

# Universal Lite Control Panel incorporating SIMS™

## Installation and Maintenance Instructions

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1. Safety information
2. General product information
3. Installation
4. Commissioning
5. Fault finding
6. Maintenance

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# 1. Safety information

Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

Note: This document refers only to the electrical connection and operation of the control system within the Universal Lite control panel. Please refer to the relevant IMIs for the systems components and supplementary safety information.

## Warnings - General:

1. This product is designed and constructed to withstand the forces encountered during normal use.
2. Use of the product for any purpose other than its intended use could cause damage to the product and may cause injury or fatality to personnel.
3. Always wear appropriate safety clothing before carrying out any installation or maintenance work.

## 1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.

- i) The product has been specifically designed for use on steam or water/condensate. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

## 1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

## 1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

## 1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

## 1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

## 1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

## 1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

## 1.8 Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns.

## 1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

## 1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

## 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

## 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

Please note that if lifting straps are required we would recommend that they be fitted around the baffle plate legs to prevent damage to the unit.

## 1.13 Transport

Transportation and storage temperatures within a range of  $-25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$  and for short periods not exceeding 24 h at up to  $+70^{\circ}\text{C}$ . Suitable means shall be provided to prevent damage from humidity, vibration, and shock.

## 2. General product information

### 2.1 General information

The Universal Lite Control panel has built in flexibility to be fitted to any heating (HTG) or domestic hot water package (DHW) utilising a selection of different heat exchanger technologies.

The flexibility offered by the control panel includes steam side control, condensate control and bypass options. With advance control logic that can suit packages for retro-fit or new designs.

**The Spirax Package shown below is fitted with a plate and frame heat exchanger as an example (refer to Figure 1):**

- A Plate heat exchanger.
- B Pneumatic or electrically actuated control valve and positioner.
- C Universal Lite Control panel.
- D Pipeline ancillaries.



Fig. 1 DHW heat transfer solution

### Notes:

1. For additional information about any particular product used in the construction of this unit see the relevant product specific Technical Information (TI) sheet.

# 3. Installation

## 3.1 Electrical supply

All electrical wiring and connections should be carried out in accordance with National Regulations.

A lockable isolator/switch disconnect should be fitted adjacent to the unit.

Mains supply is directly connected to the primary side of the incoming control panel isolator and main earth terminal.

## 3.2 Electrical specifications

Electrical supply: Refer to the name-plate on the unit

<b>Control panel supply voltage</b>	220 - 240 Vac 50 - 60 Hz
<b>Control panel load requirements</b>	Internally fused at 5 amps
<b>Electrical control actuator</b>	24 Vdc (Asia) 240 Vac (Korea) 4 - 20 mA control
<b>Pneumatic control actuator</b>	4 - 20 mA control
<b>High Limit isolation valve (optional)</b>	24 Vdc (Asia) 240 Vac (Korea)
<b>Steam flowmeter TVA (optional)</b>	4 - 20 mA control
<b>Temperature sensor</b>	4 - 20 mA 2 wire
<b>Ambient temperature</b>	0 °C (32 °F) - 48 °C (118 °F)
<b>IP rating</b>	IP54

### 3.3 Electrical connections

The following are available for customer connection to the Spirax EasiHeat™ system if required:

#### Volt free contacts

Terminal Designation	Description	Type
X2	Enabled/Running Signal	1x N/O Contact
		1x N/C Contact
X3	Volt Free High Limit Alarm	1x N/O Contact
		1x N/C Contact
X4	Volt Free Common Alarm	1x N/O Contact
		1x N/C Contact

#### Remote operation and re-transmission connections

Terminal Designation	Description	Type
X15	Remote Set Point (Not Available if EHHCC +Bypass)	4-20 mA Input
X5	Remote Enable	24 V dc Signal
X17	Retransmission Valve	4-20 mA Output

