C and the desired room temp was 20°C then the controller would calculate the correction factor as
 $1 + [(20 - 7) \times 0.02] = 1.26$

The actual preheat time with the above values would therefore be : 120 min. x 1.26 = 151.2 minutes

The following settings are used to ensure that on a cold night the room temperature is not allowed to fall to a point which cannot be recovered in time to the desired day time room temperature.

Max setback start point 5K

The number of °C below the day time temp. that the night time temp. is allowed to fall to on the coldest day the system is designed to work against (outside temp startpoint).
 Min. 0. Max. 30.

setback reaction 0.5K/K

With a higher outside temperature the night time temperature is allowed to fall lower. At 0.5K/K the maximum setback is increased/reduced by 0.5°C for every 1°C above/below the outside temp. startpoint.
 Min. 0.0. Max. 5.0.

Requested load P-factor 5.0%

The set value of the proportional factor of the PID control.
 Min. 0%. Max. 100%.

Requested load I-factor 2.0%

The set value of the integral factor of the PID control.
 Min. 0%. Max. 10%.

Requested load D-factor 0.0%

The set value of the differential factor of the PID control.
 Min. 0%. Max. 50%.

Boiler sequence delay on 3 min

Minimum time between boilers being switched on to prevent unnecessary cycling.
 Min. 0 min. Max. 30 min.

Fault burner on contact 15 min

A boilers role is taken over by another boiler if it does not signal that it has started operating during this set time.
 Min. 0 min. Max. 30 min.

Timed override delay off 0h

The plant will run in day mode for this number of hours after operation of the external overtime switch (if fitted).
 Min. 0h. Max. 8h.

Flow-T setpoint differential 10K

The permitted (negative) deviation from the setpoint flow temperature achieved within the time set below. An alarm is raised if this is not achieved. This alarm will not shut any plant down and will self cancel once these parameters are achieved.
 Min. 0K. Max. 20K.

Diff reaction delay 60min

The flow temperature must be within the above differential, from the setpoint flow temperature within this time.
 Min. 0 min. Max. 360 min.


INSTALLATION

5.8 FUNCTION GENERAL 'SETTINGS' MODIFICATION

Set access level to 3. Depending on the configuration of the controller some settings will not be available for modification.

All of the following settings are factory preset to values which suit most applications. However they can be modified to optimise a particular installation.

Function 001-A
AX5200SQ General

Select General Function. Once this screen is displayed press .

Settings

Use  or  to select settings menu. Press the  to access the settings menu.

Only the following settings if available should be modified.

Reset factory
settings No

Changing this to Yes will completely reset the controller. All configurations, settings and data logging is lost.

Daylight saving
start March

Daylight saving begins at 2am on Sunday morning on the last weekend of the month shown.

Daylight saving
end October

Daylight saving ends at 3am on Sunday morning on the last weekend of the month shown.

5.9 FUNCTION HWS CIRCUIT 'SETTINGS' MODIFICATION

Card 3 only

Set access level to 3. Depending on the configuration of the controller some settings will not be available for modification.

All of the following settings are factory preset to values which suit most applications. However they can be modified to optimise a particular installation.

Function 001-D
HWS circuit

Select Function HWS Circuit. Once this screen is displayed press .

Settings

Use  or  to select menu. Press  to access settings menu.

HWS secondary -T
60°C

Desired temperature for stored water.
Min. 20°C. Max. 90°C.

HWS secondary -T
switch diff 5K

Stored water head demand is generated when the stored water temperature drops below the HWS secondary-T by this value.
Min. 2K. Max. 8K.

Prim/secondary
temp diff 25K

The flow temperature of the boiler is set by this value above the HWS Secondary-T.

Frost protection
min prim-T 20°C

If a risk of frost is detected the flow temperature will not be allowed to fall below this value.
Min. 20°C. Max. 50°C.

Legionella Prot
setpoint 60°C

The temperature required to kill any legionella bacteria that may be present.
Min. 60°C. Max. 90°C.

INSTALLATION

Legionella Prot
on at 2h

Legionella protection starts at the specified time.
Min. 0h. Max. 24h.

Earllystart
HW-storage 15min

The time required to start to preheat the stored hot water before the time set by the time clock.
Min. 0min. Max. 60min.

Prim HWS pump
delay on 0min

The overrun time for the HWS pump after the boilers are switched off.
Min. 0min. Max. 60min.

HWS secondary -T
switch diff 5K

The permitted (negative) deviation from the setpoint secondary HWS temperature achieved within the time set below. An alarm is raised if this is not achieved. This alarm will not shut any plant down and will self cancel once these parameters are achieved.
Min. 0K. Max. 20°C.

HWS secondary -T
heatup max 60min

The secondary HWS temperature must be within the above differential from the setpoint secondary HWS temperature within this time.
Min. 0min. Max. 180min.

5.10 FUNCTION PUMP CIRCUIT 'SETTINGS' MODIFICATION

Card 4 only.

Set access level to 3. Depending on the configuration of the controller some settings will not be available for modification.

All of the following settings are factory preset to values which suit most applications. However they can be modified to optimise a particular installation.

Follow process for 'Plant Control' settings section 5.7. The following will not be available for this function.

Flowtemp
margin OK

Heat demand ext
setpoint 80°C

Requested load
P-factor 5.0%

Requested load
I-factor 2.0%

Requested load
D-factor 0.0%

Boiler sequence
delay on 3 min

Fault burner on
contact 15 min

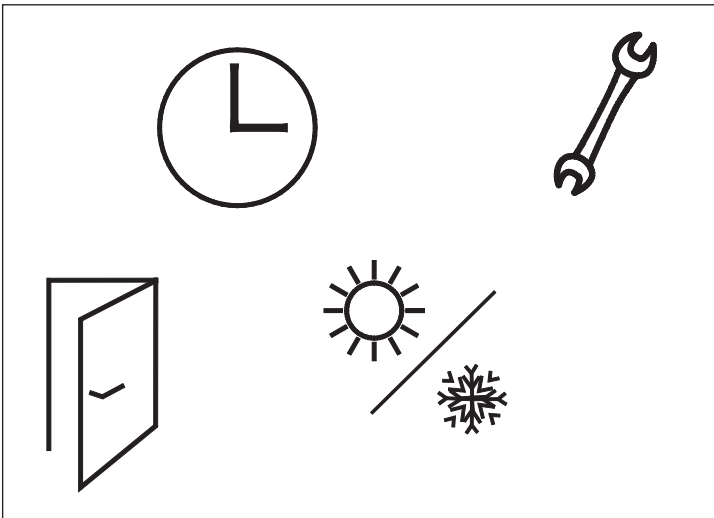
REFERENCES

6.0 FUNCTIONS

6.1 FUNCTION AX5200SQ GENERAL

The most important of the Function General AX5200SQ is to carry out general tasks such as setting the date and time for the Controller. The Controller can consist of the following Functions: HWS Circuit, Plant Control (only on the master controller), OpenTherm Boiler, Pump Circuit and Fault Messages. Each of these Functions has a specific job. The actual availability of a Function depends on how the Controller has been configured.

Figure 6.1 Schematic Representation of Function General



There follows a summary of the specific features of the Function:

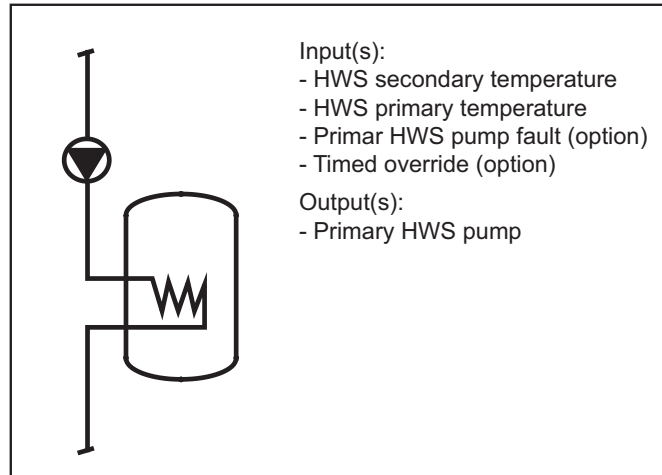
- Date and time § 7.11.1 Page 50
- Choosing an access level §1.4 Page 7
- Changing the access level §1.4 Page 7
- Daylight saving §7.11.2 Page 51
- Manual operation of outputs §8.4 Page 56

REFERENCES

6.4 HWS CIRCUIT FUNCTION (This function is enabled if card no.3 is selected when configuring 'AX5200SQ General')

The HWS Circuit Function can be used to maintain the setpoint HWS secondary temperature in the storage cylinder by indirect heating. The Function provides the possibility of preheating the storage cylinder before the start of day mode and can calculate the setpoint flow temperature itself. The primary HWS pump can be switched on and off on the basis of a user-defined HWS secondary temperature. The Function is equipped with a facility that raises the HWS secondary temperature every day to a level that combats the generation of legionella bacteria.

Figure 6.4 Schematic Representation of the HWS Circuit Function



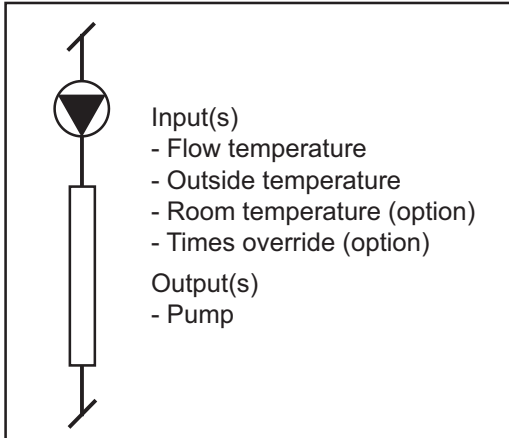
- Boiler operating modes § 7.5.1 Page 43
- Operating mode (day, night, holiday, off) § 7.1.1 Page 33
- Time clock with two operating times per day (internal) § 7.1.2 Page 33
- Holiday programme with eight holiday periods (internal) § 7.1.3 Page 34
- Continuous operation HWS § 7.1.4 Page 34
- Standard timed override input with release delay § 7.1.5 Page 34
- Flow temperature in presence of storage demand § 7.3.4 Page 39
- Setpoint HWS secondary temperature § 7.6.1 Page 44
- Determining storage demand § 7.6.2 Page 44
- Delaying the recovering of the storage § 7.6.3 Page 44
- Start storage recovering depending on flow temperature § 7.6.4 Page 45
- Anti-legionella protection § 7.6.5 Page 45
- User-defined Primary HWS pump overrun time § 7.6.6 Page 45
- Recovering the hot water storage before switching to day mode § 7.9.1 Page 47
- Hot water storage priority § 7.9.2 Page 47
- Secondary HWS temperature setpoint monitoring § 7.10.2 Page 49
- Frost protection secondary HWS temperature § 7.10.6 Page 50
- Pump seizure protection § 7.10.7 Page 50
- Hours run and Pulse counters § 7.11.3 Page 51
- Datalogger (at least 48 hours' storage with a 5-minute interval) § 7.11.4 Page 52
- Fault detection § 7.11.5 Page 52

REFERENCES

6.5 PUMP CIRCUIT FUNCTION (This function is enabled if card no.4 is selected when configuring 'AX5200SQ General')

The Pump Circuit Function sets the setpoint flow temperature at a level that meets the heating requirements of the installation (or part of an installation). The Function also controls the pump. This pump operates when heat is required. In night or holiday mode, and in the summer, the pump is normally switched off.

