



# *i*CCS COMMERCIAL CONTROL SYSTEM

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**NOTE : LEAVE THESE INSTRUCTIONS ADJACENT TO THE iCCS**

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## 1 INTRODUCTION

This document describes the iCCS which is a commercial control system platform that is integrated at all levels in a plant room, from the combustion manager within the boiler to the extension module at the final heating and DHW circuits.

It covers the description of the system and its modules, along with the configuration, hydraulic circuits supported, interconnection wiring, data logging and fault management.

The iCCS consists of:

- Boiler combustion manager
- System manager
- VariCAN adapter
- Extension module
- System accessories
- Heat Pump module
- Solar module

### 1.1 Combustion Manager

The Combustion manager is mounted in the boiler and controls the internal safety functions associated with a heat engine. It also provides information to the System manager on the status of the heat engine as well as auxiliary inputs and outputs.

### 1.2 System Manager

The System manager is located within the boiler and provides the controlling functions. One System manager is required per boiler, it can support multiple Combustion managers. The System manager also provides the User interface function.

A System manager can be configured as a Master or Slave in a cascade of Boilers, and/or when any external module is used.

E.g. Extension module.

The Master System manager controls both its own Combustion manager and all other Slave System managers as well as the external modules. It can also control other Combustion managers within the same boiler.

### 1.3 VariCAN Adapter

The VariCAN adapter is an optional accessory that is installed within the boiler. It allows the Bus communication system to be extended outside of the boiler to either other boilers in a Cascade, where each boiler requires one, or to the Extension modules.

### 1.4 Extension Module

The Extension module adds additional Heating, DHW storage and Hot Water Systems to the installation.

### 1.5 VariCAN Bus

The iCCS communicates using the VariCAN bus. A total of 60 devices can be managed on a single bus, made up from a mix of Combustion managers, System managers and Extension modules. Each of these is counted as one device on the VariCAN bus.

It is possible to cascade up to 20 boilers on the VariCAN bus, 1 Master System manager and 19 Slave System managers.

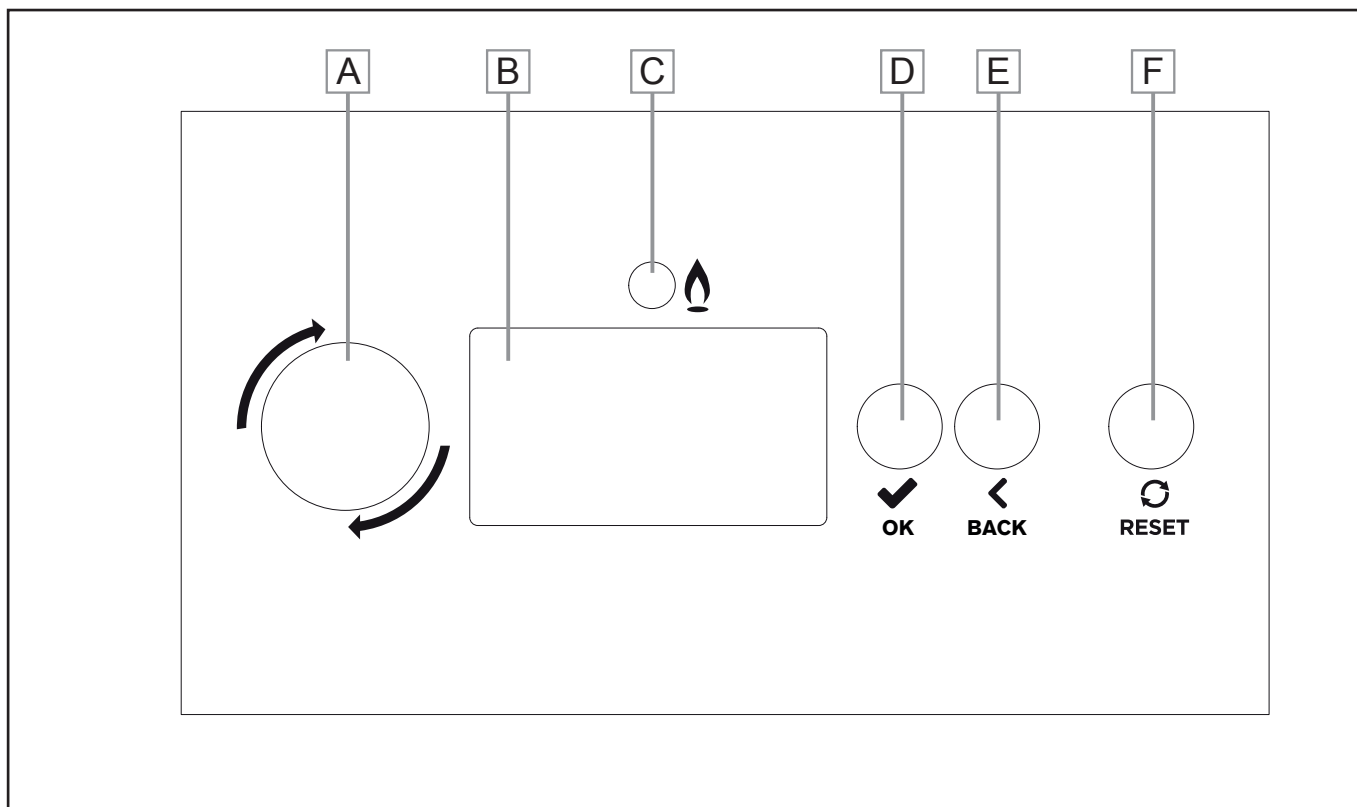
Each boiler with a System manager can support up to 4 Extension modules.

However, the total number of devices still cannot exceed 60.

## 2 PARTIAL HYDRAULIC CIRCUITS

Refer to **APPENDIX 1** on page 36.

### 3 OPERATING GUIDE



**FIGURE 1 SYSTEM MANAGER INTERFACE**

**A. Rotary Knob**

- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Scroll up (anti-clockwise) or down (clockwise) in a menu
- Change the value in parameter setting.
- If an error is showing in the title bar, scroll to the associated error screen(s), and return.

**B. LCD Display Screen**

- Menu and status display.

**C. Burner LED**

- Will be on if the burner is lit.

**D. Select button**

- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Enter the highlighted menu (sub menu or parameter), if in a menu or sub menu.
- If in a parameter setting, select a parameter which will then flash for adjustment, once adjusted using the rotary knob press again to store and move on.

**E. Back button**

- In a menu, return to the previous menu layer.
- In parameter setting, exit the parameter without storing the value.
- In a guided assistant, go back to the previous screen.

**F. Reset button**

- Reset the associated boiler module error, if a resettable (lockout) error is active.
- Return to the normal operation screen.

3.1 Introduction

Once the boilers are installed and configured there are still a number of functions available for the overall system Settings, the Status of the Boilers, Heating Circuits, and Cascade.

The status screens of each boiler in the cascade are the same, they show the same information in relation to the boiler, and each slave will show the following screen:

< Boiler Name & Model No. >	
Operation:	Standby
Boiler Setp.:	0%
Boiler cap.:	0%
Flow temp.:	40.2°C

The Master will show the same except for a small left pointing chevron in the top left hand corner, this is indicating that there is a second status screen access by turning the knob anticlockwise:

< Boiler Name & Model No. >	
Operation:	Standby
Boiler Setp.:	0%
Boiler cap.:	0%
Flow temp.:	40.2°C

On the Master boiler in the cascade there is an additional status screen which gives information in relation to the system, on rotating the knob anticlockwise:

< Boiler Name & Model No. >	
Operation:	Standby
Plant Setp.:	0%
Plant cap.:	0%
Header:	40.2°C

The chevron will now be right pointing and appear on the top right hand corner, indicating that there is another status screen accessed by rotating the knob clockwise. In this case back to the Boiler status screen.

If any boiler faults exist, there will be another right pointing chevron on the boiler status screen. For boiler specific faults refer to the Boiler User guide.

3.2 Menu

When any of the buttons are pressed or the knob rotated the display backlight will brighten up from its standby reduced level. To select the menu, press the ‘Select’ button, the menu will appear:

Menu	
Configuration	
Boiler Menu	
Plant	

The menu can be scrolled down and contains the following items:

Menu	
Configuration	
Boiler Menu	
Plant	
Heating circuits	

Menu	
Boiler Menu	
Plant	
Heating circuits	
DHW	

Menu	
Plant	
Heating circuits	
DHW	
Cascade	

Menu	
Heating circuits	
DHW	
Cascade	

Menu	
DHW	
Cascade	

Note: Slave boilers do not have the Cascade menu option.

3.3 Menu - Configuration

The configuration menu has the following options, there are other options but these are hidden from the User/Installer:

Configuration	
General	

3.3.1 Menu - Configuration – General

The General menu has the following options:

General	
Language	
Date	
Time	

General	
Language	
Date	
Time	
Access level	

General	
Date	
Time	
Access level	

General	
Time	
Access level	

### 3.3.2 Menu - Configuration - General - Language

The language menu has the following options:

Language
Local language
System language

Language
Local language
System language

Note: Only the Master boiler has an option to set the System language.

The options are identical for System or Local Language option.

Local language
English
Francais
Nederlands

Local language
English
Francais
Nederlands
Italiano

Local language
Francais
Nederlands
Italiano
Espanol

Local language
Nederlands
Italiano
Espanol
Turk

Local language
Italiano
Espanol
Turk

Local language
Espanol
Turk

Once the language is selected the Local boiler or complete System will reconfigure itself to the chosen language. The display will change immediately to the selected language.

### 3.3.3 Menu – Configuration – General - Date

The Date screen is then displayed and each item can be selected and changed:

Date
Year: 2019
Month: 7
Day: 4
Done

Date
Year: 2019
Month: 7
Day: 4
Done

Date
Year: 2019
Month: 7
Day: 4
Done

Date
Year: 2019
Month: 7
Day: 4
Done

### 3.3.4 Menu – Configuration – General - Time

The Time screen is then displayed and each item can be selected and changed:

Time
Hour: 9
Minute: 11
Auto su/wi time: <input checked="" type="checkbox"/>

Time
Hour: 9
Minute: 11
Auto su/wi time: <input checked="" type="checkbox"/>

Time
Hour: 9
Minute: 11
Auto su/wi time: <input checked="" type="checkbox"/>

Once the setting is made then the screen is left by pressing the back button.

### 3.3.5 Menu – Configuration – General – Access level

The Access level screen is then displayed and each item can be selected and the default access level code can be changed:

Access level
Advanced user
Installer 1
Installer 2

Access level
Advanced user
Installer 1
Installer 2
Expert

Access level
Installer 1
Installer 2
Expert

Access level
Installer 2
Expert

Once an access level is selected then the display will allow the current access level code to be entered. Each access level has its own initial code:

Advanced user
####

Default code 2222

Installer 1
####

Default code 3333

Installer 2
####

Default code 4444

Once the correct code has been entered the following confirmation screen will be displayed for a short period, depending upon which access level was selected:

Installer 1
Installer 1
Confirm



3.3.6 Menu - Configuration

All menus and setting will now be available for that particular access level. There will now also be the chance to reconfigure different functions within the system:

Configuration

General

Recommission system

Recommission Plant

Configuration

General

Recommission System

Recommission Plant

Recommission Boiler

Configuration

Recommission System

Recommission Plant

Recommission Boiler

Recommission HC

Configuration

Recommission Plant

Recommission Boiler

Recommission HC

Recommission DHW

Configuration

Recommission Boiler

Recommission HC

Recommission DHW

Configuration

Recommission HC

Recommission DHW

Depending upon the access level, not all configuration options will be available. Once selected, refer to the Configuration section below for guidance.

3.4 Menu – Boiler

The boiler menu has the following options, there are other options but these are hidden from the User/Installer:

Boiler menu

Status

Service

Settings

Boiler menu

Status

Service

Settings

Flue offset

Boiler menu

Service

Settings

Flue offset

Hours run

Boiler menu

Settings

Flue offset

Hours run

Faults

Boiler menu

Flue offset

Hours run

Faults

Boiler menu

Hours run

Faults

3.4.1 Menu – Boiler - Status

The status sub menus give you access to check the current configuration of the boiler. It also allows you to see the current real time values of the boiler.

The status menu has the following options:

Status

Configuration

Real time values

Status

Configuration

Real time values

3.4.2 Menu – Boiler – Status - Configuration

The configuration menu has the following options:

Configuration

Inputs

Outputs

Parameters

Configuration

Inputs

Outputs

Parameters

Configuration

Outputs

Parameters

3.4.3 Menu – Boiler – Status – Configuration - Inputs

The inputs menu has the following options:

Configuration

Boiler 1

Boiler 2

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list. Once a boiler is selected, then the following menu allows you to select which configuration parameters you want to display:

Boiler 1

Demand control

Temperature sensors

Other sensors

Boiler 1

Demand control

Temperature sensors

Other sensors

Boiler 1

Temperature sensors

Other sensors

**Demand Control**

When the menu option Demand control is selected the following screen will now be displayed, items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Demand Control

SL1: - -  
SL2: DHW1 Boiler 1  
OT1: HC1 Boiler 1.1

Demand Control

SL1: - -  
SL2: DHW1 Boiler 1  
OT1: HC1 Boiler 1.1  
OT2: - -

Demand Control

SL2: DHW1 Boiler 1  
OT1: HC1 Boiler 1.1  
OT2: - -  
0-10V: - -

Demand Control

OT1: HC1 Boiler 1.1  
OT2: - -  
0-10V: - -

Demand Control

OT2: - -  
0-10V: - -

**Temperature Sensors**

When the menu option Temperature sensors is selected the following screen will now be displayed, items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Temperature sensors

DHW/Room2: - -  
Flue: - -  
H/X: Yes

Temperature sensors

DHW/Room2:- -  
Flue: - -  
H/X: Yes  
Header: - -

Temperature sensors

Flue: - -  
H/X: Yes  
Header: - -  
Outside: - -

Temperature sensors

H/X: Yes  
Header: - -  
Outside: - -  
Room1: - -

Temperature sensors

Header: - -  
Outside: - -  
Room1: - -

Temperature sensors

Outside: - -  
Room1: - -

**Other Sensors**

When the menu option Other sensors is selected the following screen will now be displayed, items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Other Sensors

WPS: Switch  
WFS: - -

Other Sensors

WPS: Switch  
WFS: - -

**3.4.4 Menu – Boiler – Status – Configuration - Outputs**

The outputs menu has the following options:

Inputs

Boiler 1  
Boiler 2

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list.

Once a boiler is selected, then the following menu allows you to select which configuration parameters you want to display:

Boiler 1

PWM/0-10V (Boiler pump)  
MFR1 (HC1 pump)  
MFR2 (DHW pump)

Boiler 1

PWM/0-10V ()  
MFR1 (HC1 pump)  
MFR2 (DHW pump)  
MFR3 (Boiler on indicator)

Boiler 1

MFR1 (HC1 pump)  
MFR2 (DHW pump)  
MFR3 (Boiler on indicator)  
MFR4 (Boiler Fault indicator)

Boiler 1

MFR2 (DHW pump)  
MFR3 (Boiler on indicator)  
MFR4 (Boiler Fault indicator)

Boiler 1

MFR3 (Boiler on indicator)  
MFR4 (Boiler Fault indicator)

**3.4.5 Menu – Boiler – Status – Configuration - Parameters**

The parameters menu has the following options:

Parameters

Boiler 1  
Boiler 2

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list.

Once a boiler is selected, then the following menu allows you to select which configuration parameters you want to display:

Boiler 1

Soft start time  
Flue type

Boiler 1

Soft start time  
Flue type

Once selected the parameter setting will be displayed:

Soft start time

30.0sec

Flue type

Standard

3.4.6 Menu – Boiler – Status – Real time values

The Real time values menu has the following options:

Real time values
Inputs
Sensors
Outputs

Real time values
Inputs
Sensors
Outputs

Real time values
Sensors
Outputs

3.4.7 Menu – Boiler – Status – Real time values - Inputs

The inputs menu has the following options:

Inputs
Boiler 1
Boiler 2

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list. Once a boiler is selected, then the following screen will display the current Real time values for the configured Inputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Boiler 1
SL1: Off
SL2: On
0-10V: - -

Boiler 1
SL1: Off
SL2: On
0-10V: - -
OT1: 10.0°C

Boiler 1
SL2: On
0-10V: - -
OT1: 10.0°C
OT2: - -

Boiler 1
0-10V: - -
OT1: 10.0°C
OT2: - -
Cap. Setp.: 0%

Boiler 1
OT1: 10.0°C
OT2: - -
Cap. Setp.: 0%
HC temp. setp.: 0.0°C

Boiler 1
OT2: - -
Cap. Setp.: 0%
HC temp. setp.: 0.0°C
DHW temp. setp.: 0.0°C

Boiler 1
Cap. Setp.: 0%
HC temp. setp.: 0.0°C
DHW temp. setp.: 0.0°C
Max lim. Down.: 100.0°C

Boiler 1
HC temp. setp.: 0.0°C
DHW temp. setp.: 0.0°C
Max lim. Down.: 100.0°C

Boiler 1
DHW temp. setp.: 0.0°C
Max lim. Down.: 100.0°C

3.4.8 Menu – Boiler – Status – Real time values - Sensors

The inputs menu has the following options:

Sensors
Boiler 1
Boiler 2

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list. Once a boiler is selected, then the following screen will display the current Real time values for the configured Sensors, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Boiler 1
Flame: Off
Flow temp.: 37.5°C
Return temp.: 33.0°C

Boiler 1
Flame: Off
Flow temp.: 37.5°C
Return temp.: 33.0°C
H/X temp.: 48.3°C

Boiler 1
Flow temp.: 37.5°C
Return temp.: 33.0°C
H/X temp.: 48.3°C
Flue temp.: - -

Boiler 1
Return temp.: 33.0°C
H/X temp.: 48.3°C
Flue temp.: - -
Outside temp.: - -

Boiler 1
H/X temp.: 48.3°C
Flue temp.: - -
Outside temp.: - -
WPS: On

Boiler 1
Flue temp.: - -
Outside temp.: - -
WPS: On
WFS: - -

Boiler 1
Outside temp.: - -
WPS: On
WFS: - -
APS: Off

Boiler 1
WPS: On
WFS: - -
APS: Off
Safety interlock: On

Boiler 1
WFS: - -
APS: Off
Safety interlock: On

Boiler 1	
APS:	Off
Safety interlock:	On

### 3.4.9 Menu – Boiler – Status – Real time values - Outputs

The inputs menu has the following options:

Outputs	
Boiler 1	
Boiler 2	

Depending upon how many boilers are configured in the cascade, they will appear here in a sequential list.