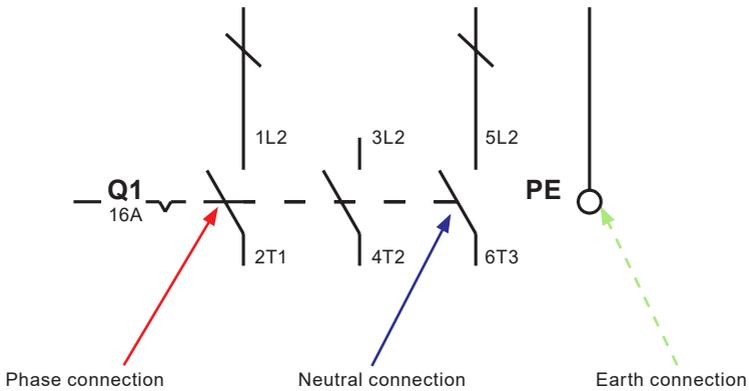


Fig. 2

### 3.4 Terminal layout overview

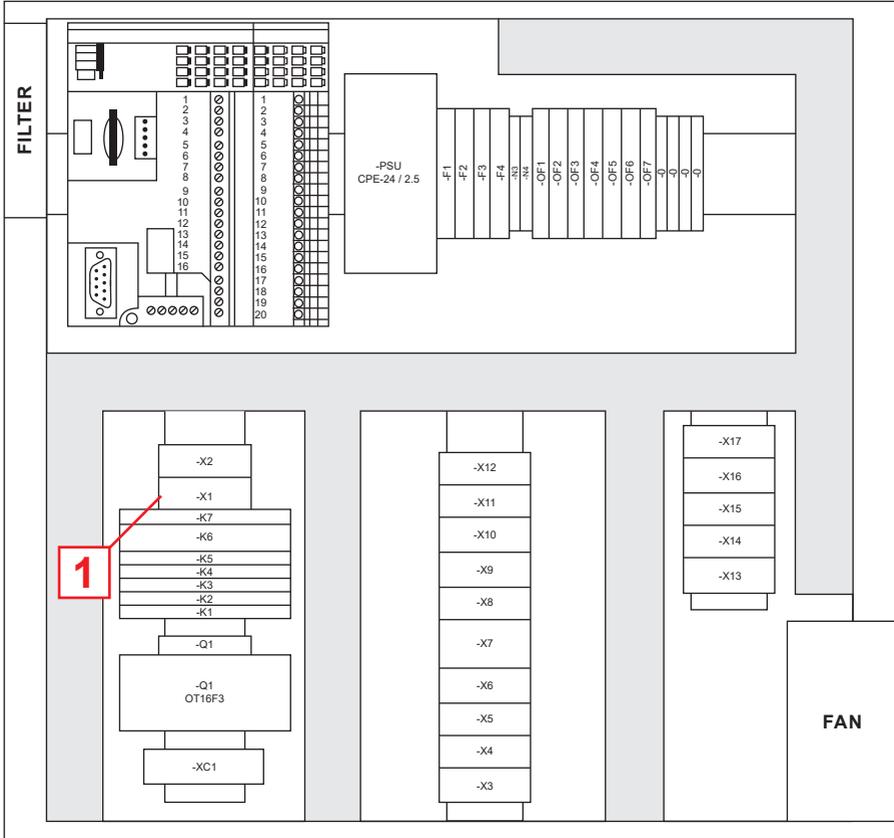


Fig. 3

#### 3.4.1 Terminal layout detailed

Note: for detailed wiring schematic options please refer to the wiring diagrams supplied with the control panel.

1. Asia
2. Korea

#### 1 X1 – Supply for Bypass Pump

X1 - Bypass Pump for EHD

### 3.4 Terminal layout overview (continued)

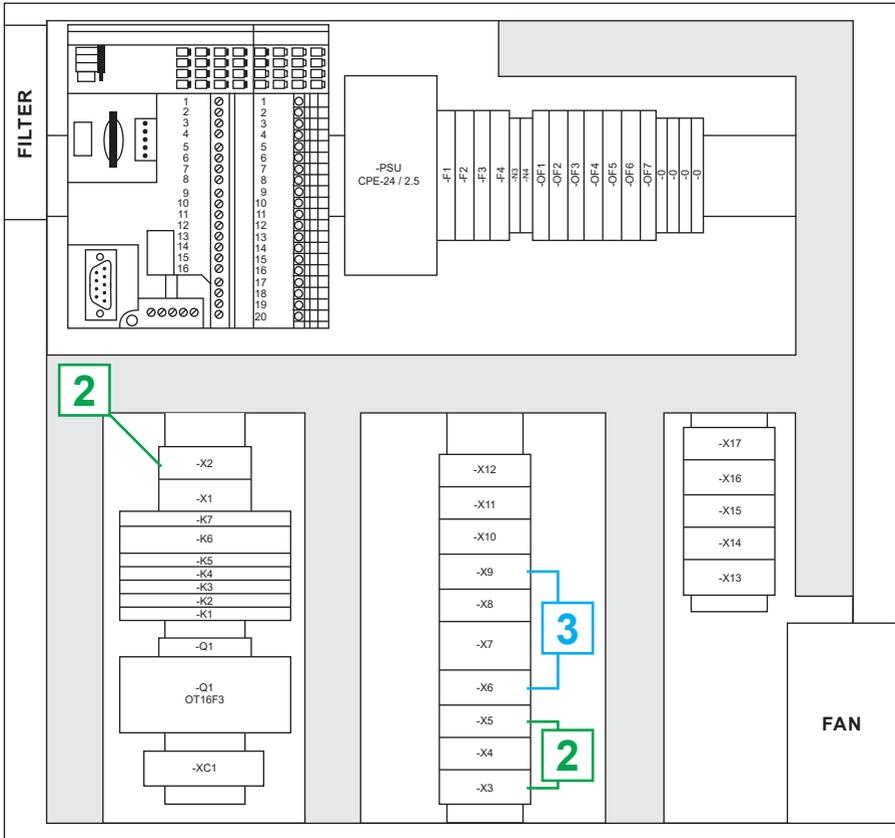


Fig. 4

#### Group X2 to X5 – Volt Free

- 2**
- X2 - Enabled/Running Signal
  - X3 - Volt Free High Limit Alarm
  - X4 - Volt Free Common Alarm
  - X5 - Remote System Enable

#### Group X6 to X9 – Valve Controls

- 3**
- X6 - EHD Bypass Valve (Mains AC for Korea, 24 V dc For Asia)
  - X7 - High Limit Valve (Mains AC for Korea, 24 V dc For Asia)
  - X8 - High Limit Valve Supply (Mains AC for Korea, 24 V dc For Asia)
  - X9 - Linear Actuator Supply (Mains AC for Korea, 24 V dc For Asia)