Figure 6.5 Schematic Representation of the Pump Circuit Function



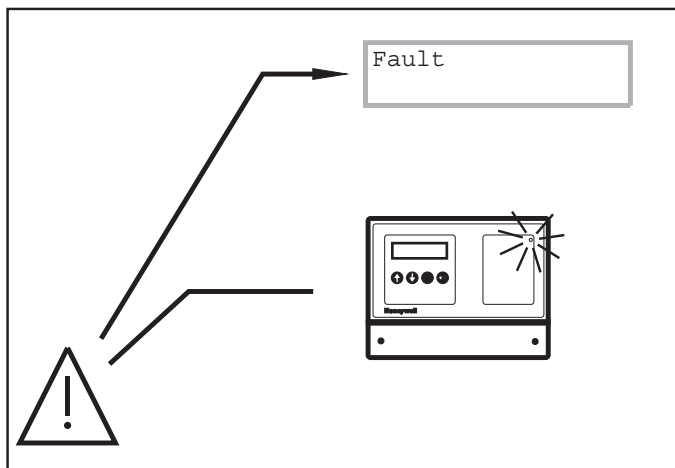
An overview of the individual features of the Function is given below:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Operating mode (day, night, holiday, off) § 7.1.1 Page 33 • Time clock with two operating times per day (internal) § 7.1.2 Page 33 • Holiday programme with eight holiday periods (internal) § 7.1.3 Page 34 • Standard timed override input with release delay § 7.1.5 Page 34 • Preheating § 7.1.7 Page 35 • Heating limit § 7.1.8 Page 35 • Enabling heating in night and | <ul style="list-style-type: none"> holiday modes § 7.1.9 Page 36 • Room temp. setpoint due to operating mode (day, night, holiday) § 7.2.1 Page 36 • Maximum setback dependent on outside temperature § 7.2.2 Page 36 • Estimated room temperature (without room temperature sensor) § 7.2.3 Page 37 • Weather-dependent flow temperature (heating curve) § 7.3.1 Page 37 • Flow temperature room compensation § 7.3.6 Page 40 • Flow temperature limits (minimum, maximum) § 7.3.8 Page 40 • Hot water storage priority § 7.7.1 Page 46 • Pump control § 7.7.2 Page 46 • User-defined pump overrun time § 7.9.8 Page 49 • Flow temperature setpoint monitoring § 7.10.1 Page 49 • Frost protection due to room temperature § 7.10.3 Page 49 • Frost protection due to flow temperature § 7.10.4 Page 50 • Frost protection due to outside temperature § 7.10.5 Page 50 • Pump seizure protection § 7.10.7 Page 50 • Hours run and Pulse counters § 7.11.3 Page 51 • Datalogger (at least 48 hours' storage with a 5-minute interval) § 7.11.4 Page 52 • Fault detection § 7.11.5 Page 52 |
|--|---|

6.6 FAULT MESSAGES FUNCTION (This function is enabled if 'Fault Messages' is selected when configuring 'AX5200SQ General')

The task of the Fault Messages Function is to collect all the faults present in the system and, if required, to report them. A fault is indicated locally by flashing of the LED marked:

Figure 6.6 Schematic Representation of the Fault Messages Function



An overview of the individual features of the Function is given below:

- Fault date (number and status) § 7.8.1 Page 46
- Scanning faults § 7.8.2 Page 46
- LED indicator § 7.8.3 Page 46
- Fault relay control § 7.8.4 Page 47

7.0 FEATURES

7.1 OPERATING MODES

7.1.1 Operating Mode (day, night, holiday, off)

The function has 4 operating modes, i.e.:

1. Day
2. Night
3. Holiday
4. Off

Depending on the mode, certain installation components may or may not be in operation, and setpoints to which the system is adjusted can change.

The Operating Data Menu indicates the current mode of the Function by means of a brief description. In some cases the operating mode and the reason that the Function is in the operating mode are indicated, for example 'Timed override: Day operation' the Function is in day mode because the timed override feature is active.

In fault situations the text 'Fault' is displayed instead of the operating mode. The Faults Menu can be used to check what faults have occurred.

Operating Data Menu

.... Day operation	The Function is in day mode. The first line specifies the reason for this mode.
------------------------------	---

.... Night operation	The Function is in night mode. The first line specifies the reason for this mode.
--------------------------------	---

.... Holiday operat.	The Function is in holiday mode. The first line specifies the reason for this mode.
--------------------------------	---

.... off	The Function is in off mode. The first line specifies the reason for this mode.
--------------------	---

Fault	The Function is defective.
--------------	----------------------------

7.1.2 Time Clock with Two Operating Times Per Day (internal)

Day mode can be set in advance for particular periods by means of a time clock. Outside the set operating periods the Function is in night mode.

This feature may only be active if an (internal) time clock was specified during configuration.

Two different operating periods can be set in the time clock programme for each day of the week. A start and a finish time must be set for each operating period. During an operating period the Function is in day mode, outside it in night mode. The Operating Data Menu specifies whether the Function is in day or night mode as a result of the time clock programme.

Operating Data Menu

Time program: Day operation	The Function is in day mode as a result of the time clock programme.
--	--

Time program: Night operation	The Function is in night mode as a result of the time clock programme.
--	--

Tu 08:00-16:00 20:00-22:00	On Tuesday the operating periods, as a result of the time clock programme, run from 8.00 to 16.00 hours and from 20.00 hours.
--	---

REFERENCES

7.1.3 Holiday Programme with Eight Holiday Periods (internal)

The Function can be set in advance to holiday mode for particular periods by means of a holiday programme.

This feature may only be active if an (internal) holiday programme was specified during configuration.

Eight different holiday periods can be set in the holiday programme. A start and finish date must be set for each holiday period. The Operating Data Menu specifies whether the Function is in holiday mode as a result of the holiday programme.

Operating Data Menu

Time program:
Holiday operat.

The Function is in holiday mode as a result of the holiday programme.

Holiday Programme Menu

1: 16-07-2000
up to 14-08-2000

The holiday period starts on 16-07-2000 and ends on 14-08-2000.

7.1.4 Continuous Operation HWS

In continuous operation, the Function is permanently in day mode. The HWS secondary temperature is kept at the set temperature.

This feature is active if continuous operation was specified during configuration.

Operating Data Menu

Continuous
operation

The Function is permanently in day mode and the HWS secondary temperature specified for day mode is maintained.

7.1.5 Standard Timed Override Input with Release Delay

The function is switched to day mode when the timed override input is closed. When the timed override input is opened, the Function remains in day mode for the set clock override time.

Operating Data Menu

Timed override:
Day operation

The Function is in day mode because the timed override feature has been activated.

Settings Menu

Timed override
delay off Oh

When the timed override input is opened, the Function remains in day mode for the set time.

7.1.6 Holiday Timed Override Input

The Function determines the mode of operation in the normal way when the timed override input is opened. When the timed override input is closed, the Function goes into holiday mode.

This feature may only be active if specified during configuration.

Operating Data Menu

Timed override:
Holiday operat

The Function is in holiday mode because the timed override input is closed.

REFERENCES

7.1.7 Preheating

Preheating is the process of switching on the heating early, i.e. before the start of the day period. This ensures that the room temperature has already reached the setpoint temperature at the start of the day period. The required pre-heating time is determined by the Function. The preheating time increases with increasing difference between the setpoint room temperature during a day mode and the actual room temperature. A longer preheating time is also required if it is colder outside. A minimum and a maximum preheating time can be set.

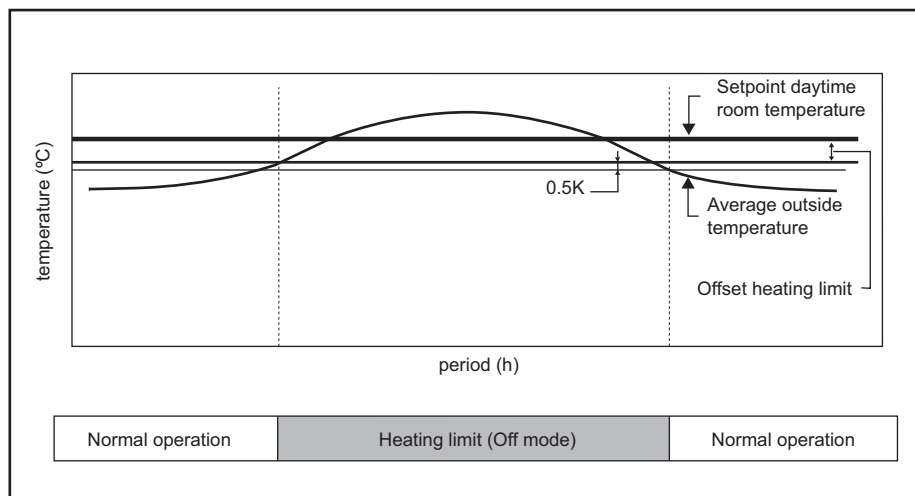
Operating Data Menu

Preheat: Day operation	The Function is in day mode as a result of preheating.
Room temp 20°C	The measured room temperature is 20°C.
Outside temp 14°C	The measured outside temperature is 14°C.
minimum preheat time 15min	The Function switches on prematurely by at least the set time.
Maximum preheat time 360min	The Function switches on prematurely by the set time at a maximum.
Room preheat factor 30min/K	The time necessary to raise the temperature in the room by 1°C. The outside temperature has no impact on this
Outside preheat factor 0.02/K	The correction to the room factor to compensate for the impact of a low outside temperature.

7.1.8 Heating Limit

The heating limit feature ensures that the heating is not switched on unnecessarily if the average outside temperature, e.g. during the summer, is higher than the setpoint room temperature in day mode. The period over which the average outside temperature is calculated is user-defined. The difference between the average outside temperature and the setpoint daytime room temperature necessary to activate or deactivate the feature is also user-defined.

Figure 7.1 Heating Limit in Relation to Average Outside Temperature



REFERENCES

Operating Data Menu

Heating limit:
switched off

The Function is in off mode as a result of the heating limit.

Heating limit:
time respons 24h

The average outside temperature is calculated over the set period. A short period means that fluctuations in the outside temperature are also correspondingly reflected in the average figure. A long period means that these fluctuations are evened out in the average figure.

Heating limit
differential -2K

The heating limit is active if the average outside temperature is higher than the setpoint daytime room temperature plus the set differential heating limit.

7.1.9 Enabling heating in night and holiday modes

The setpoint flow temperature is determined in night and holiday modes on the basis of a heating curve on condition that a heating curve is also used in day mode and the room temperature (measured or estimated) is lower than the setpoint temperature. Because the setpoint room temperature (night/holiday) is lower than during day mode, the heating curve is automatically lowered. If the room temperature rises above the setpoint room temperature plus a user-defined differential gap, the setpoint flow temperature is set to 0°C.

Operating Data Menu

Flow temp
setpoint 0°C

The Function is in off mode as a result of the heating limit.

Flow temp
73°C

The average outside temperature is calculated over the set period. A short period means that fluctuations in the outside temperature are also correspondingly reflected in the average figure. A long period means that these fluctuations are evened out in the average figure.

Room temp
switch diff 0.8K

The heating limit is active if the average outside temperature is higher than the setpoint daytime room temperature plus the set differential heating limit.

7.2 SETPOINT

7.2.1 Room Temperature Setpoint Due to Operating Mode (day, night, holiday)

The setpoint room temperature can be set for day, night and holiday modes (not for off mode, the setpoint room temperature is then 0 °C).

Operating Data Menu

Room temp
setpoint 20°C

The current setpoint room temperature.

Room temp
day 20°C

The setpoint room temperature in daymode.

Room temp
night 15°C

The (minimum) setpoint room temperature in night mode.

Room temp
holiday 10°C

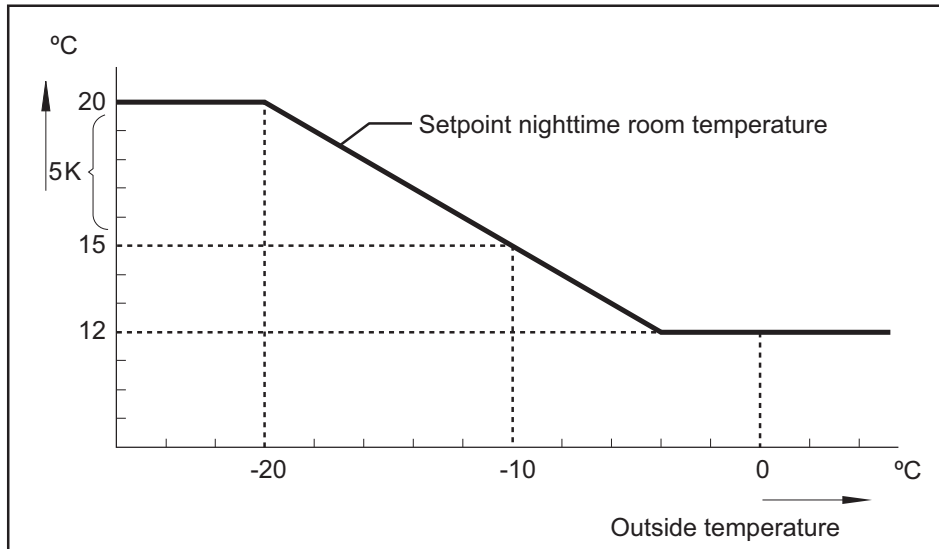
The (minimum) setpoint room temperature in holiday mode.

7.2.2 Maximum Setback Dependent on Outside Temperature

The setpoint night time room temperature is increased by the system in the event of a low outside temperature. This means that the differential between the setpoint daytime room temperature and the setpoint night time room temperature is reduced. In this situation too, therefore, it is possible to use preheating to reach the setpoint daytime room temperature by the start of day mode.