Once a boiler is selected, then the following screen will display the current Real time values for the configured Outputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Boiler 1	
PWM/0-10V:	0%
MFR1:	Off
MFR2:	Off

Boiler 1	
PWM/0-10V:	0%
MFR1:	Off
MFR2:	Off
MFR3:	Off

Boiler 1	
MFR1:	Off
MFR2:	Off
MFR3:	Off
MFR4:	Off

Boiler 1	
MFR2:	Off
MFR3:	Off
MFR4:	Off

Boiler 1	
MFR3:	Off
MFR4:	Off

### 3.4.10 Menu – Boiler - Service

The service sub menus give you the option to run the boiler selected at Min, Max and Variable capacity.

The service menu has the following three options:

Service	
Service min	
Service max	
Service variable	

Service	
Boiler 1	
Boiler 2	

Once the boiler is selected then the service interval will start and the boiler will run in service mode at the selected capacity for a maximum of 10 minutes. If you wish to abort service mode, just use the back key.

The following screens will be displayed during service mode:

Boiler 1 Service	
Operation:	Service min
Flow temp:	40.2°C
Capacity:	30%

Boiler 1 Service	
Operation:	Service max
Flow temp:	40.2°C
Capacity:	100%

When service variable is selected, an additional parameter needs to be set. The following menu will be displayed:

Service variable	
Set capacity	
Start service var. capacity	

Set capacity	
Boiler 1	
Boiler 2	

The variable service mode capacity for the selected boiler can now be set:

Boiler 1 Capacity	
90%	

Once this has been adjusted and confirmed by the select key then the back key can be used to return to the Service variable menu:

Service variable	
Set capacity	
Start service var. capacity	

Once the boiler is selected then the service interval will start and the boiler will run in service mode at the selected capacity for a maximum of 10 minutes. If you wish to abort service mode, just use the back key.

Start service var. capacity	
Boiler 1	
Boiler 2	

The following screens will be displayed during service mode:

Boiler 1 Service	
Operation:	Service variable
Flow temp:	40.2°C
Capacity:	90%

Once the boiler has lit and ramped up to capacity, this is limited to the setting made.

### 3.4.11 Menu – Boiler – Settings

The settings sub menu allows adjustment of boiler specific variables.

Settings
Boiler 1
Boiler 2

Boiler 1
Boiler pump

When the boiler pump is controlled by the PWM/0-10V modulating control, the parameters for the pump may be set:

Boiler pump
Operating mode
Min. Boiler pump capacity
Max. Boiler pump capacity

Boiler pump
Operating mode
Min. Boiler pump capacity
Max. Boiler pump capacity
Standby pump capacity

Boiler pump
Min. Boiler pump capacity
Max. Boiler pump capacity
Standby pump capacity
Inertia delta temp.

Boiler pump
Max. Boiler pump capacity
Standby pump capacity
Inertia delta temp.
Diff. temp. flow/return

Boiler pump
Standby pump capacity
Inertia delta temp.
Diff. temp. flow/return

Boiler pump
Inertia delta temp.
Diff. temp. flow/return

Note: Depending on the selected operating mode additional parameters may be present or omitted.

### 3.4.12 Boiler Pump Operating Mode

The boiler pump can be controlled in one for two ways.

Capacity control means that the pump speed follows the burner capacity proportionally between minimum capacity/ minimum pump speed and maximum capacity/maximum pump speed.

Temp. Diff. Control means that the pump speed is controlled to maintain a fixed boiler flow to return temperature differential.

Operating mode
Capacity control <input checked="" type="checkbox"/>
Temp. Diff. Control <input type="checkbox"/>

Operating mode
Capacity control <input type="checkbox"/>
Temp. Diff. Control <input checked="" type="checkbox"/>

### 3.4.13 Menu – Boiler – Flue offset

The flue offset parameter allows adjustment of the boiler specific cascade flue setting. The flue offset is an increase in the minimum burner capacity to ensure that the cascade flue pressure or an unpowered flue damper can be overcome safely and avoid any risk of the burner going out at the minimum boiler capacity. When a multiline flue system is selected during configuration this parameter is enabled, it has a predetermined minimum already applied which is required for the optional flue kit that can be supplied for the boiler.

Flue offset
12%

### 3.4.14 Menu – Boiler – Hours run

The hours run screen show the number of successful burner starts and the number of full burner operating hours for each boiler in the cascade:

Hours run
Boiler 1
Boiler 2

Hours run
Ignitions: 12
Burner: 2 hours

### 3.4.15 Menu – Boiler – Faults

The fault history, summary and detail, of each boiler in the cascade can be interrogated, this can also be reset:

Faults
Summary
Show detail
Reset

### 3.4.16 Menu – Boiler – Faults – Summary

On selecting which boiler you want to interrogate, the system will read back the fault summary and display:

Boiler 1
Fault 09 : Count 14
Fault 10 : Count 11
Fault 51 : Count 5

The list can be scrolled and any fault selected will then show the specific fault description:

Fault 09
Outside thermistor defect (open/short)

### 3.4.17 Menu – Boiler – Faults – Show detail

On selecting which boiler you want to interrogate, the system will then read back the fault detail and display:

Boiler 1
09/09/2019, 09:13 Fault 07
09/09/2019, 09:13 Fault 01
04/09/2019, 09:13 Fault 23

The list can be scrolled to see the last 10 items in the fault history with date and time.

### 3.4.18 Menu – Boiler – Faults – Reset

By selecting the boiler which you want to reset the fault information, you then the fault summary and details for that specific boiler. It may take some time for the fault information to clear as this process is flagged for action at the next available timeslot.

### 3.5 Menu – Plant

The plant menu has the following options, there are other options but these are hidden from the User/Installer:

Plant
Status
Operating mode
Settings

Plant
Status
Operating mode
Settings
Time clock

Plant
Operating mode
Settings
Time clock
Holiday programme

Plant
Settings
Time clock
Holiday programme

Plant
Time clock
Holiday programme

#### 3.5.1 Menu – Plant - Status

The status sub menus give you access to see the current real time values of the plant. The status menu has the following options:

Status
Real time values

#### 3.5.2 Menu – Plant – Status – Real time values

The Real time values menu has the following options:

Real time values
Demand inputs
Sensors
Outputs

Real time values
Inputs
Sensors
Outputs

Real time values
Sensors
Outputs

#### 3.5.3 Menu – Plant – Status – Real time values – Demand inputs

Once inputs is selected, then the following screen will display the current Real time values for the configured Inputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled to show all values:

Demand inputs
0-10V: - -
SL1: Off
OT1: - -

Demand inputs
0-10V: - -
SL1: Off
OT1: - -
Plant setp.: 0%

Demand inputs
SL1: Off
OT1: - -
Plant setp.: 0%
Plant setp.: 0.0°C

Demand inputs
OT1: - -
Plant setp.: 0%
Plant setp.: 0.0°C

Demand inputs
Plant setp.: 0%
Plant setp.: 0.0°C

#### 3.5.4 Menu – Plant – Status – Real time values - Sensors

Once sensors is selected, then the following screen will display the current Real time values for the configured sensors, once again items that are not configured will be shown with no value but with 2 dashes to indicate this:

Sensors
Plant flow temp.: 37.5°C
Outside temp.: - -

#### 3.5.5 Menu – Plant – Status – Real time values - Outputs

Once outputs is selected, then the following screen will display the current Real time values for the configured outputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this:

Outputs
Shared boiler pump: - -
System pump: - -

#### 3.5.6 Menu – Plant – Operating mode

The plant operating mode can be set. This controls the operation of the complete system, all boilers, all HCs and all DHW circuits. The options are:

Operating mode
Off

Operating mode
Standby

Operating mode
Summer

Operating mode
Automatic

Off – No operation

Standby – Frost protection only

Summer – Normal operation but no HCs

Automatic – Full automatic operation

### 3.5.7 Menu – Plant – Settings

The plant settings can be adjusted. The options are:

Settings
Plant setp. SL1
OT temp. setpoint
Frost protection

Settings
Plant setp. SL1
OT temp. setpoint
Frost protection

Settings
OT temp. setpoint
Frost protection

### 3.5.8 Menu – Plant – Settings – Plant setp. SL1

The plant flow temperature set point for the SL1 input can be adjusted:

Plant setp. SL1
80.0°C
Done

### 3.5.9 Menu – Plant – Settings – OT temp. setpoint

The plant flow temperature set point for the OT1 input when used as an On/Off demand can be adjusted:

OT temp. setpoint
50.0°C
Done

### 3.5.10 Menu – Plant – Settings – Frost protection

The plant frost protection temperature set point, as measured at the header thermistor, can be adjusted:

Frost Protection
Minimum flow temperature

Minimum flow temperature
5.0°C
Done

### 3.5.11 Menu – Plant – Settings – Time clock

The plant internal time clock can be adjusted as below.

The next prompt asks if you wish to configure individual days or multiple days for the timeclock programmes.

A single day is for individual programmes for every day of the week, Monday through to Sunday.

Multiple days are defined as Mon-Fri, or Sat-Sun. Where the same programme times are set for each group.

Time clock
Single
Multiple

#### Single days

The individual days can be selected as highlighted, then each of the program periods and Start/Finish times. As shown below:

Single
Monday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Tuesday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Wednesday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Thursday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Friday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Saturday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Single
Sunday
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

### Multiple days Multiple days

Multiple
Mon-Fri
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

Multiple
Sat-Sun
Period 1 06:00-22:00
Period 2 00:00-00:00
Period 3 00:00-00:00

The cursor can then scroll through the setting for each period in order, Hours followed by Minutes. Once the timeclock settings are completed, press the 'back' button. The system will then prompt you to allow you to save these timeclock values to all HCs and DHW circuits, note that this will overwrite any existing settings:

Save to all circuits?
No
Yes

### 3.5.12 Menu – Plant – Settings – Holiday programme

The plant holiday programmes may also be adjusted as shown.

To set holiday periods select the period, 1-8 and set the Start and End date.

Holidays
Period 1
Start 01/01/2000
End 01/01/2000
Done

Once the Holiday period settings are completed press the 'back' button. The system will then prompt you to allow you to save these timeclock values to all HCs and DHW circuits, note that this will overwrite any existing settings:

Save to all circuits?
No
Yes



### 3.6 Menu – Heating circuits

The heating circuits menu has the following options, there are other options but these are hidden from the User/ Installer:

Heating circuits
Status
Operating mode
Room temperature

Heating circuits
Status
Operating mode
Room temperature
Flow temperature

Heating circuits
Operating mode
Room temperature
Flow temperature
Settings

Heating circuits
Room temperature
Flow temperature
Settings
Time clock

Heating circuits
Flow temperature
Settings
Time clock
Holiday program

Heating circuits
Settings
Time clock
Holiday program

Heating circuits
Time clock
Holiday program

#### 3.6.1 Menu – Heating circuits - Status

The status sub menu give you access to see the current real time values of the heating circuits.

The status menu has the following options:

Status
Summary
Real time values

#### 3.6.2 Menu – Heating circuits – Status - Summary

The summary sub menu lists the configured heating circuits that are configured and can be selected, which then shows the main values for the heating circuit.

Summary
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

HC1 Boiler 1.1
Status: OpenTherm
Operation: Standby
Room setp.: 0.0°C
Flow setp.: 0.0°C

#### 3.6.3 Menu – Heating circuits – Status – Real time values

The Real time values menu has the following options:

Real time values
Demand inputs
Sensors
Outputs

Real time values
Demand inputs
Sensors
Outputs

Real time values
Sensors
Outputs

#### 3.6.4 Menu – Heating circuits – Status – Real time values – Demand inputs

Once inputs is selected the screen will show the configured list of heating circuits:

Demand inputs
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

Once a heating circuit is selected, then the following screen will display the current Real time values for the configured Inputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

Demand inputs
SL1: - -
OT1: 80°C
Room setp.: - -

#### 3.6.5 Menu – Heating circuits – Status – Real time values – Sensors

Once sensors is selected the screen will show the configured list of heating circuits:

Sensors
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

Once a heating circuit is selected, then the following screen will display the current Real time values for the configured sensors, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

HC1 Boiler 1.1
Room temp.: 17.8°C
Outside temp.: - -
Source temp: 37.2°C

HC1 Boiler 1.1
Room temp.: 17.8°C
Outside temp.: - -
Source temp: 37.2°C
HC flow sensor: - -

HC1 Boiler 1.1
Outside temp.: - -
Source temp: 37.2°C
HC flow sensor: - -

HC1 Boiler 1.1
Source temp: 37.2°C
HC flow sensor: - -



### 3.6.6 Menu – Heating Circuits – Status – Real time Values – Outputs

Once outputs is selected the screen will show the configured list of heating circuits:

Outputs
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

Once a heating circuit is selected, then the following screen will display the current Real time values for the configured outputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

HC1 Boiler 1.1
Pump/valve: Off

### 3.6.7 Menu – Heating circuit – Operating mode

Each heating circuit operating mode can be set. This controls the operation of the selected HC.

Operating Mode
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

The options are:

HC1 Boiler 1.1
Standby

HC1 Boiler 1.1
Time clock single day

HC1 Boiler 1.1
Time clock multiple days

HC1 Boiler 1.1
Day

HC1 Boiler 1.1
Night

Standby – Frost protection only

Time clock single day – Normal operation, timed

Time clock multiple day – Normal operation, timed

Day – Normal operation, continuous day mode

Night – Normal operation, continuous night mode

### 3.6.8 Menu – Heating circuit – Room temperature

Each heating circuit target room temperature can be set for different operating modes for the selected HC.

Room temperature
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

HC1 Boiler 1.1
Room temp day
Room temp night
Room temp holiday

HC1 Boiler 1.1
Room temp day
Room temp night
Room temp holiday

HC1 Boiler 1.1
Room temp night
Room temp holiday

Each selected room temperature set point can be adjusted and then set, the adjustment screen is left by pressing the back button:

Room temp day
21°C

### 3.6.9 Menu – Heating circuit – Flow temperature

Each heating circuit flow temperature can be set for different operating modes for the selected HC.

Flow temperature
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

HC1 Boiler 1.1
Flow temp day
Flow temp night
Flow temp holiday

HC1 Boiler 1.1
Flow temp day
Flow temp night
Flow temp holiday

HC1 Boiler 1.1
Flow temp night
Flow temp holiday

Each selected flow temperature set point can be adjusted and then set, the adjustment screen is left by pressing the back button:

Flow temp day
60°C

This limits the flow temperature into a HC.

### 3.6.10 Menu – Heating circuit – Settings

Each heating circuit has a number of settings that can be adjusted for the selected HC.

Settings
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

HC1 Boiler 1.1
Preheat
Heating limit
Room temp. switch diff.

HC1 Boiler 1.1
Preheat
Heating limit
Room temp. switch diff.
Pump

HC1 Boiler 1.1
Heating limit
Room temp. switch diff.
Pump
Frost protection

HC1 Boiler 1.1
Room temp. switch diff.
Pump
Frost protection

HC1 Boiler 1.1
Pump
Frost protection

### 3.6.11 Menu – Heating circuit – Settings - Preheat

This controls the preheat compensation for a given heating circuit, if enabled this will bring on demand from that heating circuit prior to an increase in temperature set point. E.g. from night to day mode. The time allowed for preheat is limited by the Maximum preheat time, this ensures that the heating circuit demand can only start within that time value and not start any earlier.

Preheat can be enabled for the selected HC and the maximum allowable preheat time set.

Preheat
Preheat switch
Maximum preheat time

Preheat
On/Off <input type="checkbox"/>

Preheat
On/Off <input checked="" type="checkbox"/>

Preheat
Preheat switch
Maximum preheat time

Preheat
120minutes

### 3.6.12 Menu – Heating circuit – Settings – Heating limit

This ensures that the heating is not switched on unnecessarily if the average outside temperature, e.g. during the summer months, is higher than the room temperature setpoint in day mode.