### 3.4 Terminal layout overview (continued)

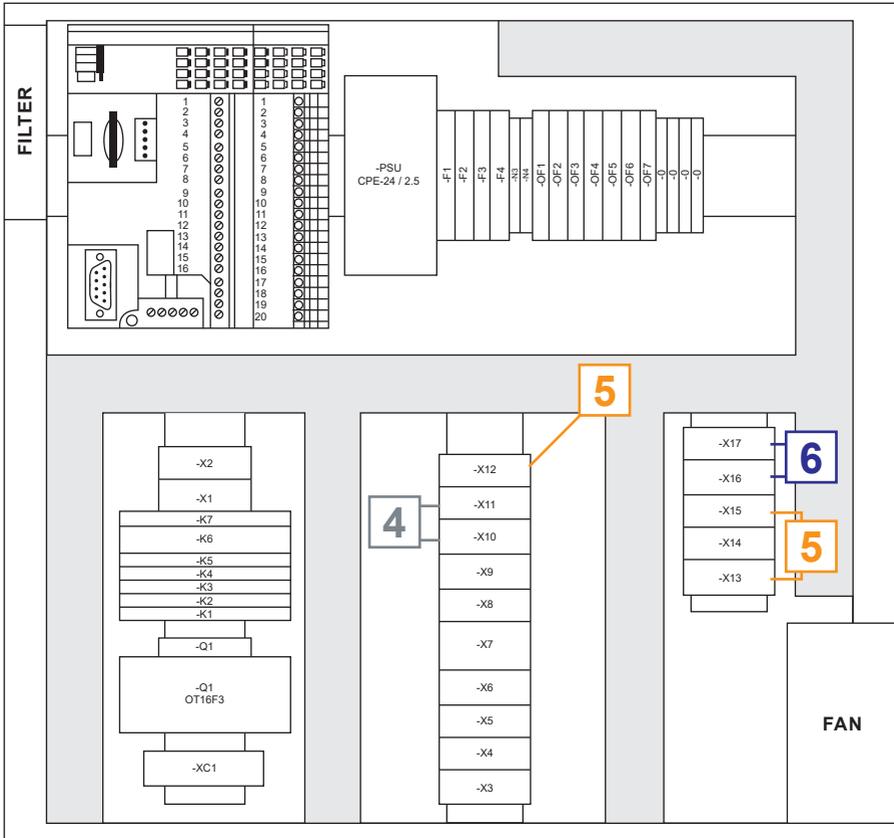


Fig. 5

#### Group X10 to X11 - Digital Inputs

4

- X10 - Linear actuator closed signal
- X11 - High Limit Valve Battery Healthy (Valves Only)

#### Group X12 to X15 - Analog Inputs

5

- X12 - T1 – Return Water Temperature
- X13 - T2 – Output Water Temperature
- X14 - T4 – Condensate Temperature/Pre-Blended Water Temperature
- X15 - Remote Setpoint/T6 – Pre Blended Water Temperature

#### Group X16 to X17 – Analog Outputs

6

- X16 - Linear Actuator Request Position
- X17 - Re-Transmission Of PV

## 4. Commissioning

We recommend that you use the service and support of a Spirax Sarco commissioning engineer. Details of this service can be found by contacting Spirax Sarco.

**Note:** Pre commissioning requirements:

- In most new installations, dirt collects in the steam pipeline during construction of the system. It is essential to flush this out prior to commissioning.
- Ensure the secondary (cold side) of the system is charged and all air is bled from the system.
- Ensure that all main isolation valves for both steam and water are isolated.
- Ensure that the electrical supply to the Spirax EasiHeat™ is isolated.
- Double check that all steam, condensate and water connections are correctly connected to the Spirax EasiHeat™.
- Check all flange bolts are tight.

#### 4.1 HMI quick start commissioning procedure:

The HMI display is a 7" touch screen, and the following procedures detail a basic set-up of the control system from initial power up. For a more detailed commissioning need then contact Spirax Sarco.

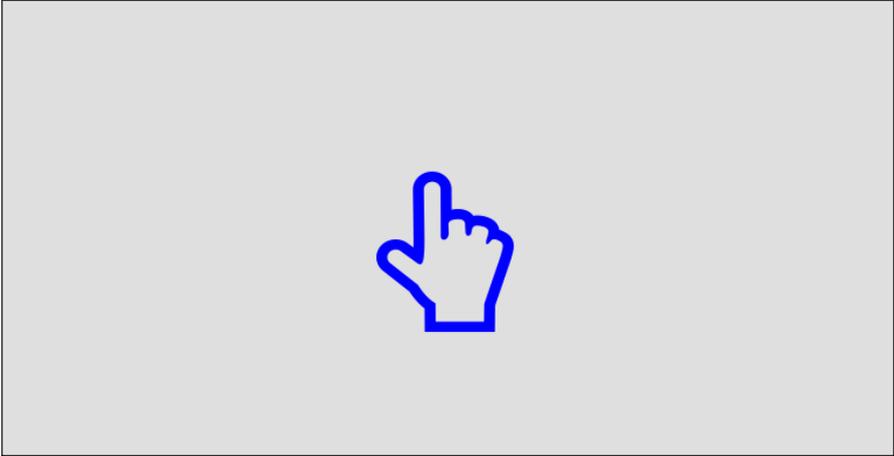


Fig. 8

Once you touch the screen for the first time this will move you Language selection screen with flag selection. After making a selection proceed to the next screen using the arrow symbol in the bottom right hand side of the screen.