REFERENCES

Figure 7.2 Maximum Setback



From fig. 7.2 it is apparent that the setpoint night time room temperature increases, as a result of the setback, as the outside temperature falls. The set values for the setpoint daytime room temperature and the setpoint night time room temperature are 20 and 12 °C, respectively. The setback is at its maximum at an outside temperature of -20 °C. The setpoint night time room temperature is now the same as the daytime setpoint (20°C). The setback is at its minimum with an outside temperature of -4 °C. The setpoint night time room temperature now equals the setting (12°C).

Settings Menu

**Max setback
start point** 5K

The maximum differential between the setpoint night time room temperature and the setpoint daytime room temperature limited to the set value, from the start point (in this example -10°C, see also § 7.3.1) and colder. The outside temperature at the start point is the same as the condition temperature for which the system is designed (see also § 7.3.1).

**Setback
reaction** 0.5K/K

The permitted cooling of the room is less with a larger value (steeper angle) than with a smaller value.

7.2.3 Estimated Room Temperature (without room temperature sensor)

If no room temperature sensor is connected, or if it is defective, the current room temperature is estimated by the Function, where necessary.

The estimate is based on the outside temperature and the building construction. The building construction (mass and insulation factor) determines the time which is needed, at given outside and room temperatures, to heat the building up or cool it down.

Settings Menu

Building constr
Medium

The set building construction (Light, Medium or Heavy). Building construction Light means that the room temperature trails the outside temperature with a short delay. Building construction Heavy means that the room temperature trails the outside temperature with a long delay.

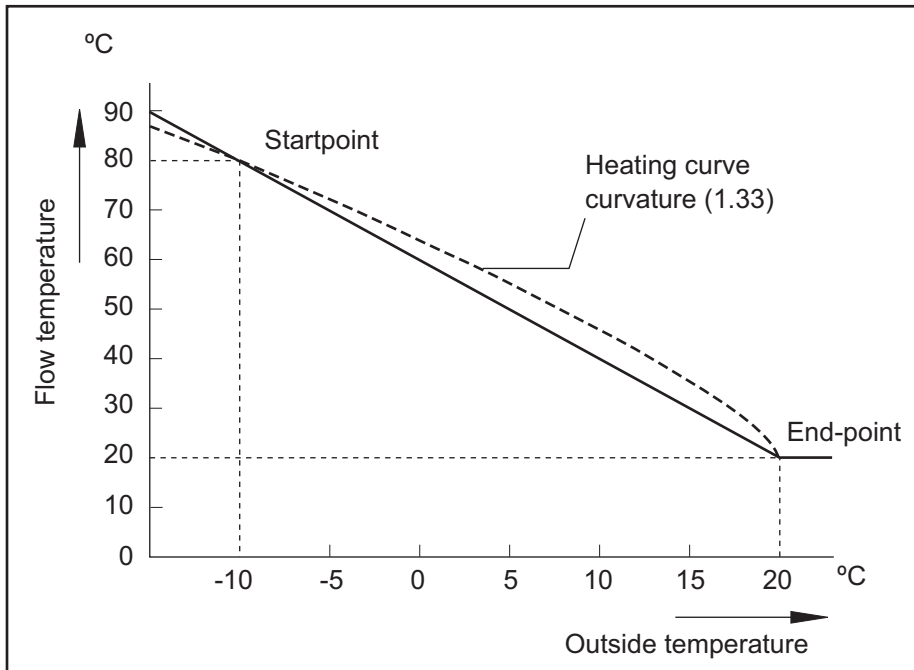
7.3 SETPOINT FLOW TEMPERATURE

7.3.1 Weather-Dependent Flow Temperature (heating curve)

The heating curve is the relation between the outside temperature and the setpoint flow temperature. The purpose of the heating curve is to ensure that the quantity of heat to be produced is matched to the heat loss. Functions with a heating curve are often termed 'weather-dependent'.

REFERENCES

Figure 7.3 Heating Curve with Operation Points



The way in which a heating curve has to be set (see fig. 7.3), depends on the system design. Setting entails defining the coordinates of two points (startpoint and end-point) and the curvature of the line between these two points. It is important, when setting the heating curve, to take as much account as possible of the size of the installation.

The heating curve is generally used in day mode and in situations where the room temperature falls below the setpoint figure.

In the Plant Control Function you can select during configuration not to use a time clock. The setpoint flow temperature will then not be determined by reference to the heating curve. It is assumed that the setpoint flow temperature is determined, in these circumstances, by other Functions.

Settings Menu

Outside temp
end-point 20°C

In most cases the value of the outside temperature at the end-point must be set to the same figure as the setpoint room temperature in day mode.

Flow temp
end-point 20°C

With radiator heating this figure is usually the same as the figure set under Outside temp end-point. With convector heating a higher setting is recommended.

Outside temp
startpoint -10°C

Set this temperature to the conditioning temperature (starting point) for which the system is designed.

Flow temp
startpoint 80°C

Set this figure to the selection temperature of the radiators etc.

Heating curve:
curvature 1.33

The curvature factor of the heating curve is set to 1.33. This is based on the characteristic features of a DIN radiator

Curvature factor guideline figures:

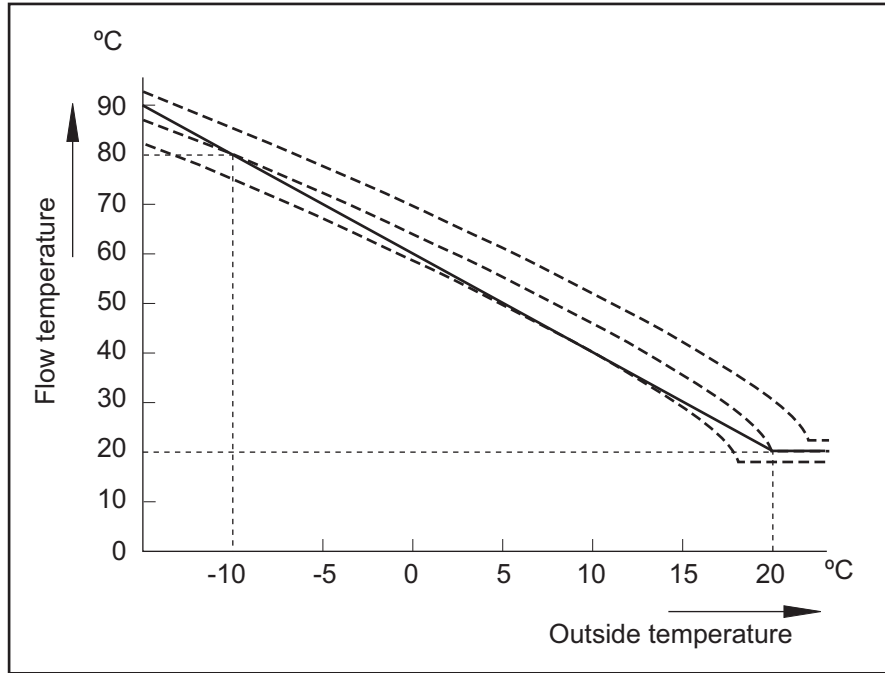
- radiators :1.25 - 1.35
- Convectors :1.40
- floor heating :1.1

The above menu items are only displayed if an internal heating curve is used.

Two heating curves are shown in fig. 7.3. The curvature factor of one heating curve is 1, and of the other 1.33. In addition to the curvature, the setpoint room temperature also has an effect on the heating curve. Changing the setpoint room temperature results in a parallel shift in the heating curve. With a higher setpoint the heating curve is raised, and with a lower setpoint it is lowered. In fig. 7.4 the heating curves are added for setpoint room temperatures of 22 °C and 18 °C.

REFERENCES

Figure 7.4 Parallel Shift of the Heating Curve



7.3.2 Flow Temperature Dependent on Heat Demand Input

The setpoint flow temperature is at least equal to the set figure with a closed 'Heat demand extern' input.

Operating Data Menu

Heat demand ext

The setpoint flow temperature is determined by the status of the 'Heat demand extern' input.

Settings Menu

**Flow-T setpoint
heat demand 80°C**

The setpoint flow temperature with a closed 'Heat demand extern' input.

7.3.3 Flow Temperature Dependent on On/Off Room Thermostat

The setpoint flow temperature is at least equal to the set figure with a closed 'Room thermostat On/Off' input.

Operating Data Menu

**Setpoint input
thermostat**

The setpoint flow temperature is determined by the status of the 'Room thermostat On/Off' input.

Settings Menu

**On/Off thermost
setpoint 80°C**

The setpoint flow temperature is determined by the status of the 'Room thermostat On/Off' input.

7.3.4 Flow Temperature in Presence of Storage Demand

When storage demand exists, the setpoint flow temperature is equal to the setpoint secondary HWS temperature plus a user-defined amount. The setpoint flow temperature is equal to 0°C when there is no storage demand.

This feature is only active if the address of the Function to which the setpoint flow temperature must be passed was specified during configuration.

Settings Menu

**Prim/secondary
temp diff 25K**

The setpoint flow temperature is equal to the set secondary HWS temperature plus the value specified here.

REFERENCES

7.3.5 Flow temperature of OpenTherm® Room Thermostat

As far as the setpoint flow temperature is concerned, the Function meets the demand from the room thermostat.

Operating Data Menu

Setpoint input
thermostat

The setpoint flow temperature is determined by an OpenTherm® room thermostat.

7.3.6 Flow Temperature Room Compensation

If the relevant room is too cold, the setpoint flow temperature is increased to ensure that it is heated faster.

The feature is only available if the room temperature is measured by the Function.

The rise in the setpoint flow temperature increases with increasing differential gap between the measured and setpoint room temperatures.

Settings Menu

Room compensa-
tion 3K/K

Enter the figure by which the start point flow temperature must be increased per degree of differential between the setpoint and measured room temperatures.

7.3.7 Flow Temperature Margin

In order to compensate for decreases or fluctuations in the flow temperature during transport from the heat source to the point of heat delivery, the setpoint temperature can be increased by a user-defined value.

Settings Menu

Flowtemp
margin 0K

The setpoint flow temperature is increased by the set number of degrees.

7.3.8 Flow Temperature Limits (minimum, maximum)

It can be important to limit the setpoint flow temperature. Reasons for setting a minimum flow temperature include:

- Preventing condensation with boilers.
- Providing heat for a heater.

Reasons for setting a maximum flow temperature include:

- The use of the system for floor heating.
- Preventing the maximum temperature (boiler thermostat) of the boiler(s) from being reached.

Settings Menu

Flowtemp
minimum 1°C

The set minimum flow temperature

Flowtemp
maximum 90°C

The set maximum flow temperature

 The setpoint flow temperature is only limited if there is a heat demand (the setpoint flow temperature is higher than 0°C).

REFERENCES

7.4 PLANT CONTROL FUNCTION

7.4.1 Switching Methods

If several boilers are installed in cascade formation, the required plant load can be distributed over the boilers in different ways. How this distribution takes place is determined by the selected switching method.

7.4.1.1 Switching Method 1

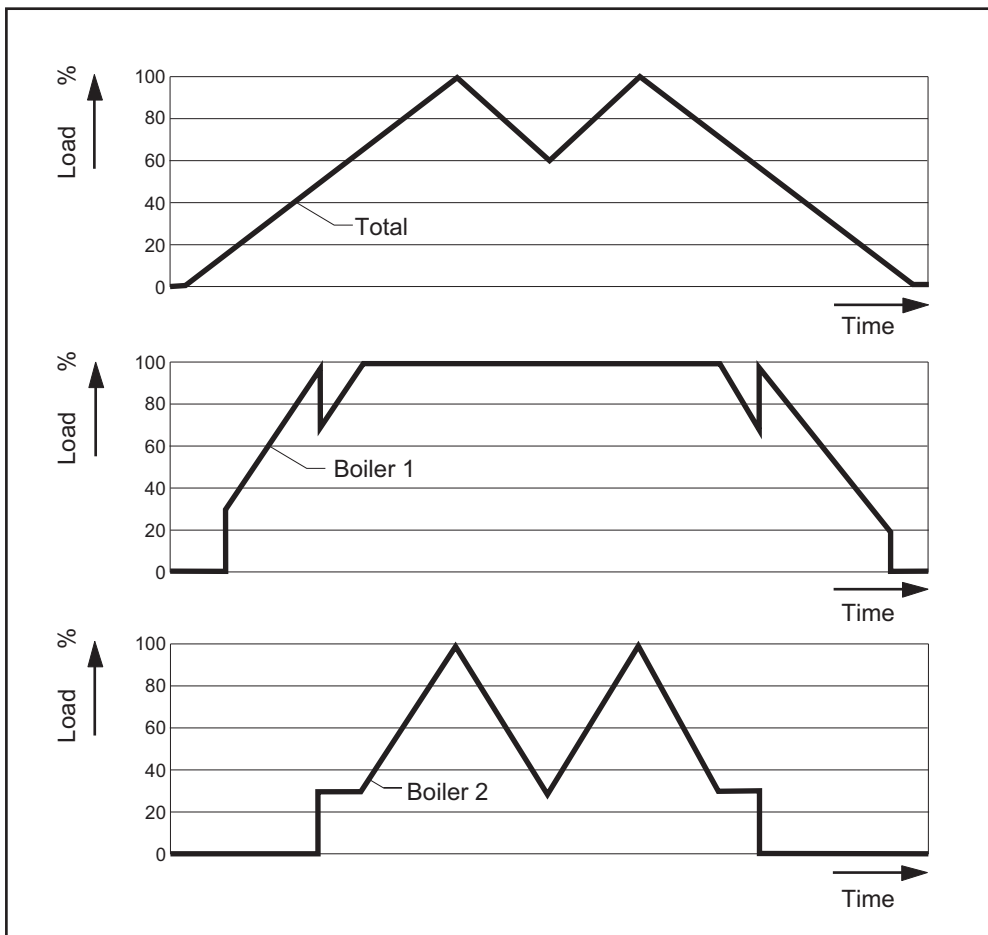
In principle, a boiler is switched on as late as possible and switched off as soon as possible. This means that all the boilers that have already been switched on must operate at full load (burner high fire) before the next boiler is switched on.