Heating limit can be enabled for the selected HC and the heating limit temperature setpoint defined.

Heating limit switch
On/Off <input type="checkbox"/>

Heating limit switch
On/Off <input checked="" type="checkbox"/>

Heating limit temperature
19°C

### 3.6.13 Menu – Heating circuit – Settings – Room temp. switch diff.

This sets the switching differential for the HC room sensor. The value ensures that the HC does not continuously cycle demand into the system.

Room temp. switch diff.
1°C

### 3.6.14 Menu – Heating circuit – Settings – Pump

The pump for each individual heating circuit has a number of settings. Some relate to speed if configured for control by a 0-10V output.

Pump
Overrun time
Overrun speed
Maximum speed

Overrun time
10secs

Overrun speed
70%

Maximum speed
100%

### 3.6.15 Menu – Heating Circuit – Settings – Frost protection

Heating circuit frost protection operation can be triggered by a number of measured real time values:

Frost protection
Flow temperature
Outside temperature
Room temperature

Each of these has a trigger set point and a hysteresis value above which the function is once again deactivated. E.g. Room temperature, if the actual room temperature drops below the temperature setpoint value then HC will create a demand into the system. It will only remove this demand once the actual room temperature has risen above this value, plus the hysteresis setting.

Room temperature
Temperature
Hysteresis

Temperature
6°C

Hysteresis
2°C

### 3.6.16 Menu – Heating Circuit –Time clock

Each heating circuit can have its own individual time programme. Refer to the Plant section for guidance on how this is set.

### 3.6.17 Menu – Heating circuit – Holiday programme

Each heating circuit can have its own individual holiday programmes. Refer to the Plant section for guidance on how this is set.

### 3.7 Menu – DHW

DHW	
Status	
Operating mode	
Tank temperature	

DHW	
Status	
Operating mode	
Tank temperature	
Settings	

DHW	
Operating mode	
Tank temperature	
Settings	
Time clock	

DHW	
Tank temperature	
Settings	
Time clock	
Holiday program	

DHW	
Settings	
Time clock	
Holiday program	

DHW	
Time clock	
Holiday program	

#### 3.7.1 Menu – DHW - Status

The status sub menu give you access to see the current real time values of the DHW circuits.

The status menu has the following options:

Status	
Summary	
Real time values	

#### 3.7.2 Menu – DHW – Status - Summary

The summary sub menu lists the configured DHW circuits that are configured and can be selected, which then shows the main values for the DHW circuit.

Summary	
DHW1 Boiler 1	

DHW1Boiler 1	
Status:	Standby
Tank temperature:	21.1°C
Flow setpoint:	23.0°C
Pump speed:	0 %

#### 3.7.3 Menu – DHW – Status – Real time values

The Real time values menu has the following options:

Real time values	
Demand inputs	
Sensors	
Outputs	

Real time values	
Inputs	
Sensors	
Outputs	

Real time values	
Sensors	
Outputs	

#### 3.7.4 Menu – DHW – Status – Real time values – Demand inputs

Once inputs is selected the screen will show the configured list of DHW circuits:

Demand inputs	
DHW1 Boiler 1	

Once a DHW circuit is selected, then the following screen will display the current Real time values for the configured Inputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

DHW1 Boiler 1	
SL2:	On
OT1:	--
Tank setpoint:	8°C

DHW1 Boiler 1	
SL2:	On
OT1:	--
Tank setpoint:	8°C
Flow setpoint:	8°C

DHW1 Boiler 1	
OT1:	--
Tank setpoint:	8°C
Flow setpoint:	8°C

DHW1 Boiler 1	
Tank setpoint:	8°C
Flow setpoint:	8°C

#### 3.7.5 Menu – DHW – Status – Real time values – Sensors

Once sensors is selected the screen will show the configured list of DHW circuits:

Sensors	
DHW1 Boiler 1	

Once a DHW circuit is selected, then the following screen will display the current Real time values for the configured sensors, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

DHW1 Boiler 1	
Tank temperature:	45.6°C

#### 3.7.6 Menu – DHW – Status – Real time values – Outputs

Once outputs is selected the screen will show the configured list of DHW circuits:

Outputs	
DHW1 Boiler 1	

Once a DHW circuit is selected, then the following screen will display the current Real time values for the configured outputs, once again items that are not configured will be shown with no value but with 2 dashes to indicate this, the list can be scrolled if required to show all values:

DHW1 Boiler 1	
DHW pump/valve:	Off

### 3.7.7 Menu – DHW – Operating Mode

Each DHW circuit operating mode can be set. This controls the operation of the selected DHW circuit.

Operating mode
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

The options are:

DHW Boiler 1
Standby

DHW Boiler 1
Time clock single day

DHW Boiler 1
Time clock multiple days

Standby – Frost protection only  
Time clock single day – Normal operation, timed  
Time clock multiple day – Normal operation, timed

### 3.7.8 Menu – DHW – Tank temperature

Each DHW circuit target tank temperature can be set for different operating modes for the selected DHW circuit.

Tank temperature
DHW1 Boiler 1

DHW1 Boiler 1
Tank temp day
Tank temp night
Tank temp holiday

Each selected tank temperature set point can be adjusted and then set, the adjustment screen is left by pressing the back button:

Tank temp day
65°C

Tank temp night
10°C

Tank temp holiday
10°C

### 3.7.9 Menu – DHW – Settings

Each DHW circuit has a number of settings that can be adjusted for the selected DHW circuit.

Settings
HC1 Boiler 1.1

DHW1 Boiler 1
One time boost
Primary pump
Legionella

DHW1 Boiler 1
One time boost
Primary pump
Legionella
Frost protection

DHW1 Boiler 1
Primary pump
Legionella
Frost protection

DHW1 Boiler 1
Legionella
Frost protection

### 3.7.10 Menu – DHW – Settings – One time boost

Each DHW circuit can have a one-time boost to allow for out of hours hot water requirements. The boost can be enabled and a tank temperature set for this function.

On/Off
One time boost <input type="checkbox"/>

On/Off
One time boost <input checked="" type="checkbox"/>

Temperature
60°C

### 3.7.11 Menu – DHW – Settings – Pump

The primary pump for each individual DHW circuit has a number of settings. Some relate to speed if configured for control by a 0-10V output.

Primary pump
Overrun time
Overrun speed
Minimum speed

Primary pump
Overrun time
Overrun speed
Minimum speed
Maximum speed

Primary pump
Overrun speed
Minimum speed
Maximum speed

Primary pump
Minimum speed
Maximum speed

Overrun time
10secs

Overrun speed
50%

Minimum speed
10%

Maximum speed
100%

### 3.7.12 Menu – DHW – Settings – Legionella

Two modes of operation of the function for Anti-legionella exist in the system. They can be selected and the parameters adjusted.

Legionella
Operation mode
Temperature
Interval

or

Legionella
Operation mode
Temperature
Interval

The operating mode options are:

Operation Mode
None

Operation Mode
Weekday

Operation Mode
Interval

Weekday – set the weekday and time of operation

Interval - sets the interval between operation  
The mode of operation when set changes the last menu option to set the parameter controlling the anti-legionella event. Both modes require a temperature setpoint.

Temperature
65°C
Done

Interval
7day(s)
Done

Weekday and time
Weekday: Saturday
Start time: 01:00

### 3.7.13 Menu – DHW – Settings – Frost protection

Frost protection
DHW minimum flow

DHW minimum flow
8°C
Done

### 3.7.14 Menu – DHW – Time clock

Each DHW circuit can have its own individual time programme. Refer to the Plant section for guidance on how this is set.

### 3.7.15 Menu – DHW – Holiday programme

Each DHW circuit can have its own individual holiday programmes. Refer to the Plant section for guidance on how this is set.

## 3.8 Menu – Cascade manager

The cascade manager menu has the following sub menus:

Cascade manager
Status
Settings

### 3.8.1 Menu – Cascade manager - Status

On selecting status, the following sub menus are available:

Cascade manager
Summary
Boilers

This will now show the status of the plant cascade, and each boiler in the cascade.

### 3.8.2 Menu – Cascade manager – Status – Summary

Summary shows the actual heat capacity being generated and the target calculated requirement.

Summary
Actual: 0%
Requested: 0%

### 3.8.3 Menu – Cascade manager – Status – Boilers

Summary shows the actual operating mode and heat capacity being generated by each boiler, the list can be scrolled if required to show all boilers configured:

Boilers
Boiler 1: Off, 0%
Boiler 2: Off, 0%

### 3.8.4 Menu – Cascade manager – Settings

The cascade manager has a number of setting which can be adjusted in the following sub menus:

Settings
Boiler modulation
Sequence on delay
Sequence order

### 3.8.5 Menu – Cascade manager – Settings – Boiler modulation

Boiler modulation controls the switching capacity set points in the cascade. Each boiler in cascade can be switched on at the earliest or latest modulation capacity set point (modulation max.), as well as switched off in the same way (modulation min.).

Boiler modulation
Modulation max.
Modulation min.

### 3.8.6 Modulation max

This causes the first boiler in the sequence to modulate up to the Modulation max capacity setting before it brings on the second boiler in the sequence and then modulates down to match the capacity of both. This continues for each boiler.

Modulation max.
80%

### 3.8.7 Modulation min

This causes the cascade to modulate down to the Modulation min setting on each boiler before switching one off. This then continues for each boiler.

Modulation min.
30%

### 3.8.8 Menu – Cascade manager – Settings – Sequence on delay

This parameter sets the time delay when bringing on boilers in sequence, this is to allow for the boiler cascade to better match the load during the start of a demand cycle.

Sequence on delay
10secs

### 3.8.9 Menu – Cascade manager – Settings – Sequence order

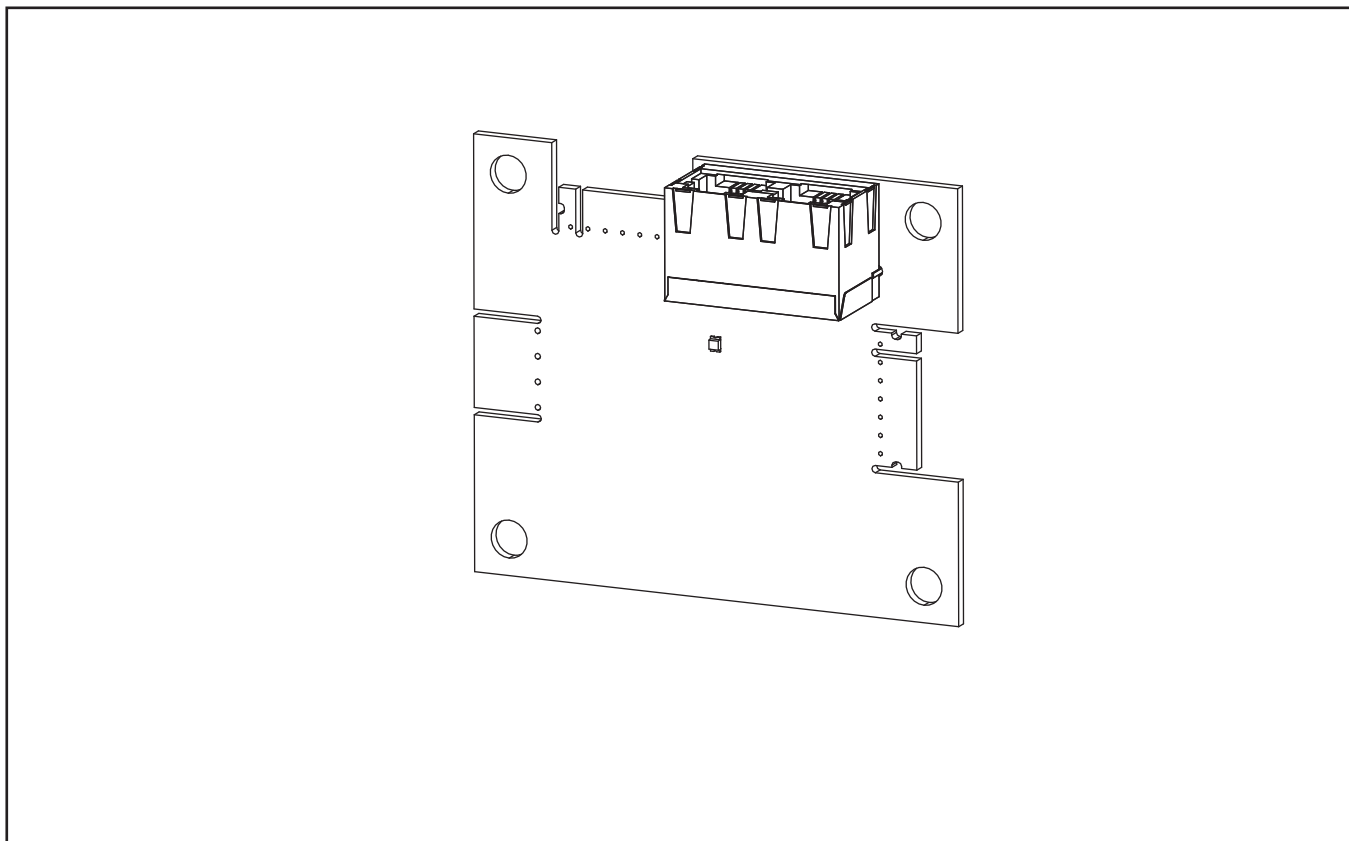
The order that the boilers run in sequence can be set, this does not affect the lead boiler rotation. To change the order, remove the boiler numbers in sequence by setting them to NN and then redefine the boiler numbers as required. By default the boiler number follows the sequence number.

Sequence order
Seq. 1: Boiler 01
Seq. 2: Boiler 02

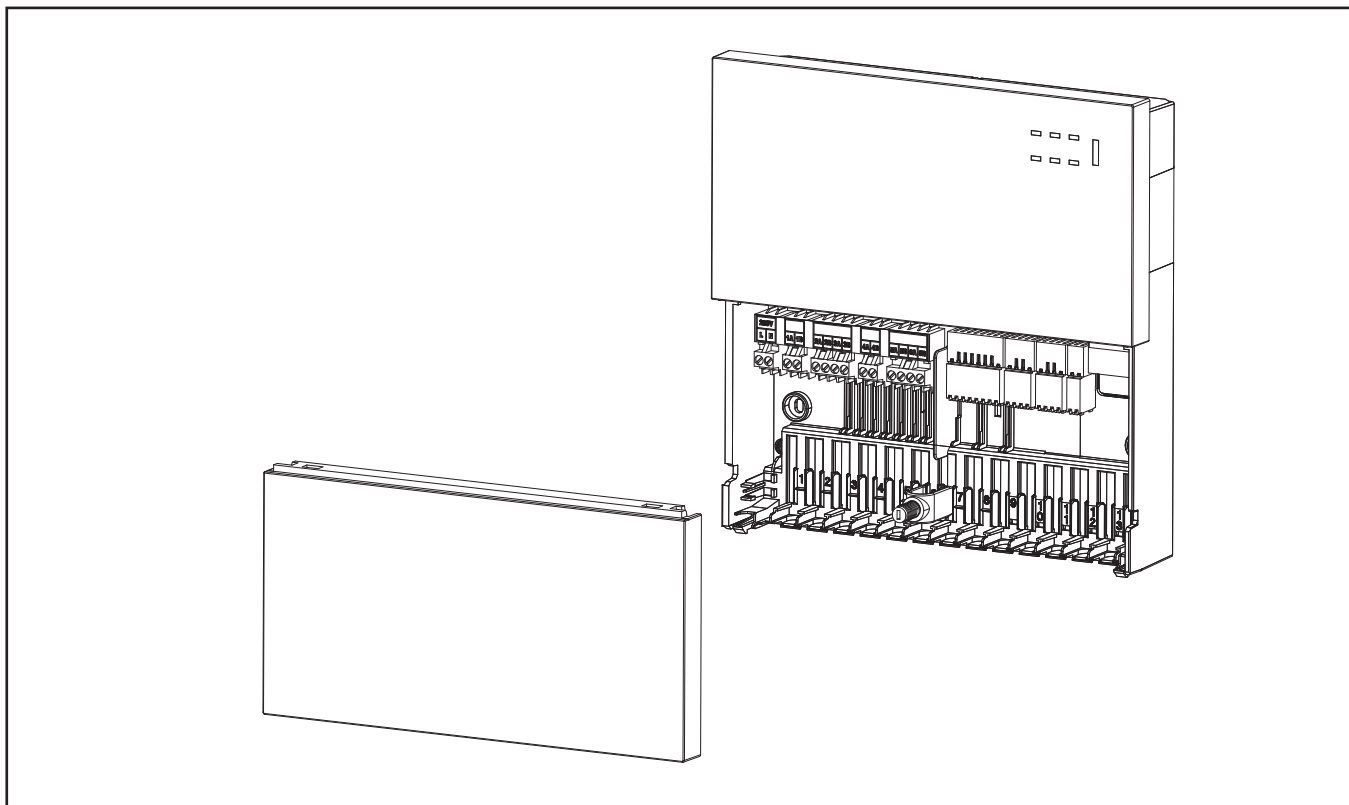
Sequence order
Seq. 1: Boiler 01
Seq. 2: Boiler 02