By choosing the relevant flag for your Country the common default engineering units and language will automatically be selected for that region. These values can be changed after the initial commissioning set-up procedure has been completed.

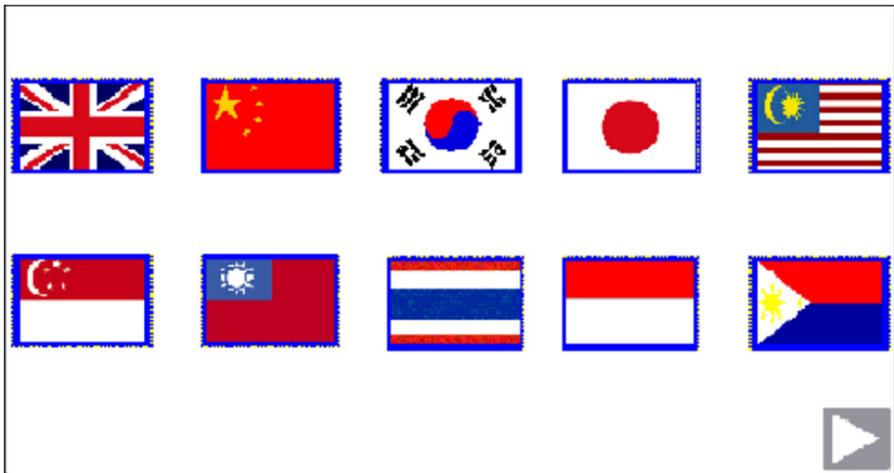


Fig. 9

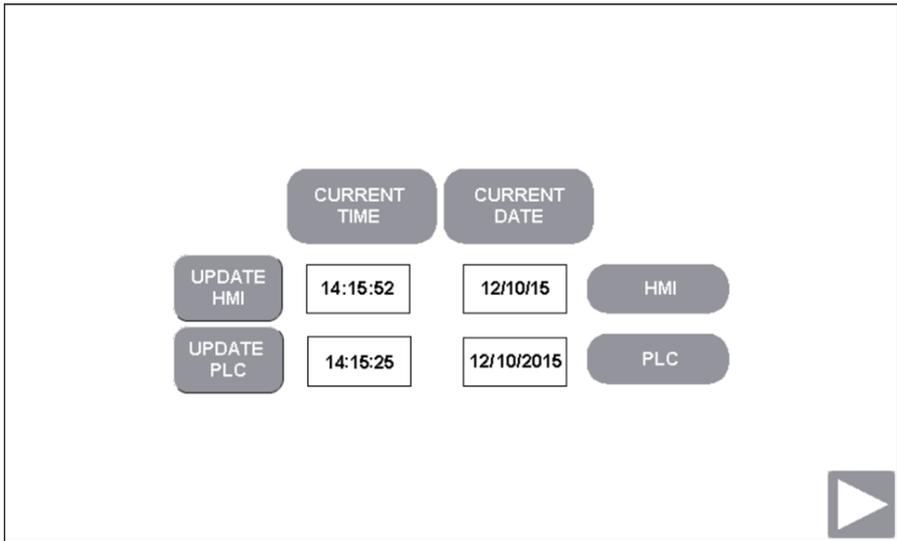


Fig. 10

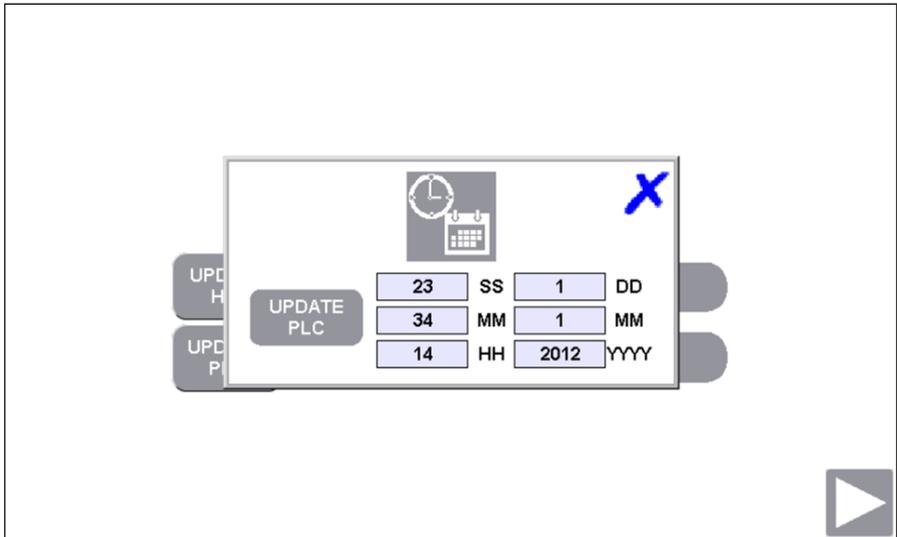


Fig. 11

The next screen (Figure 12) requires confirmation of the heat exchanger installed.