A boiler is switched off when all previous switched-on boilers can deliver the requested load.

During control all boilers run at maximum load, except the last boiler switched on. That boiler is set to a modulation level in such a way that the total actual load is equal to the requested load.

In fig. 7.5, an example is given of the boiler operation. This example is based on two similar boilers of the same rating and a burner low fire operation of 30%.

Figure 7.5 Switching Method 1: Example of two boilers of the same rating



REFERENCES

7.4.1.2 Switching Method 2

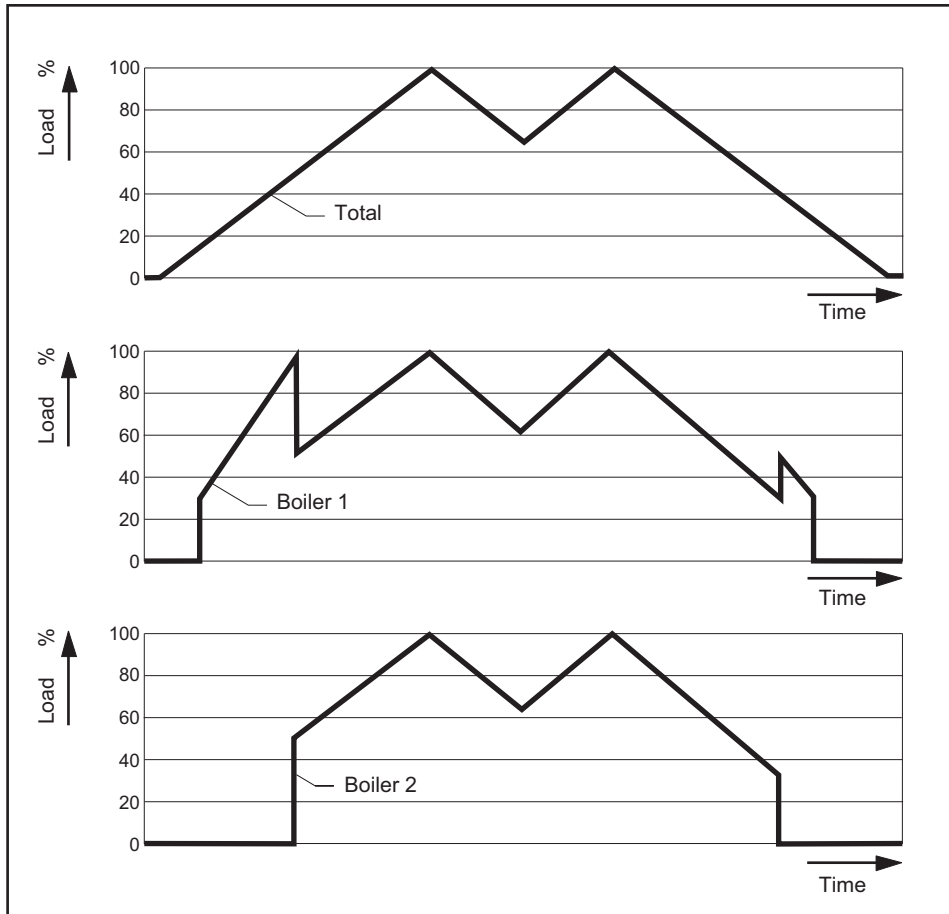
In principle, a boiler is switched on as late as possible and switched off as late as possible. This means that all the boilers that have already been switched on must operate at full load (burner high fire) before the next boiler is switched on.

A boiler is switched off when all previous switched-on boilers are operating at burner low fire. After switching on a boiler, the load of modulating boiler will be reduced so that the operational plant load equals the required plant load. Also the load of a modulating boiler will first be reduced before a boiler is switched off and then be increased again.

If more than one modulating boiler is used, the boilers will achieve the required plant load together by operating at the same partial load.

In fig. 7.6, an example is given of the boiler operation. This example is based on two similar boilers of the same rating and burner low fire operation of 30%.

Figure 7.6 Switching method 2: Example of Two Boilers of the Same Rating



7.4.2 Pump Control

The pump is switched on when heat demand exists. The setpoint flow temperature is above 0°C.

The Plant Control Function has a special feature which switches off the circulating pump during DHW demand (based on the state of input heat demand external).

This feature is only active if, during configuration, Thermostat On/Off (controls CH demand), heat demand ext. (controls DHW demand) and pump during DHW off were selected.

REFERENCES

7.5 OPENTHERM BOILER FUNCTION

7.5.1 Boiler Operating Modes

The current mode in which the boiler is operating is shown in the Operating Data Menu. In some cases, the reason why the boiler is in a particular operating mode is also given.

Operating Data Menu

Boiler
Off

The boiler is not in operation (no heat demand).

Boiler
On

The boiler is in operation.

Hot water mode

The boiler is in operation to provide a supply of hot water.

Fault

There is a fault. The particular fault is shown in the Faults Menu.

Manual operation

The boiler's burner is on but the OpenTherm Boiler Function is not requesting any load from the boiler.

7.5.2 Boiler Control

The OpenTherm Boiler Function transmits the requested load to the boiler.

Operating Data Menu

Load
requested 0%

The requested load as a percentage.

Load
actual 0%

The current actual load as a percentage.

Load requested
0KW

The requested load in kW.

Load
actual 0KW

The current actual load in kW.

REFERENCES

7.6 HWS CIRCUIT FUNCTION

7.6.1 Setpoint HWS Secondary Temperature

In day mode and while recovering is proceeding before the start of the day period, the setpoint HWS secondary temperature is the same as the set HWS secondary temperature.

For the purposes of combating legionella, the setpoint HWS secondary temperature is equal to the set legionella protection temperature (see §7.6.5).

Operating Data Menu

HWS secondary-T
setpoint 0°C

The current setpoint HWS secondary temperature.

Settings Menu

HWS secondary-T
60°C

Set the setpoint HWS secondary temperature for day mode.

7.6.2 Determining Storage Demand

Storage demand occurs as soon as the HWS secondary temperature in day mode, or during recovering before the start of day mode, falls too low. The HWS secondary temperature is too low if the measured HWS secondary temperature is lower than the setpoint HWS secondary temperature minus a user-defined differential.

Storage demand ceases when the HWS secondary temperature rises above the setpoint value.

Operating Data Menu

Storage
demand

The HWS secondary temperature is too low. However, recovering has not yet started.

Settings Menu

HWS secondary-T
switch diff 5K

Storage demand occurs when the HWS secondary temperature falls below the setpoint HWS secondary temperature minus the set differential.

7.6.3 Delaying the Recovering of the Storage

The feature prevents water from circulating through the storage before it is hot enough to raise the temperature of the water already in the storage.

This feature is only active if, during configuration, delayed activation of the primary HWS pump was specified.

When storage demand exists, the primary HWS pump is switched on after the set delay period has elapsed.

Operating Data Menu

Storage
recovery

The primary HWS pump is in operation and the storage is being recovered.

Settings Menu

Prim. HWS pump
delay on 0min

When storage demand exists, the primary HWS pump is not switched on until the set waiting time has elapsed.

 In case Function Plant Control does not operate a circulating pump, the delay on time has to be set to zero, to assure circulation in the system in case of storage demand.

REFERENCES

7.6.4 Start Storage Recovering Depending on Flow Temperature

This feature prevents water from circulating through the storage before it is hot enough to raise the temperature of the water already in the storage.

This feature is only active if, during configuration, the option to release the primary HWS pump on the basis of a minim flow temperature was selected.

Under condition of storage demand, the primary HWS pump is switched on as soon as the flow temperature exceeds the HWS secondary temperature plus 2 k. The primary HWS pump is switched off when the flow temperature falls below the HWS secondary temperature.

Operating Data Menu

Storage
recovery

The primary HWS pump is in operation and the storage is being recovered.

7.6.5 Anti-legionella Protection

This feature combats the formation of legionella bacteria in the storage.

This feature may only be active if legionella protection was specified during configuration.

Every day, at a user-defined time, the storage is heated to a user-defined temperature which must be high enough to ensure that the legionella bacteria are killed.

Operating Data Menu

Legionella pro-
tection active

This primary HWS pump is switched on and the storage is heated up until the legionella protection temperature is reached.

Legionella pro-
tection

The legionella protection feature is active but the primary HWS pump has not yet been switched on.

Settings Menu

Legionella prot
setpoint 60°C

Enter the HWS secondary temperature required to kill any legionella bacteria that may be present.

Legionella prot
on at 2h

Legionella protection starts at the specified time.

7.6.6 User-defined Primary HWS Pump Overrun Time

This feature makes it possible for the boilers to be switched off while there is still circulation in the system.

The feature is only available if, during configuration, Pump release delay on time has been selected.

Settings Menu

Overrun time
prim. pump 0min

The primary HWS pump runs on for the set time.

 In case Function Plant Control does not control a circulating pump the overrun time of the primary HWS pump has to be set to such a value that the boilers can be switched off while the pump is still running.

REFERENCES

7.7 PUMP CIRCUIT FUNCTION

7.7.1 Hot Water Storage Priority

To ensure hot water storage priority, the pump will be switched off.

This feature is only active if a HWS Circuit Function is present and HWS priority has been selected during configuration of HWS Circuit Function.

The HWS Circuit Function automatically informs the Pump Circuit Function to switch of the pump.

Operating Data Menu

HWS priority

The pump is switched off due to the hot water storage priority.

7.7.2 Pump Control

The pump that ensures the circulation of the CH water is switched on if the setpoint flow temperature is higher than 0°C.

7.8 FAULT MESSAGES FUNCTION

7.8.1 Fault Data (number and status)

The system's fault data can be viewed in the Status Display of the Function. The following texts (examples) can be seen:

Status Display Menu

No faults

No fault has occurred.

Number of faults

0

The total numbers of actual faults.

Busy scanning

The Function is busy checking all the Functions for faults

The Faults Menu shows further details on a fault situation.

Faults Menu

No alarms

There is no fault situation.

Fault(s)
unknown

There is a fault situation but the Function has not yet finished checking all the Functions for faults.

Function 001-B
Flow temp

A list of Functions that have triggered alarms is maintained. The first line records the address of the Function that has triggered an alarm. The second line specifies the type of fault. The list is possibly incomplete because it is limited to a maximum of 10 items.

7.8.2 Scanning Faults

The purpose of scanning is to check all the Functions in the system for faults. Checking (scanning) is carried out as soon as a Function reports a change in its number of faults. In addition, a check is performed every 10 minutes.

Operating Data menu

Checking
Controller 001

A list of Functions that have triggered alarms is maintained. The first line records the address of the Function that has triggered an alarm. The second line specifies the type of fault. The list is possibly incomplete because it is limited to a maximum of 10 items.

7.8.3 LED Indicator

In AX5000 Controllers the LED marked:  flashes when a Function detects one or more faults.

REFERENCES

7.8.4 Fault Relay Control

The fault relay is activated as soon as a fault occurs. The relay is deactivated as soon as the fault is removed or if a reset is selected from the Faults Menu. If a reset is selected, the fault relay is activated again after the set waiting time has elapsed if the fault is still present. The fault relay is activated during the waiting time if the number of faults increases.

The relay can be used to activate, for example, a light, a buzzer or a fault indicator.

Settings Menu

Reset alarm
relay 24h

The fault relay is activated again after the set waiting time has elapsed if it is currently off as a result of a 'Reset' on the Faults Menu.