## 4 INSTALLATION

### 4.1 Electrical Connections



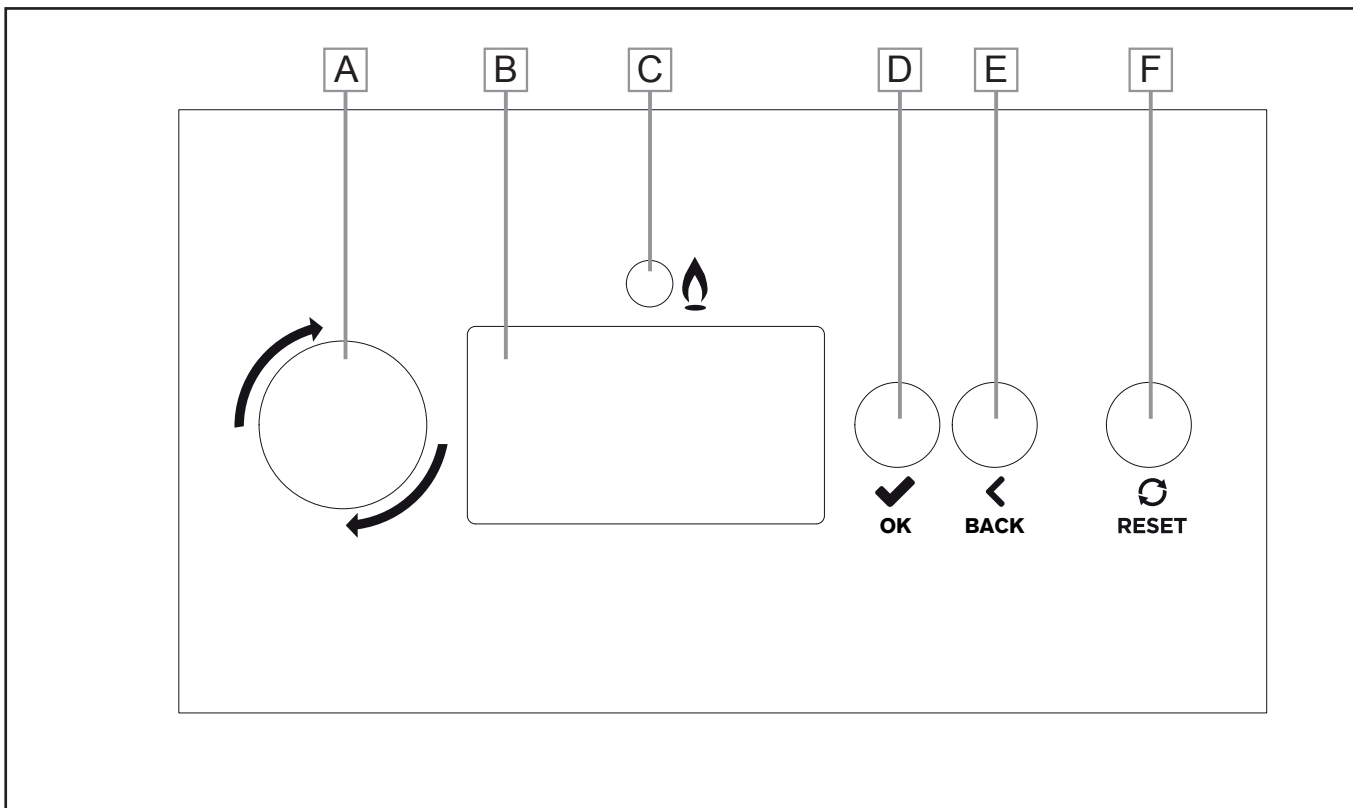
**FIGURE 2 VARICAN ADAPTOR DIAGRAM**



**FIGURE 3 EXTENSION MODULE DIAGRAM**

## 5 CONFIGURATION

### 5.1 System Manager Interface



**FIGURE 4 SYSTEM MANAGER INTERFACE**

#### A. Rotary Knob

- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Scroll up (anti-clockwise) or down (clockwise) in a menu
- Change the value in parameter setting.
- If an error is showing in the title bar, scroll to the associated error screen(s), and return.

#### B. LCD Display Screen

- Menu and status display.

#### C. Burner LED

- Will be on if the burner is lit.

#### D. Select button

- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Enter the highlighted menu (sub menu or parameter), if in a menu or sub menu.
- If in a parameter setting, select a parameter which will then flash for adjustment, once adjusted using the rotary knob press again to store and move on.

#### E. Back button

- In a menu, return to the previous menu layer.
- In parameter setting, exit the parameter without storing the value.
- In a guided assistant, go back to the previous screen.

#### F. Reset button

- Reset the associated boiler module error, if a resettable (lockout) error is active.
- Return to the normal operation screen.



## 5.2 Cascade Configuration

Once the VariCAN adapters have been installed and connected into each boiler in the cascade then the cascade can be configured.

Power up each boiler in the cascade then return to the Cascade Master boiler to start the configuration. The following screens will be displayed on each boiler at power up:

443.100.000
-------------


Initial configuration


Language
English
Francais
Nederlands


The default language will be selected and highlighted.


Controller
Slave
Master

On the Master boiler in the cascade, select "Master", the following screens will appear in the order shown below:

Initialize communication



Configure as master


Scan devices


Pairing devices


Date
Year: 2018
Month: 1
Day: 1
Done

Once the master boiler System Manager has been selected and the Scan Devices completed, all Slave boilers will display the following screen.

Waiting for master


On the Master boiler, set the date fields, followed by "Done".

Date
Year: 2019
Month: 1
Day: 1
Done

Date
Year: 2019
Month: 1
Day: 1
Done

Date
Year: 2019
Month: 9
Day: 1
Done

Date
Year: 2019
Month: 9
Day: 6
Done

Once the date is set and "Done" is selected the following screen is displayed:

Time
Hour: 0
Minute: 0
Auto su/wi time: <input checked="" type="checkbox"/>
Done

On the Master boiler now set the time and settings for Summer/Winter time change, followed by "Done":

Time
Hour: 0
Minute: 0
Auto su/wi time: <input checked="" type="checkbox"/>
Done

Time
Hour: 15
Minute: 0
Auto su/wi time: <input checked="" type="checkbox"/>
Done

Time
Hour: 15
Minute: 55
Auto su/wi time: <input checked="" type="checkbox"/>
Done

Time
Hour: 15
Minute: 55
Auto su/wi time: <input checked="" type="checkbox"/>
Done

Once the Master boiler has the date and time set then all slave boilers will adopt these settings.

Once 'Done' is selected, the following screen will appear:

Set boiler number
Boiler 01 Master
Boiler 02
Done

This is an example where there are two boilers in the Cascade, each Slave boiler will be listed from Boiler 02 onwards, Boiler 01 is always the Master, and the configuration of Slave boilers will be different to the Master but will follow the identical procedure.

The Boilers numbers in the case of only 2 boilers can appear in any order, this is in relation to how they are discovered during the Bus Scanning process, and the Slave boiler is also pre-allocated as boiler 2. When a Boiler is highlighted in the menu, the corresponding TTL-i5 VariCAN adapter LED will illuminate, in the case of a Slave boiler the System Manager Display will also change to inverse video to allow identification, selection and labelling. For any Slave boilers where there is more than 2 boilers in the cascade, the display will show:

Set boiler number
Boiler 01 Master
Boiler ##
Boiler ##

If any Slave boilers are not listed, check that they are connected correctly to the bus and that they have their power switched on.

Each Slave boiler can be selected and a number allocated, usually corresponding to their physical location in the cascade:

Set boiler number
Boiler 01 Master
Boiler 03
Boiler 02

In the case above, the second Slave boiler highlighted was identified as Boiler 03 in the cascade, and the third Slave as Boiler 02, adjacent to the Master boiler.

Once you are happy with the selection of the Slave boiler numbers, select 'Done'.

The following screen will then appear:


---

The Master boiler is now scanning the installation to locate all of the connected boiler Heating Circuits.

Upon completion the following screen will be displayed showing all available Heating Circuits in relation to all boilers:

Set HC number

HC ## Boiler 1.1

HC ## Boiler 1.2

HC ## Boiler 2.1

In this example each boiler has 2 heating circuits that may be selected for use. By scrolling down all boiler Heating Circuits can be selected and allocated a unique number in the system. For example in a two boiler cascade:

Set HC number

HC ## Boiler 1.1

HC ## Boiler 1.2

HC ## Boiler 2.1

HC ## Boiler 2.2

Set HC number

HC ## Boiler 1.2

HC ## Boiler 2.1

HC ## Boiler 2.2

Done

Once you have selected and allocated a number to the Heating Circuits that you wish to use and configure, for example a single HC on the Master boiler and Two HCs on the Slave boiler:

Set HC number

HC 01 Boiler 1.1

HC ## Boiler 1.2

HC ## Boiler 2.1

Set HC number

HC 01 Boiler 1.1

HC ## Boiler 1.2

HC ## Boiler 2.1

HC ## Boiler 2.2

Set HC number

HC ## Boiler 1.2

HC 02 Boiler 2.1

HC ## Boiler 2.2

Done

Set HC number

HC 02 Boiler 2.1

HC 03 Boiler 2.2

Done

Select 'Done' and the following screens will appear:

Set DHW number

DHW ## Boiler 1

DHW ## Boiler 2

Done

Note: The DHW circuit shares resources with the second Heating Circuit on each boiler, therefore is a second HC is already allocated then this will not be available for selection.

Once you have selected and allocated a number to the DHW Circuits that you wish to use and configure, for example, in line with the above example, a single HC on the Master boiler and Two HCs on the Slave boiler with a single DHW circuit on the Master boiler:

Set DHW number

DHW 01 Boiler 1

Done

Select 'Done' and the following screen will appear:

## 5.3 Plant Configuration

Configure plant?
No
Yes

Plant configuration is related to shared resources necessary for the operation of the complete cascade/plant. To configure these select 'Yes' and then follow the screens.

If you are using a Cascade header thermistor then select 'Yes'.

Do you have a hydraulic separation?
No
Yes

If you are using the Cascade flue system that requires an increase in the minimum fan speed then select 'Yes'

Set flue system
Standard
Multiline

If the boiler cascade has a common pump that circulates water through all the boilers in the Cascade the select the output of the Master boiler that controls this pump. Otherwise select 'None'.

Loc'n of shared boiler pump?
None
PWM/0-10V ()
MFR1 ()

The following outputs can be configured for this function:

Loc'n of shared boiler pump?
None
PWM/0-10V ()
MFR1 ()
MFR2 ()

Loc'n of shared boiler pump?
PWM/0-10V ()
MFR1 ()
MFR2 ()
MFR3 ()

Loc'n of shared boiler pump?
MFR1 ()
MFR2 ()
MFR3 ()
MFR4 ()

Loc'n of shared boiler pump?
MFR2 ()
MFR3 ()
MFR4 ()

Loc'n of shared boiler pump?
MFR3 ()
MFR4 ()

Note: Once a programmable has been selected the function will appear within the parenthesis at the right of the designated output name.

If the boiler cascade has a common pump that circulates water through either the boiler cascade or cascade header and supplies the heating load then select the output of the Master boiler that controls this pump. Otherwise select 'None'.

Select Loc'n of system pump?
None
PWM/0-10V ()
MFR1 ()

The following outputs can be configured for this function:

Select Loc'n of system pump?
None
PWM/0-10V ()
MFR1 ()
MFR2 ()

Select Loc'n of system pump?
PWM/0-10V ()
MFR1 ()
MFR2 ()
MFR3 ()

Select Loc'n of system pump?
MFR1 ()
MFR2 ()
MFR3 ()
MFR4 ()

Select Loc'n of system pump?
MFR2 ()
MFR3 ()
MFR4 ()

Select Loc'n of system pump?
MFR3 ()
MFR4 ()

If the boiler cascade has a shunt pump to control the temperature differential of the cascade flow to return then select the output of the Master boiler that controls this pump. Otherwise select 'None'.

Select Loc'n of shunt pump?
None
PWM/0-10V ()
MFR1 ()

The following outputs can be configured for this function:

Select Loc'n of shunt pump?
None
PWM/0-10V ()
MFR1 ()
MFR2 ()

Select Loc'n of shunt pump?
PWM/0-10V ()
MFR1 ()
MFR2 ()
MFR3 ()

Select Loc'n of shunt pump?
MFR1 ()
MFR2 ()
MFR3 ()
MFR4 ()

Select Loc'n of shunt pump?
MFR2 ()
MFR3 ()
MFR4 ()

Select Loc'n of shunt pump?
MFR3 ()
MFR4 ()

The Master boiler in a cascade can indicate if a system fault condition exists, so any boiler fault, Master or Slave. This can then be used to indicate to plant monitoring equipment if any fault exists in the complete system. If this is required then select the output of the Master boiler that controls this signal. Otherwise select 'None'.

System fault indication
None
PWM/0-10V ()
MFR1 (HC1 pump)

The following outputs can be configured for this function:

System fault indication
None
PWM/0-10V ()
MFR1 (HC1 pump)
MFR2 (DHW pump)

System fault indication
PWM/0-10V ()
MFR1 (HC1 pump)
MFR2 (DHW pump)
MFR3 (Boiler on indicator)

System fault indication
MFR1 (HC1 pump)
MFR2 (DHW pump)
MFR3 (Boiler on indicator)
MFR4 (Boiler Fault Indicator)

System fault indication
MFR2 (DHW pump)
MFR3 (Boiler on indicator)
MFR4 (Boiler Fault Indicator)

System fault indication
MFR3 (Boiler on indicator)
MFR4 (Boiler Fault Indicator)

The plant may be controlled in a number of ways:

1. 0-10V analogue input
2. 230V 50Hz switched live input via a 'Volts Free' contact
3. OpenTherm Master controller

### 0-10V analogue input control

If the Plant cascade control is via a BMS with a 0-10V signal then this can be selected and configured next. The following options are available:

Configure 0-10V input

None

0-10V Capacity

0-10V Temperature

Configure 0-10V input

None

0-10V Capacity

0-10V Temperature

Configure 0-10V input

0-10V Capacity

0-10V Temperature

Once 0-10V control is selected a number of parameters must be defined. The default settings are as shown below but these can be changed if required. To configure the parameters select 'Yes', to accept the current default settings select 'No'.

Configure 0-10V parameters

No

Yes

Once 'Yes' is selected the parameters can be set using the following screens. Firstly the 'Voltage Life Zero' is set, this is the minimum voltage that is required to be present on the 0-10V input to indicate that the electrical connection to the BMS is present. If the voltage is not at or above this level then a fault will be indicated, this confirms that the BMS is connected to the Master boiler 0-10V input and the wiring is intact.

Configure voltage life zero

2.0V

Done

Once this level is set, 'Done' may be selected and then the voltage that starts a demand on the Plant can be set. So any voltage above this level will generate a demand.

Configure voltage demand

3.0V

Done

Once this level is set, 'Done' may be selected.

The next plant control signal that may be configured is where a Switched Live signal is used to generate a demand to enable the cascade.

### SL1 230V demand

Configure SL1

None

Enable

If this signal is to be configured then select Enable, otherwise select 'None'. This will then prompt for a Cascade flow temperature set point, which will be the target temperature for the cascade under direct SL1 control.

Plant Setp. SL1

85°C

Done

Once this level is set, 'Done' may be selected.

The next plant control signal that may be configured is the OpenTherm Bus signal which is a bidirectional signal to the cascade.

### OpenTherm

This bus signal can both control and monitor the status of the cascade via the Master boiler. It has a number of modes of operation:

1. On/Off demand
2. Temperature setpoint demand
3. Capacity setpoint demand

If no OpenTherm control of the cascade is required then 'None' may be selected.

Configure OpenTherm

No

On demand

Temperature demand

The options that may be selected are as below, if 'On demand' is selected this is effectively a PELV 'volts free' enable signal.

Configure OpenTherm

None

On demand

Temperature demand

Capacity demand

If 'On demand' is configured then this will then prompt for a Cascade flow temperature set point, which will be the target temperature for the cascade under direct OpenTherm control.

OpenTherm Temp. Setpoint

60°C

Done

Once this level is set, 'Done' may be selected.

The next plant function that may be selected is the outside sensor input if one is to be used for the control of the flow temperature from the cascade. If not then select 'Done'.

Outside sensor available?

None

Yes

An internal timeclock can be configured to control the operating times of the Plant cascade. If this is required then multiple or single days can be programmed, within these programmed days three periods can be set. If no internal timeclock is required then select 'No'.

Config. internal time clock?

No

Yes

The next prompt asks if you wish to configure individual days or multiple days for the timeclock programmes.

A single day is for individual programmes for every day of the week, Monday through to Sunday.

Multiple days are defined as Mon-Fri, or Sat-Sun. Where the same programme times are set for each group.

Time clock?