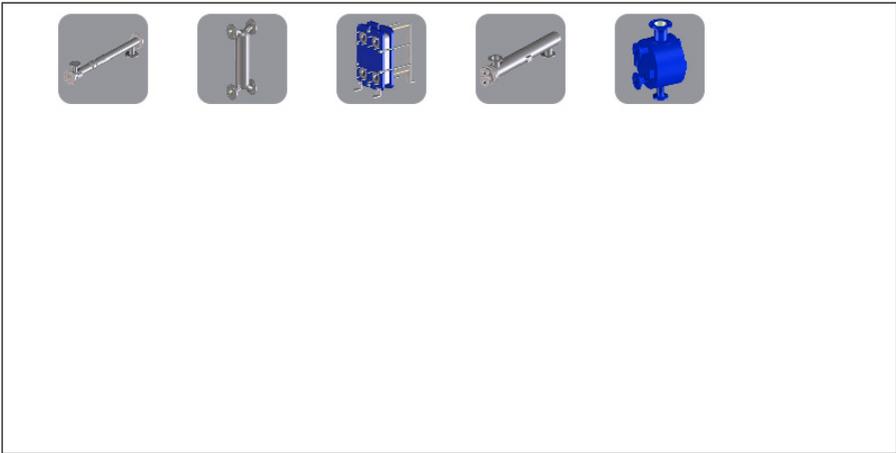


Fig. 12

Select the appropriate heat exchanger as installed on the package. The selection shall be confirmed by the icon becoming highlighted with a red surround and a continue button shall be revealed.

Press the continue button to advance to the system configuration menu.

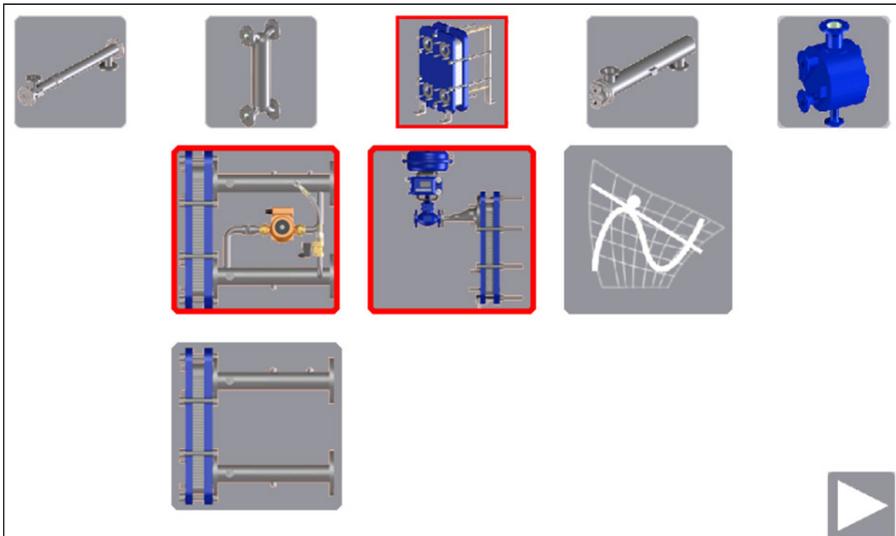


Fig. 13

System configuration is required on this page. Selections are highlighted by a red surround to the icons.

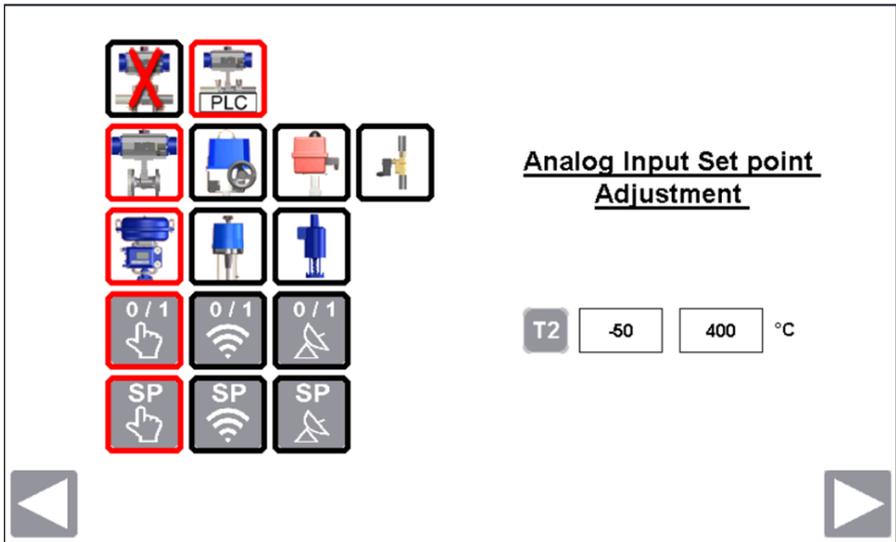


Fig. 14

System configuration should match the mechanical configuration of the package and control system of the plant, proper configuration will show or hide options available after configuration. Some of the screens may contain additional options which with specified configuration may be hidden; all the options are described in this document.