Faults Menu

Reset alarm
relay No

If Yes is selected, the fault relay is switched off for a user-defined time (see above).

7.9 OTHER CONTROL FEATURES

7.9.1 Recovering The Hot Water Storage Before Switching to Day Mode

This feature ensures that the storage is at the setpoint secondary HWS temperature at the start of the day period.

The time required to bring the storage to the correct temperature before the start of the day period can be set by the user.

Settings Menu

Early start
HW-Storage 15min

The time, in minutes, required to bring the storage up to the setpoint secondary HWS temperature before the start of the day period.

7.9.2 Hot Water Storage Priority

This feature allows the storage to be brought up to the setpoint secondary HWS temperature more quickly.

The feature is only active if HWS priority has been selected during configuration of HWS Circuit Function.

If the hot water storage requires additional heat, less or no heat is supplied to other components in the installation that have a heat demand. No heat will be supplied to those components if the flow temperature drops below the setpoint secondary HWS temperature minus the set HWS secondary temperature switch differential. This means that a Pump Circuit Function switches off the pump, an Air Heater Function switches off the air heater and a Mixing Circuit Function closes the mixing valve. If the flow temperature raises above the setpoint HWS temperature plus the set primary/secondary temperature differential, pumps and air heaters may be switched on again and mixing valves may be fully opened. Between closed and fully open, the mixing valve position is restricted. The extent of the restriction depends on the actual flow temperature.

Settings Menu

HWS secondary-T
switch diff 5K

The Function raises the temperature of the storage when the storage temperature falls below the setpoint temperature minus this differential.

Prim/Secondary
temp diff 25K

The setpoint flow temperature of the HWS Circuit Function is equal to the setpoint secondary HWS temperature plus this differential value.

7.9.3 PID Control for Load Setpoint

The Function determines the load setpoint with the aid of a PID control, based on the difference between the measured and setpoint flow temperatures. The PID factors can be set separately.

Operating Data Menu

Load
requested 0%

The system's load demand in percent.

REFERENCES

Load
requested 0KW

The system's load demand in kilowatts.

Boiler 1
Load req 40KW

The load demand of boiler 1 in kilowatts.

Settings Menu

Requested load
P-factor 5.0%

The set value of the proportional factor of the PID control.

Requested load
I-factor 2.0%

The set value of the integral factor of the PID control.

Requested load
D-factor 0.0%

The set value of the differential factor of the PID control.

7.9.4 general Conditions for Boilers Switching on and Off

All boilers that are in operation (operating messages) are controlled in such a way as to achieve the load demand, as far as possible. In principle, a boiler may only be switched on when all other boilers that are enabled are in operation (operating message). When switching a boiler either on or off, a switch differential value is applied. This differential is equal to 1 % of the total installed load, i.e. including that of boilers that are being operated manually or that have faults.

The switching differential is disregarded in the following situations:

- Change over to another boiler if a fault occurs or a boiler is being operated manually.
- Change over to another boiler resulting from an alteration to the order in which boilers are switched on following a sequence change.
- Switching off boilers that are not in operation; i.e. boilers that are enabled but are not issuing any operating messages.

7.9.5 Boiler Sequence Delays

One of the conditions for switching a boiler on is that the period between switching on one boiler and switching on the next must be at least equal to the set delay time . This serves to prevent a boiler being switched on unnecessarily.

To prevent gas pressure faults, the system always waits for at least the set delay period between switching off two boilers.

Settings Menu

Boiler sequence
delay on 3min

The delay time when switching on a boiler is at least equal to the set time.

7.9.6 Switching on boiler (fault, manual or not operating, hot water)

The function is taken over by another boiler if the boiler is in manual operation or reporting a fault, if there is no communication with the boiler for an extended period, if no operating message is forthcoming from the boiler within the set time, or if the boiler is being used to supply hot water.

The changeover takes place immediately if the unused modulating load of all other boilers that are enabled and in operation is not sufficient to make up for the loss of the boiler.

Settings Menu

Fail boiler on
15min

A boiler's role is taken over by another boiler if it does not signal that it has started operating during this set time.

REFERENCES

7.9.7 Automatic Sequence Change Over

The automatic sequence change over ensures that the operating hours are distributed as evenly as possible over all the boilers. The Function changes the sequence for switching boilers on and off based on the boilers' number of operating hours. The boiler with the lowest number of operating hours is switched on first, then the boiler with the next-lowest number of operating hours etc.

This feature is only active if (automatic) sequence change over was specified during configuration.

Operating Data Menu

Boilersequence A
1-2

The current sequence for switching boilers on.

7.9.8 User-Defined Pump Overrun Time

The pump runs on for a user-defined time to prevent limescale formation.

Settings Menu

Overrun time
pump 10min

The pump runs on for the set time.

7.10 SAFETY AND PROTECTIVE SYSTEMS

7.10.1 Flow Temperature Setpoint Monitoring

The flow temperature is monitored by means of a user-defined time and a user-defined temperature differential.

If the flow temperature is not higher than the setpoint flow temperature minus the set temperature differential within the set time, a fault message is generated. The Function continues to operate as normal.

If the flow temperature rises above the setpoint flow temperature minus the set temperature differential, the alarm is cancelled.

Settings Menu

Flow-T setpoint
differential 10K

The permitted (negative) deviation from the setpoint flow temperature.

Diff reaction
delay 60min

The flow temperature must reach the setpoint figure, with due allowance for the permitted deviation, within the set time.

7.10.2 Secondary HWS Temperature Setpoint Monitoring

The boiler temperature is monitored by means of a user-defined time and a user-defined temperature differential.

If the secondary HWS temperature is not higher than the setpoint secondary HWS temperature minus the set temperature differential within the set time, a fault message is generated. The Function continues to operate as normal.

If the secondary HWS temperature rises above the setpoint secondary HWS temperature minus the set temperature differential, the alarm is cancelled.

Settings Menu

HWS secondary-T
max tempdiff 5K

The permitted (negative) deviation from the setpoint secondary HWS temperature.

HWS secondary-T
Heatup max 60min

The secondary HWS temperature must reach the setpoint figure, with due allowance for the permitted deviation, within the set time.

7.10.3 Frost Protection Due to Room Temperature

The room temperature is monitored to prevent possible freezing of, for example, pipes in the system.

This feature may only be active if a room temperature sensor was specified during configuration.

There is a risk from frost if the room temperature falls below 3 °C. The setpoint flow temperature is at least the set minimum flow temperature for frost protection. No further measures are taken. If the room temperature rises above 5 °C, there is no longer any risk from frost.

REFERENCES

7.10.4 Frost Protection Due to Flow Temperature

The flow temperature is monitored to prevent possible freezing of, for example, pipes in the system.

There is a risk from frost if the flow temperature falls below 5°C. The setpoint flow temperature is at least the set minimum flow temperature for frost protection. No further measures are taken. Once the flow temperature then rises above the set value minus 5 K, there is not longer any risk from frost.

Settings Menu

Frost protection
min flow-T 20°C

The setpoint flow temperature is set to at least the set value if there is a risk of frost.

7.10.5 Frost Protection Due to Outside Temperature

The outside temperature is monitored to prevent possible freezing of, for example, pipes in the system.

This feature may only be active if this was specified during configuration. There is a risk from frost if the outside temperature falls below 3 °C. The setpoint flow temperature is at least the set minimum flow temperature for frost protection. No further measures are taken. Once the outside temperature then rises above 4 °C, there is no longer any risk from frost.

Operating Data Menu

Frost protection
outside temp

There is a heat demand because the frost protection is active due to the outside temperature.

Settings Menu

Frost protection
min flow-T 20°C

The setpoint flow temperature is set to at least the set value if there is a risk of frost.

7.10.6 Frost Protection Secondary HWS Temperature

This feature protects the storage against freezing up.

There is a risk from frost if the secondary HWS temperature falls below 5 °C. The setpoint flow temperature is raised to at least the minimum flow temperature set for frost protection. No further specific action is taken.

If the secondary HWS temperature rises above 10 °C, there is no longer any risk from frost.

Settings Menu

Frost protection
min prim-T 20°C

The setpoint flow temperature is set to at least the set value if there is a risk of frost.

7.10.7 Pump Seizure Protection

Periodically switching the pump on prevents it from seizing.

This feature may only be active if seizure protection was specified during configuration.

The pump is switched on daily between 12:00 and 12:05 hours.

7.11 GENERAL FEATURES

7.11.1 Date and Time

A number of features, e.g. time clock, holiday programme and preheating, make use of the date and time.

REFERENCES

7.11.2 Daylight Saving

A number of features, such as the time clock and the holiday programme, use the current time. It is therefore essential to correct the time when daylight savings begins or ends. The Controller can do this automatically.

The feature is only active if automatic daylight saving was enabled when the Master Controller was configured.

To ensure a smooth switchover, the months in which daylight saving begins and ends must be set in the Settings Menu of the Master Controller.

Settings Menu

Daylight saving
Start March

Daylight saving begins at 2am on Sunday morning on the last weekend in march

Daylight saving
Eng October

Daylight saving ends at 3am on Sunday morning on the last weekend in October.

7.11.3 Hours Run and Pulse Counters

The hours run and pulse counters update the number of operating hours and the number of switching operations for the pumps, burners etc. actuated by the Function. These data can be valuable in determining when or if to replace or service various components.

The number of counters depends on the Function and the options selected during configuration.

When configuring a Function there is the option of resetting all the counters to zero at the same time. The Hours run/Pulse Counters Menu enables each counter to be reset individually by selecting the counter which is to be reset and then pressing **+** twice. The text Reset? appears on the display. Press **+** again. The counter reading is now reset to zero, and the start date is set to the current date.

Hours Run/Pulse Counters Menu

Boiler
12h 8I

The boiler has been (was) in operation for 12 hours and has been switched on eight times.

Boiler high fire
12h 8I

The boiler has been (was) in high fire operation for a total of 12 hours and has been switched to high fire eight times. High fire operation in case of a modulating boiler means a requested load of at least 60%.

Boiler low fire
12h 8I

The boiler has been (was) in low fire operation for a total of 12 hours and has been switched to low fire eight times. Low fire operation in case of a modulating boiler means a requested load of at least 50%.

Day operation
63h 3I

The Function has been in day mode for a total of 63 hours and has been switched to day mode three times.

Hot water mode
112h 16I

Due to hot water demand, the boiler has been (was) in operation for a total of 112 hours and has been switched on sixteen times.

Primary HWS ump
63h 3I

The primary HWS pump has been (was) in operation for a total of 63 hours and has been switched on three times.

Pump
112h 16I

The pump has been (was) in operation for a total of 112 hours and has been switched on sixteen times.

REFERENCES

```
Timed override
3h          2I
```

The Function was in day mode for a total of 3 hours as a result of the use of the timed override feature and the Function was switched to day mode twice by means of the timed override feature.

```
....
dd: 01-01-2000
```

The date on which the counter started. The first line specifies the counter in question. This menu item is seen after a counter has been selected and **↵** has then been pressed.

```
....
dd: 01-01-2000
```

Press **↵** to reset the counter and set the date to the current date. The first line specifies the counter in question. Press **ESC** to exit the menu. The counter is now reset. This menu item is seen after a counter has been selected and **↵** has then been pressed twice.

7.11.4 Datalogger (at least 48 hours' storage with a 5-minute interval)

The data stored in the datalogger can be used, for example, to trace the operation of an installation over an extended period.

The Functions are equipped with a system for storing the following data in an internal memory (termed the datalogger):

- analog input values used by the Function (e.g. flow temperature)
- discrete input values used by the Function (e.g. pump fault)
- mode of the Function (e.g. cooling day)
- calculated values (e.g. setpoint valve position)
- actuation of components (e.g. pump on)

The data are also stored in the memory of the relevant Function after the set interval. With an interval of 5 minutes (default) the data can be stored for at least two days.

The data stored in the datalogger can be read in and graphically displayed using a PC and the XIB-remote program. The XIB-remote programme can be used, if required, to adjust the interval for each Function.

7.11.5 Fault Detection

The Function automatically detects various faults (e.g. defective temperature sensor, faulty input, limit values exceeded).

In the event of a fault Status display fault is shown on the Status Display Menu of the Function while the fault indicator LED flashes on the Controller.

The Faults Menu of a Function contains the following data:

- summary of all the active alarms
- date and time of the last change in the fault situation
- list of the 10 most recent faults
- reset item to clear the above named list

A change in the number of faults is reported by the Function to the Fault Messages Function (if present).

Status Display Menu

```
Status display
fault
```

There is a fault situation

Operating Data Menu

```
Fault
```

There is a fault situation

REFERENCES

Faults Menu

Fault

There is a fault. The second line (.....) indicates to what the fault refers.