Single

Multiple

### Single days

The individual days can be selected as highlighted, then each of the program periods and Start/Finish times. As shown below:

Single	
Monday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Tuesday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Wednesday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Thursday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Friday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Saturday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Sunday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

### Multiple days

Multiple	
Mon-Fri	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Multiple	
Sat-Sun	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

The cursor can then scroll through the setting for each period in order, Hours followed by Minutes. Once the timeclock settings are completed, select 'Done'

Holiday programmes may also be set for the Plant cascade where the operation of the Plant can be set to Holiday mode. Eight holiday periods may be set with Start and End dates. If no Holiday periods need to be set then select 'No'.

Configure holiday program	
No	
Yes	

To set holiday periods select the period, 1-8 and set the Start and End date. Once completed select 'Done'.

Holidays	
Period 1	
Start	01/01/2000
End	01/01/2000
Done	

This is now the end of plant configuration.

## 5.4 Boiler Configuration

The next stage is to configure each of the boilers in the cascade. This process is carried out from the Master boiler. The configuration parameters for the boiler configuration are specific to that particular boiler.

Select the boiler from the list which is to be configured.

Select boiler to configure
Boiler1
Boiler 2
Done

If the selected boiler has its own unique primary water circulation pump this is where it is configured. Once again one of the programmable outputs from the boiler can be used to control this pump function. If no individual boiler pump is present then select 'None'.

Select location of boiler pump
None
PWM/0-10V ()
MFR1 ()

Select location of boiler pump
None
PWM/0-10V ()
MFR1 ()
MFR2 ()

Select location of boiler pump
PWM/0-10V ()
MFR1 ()
MFR2 ()
MFR3 ()

Select location of boiler pump
MFR1 ()
MFR2 ()
MFR3 ()
MFR4 ()

Select location of boiler pump
MFR2 ()
MFR3 ()
MFR4 ()

Select location of boiler pump
MFR3 ()
MFR4 ()

The next boiler configuration step is the Boiler On indication output. Once again any of the programmable outputs may be selected. Usually MFR3 is allocated. The full screens list is omitted for simplicity.

Boiler on indication
None
PWM/0-10V ()
MFR1 ()

The next boiler configuration step is the Boiler Fault indication output. Once again any of the programmable outputs may be selected. Usually MFR4 is allocated. The full screens list is omitted for simplicity.

Boiler fault indication
None
PWM/0-10V ()
MFR1 ()

The next boiler configuration step is the LPG valve control output. This function is for control of an external LPG valve in series with the Gas line as an additional safety feature. It is opened during the burner phase of the Boiler. Once again any of the programmable outputs may be selected. The full screens list is omitted for simplicity.

LPG valve
None
PWM/0-10V ()
MFR1 (HC1 pump)

The next boiler configuration step is the powered flue damper control output. This function is for control of an external flue damper as an additional safety feature. It is opened during the fan start-up and closed after the fan post purge period of the Boiler. Once again any of the programmable outputs may be selected. The full screens list is omitted for simplicity.

Flue damper
None
PWM/0-10V ()
MFR1 (HC1 pump)

Once completed the following screen will be displayed:

Select boiler to configure
Boiler1 ✓
Boiler2
Done

Note: The boiler that has just been configured will now have a 'tick' next to its designation.

The next boiler to configure can now be selected. The process above is then repeated for all boilers in the cascade. After all Boilers have been configured, select 'Done'.

## 5.5 Heating Circuit Configuration

If heating circuits were located and allocated during initial setup then they will now appear here to be configured. There is a maximum number of heating circuits for each boiler, in this case two circuits identified by boiler number and HC number. E.g. Boiler 1.1 is boiler 1 HC 1.

Select HC to configure
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

At the end of the list of allocated HCs 'Done' is displayed.

Select HC to configure
HC1 Boiler 1.1
HC1 Boiler 2.1
HC2 Boiler 2.2
Done

Firstly select the HC you wish to configure:

Select HC to configure
HC1 Boiler 1.1
HC2 Boiler 2.1
HC3 Boiler 2.2

The next step is to configure the HC pump control signal if it has its own unique circulation pump. If you have already configured a System pump this may not be required so 'None' may be selected. One of the programmable outputs can be selected for this function. The following screen will be displayed.

Select location of HC pump
None
PWM/0-10V ( )
MFR1 ( )

Select location of HC pump
None
PWM/0-10V ( )
MFR1 ( )
MFR2 ( )

Select location of HC pump
PWM/0-10V ( )
MFR1 ( )
MFR2 ( )
MFR3 ( )

Select location of HC pump
MFR1 ( )
MFR2 ( )
MFR3 ( )
MFR4 ( )

Select location of HC pump
MFR2 ( )
MFR3 ( )
MFR4 ( )

Select location of HC pump
MFR3 ( )
MFR4 ( )

Once completed the next step is to set the Maximum and Minimum flow temperature for the HC.

Set max flow temp
85°C
Done

Select the temperature and adjust to the desired setting, confirm and then select 'Done'.

Set max flow temp
75°C
Done

Set min flow temp
15°C
Done

Set min flow temp
30°C
Done

Once completed the next step is to confirm if a Room Temperature sensor is connected and being used control the room temperature for this HC.

Room Sensor available?
No
Yes

The next step is to confirm is an Outside Temperature sensor is connected and being used as an input to the HC to calculate the required flow temperature.

Outside Sensor available?
No
Yes

Depending upon the two item selection above the next screen will show what options are available for control of the flow temperature for that specific HC.

Control variant
Flow
Weather
Room

Control variant
Flow
Weather
Room
Weather and Room

The next step is to select the function for the SL1 230V switched live input in relation to this HC, if it is required.

It can be used as a HC enable signal, an Override signal, a Holiday signal or a Frost protection input from an external 'Volts Free' contact for that specific HC. If this input is already configured, you will be queried, or if not required then 'None' can be selected.

Configure SL1
None
HC enable
Override

Configure SL1
None
HC enable
Override
Holiday

Configure SL1
HC enable
Override
Holiday
Frost

Configure SL1
Override
Holiday
Frost

Configure SL1
Holiday
Frost

The next step is to configure the OpenTherm input if it is to be used for this specific HC. The OpenTherm interface can be operated in a number of modes, On/Off as a 'volts free' PELV signal, Temperature control from an OpenTherm master, or if already configured you will be prompted, or if not used select 'None'.

Configure OpenTherm
None
On/Off
Temperature control

Configure OpenTherm
None
On/Off
Temperature control

Configure OpenTherm
On/Off
Temperature control

If On/Off or Temperature control is selected then the system needs to know of the OpenTherm Master has a built in timeclock.

OT Master with time clock?
No
Yes



The next step is to configure the HC timeclock. If no internal timeclock is required then select .No'.

Config. internal time clock?	
No	
Yes	

The next prompt asks if you wish to configure individual days or multiple days for the timeclock programmes.

A single day is for individual programmes for every day of the week, Monday through to Sunday.

Multiple days are defined as Mon-Fri, or Sat-Sun. Where the same programme times are set for each group.

Time clock?	
Single	
Multiple	

### Single days

The individual days can be selected as highlighted, then each of the program periods and Start/Finish times. As shown below:

Single	
Monday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Tuesday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Wednesday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Thursday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Friday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Saturday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Single	
Sunday	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

### Multiple Days

Multiple	
Mon-Fri	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

Multiple	
Sat-Sun	
Period 1	06:00-22:00
Period 2	00:00-00:00
Period 3	00:00-00:00 Done

The cursor can then scroll through the setting for each period in order, Hours followed by Minutes. Once the timeclock settings are completed, select 'Done'. Holiday programmes may also be set for the Heating Circuit where the operation of the Heating Circuit can be set to Holiday mode. Eight holiday periods may be set with Start and End dates. If no Holiday periods need to be set then select 'No'.

Configure holiday program	
No	
Yes	

To set holiday periods select the period, 1-8 and set the Start and End date. Once completed select 'Done'.

Holidays	
Period 1	
Start	01/01/2000
End	01/01/2000
Done	

The next step is to configure the pump protection function for this specific heating circuit.

Configure pump protection?	
No	
Yes	

If Pump protection is selected then an associated period can be set, the time duration between protection cycles and the time point at which the function should start to operate the pump.

Pump protection interval	
1day(s)	
Done	

Pump protection time point	
12:00	
Done	

The next step is to select if any DHW circuit demand configured in the system has priority over this specific heating circuit. If 'Yes' is selected than any DHW circuit demand will interrupt the HC function.

DHW priority?	
No	
Yes	

The next step is to set the initial mode of operation for this HC. By selecting the highlighted field the choices are shown in the following screens. Once selected then select 'Done'.

Operating mode	
Standby	
Done	

Operating mode	
Time clock single day	
Done	

Operating mode	
Time clock multiple days	
Done	

Operating mode	
Day	
Done	

Operating mode	
Night	
Done	

Operating mode	
Day	
Done	

Once completed the following screen will be displayed:

Select HC to configure	
HC1 Boiler 1.1 ✓	
HC2 Boiler 2.1	
HC3 Boiler 2.2	

Note: The HC that has just been configured will now have a '✓' next to its designation. The next allocated HC to configure can now be selected. The process above is then repeated for all HCs in the cascade.

Select HC to configure	
HC3 Boiler 2.2 ✓	
Done	

After all HCs have been configured, select 'Done'.



## 5.6 DHW circuit configuration

If DHW circuits were located and allocated during initial setup then they will now appear here to be configured. There is a maximum number of local DHW circuits for each boiler, in this case one circuit identified by boiler number and HC number. E.g. Boiler 1 is boiler 1 DHW circuit.

Select DHW to configure
DHW1 Boiler 1
Done

A DHW circuit can be configured as a Local DHW circuit served by that boiler only. See associated Hydraulics. If this is the case select 'Yes' in the menu.

Local DHW circuit
No
Yes

If the selected boiler has its own unique primary DHW charge pump this is where it is configured. Once again one of the programmable outputs from the boiler can be used to control this pump function. If no individual boiler pump is present then select 'None'.

Select loc'n of DHW pump
None
PWM/0-10V ()
MFR1 ()

Select loc'n of DHW pump
None
PWM/0-10V ()
MFR1 ()
MFR2 ()

Select loc'n of DHW pump
PWM/0-10V ()
MFR1 ()
MFR2 ()
MFR3 ()

Select loc'n of DHW pump
MFR1 ()
MFR2 ()
MFR3 ()
MFR4 ()

Select loc'n of DHW pump
MFR2 ()
MFR3 ()
MFR4 ()

Select loc'n of DHW pump
MFR3 ()
MFR4 ()

Once completed the next step is to set the Maximum tank temperature for the DHW circuit, followed by 'Done'.

Max tank temp
60°C
Done

Max tank temp
60°C
Done

The next step is to set the Antilegionella operating parameters. The options allow for setting a fixed day and time, or a fixed interval between cycles. Both have the ability to set the Tank temperature that the tank must achieve during the cycle. If the function is not required, 'None' may be selected.

Antilegionella?
None
Weekday
Interval

On selecting weekday the following screens with options are shown, the weekday and Start time can be set:

Antilegionella timing
Weekday: Saturday
Start time: 01:00
Done

Antilegionella
Weekday: Saturday
Start time: 01:00
Done

Once set select 'Done' to continue:

Antilegionella
Weekday: Saturday
Start time: 01:00
Done

Next you will be prompted to set the Tank temperature for the Antilegionella cycle:

Antilegionella temperature
65°C
Done

Once the required temperature has been set select 'Done' to confirm and continue:

Antilegionella temperature
65°C
Done

If Interval is selected then the following screen will be shown and the interval between Antilegionella cycles can be set:

Interval
7day(s)
Done

Once the interval is set select 'Done'.

Interval
7day(s)
Done

Once again the Antilegionella Tank temperature can be set followed by 'Done'.

Antilegionella temperature
65°C
Done

Antilegionella temperature
65°C
Done

The next step is to confirm if a Tank Temperature sensor is connected for the DHW circuit. This gives greater control to the Tank Temperature and allows multiple temperature storage values. Select 'Yes' if a Tank Temperature sensor is connected to the boiler.

Tank sensor?
No
Yes

The next step is to determine the function of the SL2 input which is a mandatory input for an Unvented DHW tank. If the Tank is Unvented you MUST select DHW Enable or DHW Override and wire the SL2 230V switched live input accordingly. The SL2 input can also provide an override function which will generate a recharge cycle for the tank when operated outside of the DHW timeclock settings.

Select the option as required.

Configure SL2
None
DHW enable
DHW override

Configure SL2
None
DHW enable
DHW override

Configure SL2
DHW enable
DHW override

The next step is to select if the OpenTherm interface is capable of controlling the DHW setpoint and time. If this is not used select 'None'.

Configure OpenTherm	
None	
Temperature demand	

Configure OpenTherm	
None	
Temperature demand	

The next step is to configure the internal timeclock function for the DHW circuit if it is required, this is the same as all other occurrences but is repeated below for ease of reference.

If no internal timeclock is required then select .No'.

Config. internal time clock?	
No	
Yes	

The next prompt asks if you wish to configure individual days or multiple days for the timeclock programmes.

A single day is for individual programmes for every day of the week, Monday through to Sunday.

Multiple days are defined as Mon-Fri, or Sat-Sun. Where the same programme times are set for each group.

Time clock	
Single	
Multiple	

### Single days

The individual days can be selected as highlighted, then each of the program periods and Start/Finish times. As shown below:

Single	
Monday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Tuesday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Wednesday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Thursday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Friday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Saturday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Single	
Sunday	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

### Multiple days

Multiple	
Mon-Fri	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

Multiple	
Sat-Sun	
Period 1 06:00-22:00	
Period 2 00:00-00:00	
Period 3 00:00-00:00	Done

The cursor can then scroll through the setting for each period in order, Hours followed by Minutes. Once the timeclock settings are completed, select 'Done'.

Holiday programmes may also be set for the DHW circuit where the operation of the DHW circuit can be set to Holiday mode. Eight holiday periods may be set with Start and End dates. If no Holiday periods need to be set then select 'No'.

Configure holiday program	
No	
Yes	

To set holiday periods select the period, 1-8 and set the Start and End date. Once completed select 'Done'.

Holidays	
Period 1	
Start 01/01/2000	
End 01/01/2000	
Done	

The next step is to set the initial mode of operation for this DHW circuit. By selecting the highlighted field the choices are shown in the following screens. Once selected then select 'Done'.

Operating mode	
Standby	
Done	

Operating mode	
Time clock single day	
Done	

Operating mode	
Time clock multiple days	
Done	

Operating mode	
Standby	
Done	

Once completed the following screen will be displayed:

Select DHW to configure	
DHW1 Boiler 1 ✓	
Done	

Note: The DHW circuit that has just been configured will now have a '✓' next to its designation.

The next allocated DHW circuit to configure can now be selected. The process above is then repeated for all DHW circuits in the cascade.

The next allocated DHW circuit to configure can now be selected. The process above is then repeated for all DHW circuits in the cascade.

Select DHW to configure


DHW1 Boiler 1 ✓

Done

After all HCs have been configured, select 'Done'.

The system configuration has now been completed. The settings relating to the Plant, Heating circuits and DHW circuits can be changed in the corresponding settings menu within each of the sections of the menus system. Refer to the operating guide section of this manual.

The system will now reboot and the following screens will be displayed:



443.100.000

< BRAND LOGO >

Loading system table

Then the following status screen will be shown, this screen shows the boiler status for a Master boiler in a cascade, a second status screen exists and can be accessed by rotating the knob anticlockwise:

< Boiler Name & Model No. >

Operation: Standby

Boiler Setp.: 0%

Boiler cap.: 0%

Flow temp.: 40.2°C

This then shows that status of the Plant.

< Boiler Name & Model No. >

Operation: Standby

Plant Setp.: 0%

Plant cap.: 0%

Header: 40.2°C

No configuration is specifically required for the Cascade Manager. Refer to the Operating Guide for the status and settings within this function.