Spirax heat exchange package mechanical and control system configuration options are detailed as follows:

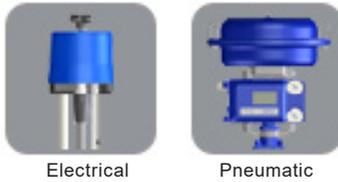
**Fig. 15 High Limit Selection**



**Fig. 16 ¼ turn actuator selection**



**Fig. 17 Linear actuator selection**



**Fig. 18 Enable control selection**



**Fig. 19 PID Set point selection**



## 4.2 Global navigation buttons



Home  
mimic



PID set  
points



Settings  
menu



Alarms  
menu



Historical  
trends



Service  
menu



### 4.2.1 Home mimic

This button will always navigate you back to the overview of the Spirax package system that has been selected and configured.

From this home screen the overall status and control of the Spirax package systems operation can be performed, depending on the security level access.



Fig. 20

Images shown below are dialogue pages that are only available for engineers access (level 2), which allow control over the valves and pumps, it is possible to enter those dialogs by pressing the screen surface at one of the unit devices (valves or pump). We are able to set the operation mode AUTO or MANUAL in which we are able to start/stop the pump or open/close the valves.

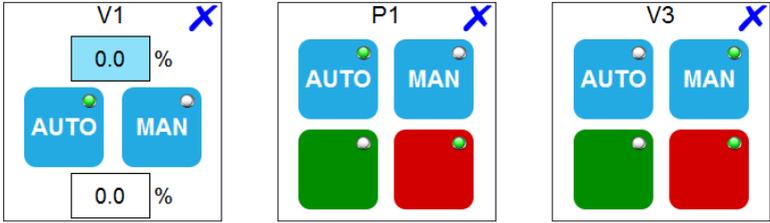


Fig. 21

V1 dialogue page contains two value fields, the top one shows the actual valve position, and the bottom one can be used to move the valve to requested position in manual mode.

- 
Automatic mode
- 
Manual mode
- 
Open/Start
- 
Close/Stop

The light indicator shows what mode is selected.



## PID set point

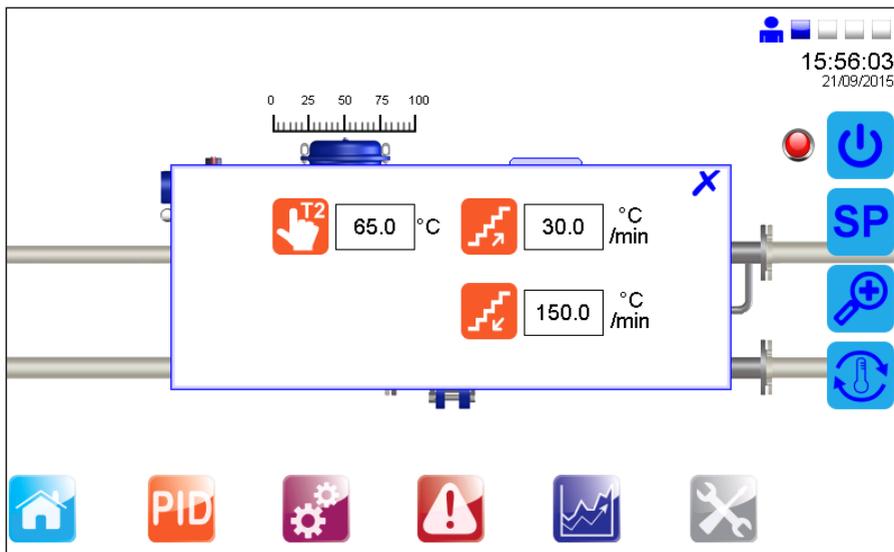


Fig. 22



Local temperature set point



Ramp-up temperature set point



MODBUS temperature set point  
(DHW or SRDHW only) remote



Ramp-down temperature set point

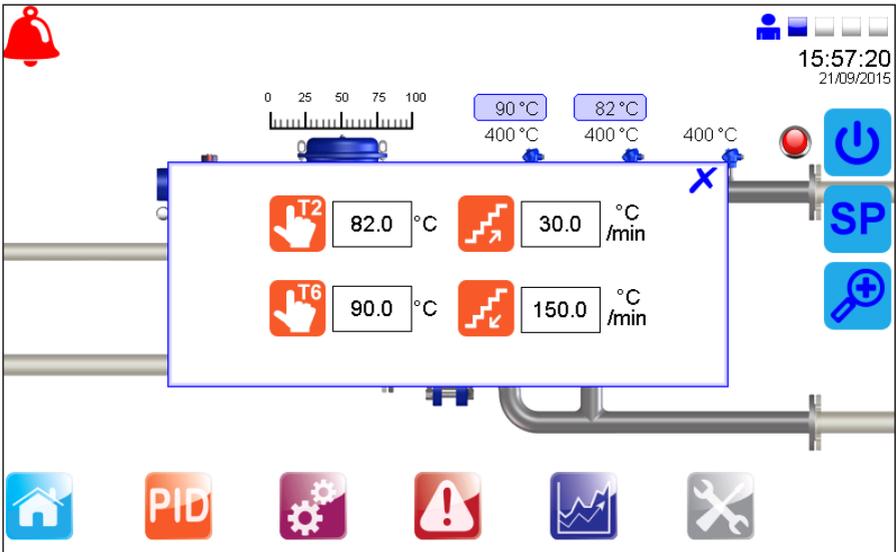


Fig. 23

If a bypass system is supplied then there are two set points required to ensure accurate temperature control.