Mo **26-06-2000**
 12:34:09

Date and time of the last change in the fault situation.

Fault log 01

.....

The 10 most recent faults are shown in order. The second line (...) indicates to what the system refers or referred.

Clear fault log
 No

Choose Yes to delete the list of the 10 most recent faults.

7.11.6 Restoring Factory Settings

The factory settings of a Controller can be restored by the use of a special sub menu. This sub menu is part of menu Settings in Function General. The implications of restoring the factory settings are:

- The Controller has to be configured again
- All Functions, present after configuration of the Controller, have to be configured (again)
- All user made changes in settings are lost
- All data stored in the datalogger are lost
- All counter values are lost

Settings Menu

Reset factory
settings **No**

Select Yes if you want to restore the factory settings.

8.0 TROUBLESHOOTING

Should problems occur please consult the paragraphs below and try to resolve the problem using the instructions given.

The faults described in this chapter are divided into:

- faults of a general nature
- hardware faults specific to each type of Controller.
- fault messages which appear in the Controller display (faults reported by the Function itself)

8.1 GENERAL

An overview of general faults and complaints is given below. Faults can be caused by various factors. Try to remedy the relevant fault using the solutions suggested.

The connected installation components are not or not properly actuated:

- Check the wiring (see Chapter 4)
- check the terminal connections (see Chapter 4).
- Check the operation by the Controller (using the Operating Data Menu).
- Check the voltage signal at the terminals.

Temperature complaints from the users:

- Check the setpoints.
- Check the measured temperature.
- Check the operation of the connected installation components.

Jerky operation of the equipment / excessive temperature variations:

- Check the various settings of the Function (e.g. the PI control, using the Settings Menu).

Incorrect temperature measurements:

- Check the connected sensor (see § 8.5).

8.2 MODULATING SEQUENCE CONTROLLER

An overview of possible hardware faults in the Controller is given below. These faults can have various causes. Try to remedy the relevant fault using the solutions suggested.

If the particular fault recurs a number of times or the problem cannot be (adequately) repaired, please contact your Honeywell supplier.

All LEDs off, no text on the display:


- Check the power supply and fuse (on the left under the large cover).

LED  on, no/black display text and/or keys not working:

- Switch the power on again and then check the Controller settings.

Some keys are not working or are working poorly:

- Check that the large cover is properly mounted.

LED  is flashing:

- At least one of the Functions has detected a fault (look in the Fault Messages Function to see which Function has reported a fault and then look in the Faults Menu of the relevant Function to identify the fault (see also § 8.3).

8.3 FAULTS REPORTED BY FUNCTIONS

An alphabetical list of faults such as can be reported via the display by the various Functions is given below. In addition to the texts which can appear on the display, the possible consequences and the action to be undertaken are described.

Faults Menu

**Fault
Boiler**

Cause: The device concerned is reporting a fault to the Function, or there is no communication with the boiler, or the boiler doesn't come in operation in time.

Consequence: If possible an other boiler will be switched on.

Action: Check the boiler and the wiring of the fault detector if necessary.

**Fault
Boilers**

Cause: All boilers are reporting a fault.

Consequence: Possibly insufficient heat production.

Action: Check the boilers.

REFERENCES

Fault Comm boiler

Cause: No communication between the OpenTherm Boiler Function and the boiler.
Consequence: The OpenTherm Boiler Function reports a fault to the Plant Control Function.
Action: Check the boiler and the wiring.

Fault Comm thermostat

Cause: Programmable Room Thermostat Kit (UIN 158492) is not (right) connected or defective.
Consequence: The setpoint flow temperature equals 0°C. If the connecting wires to the Programmable Room Thermostat Kit are short circuited, one boiler will be switched on.
Action: Check the boiler and the wiring.


Fault Comm XIB bus

Cause: No communication between the OpenTherm Boiler Function and the Plant Control Function possible, during a continuous period of ten minutes.
Consequence: The OpenTherm Boiler Function makes the boiler available for hot water storage.
Action: Check the wiring

Fault Flow temp

Cause: Sensor not or incorrectly connected or defective.
Consequence: The features which utilise the flow temperature become inoperable.
Action: Check the wiring and possibly the sensor using the resistance table (see § 8.5).

Fault Flow temp setp

Cause: The flow temperature does not reach the required value minus the set differential within the set time.
Consequence: The Function continues operating as normal.
Action: Check the installation. Adjust the set time and/or differential, if necessary. Reset the alarm by pressing  twice.

Fault Frost protection

Cause: The HWS secondary temperature drops below 5°C.
Consequence: A heat demand is generated. The setpoint flow temperature is set to at least the minimum value set in the even of a frost hazard.
Action: Check the installation.

Fault Frost prot flow

Cause: The flow temperature is so low that there is a risk of freezing (e.g. of pipes).
Consequence: A heat demand is generated. The setpoint flow temperature is set to at least the minimum value set in the event of a frost hazard
Action: Check the installation.

Fault Frost prot room

Cause: The room temperature is so low that there is a risk of freezing (e.g. of radiators).
Consequence: A heat demand is generated. The setpoint flow temperature is set to at least the minimum value set in the even of a frost hazard.
Action: Check the installation.


Fault Hot water temp

Cause: The boiler reports the fault to the OpenTherm Boiler Function.
Consequence: The OpenTherm Boiler Function reports the fault to the Plant Control Function.
Action: Check the boiler.

Fault HWS secondary-T

Cause: Sensor is not connected, incorrectly connected or defective.
Consequence: The storage recovery stops.
Action: Check the wiring and possibly the sensor using the resistance table (see § 8.5).

Fault HWS sec-T setp

Cause: The HWS secondary temperature does not reach the setpoint value minus the set differential within the set time.
Consequence: The Function continues operating as normal.
Action: Check the installation. Adjust the set time and/or differential, if necessary. Reset the fault by pressing  twice.

REFERENCES

Fault
Prim pump trip.

Cause: The device concerned is reporting a fault to the Function.
Consequence: The storage recovery stops.
Action: Check the device, using manual operation (see § 8.4) if necessary. Check the wiring of the fault detector if necessary.

Fault
Outside temp

Cause: Sensor is not connected, incorrectly connected or defective.
Consequence: The Function switches to the estimated outside temperature. Some features which utilise the outside temperature become inoperable.
Action: Check the wiring and possibly the sensor using the resistance table (see §8.5).

Fault
Return temp

Cause: The boiler reports the fault to the OpenTherm Boiler Function.
Consequence: The OpenTherm Boiler Function reports the fault to the Plant Control Function.
Action: Check the boiler.

8.4 MANUAL OPERATION OF OUTPUTS

It is possible to actuate an output (relay or OpenTherm®) manually. There are three options:

- 'Auto' :The Function controls the output. This is the normal situation.
- 'Manual off' :The output is not controlled. In the case of a relay, this means that the relay is not enabled. In the case of an OpenTherm^a connection, this means that the connected boiler either is off or goes off.
- 'Manual on' :The output is controlled. In the case of a relay, this means that the relay is enabled. In the case of an OpenTherm^a connection, this means that the connected boiler either is on or comes on.

Proceed as follows:

1. Select Function General (see § 1.3).
2. Set access level 3 (see § 1.4.3).
3. Select the Manual Control Menu in Function General.
4. Press **←** to enter the Manual Control Menu (a text such as 'Relay pump Auto' may be displayed).
5. Press **←** again. The entire text on the second line ('Auto', 'Manual off' or 'Manual on') starts to flash.
6. Use **↑** or **↓** to select the required option.
7. Press **←** again to confirm your selection. The text on the display stops flashing. The selected option is now active.

Manual Control Menu

Relay pump
Auto

The text on the display describes the output (pump, fault or boiler) and the selected option ('Auto', 'Manual off' or 'Manual on').

⚠ After manual control, it can take up to 1 minute for the controller to regain control over the output concerned.

REFERENCES

8.5 RESISTANCE TABLE FOR TEMPERATURE SENSORS

The resistance table below can be used to check the various temperature sensors.

Table 8.1: 10K NTC Resistance Table

Temp. [°C]	Resistance [Ω]	Temp. [°C]	Resistance [Ω]
-15	72.335	45	4.374
-10	54.932	50	3.608
-5	42.080	55	2.991
0	32.505	60	2.492
5	25.308	65	2.086
10	19.854	70	1.754
15	15.698	75	1.481
20	12.483	80	1.257
25	9.999	85	1.070
30	8.060	90	915
35	6.537	95	785
40	5.332	100	677

REFERENCES

9.0 TECHNICAL SPECIFICATIONS

General

dimensions	208 x 165 x 55 mm
weight	700g
rated supply voltage	230 VAC, + 10% / - 15%, 50/60 Hz
power consumption	6 VA
internal fuse	40 mA, 250 VAC
	dim. 5 x 20mm, following IEC 127
safety class	II (IEC 1010)
EMC suppression degree	immunity following EN50082-2 emission following EN 50081-1
max. ambient temperature (storage)	-10°C to + 70°C
max. ambient temperature (operate)	0°C to + 40°C
max. relative humidity	90% (non-condensing)

Relay outputs

fault relay	1 potential-free break contact
switching capacity	max. 250 VAC, max. 3 A
pump relay	1 live make contact (230V from main supply of Controller)
load	max 3 A; max load of pump equals 500 W
connection	0,14-2,5 mm ²

Analog inputs

number	4
type	10 bits, A/D conversion
application	NTC sensor, potential free switching contact
connection	0,14-1,5 mm ²

OpenTherm® slave

number	1
application	communication through OpenTherm® protocol with room thermostat
connection	0,14-1,5 mm ²

OpenTherm® master

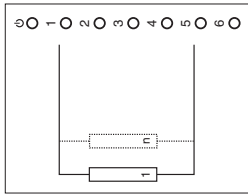
number	5
application	communication through OpenTherm® protocol with boiler
connection	0,14-1,5 mm ²

Communication

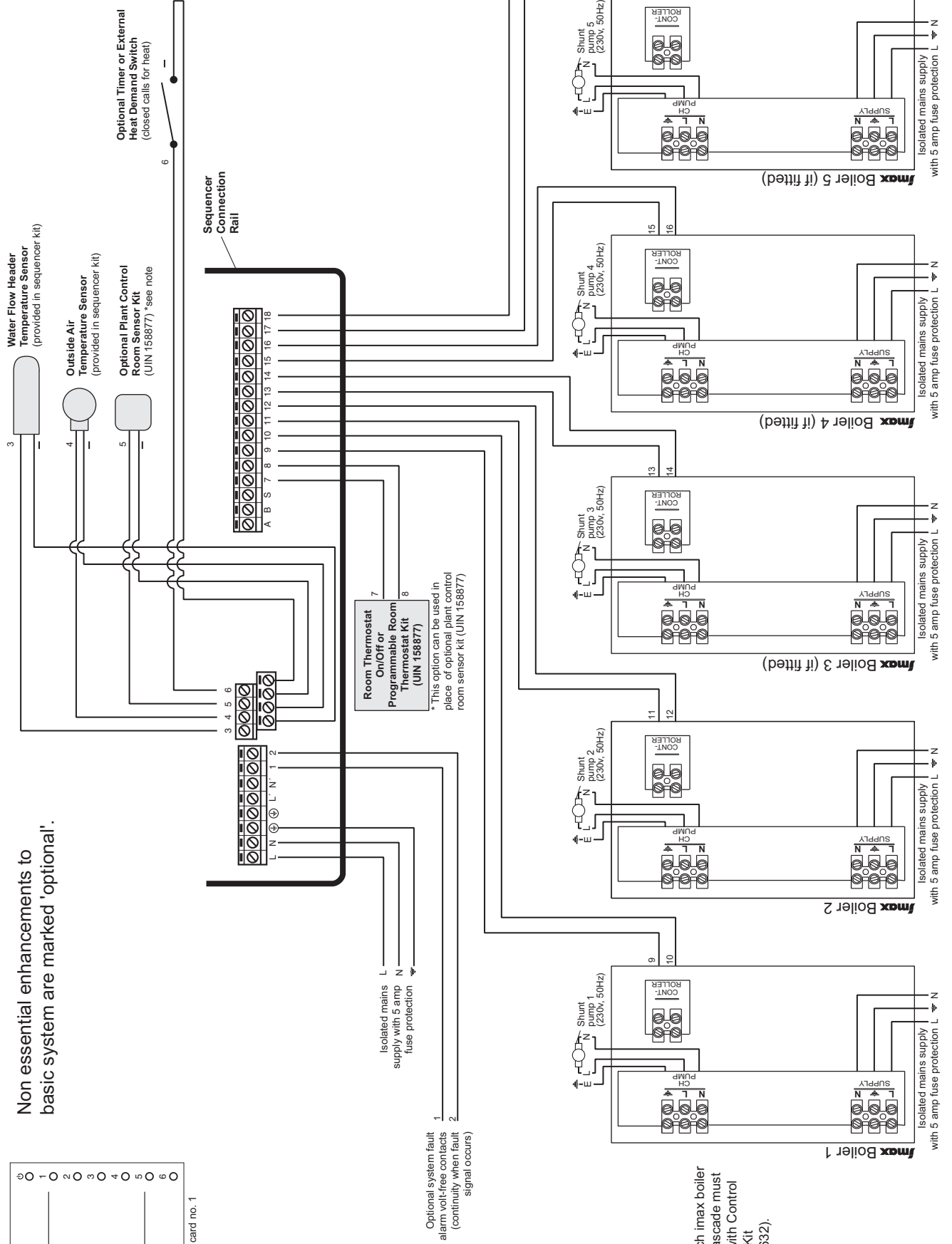
PC/modem connection	RS232 (with special adapter)
XIB-Bus	RS485
connection XIB-Bus	0,14-1,5 mm ²

APPENDIX 1 WIRING SCHEME PLANT CONTROL ONLY

Non essential enhancements to basic system are marked 'optional'.