APPENDIX 1 PARTIAL HYDRAULIC CIRCUITS

APPENDIX 1a Boiler 1 Master Configuration Options

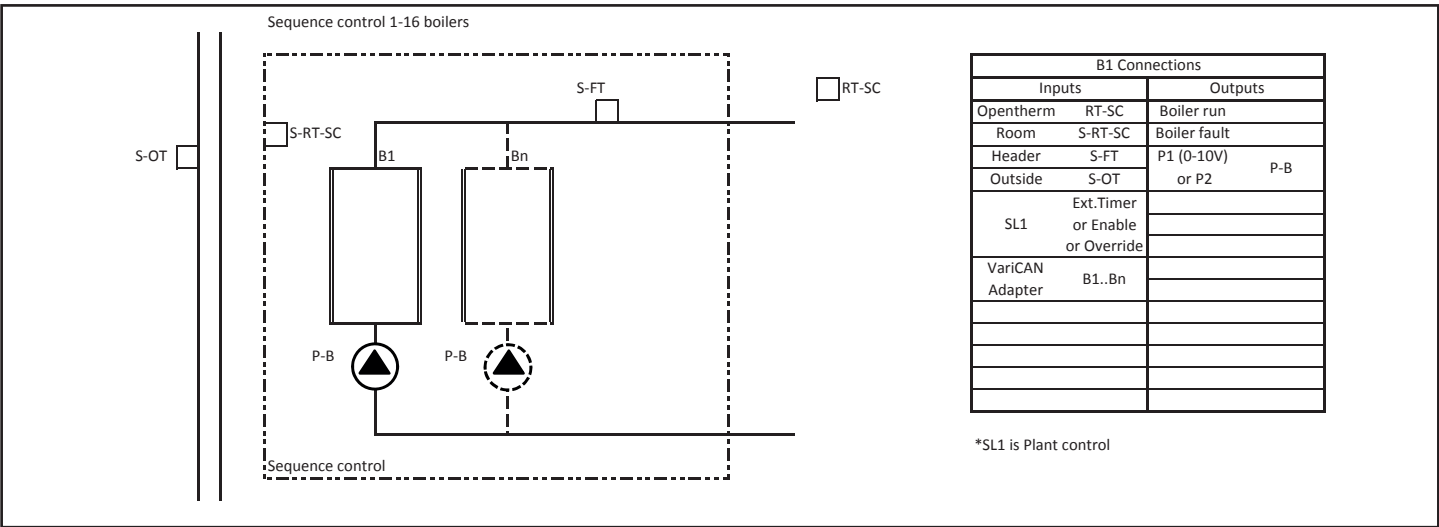


FIGURE 5 SEQUENCE CONTROL 1-16 BOILERS

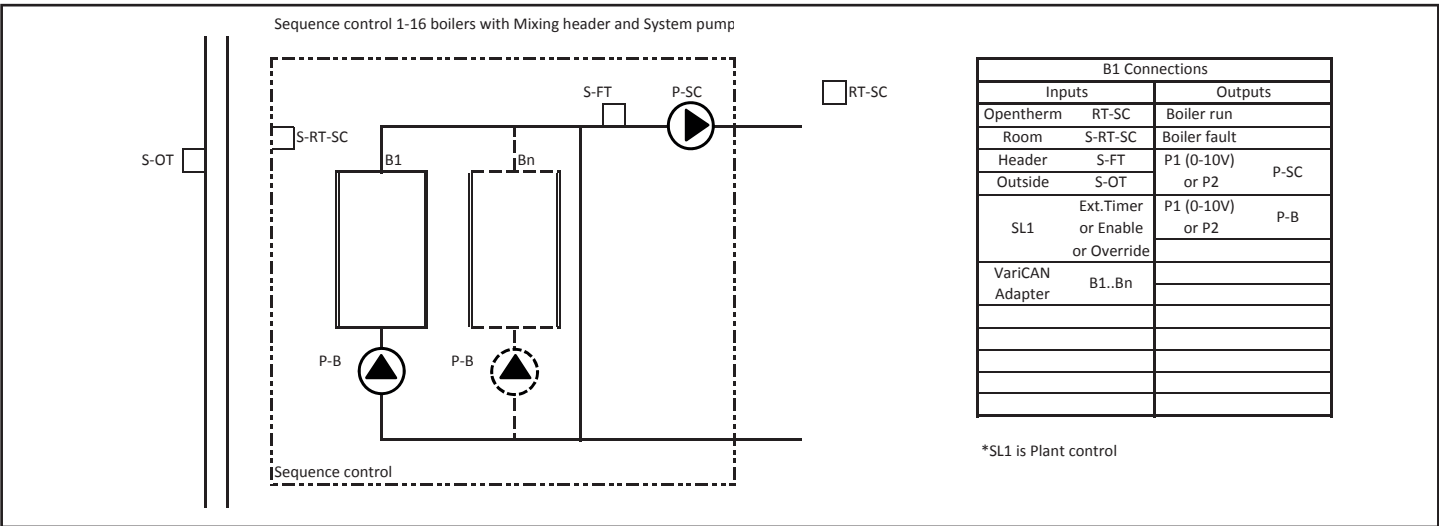


FIGURE 6 SEQUENCE CONTROL 1-16 BOILERS WITH MIXING HEADER AND SYSTEM PUMP

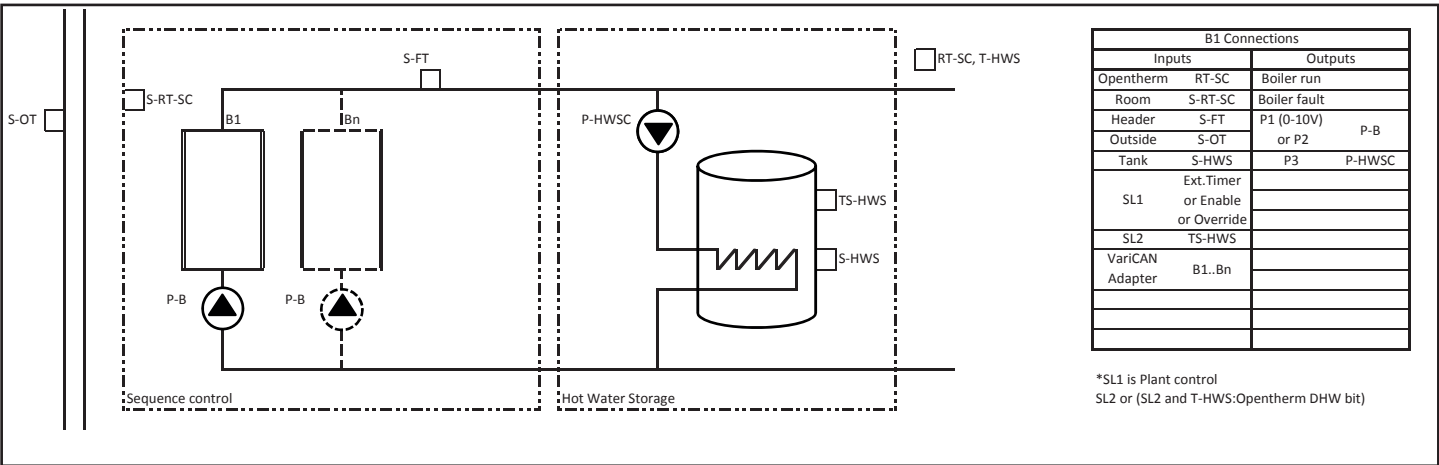


FIGURE 7 SEQUENCE CONTROL 1-16 BOILERS WITH INDIRECT HOT WATER STORAGE TANK

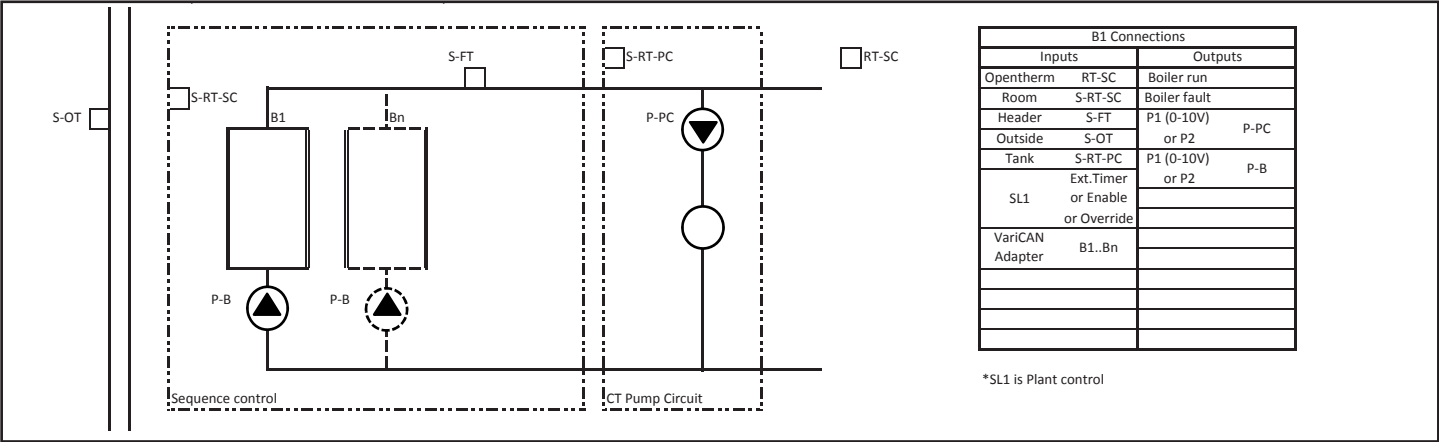


FIGURE 8 SEQUENCE CONTROL 1-16 BOILERS WITH A CT PUMP CIRCUIT

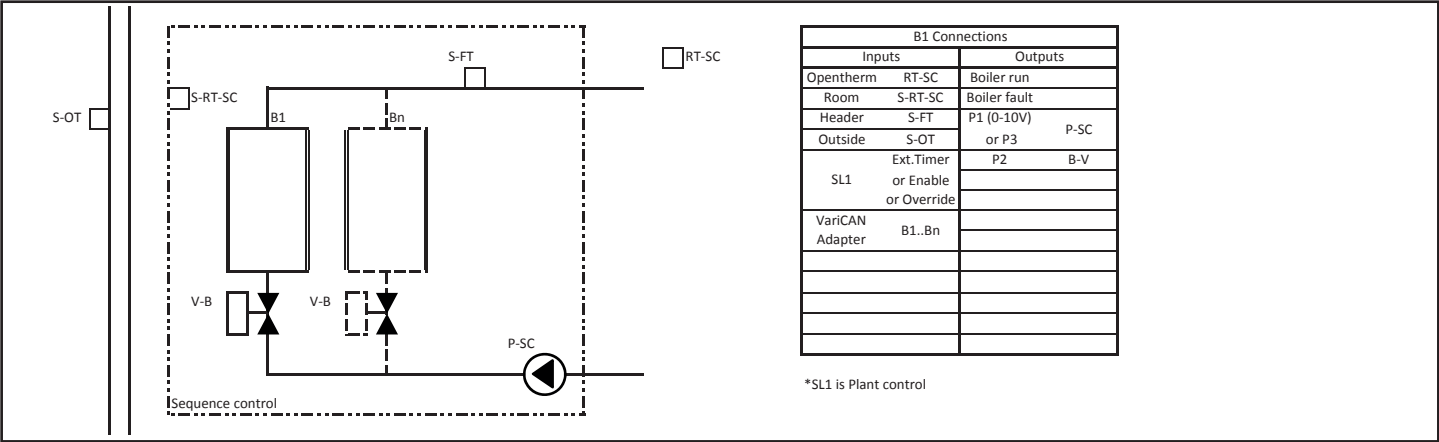


FIGURE 9 SEQUENCE CONTROL 1-16 BOILERS WITH COMMON PUMP AND OPTIONAL VALVES

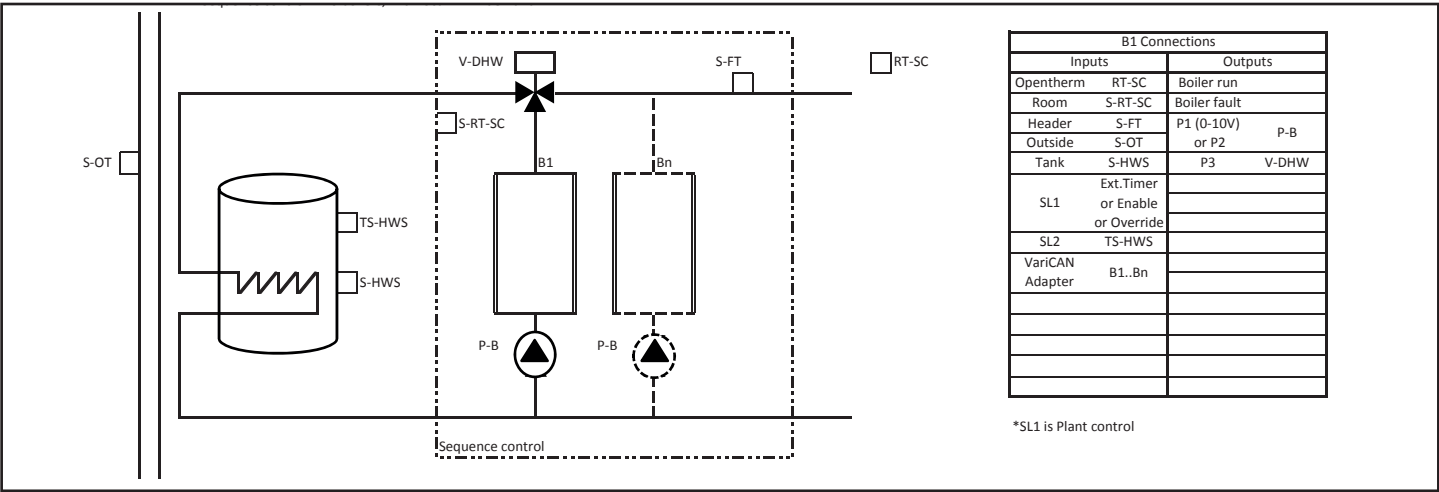
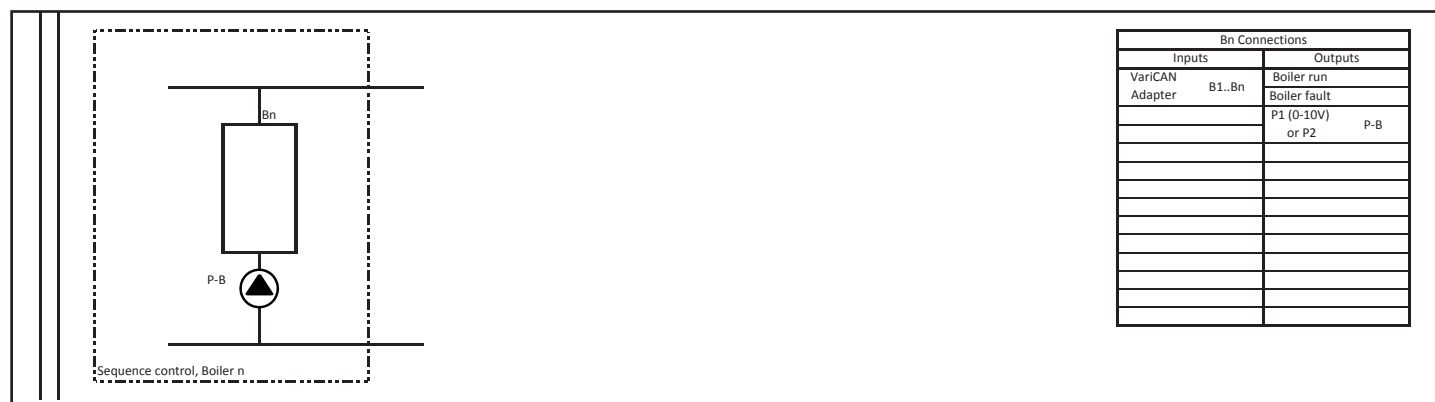


FIGURE 10 SEQUENCE CONTROL 1-16 BOILERS WITH LOCAL DHW DEMAND

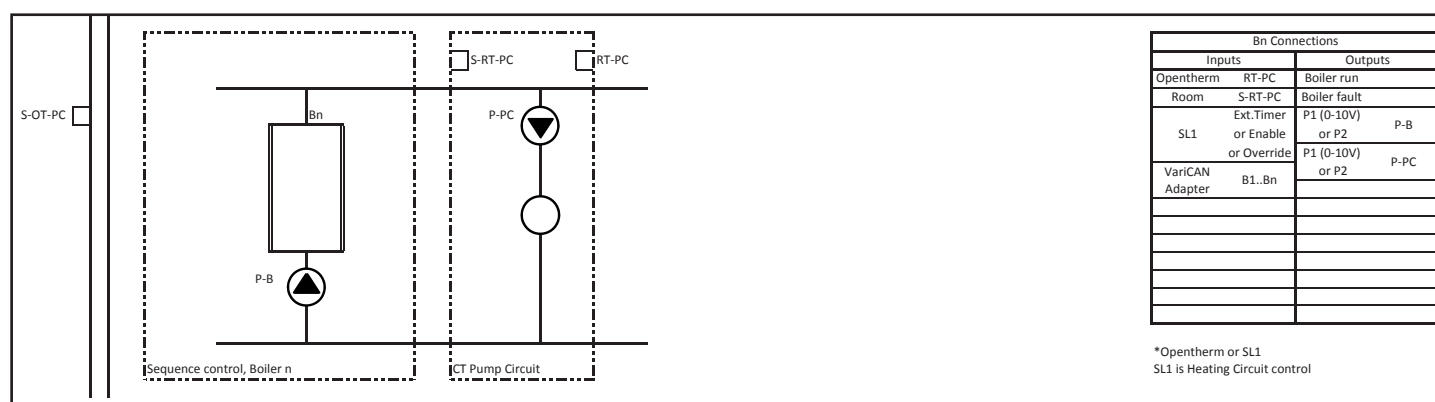




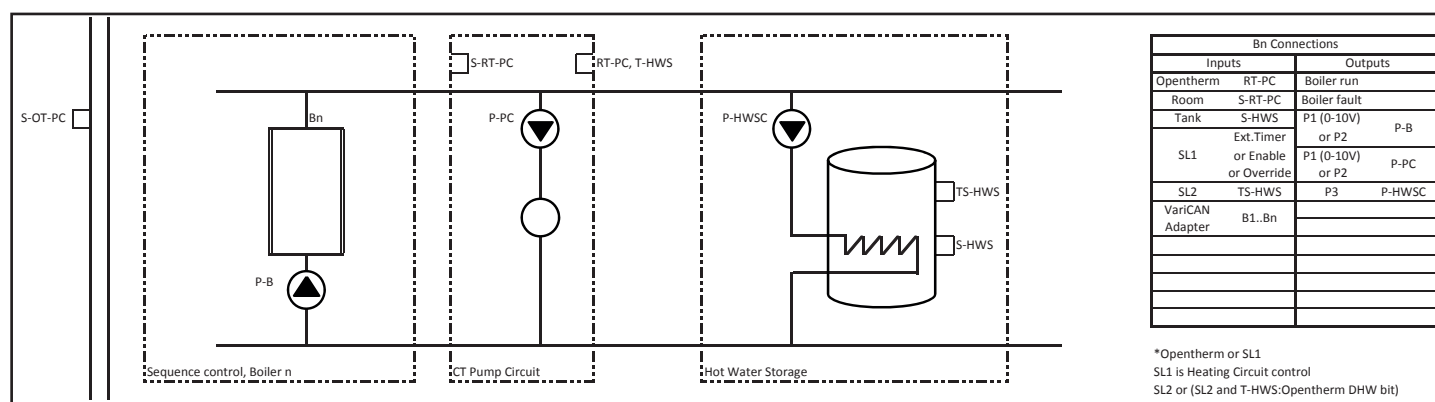
## APPENDIX 1b Boiler n Slave Configuration Options