## Enable control

This pop-up menu depending on the configuration, allows the user to select one of three control modes for the Spirax packaged or view the remote or BACnet enable status. If the configuration were set to BACnet, it is possible to override the configuration and change it to local enable configuration.

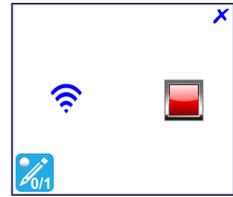
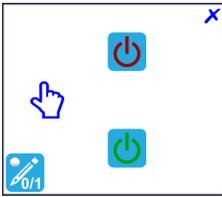


Fig. 24



OFF mode



ON mode



Remote enable



Override with local enable



## 4.2.2 PID set points

This page allows you to set the PID control factors (entries available only for engineers).

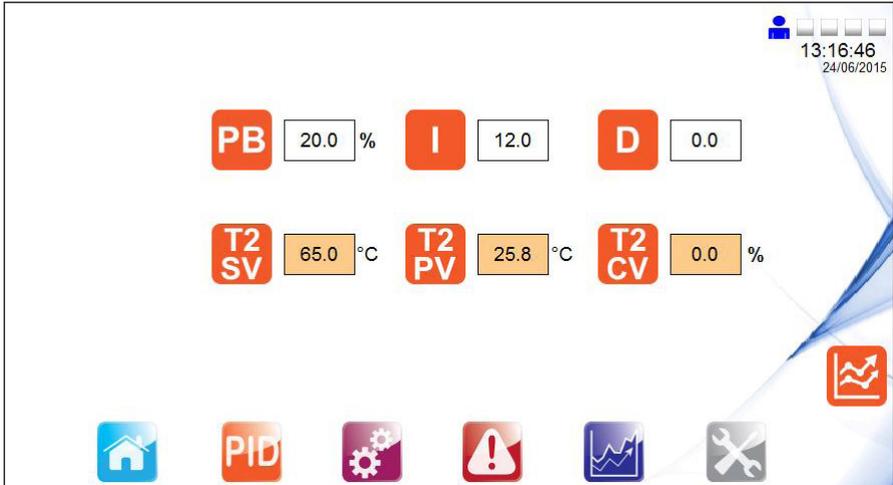


Fig. 25



Proportional band  
(P factor of the PID control)



Proportional gain  
(P factor of the PID control)



Integral factor  
(I factor of the PID control)



Derivative factor  
(D factor of the PID control)



Current value of the controlled  
variable (T2 temperature)



Manipulated value (valve position  
request)



PID real time trend page (Allows to  
configure the PID set points with  
view of the actual signals) Remote  
enable



Set value (local, remote or BACnet  
set point)

If a bypass system is installed then both set points are displayed as shown.

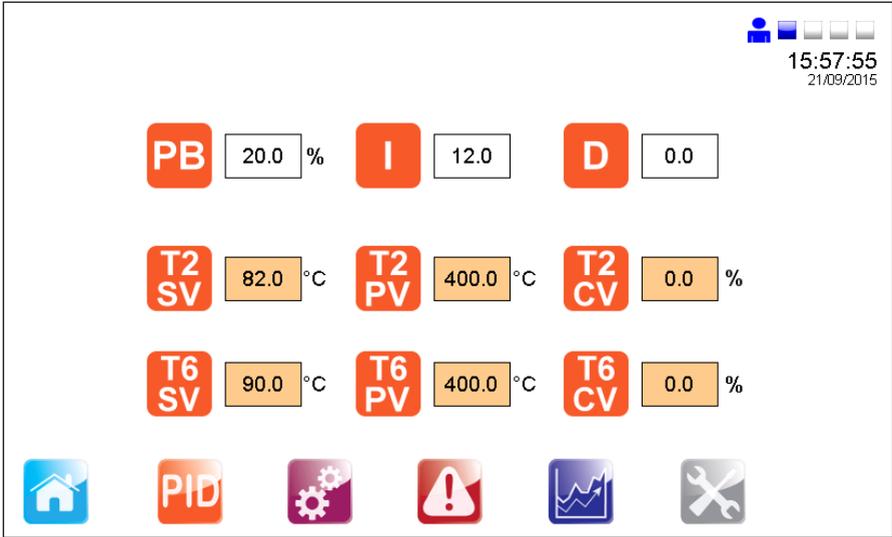


Fig. 26

The following screen is accessible from above PID Loop Set Points page (available only for engineers). We are able to switch between proportional band and proportional gain. Trend shows us PID loop real time responses. The SV, PV and CV values at PID Real Time Trend are scaled to percent.

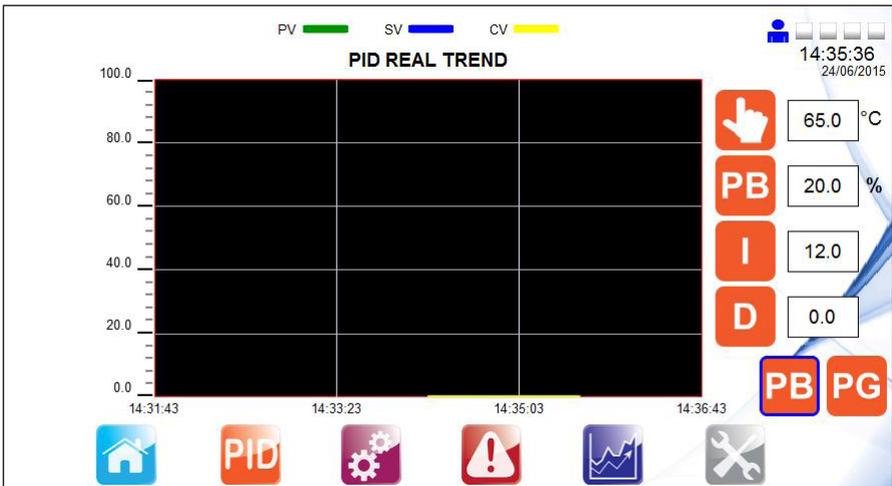


Fig. 27



### 4.2.3 Settings menu

The settings displayed (with blue surround) are default settings after the country flag has been selected, changes can be made if required.