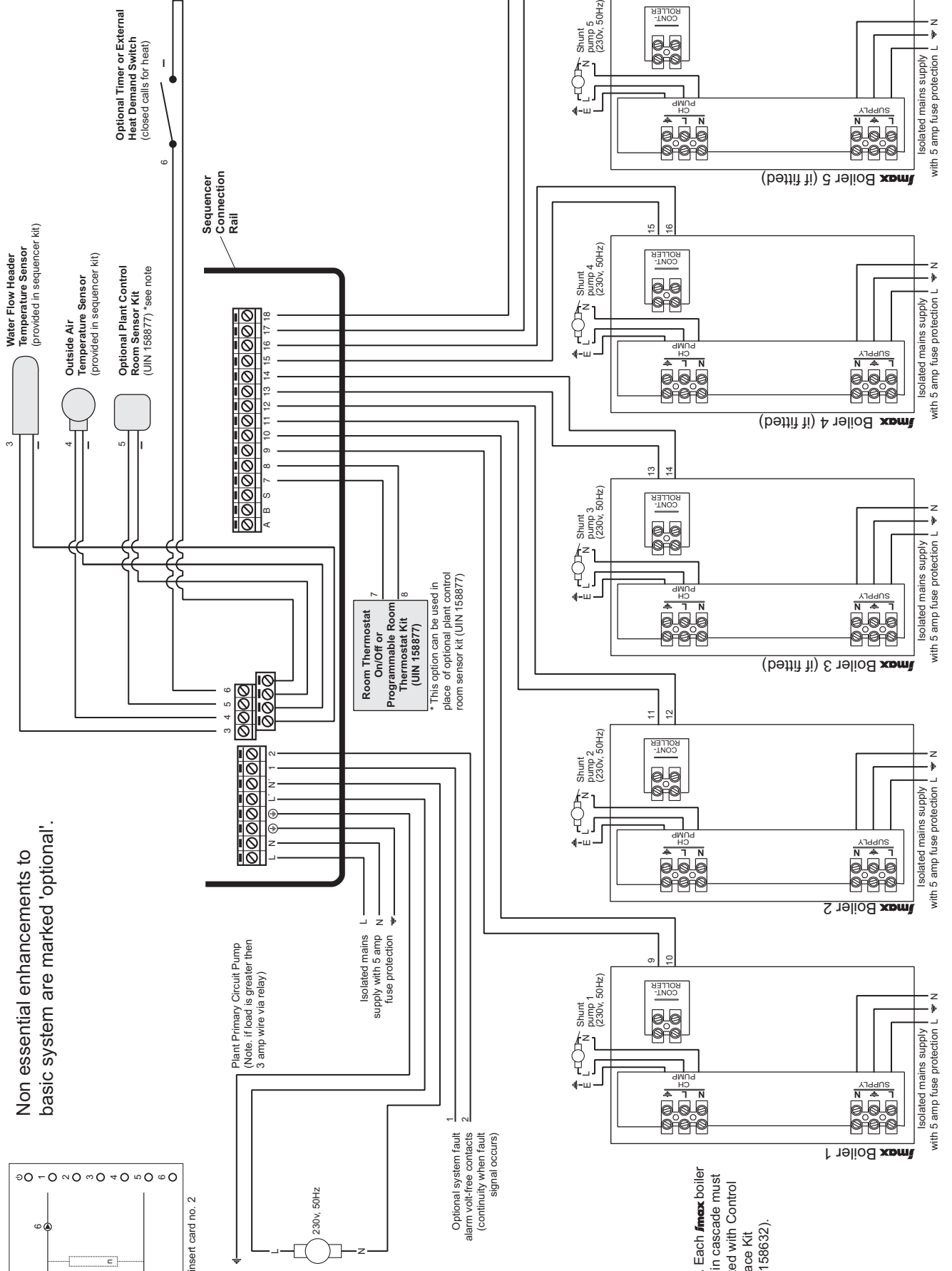
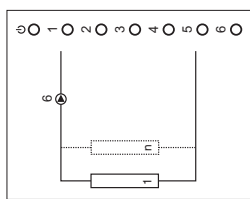
Insert card no. 1



Note. Each imax boiler fitted in cascade must be fitted with Control Interface Kit (UIN 158632).

APPENDIX 2 WIRING SCHEME PLANT PRIMARY PUMP CONTROL ONLY

Non essential enhancements to basic system are marked 'optional'.



Note. Each **fmax** boiler fitted in cascade must be fitted with Control Interface Kit (UIN 158632).

Optional system fault alarm volt-free contacts (continuity when fault signal occurs)

Room Thermostat On/Off or Programmable Room Thermostat Kit (UIN 158877)
 * This option can be used in place of optional plant control room sensor kit (UIN 158877)

Plant Primary Circuit Pump (Note, if load is greater than 3 amp wire via relay)

Isolated mains supply with 5 amp fuse protection

Isolated mains supply with 5 amp fuse protection L

Isolated mains supply with 5 amp fuse protection L

Isolated mains supply with 5 amp fuse protection L

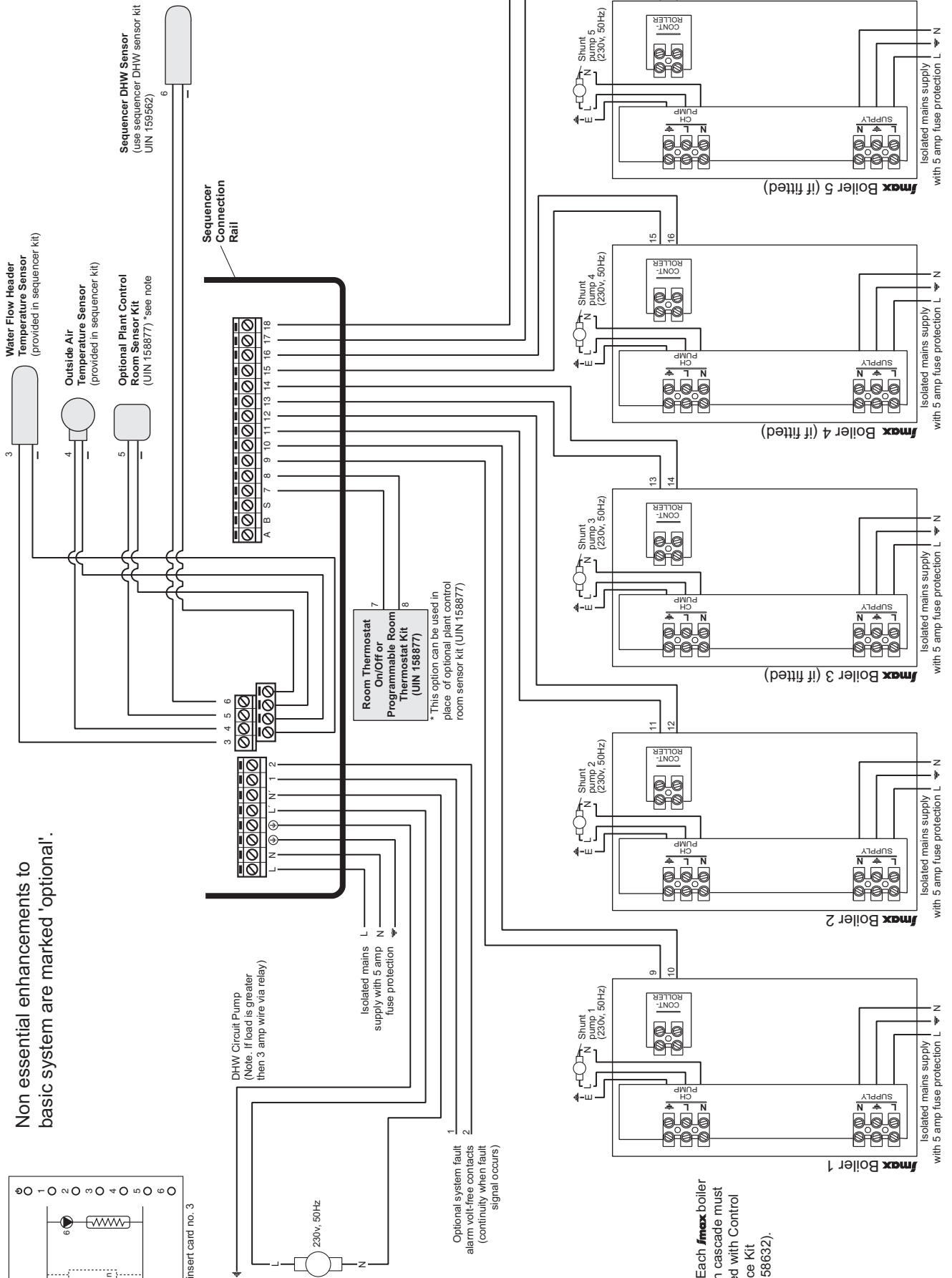
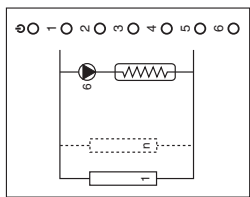
Isolated mains supply with 5 amp fuse protection L