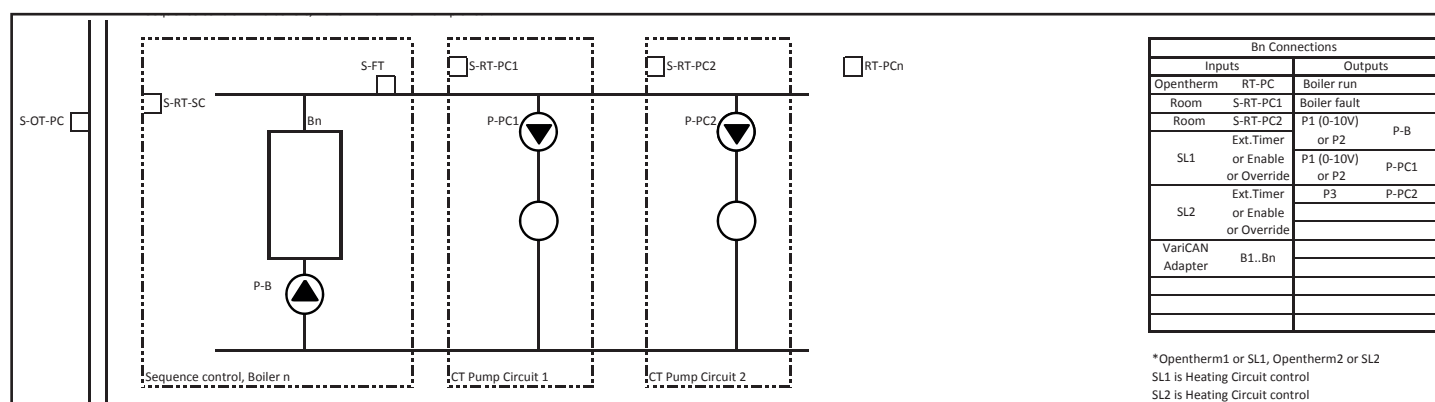
**FIGURE 15 SEQUENCE CONTROL 1-16 BOILERS, BOILER N**



**FIGURE 16 SEQUENCE CONTROL 1-16 BOILERS, BOILER N WITH CT PUMP CIRCUIT**



**FIGURE 17 SEQUENCE CONTROL 1-16 BOILERS, BOILER N WITH CT PUMP AND INDIRECT HWS CIRCUIT**



**FIGURE 18 SEQUENCE CONTROL 1-16 BOILERS, BOILER N WITH 2 X CT PUMP CIRCUIT**



APPENDIX 1c Extension Module Configuration Options

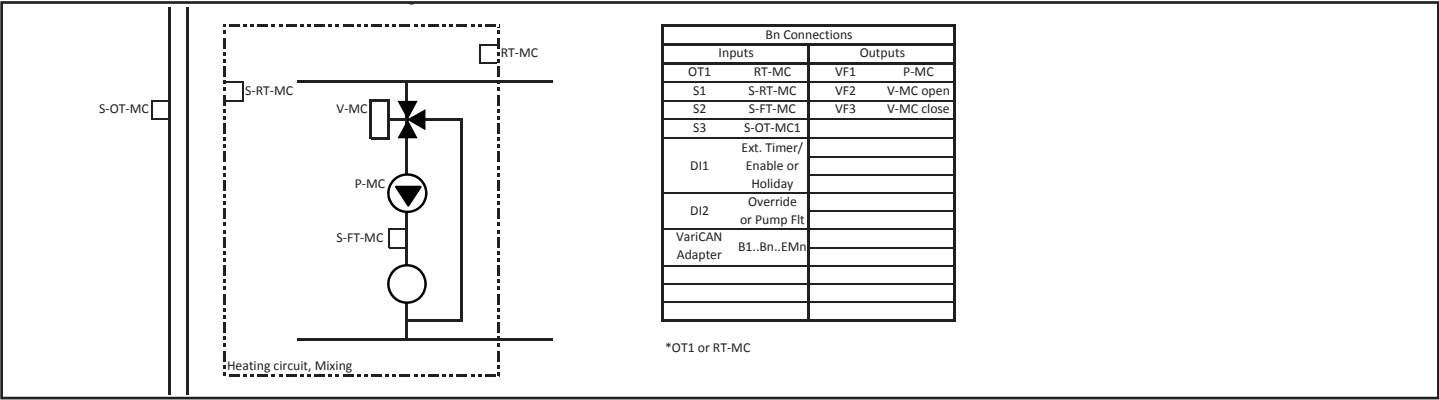


FIGURE 19 EXTENSION MODULE WITH 1 X MIXING CIRCUIT

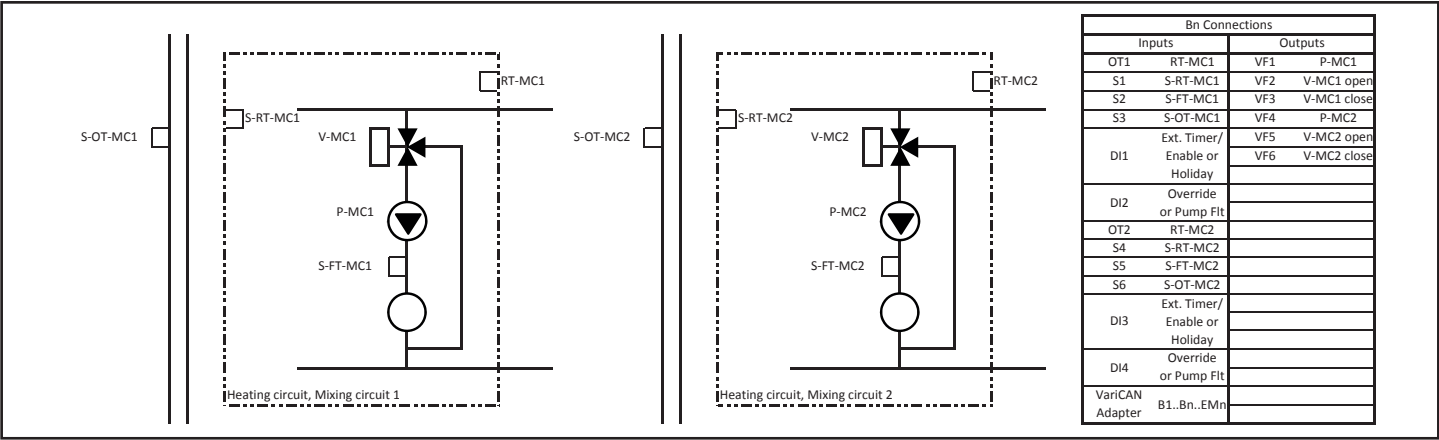


FIGURE 20 EXTENSION MODULE WITH 2 X MIXING CIRCUITS

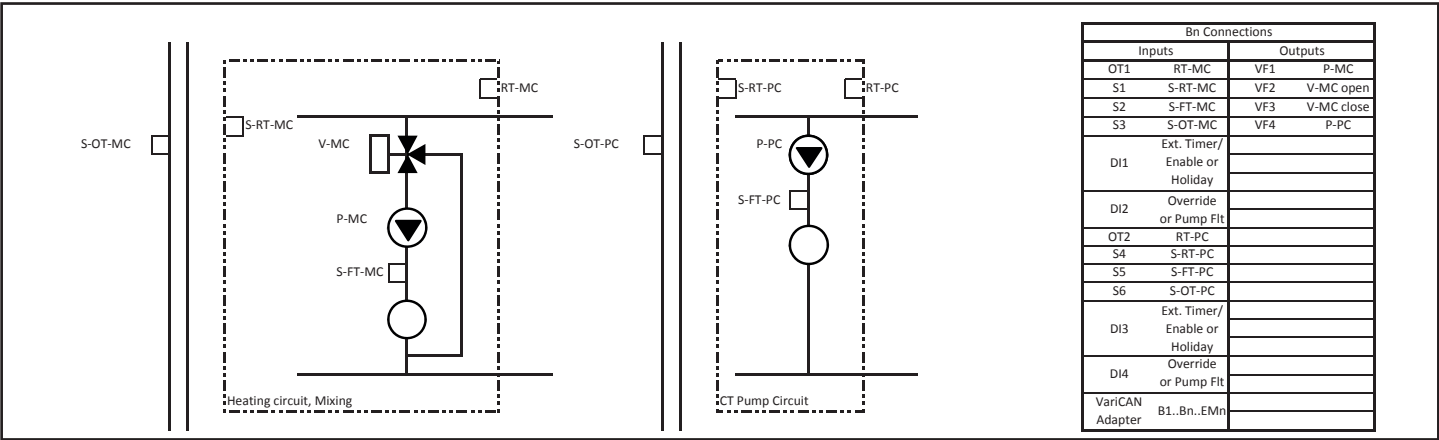
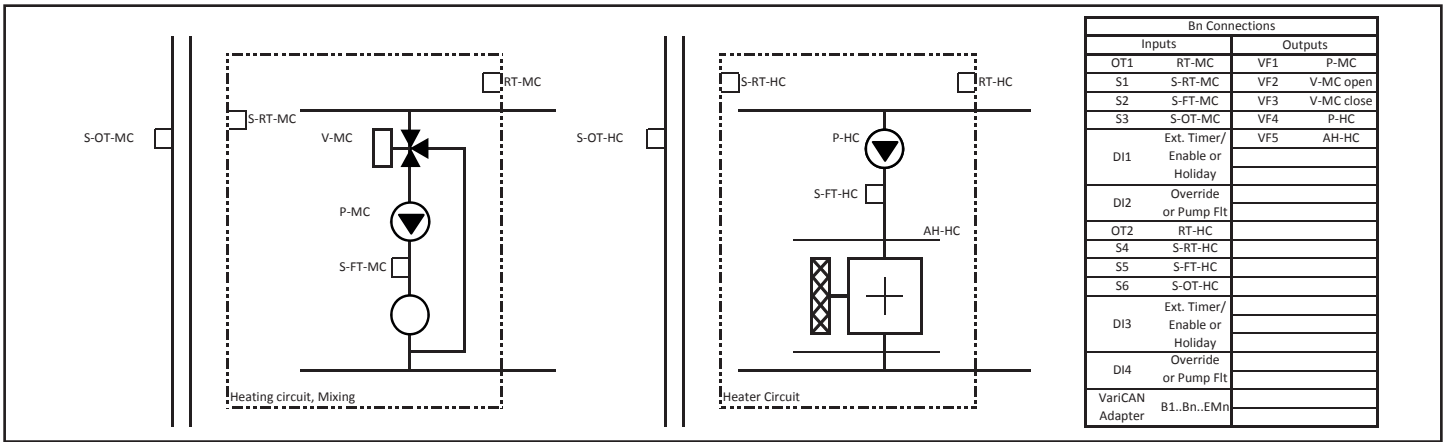
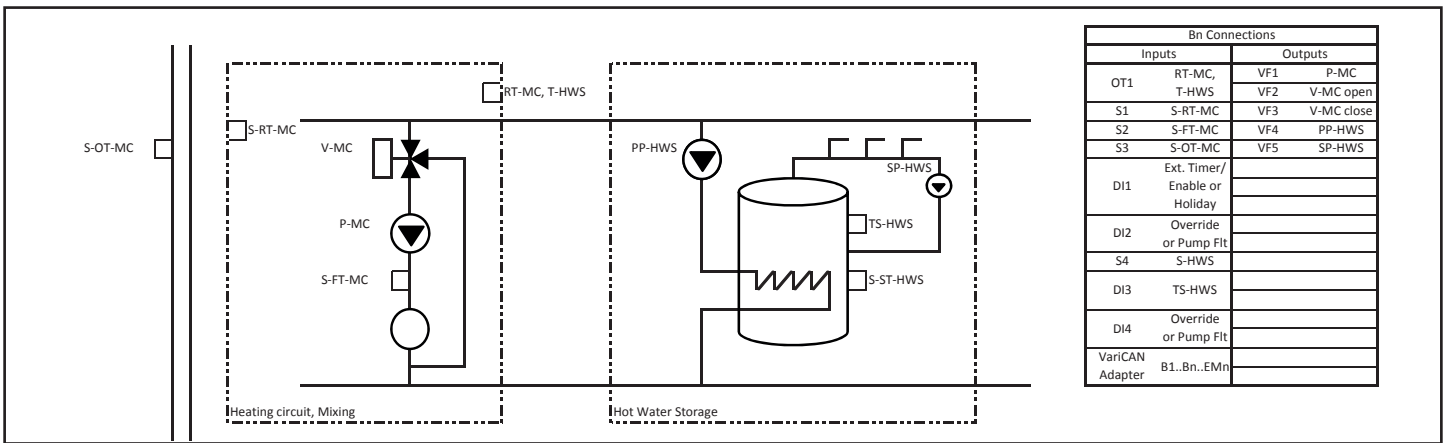


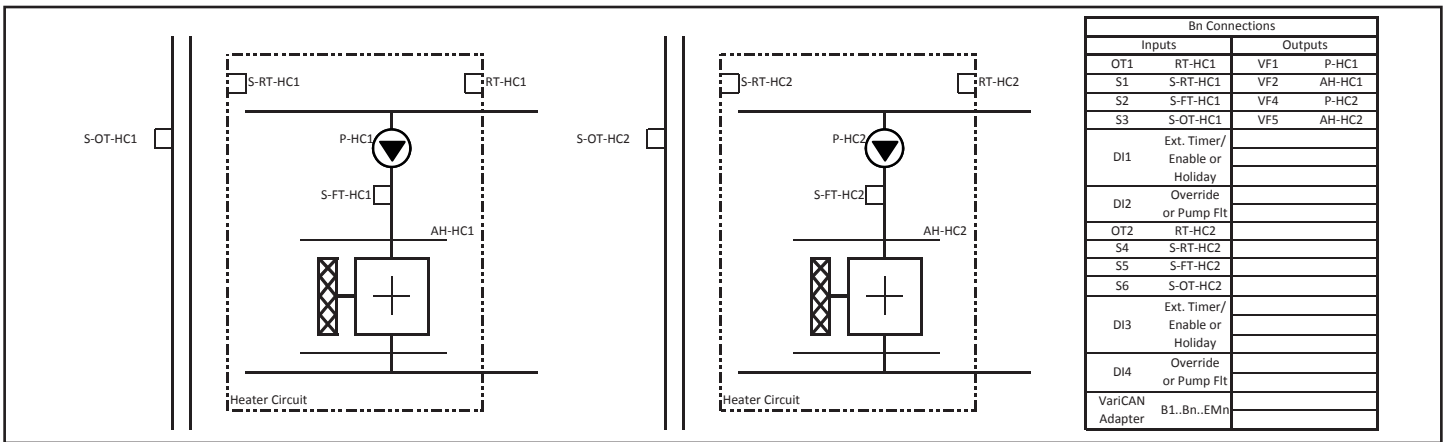
FIGURE 21 EXTENSION MODULE WITH 1 X MIXING CIRCUIT AND 1 X CT PUMPED CIRCUIT



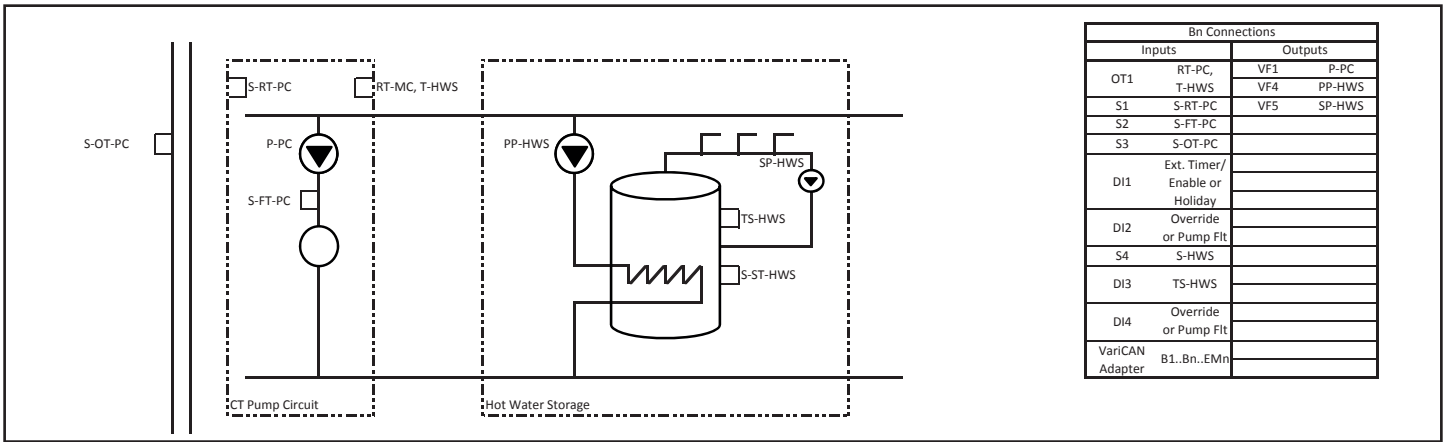
**FIGURE 22 EXTENSION MODULE WITH 1 X MIXING CIRCUIT AND 1 X AIR HANDLER CIRCUIT**