Isolated mains supply with 5 amp fuse protection L

ima8506

APPENDIX 3 Plant and DHW Circuit Control

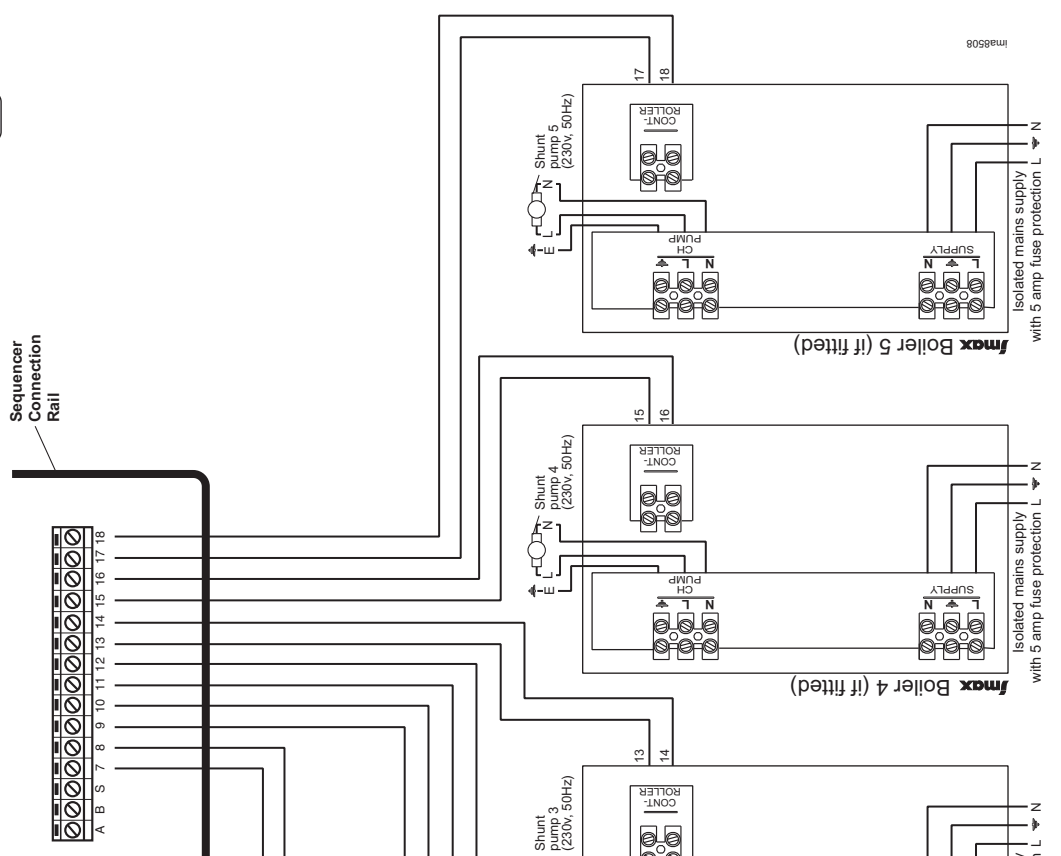
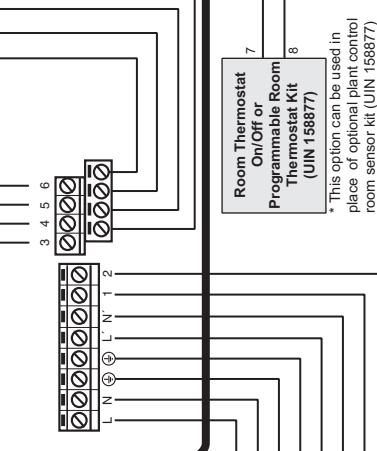
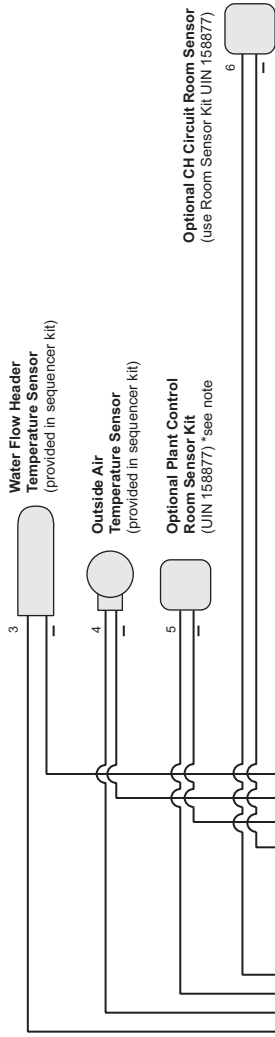
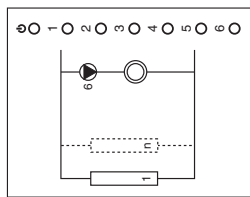
Non essential enhancements to basic system are marked 'optional'.



Note. Each fmax boiler fitted in cascade must be fitted with Control Interface Kit (UIN 158632).

APPENDIX 4 WIRING SCHEME PLANT AND CH CIRCUIT CONTROL

Non essential enhancements to basic system are marked 'optional'.



Note. Each fmax boiler fitted in cascade must be fitted with Control Interface Kit (UIN 158632).

Optional system fault alarm volt-free contacts (continuity when fault signal occurs)

REFERENCES

APPENDIX 5 - OT CENTER CONFIGURATION PROCEDURE - imax xtra F320, F400, F480 and F560 model variants

1. Remove Front Panels

Pull the front panel forwards at the top, lift off the bottom retaining lugs and remove.



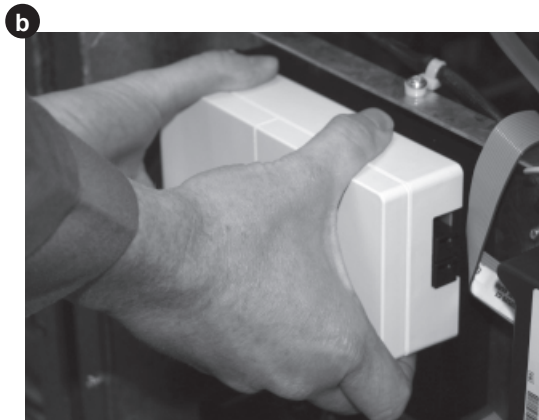
2. Remove Inner Front Panels

Loosen 3 screws on one side of the inner front panel and undo the 3 screws from the other side. The panel will now slide to one side for removal. **REPEAT PROCEDURE FOR SLAVE MODULE.**



3. OT Center Removal

- Locate communications lead plugged into RHS of both master and slave OT Center. Squeeze plug tab and gently remove plug on both boxes.
- Firmly pull up and down on white portion of module to remove from backing plate.



continued

REFERENCES

APPENDIX 5 - OT CENTER CONFIGURATION PROCEDURE - imax xtra F320, F400, F480 and F560 model variants

4. OT Center Configuration

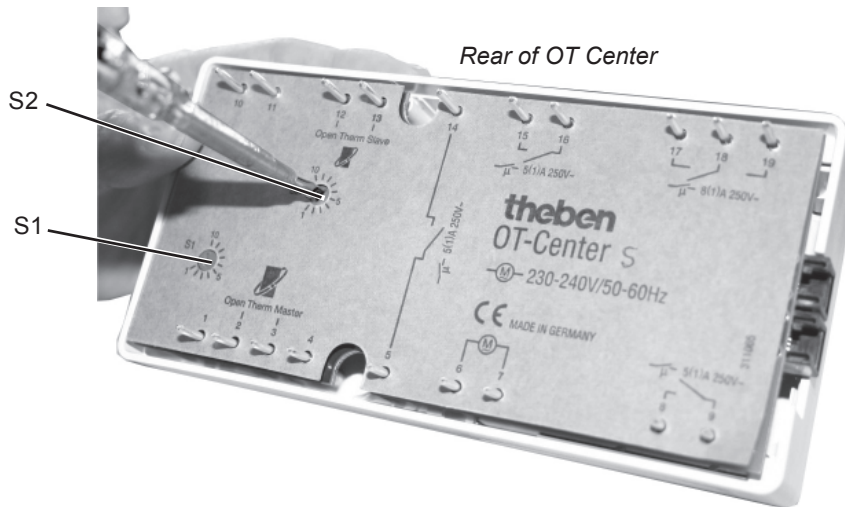
Locate the configuration switches 'S1' and 'S2' located at the rear of each OT Center. Carefully set the switches in accordance with the table below.

Position S2	Function
1	Master - Module
2	Slave Module

Position S1	Function
1	N/A
2	N/A
3	Set to position 3 for operation with sequencer kit
4	N/A
5	N/A

Note.

Both OT Centers (Master and Slave Modules) must be configured similarly.



- Following setting the configuration switches carefully, replace both OT Centers ensuring they are pushed fully home on their backing plates. Re-fit boiler panels in reverse order.

REFERENCES

MENU INDEX

A

Access Level	5,7
Actual 0kW Requested 0kW	8
Actual 45kW Requested 45kW	6

B

Boiler 1 Load Req 40kW	48
Boiler 12h 8l	51
Boiler high fire 12h 8l	51
Boiler low fire 12h 8l	51
Boiler max. rating 45kW	20
Boiler min. rating 30%	20
Boiler Off	43
Boiler fault	43
Boiler On	43
Boiler Sequence delay on 3 min	48
Boiler sequence A 1-2	49
Building Contr. Medium	37
Busy scanning	46

C

Card Number 1	18
Checking Controller 001	46
Clear Fault Log No.	53
Configuration	18,19,20,21,22,23
Configure Function No.	18,19,20,21,22,23
Continuous Operation	34
Continuous Operation Yes	21

D

Day operation 63h 3l	51
Daylight Saving End October	51
Daylight Saving Start March	51
Daylight Saving Yes	18
Diff Reaction Delay 60 min	49

E

Early Start HW-Storage 15 min	47
-------------------------------------	----

F

Fail boiler on 15min	48
Fault	32,33,43,52
Fault Boiler	54
Fault Boilers	54
Fault Comm Boiler	55
Fault Comm Thermostat	55
Fault Flow Temp	55
Fault Flow Temp Setp	55
Fault Frost Prot Flow	55
Fault Frost Prot Room	55
Fault Frost Protection	55
Fault Hot Water Temp	55
Fault HWS Secondary-T	55
Fault HWS Sec-T Setp	55
Fault Log 01	53
Fault Messages No.	18
Fault Outside Temp	56
Fault Prim Pump Trip	56
Fault Return Temp	56
Fault(s) Unknown	46
Faults	3
Flow Temp 0°C	9

Flow Temp 0°C Setpoint 0°C	8
Flow Temp 73°C	36
Flow Temp end-point 20°C	38
Flow Temp Setpoint 0°C	36
Flow Temp Startpoint 80°C	38
Flow-T setpoint heat demand	39
Flowtemp Margin 0K	40
Flowtemp Maximum 90°C	40
Flowtemp Minimum 1°C	40
Frost Protection Min Flow-T 20°C	50
Frost Protection Min Prim-T 20°C	50
Frost Protection Outside Temp	50
Frost Protection due to Outside Temp. Yes	19,22
Function 001-AAX5200SQ General	18

H

Heat Demand Ext.	8,39
Heating Curve	
Curvature 1.33	38
Heating Limit	
Switched Off	36
Time Response 24h	36
Heating Limit Differential - 2K	36
Holiday Programme Internal	20
Holiday Programme	3,11
Holiday Programme Internal	21,22
Hot Water Mode	8
Hot Water Mode 112h 16l	51
HWS Primary - T0°C	9
HWS Priority	46
HWS Priority Yes	21
HWS Secondary - T0°C	9
HWS Secondary - T 60°C	44
HWS Secondary - T Heatup max. 60min	49
HWS Secondary - T max tempdiff 5K	49
HWS Secondary - T setpoint 0°C	44
HWS secondary - T switch diff 5K	44,49
HWS sec-T0°C Setpoint 0°C	9

L

Legionella protection	45
Legionella protection	45
Legionella prot on at 2h	45
Legionella prot setoint 60°C	45
Legionella protection Yes	21
Load actual 0%	43
Load actual 0kW	43
Load requested 0%	43,47
Load requested 0kW	43,48

M

Manual operation 3,38	
Max setback start point 5K	37
Maximum preheat time 360min	35
Minimum preheat time 15min	35

N

No alarms	46
No faults	46
Not configured	3,8

REFERENCES

O

OpenTherm Thermostat No.	23
Operating Data	3,6,7,12
Option Term. 6 Not Used	19
Option Term. 6 Overtime	19
Outside Preheat Factor 0.02/K	35
Outside Temp 0°C	9
Outside Temp 14°C	35
Outside Temp End-Point 220°C	38
Outside Temp Startpoint -10°C	38
Overrun Time Prim. Pump 0min	45
Overrun Time Pump 10min	49

P

Preheat	
Day Operation	35
Prim. HWS pump delay on 0min	44
Prim/Secondary temp diff 25K	39,47
Primary HWS pump 63h 3l	51
Pump 112h 16l	51
Pump release delay on time	21

R

Relay Pump Auto	56
Requested load D-Factor 0.0%	48
Requested Load I-Factor 2.0%	48
Requested Load P-Factor 5.0%	48
Request Alarm Relay 24h	47
Reset Alarm Relay No.	47
Reset Counters No	20,22
Reset Factory Settings No.	53
Room Compensation 3K/K	40
Room Preheat Factor 30min/K	35

Room Temp 20°C	9,36
Room Temp. Holiday 10°C	9,36
Room Temp. Night 15°C	9, 36
Room Temp. Setpoint 20°C	36
Room Temp. Switch Diff. 0.5K	36
Room Temp. Yes	19,22

S

Seizure Protections Yes	20,22
Sequence Change Over Yes	20
Setback Reaction 0.5K/K	37
Setpoint Input Thermostat	39
Settings	3,6
Stage 2/Stage 1 Delay Time 10s	48
Status Display Fault	8, 52
Storage Demand	44
Storage Recovery	44
Switching Method 2	20

T

Time Clock	3,10
Time Clock Internal	19,21,22,48,51,53
Time Program	
Day Operation	8,33
Holiday Operation	34
Night Operation	33
Timed Override	
Day operation	8,33
Holiday Operation	34
Timed Override 3h 2l	52
Timed Override Delay Off 0h	34
Total Number of Boilers 1	18

NOTES

Technical Training

The Ideal Boilers Technical Training Centre offers a series of first class training courses for domestic, commercial and industrial heating installers, engineers and system specifiers. For details of courses please ring: 01482 498 432

Ideal Boilers, P.O. Box 103, National Ave, Kingston upon Hull, HU5 4JN. Telephone: 01482 492 251 Fax: 01482 448 858. Registration No. London 322 137.

Ideal Stelrad Group Limited pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.



***i* Ideal** BOILERS
The High Efficiency Pioneers

January 2008

UIN 158 709 A05



Ideal Stelrad Group

Ideal Installer/Technical Helpline: 01482 498 376
www.idealboilers.com