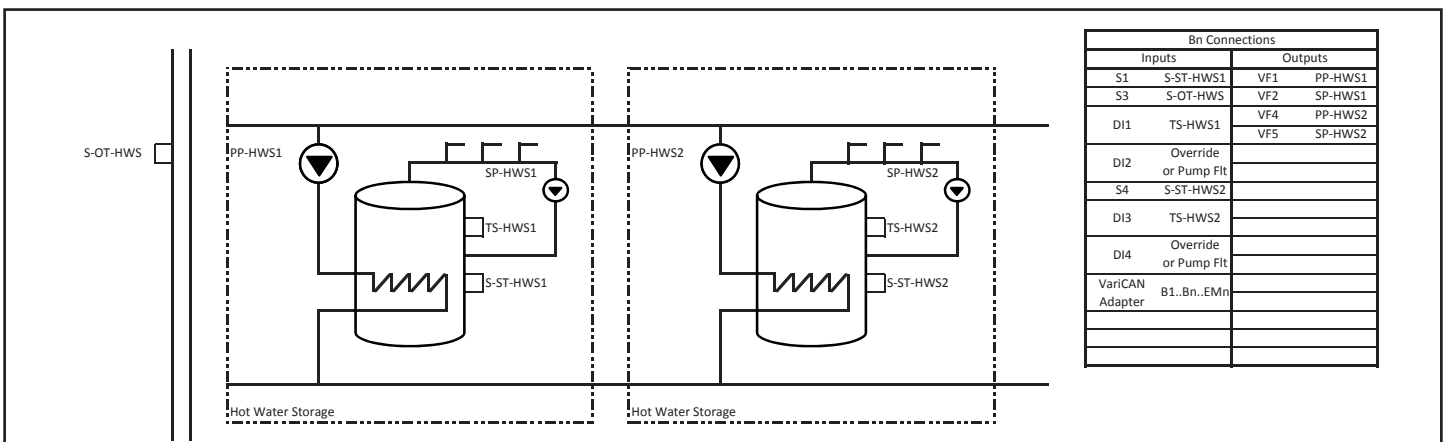
**FIGURE 23 EXTENSION MODULE WITH 1 X MIXING CIRCUIT AND 1 X HWS CIRCUIT**



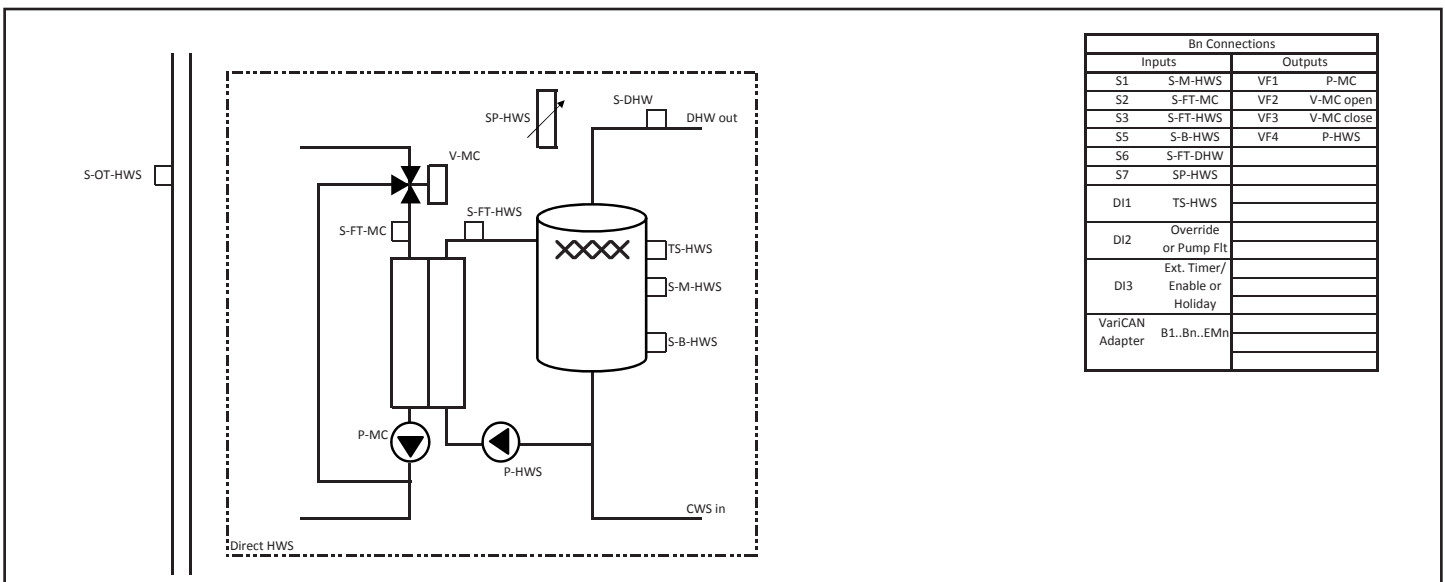
**FIGURE 24 EXTENSION MODULE WITH 2 X AIR HANDLER CIRCUITS**



**FIGURE 25 EXTENSION MODULE WITH 1 X CT PUMPED CIRCUIT AND 1 X HWS CIRCUIT**



**FIGURE 26 EXTENSION MODULE WITH 2 X HWS CIRCUIT**



**FIGURE 27 EXTENSION MODULE WITH MIXING CONTROL TO PLATE HEAT EXCHANGER FOR DIRECT HWS**

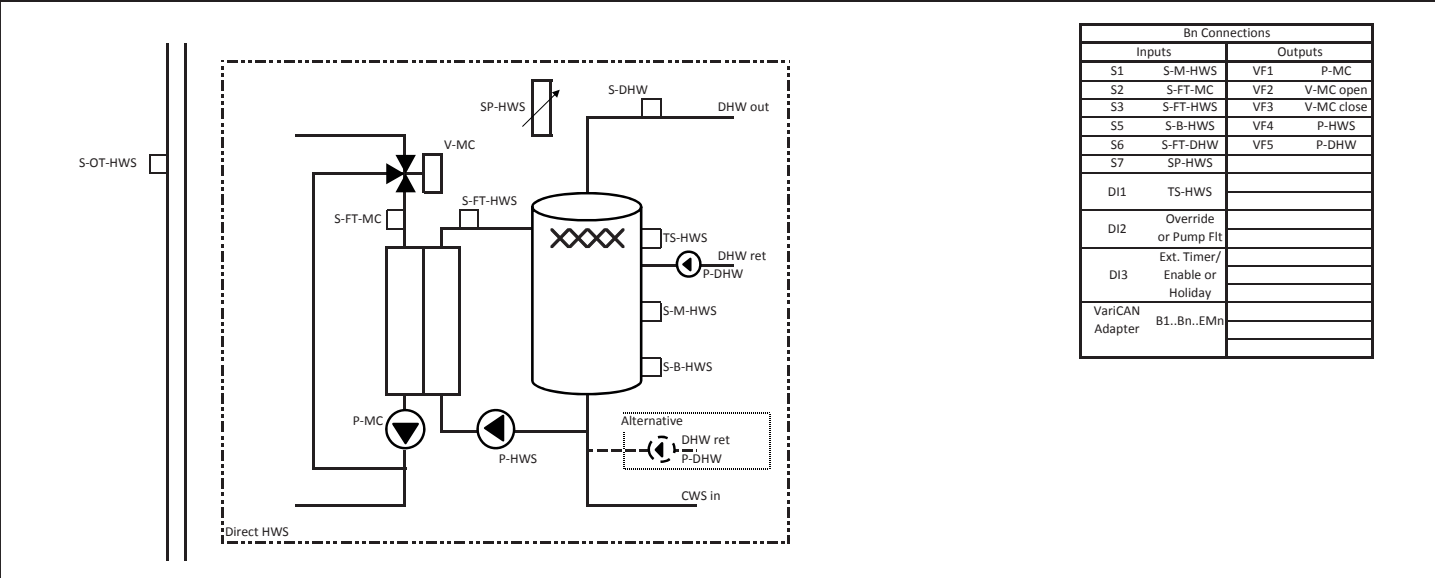


FIGURE 28 EXTENSION MODULE WITH MIXING CONTROL TO PLATE HEAT EXCHANGER FOR DIRECT HWS WITH DHW PUMP

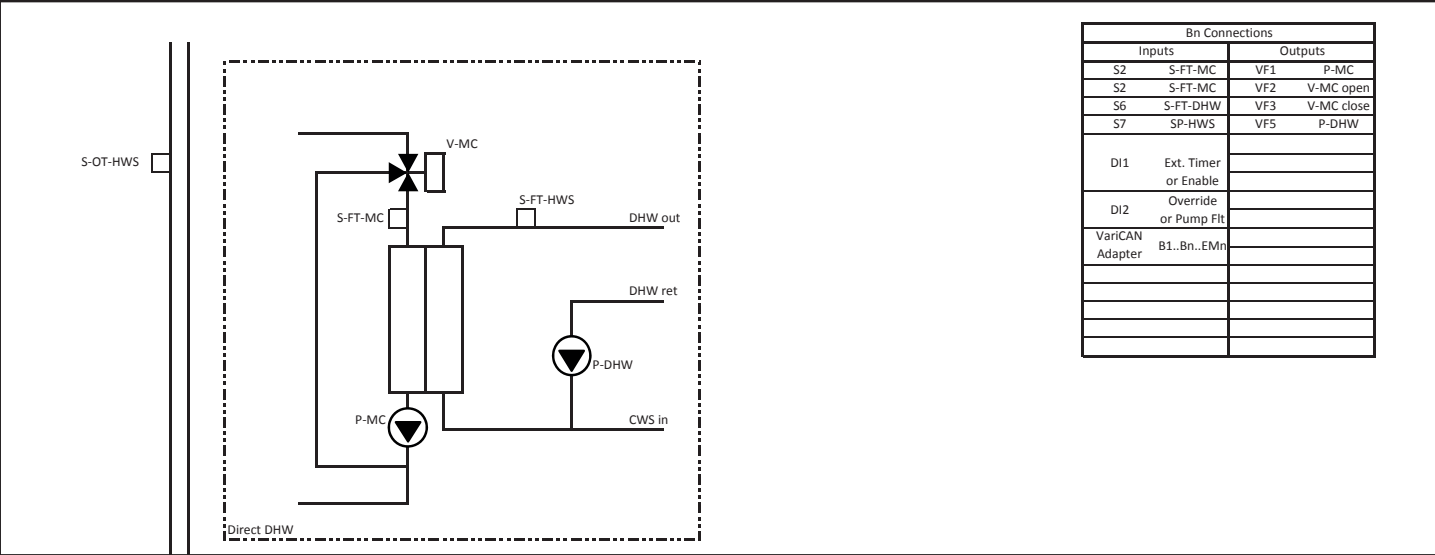


FIGURE 29 EXTENSION MODULE WITH MIXING CONTROL TO PLATE HEAT EXCHANGER FOR DIRECT DHW WITH PUMP

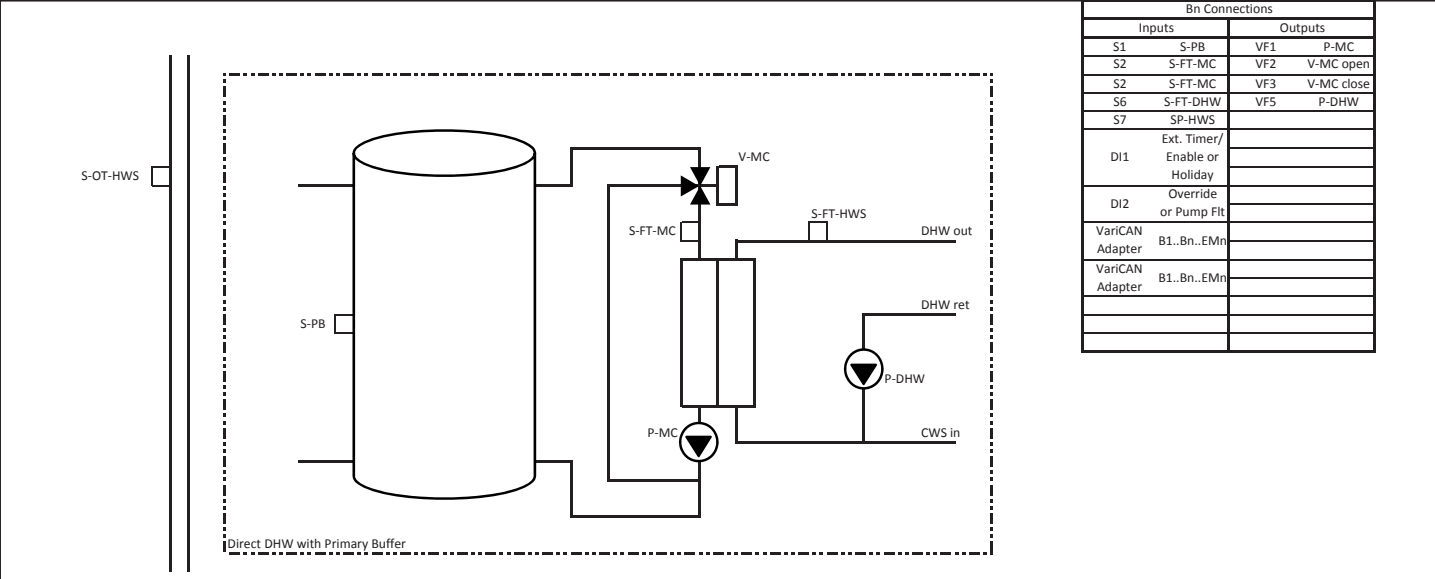


FIGURE 30 EXTENSION MODULE WITH PRIMARY BUFFER MIXING CONTROL TO PLATE HEAT EXCHANGER FOR DIRECT DHW WITH PUMP

## APPENDIX 1d Abbreviations

Abbreviation	Description
AH-HC	Air heater of Heater Circuit
Bn	On/Off Boiler n
CP	Circulating pump (controlled by Sequence Control)
F-PP-HWSC	Fault contact of primary pump of Hot Water Storage Circuit
FM	Fault Messages Function
F-B	Fault contact of Boiler
F-CP	Fault contact of Circulating pump
F-P-HWSC	Fault contact of pump of Hot Water Storage Circuit
Gen	General Function
HC	Heater Circuit Function
HD-SC	Heat demand contact of Sequence Control
HWS	Hot Water Storage Circuit Function
MC	Mixing Circuit Function
NC	No Connection
PC	Pump Circuit Function
P-HWSC	Pump of Hot Water Storage Circuit
P-MC	Pump of Mixing Circuit
P-PC	Pump of Pump Circuit
PP-HWS	Primary pump of Hot Water Storage Circuit
S-FT	Flow temperature sensor
S-FT-HC	Flow temperature sensor of Heating Circuit
S-FT-MC	Flow temperature sensor Mixing Circuit
S-FT-SC-PT	Common Flow temperature sensor of Sequence Control and Pump Circuit
S-HWS	Water temperature sensor Hot Water Storage Circuit
S-OT	Outdoor temperature sensor
S-RT-HC	Room temperature sensor of Heating Circuit
S-RT-MC	Room temperature sensor Mixing Circuit
S-RT-PC	Room temperature Pump Circuit
S-RT-SC	Room temperature sensor Sequence Control
SC	Sequence Control Function (Plant Control)
T-HC	Overtime contact of Heater Circuit
T-HWS	Overtime contact of Hot Water Storage Circuit
T-MC	Overtime contact of Mixing Circuit
T-PC	Overtime contact of Pump Circuit
T-SC	Overtime contact of Sequence Control
T-SC-HWS	Overtime contact of both Sequence Control and Hot Water Storage Circuit
V-MC	3-Way valve of Mixing Circuit





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