Fig. 28



Language selection page



## 4.2.4 Alarms menu

The following page shows all active alarms, an active alarm is indicated on all the mimic screens via the alarm bell in the top left hand corner of the screen.

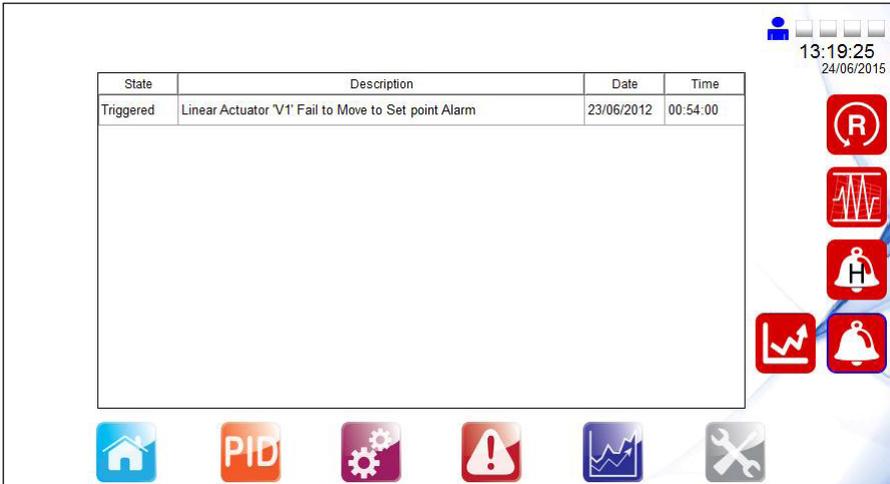


Fig. 29

There are also navigations to further alarm set point pages as well as the historical alarm list, located on the right of the display. Press each of them to view or alter.



### High-limit alarm set point (PLC controlled only)

High-limit temperature set point

High-limit temperature mask time



### Band alarm

 °C

 secs

 secs

Band alarm temperature set point

Band alarm delay time set point

Band alarm reset time set point



### Deviation alarm

 °C

Deviation alarm set point



Rate of change alarm (DHW only)

A blue 'X' icon in the top right corner of the panel.  

	27.5	°C/min
	10.0	°C
	2	secs

Temperature rate of change alarm set point

Process set point reduction set point

Alarm reset time set point



Reset high-limit alarm latch  
(PLC controlled high-limit only)



Historical alarm page

The following page provides access to historical alarm list. This allows the user to view previously triggered alarms.

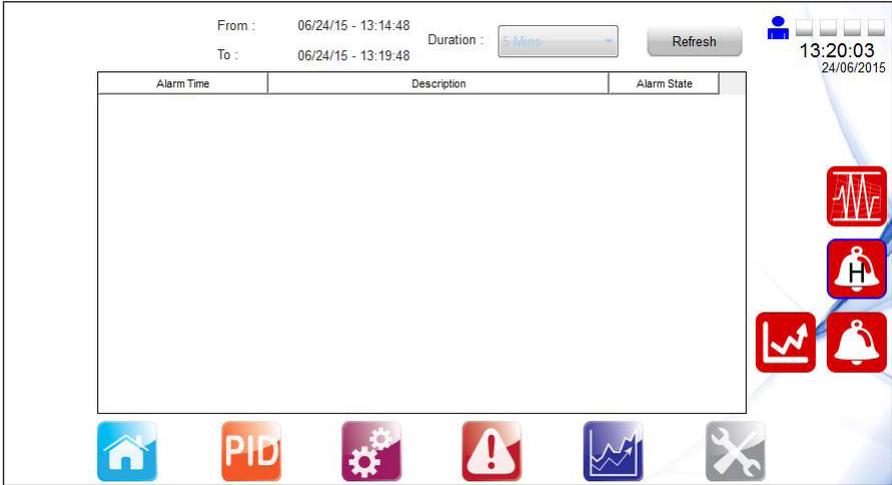


Fig. 30



Alarms indication icon



Manual alarm indication icon



Caution - high-limit setting:

- If fitted, the high-limit controller should be set at a suitable level to protect plant, process and personnel.
- Care should be taken to ensure sufficient difference between the process set point and the high-limit set point, to avoid any unwanted high limit tripping.
- Check temperature rises to set value and controls satisfactorily.
- If necessary adjust PID settings. We would strongly recommend that only a suitably trained controls engineer adjust these parameters.
- Check operation of steam traps/condensate pump.



## 4.2.5 Trend menu

This menu provides historical trend monitoring of the process values, useful for analysing the historical reactions of the Spirax packaged system to process conditions.

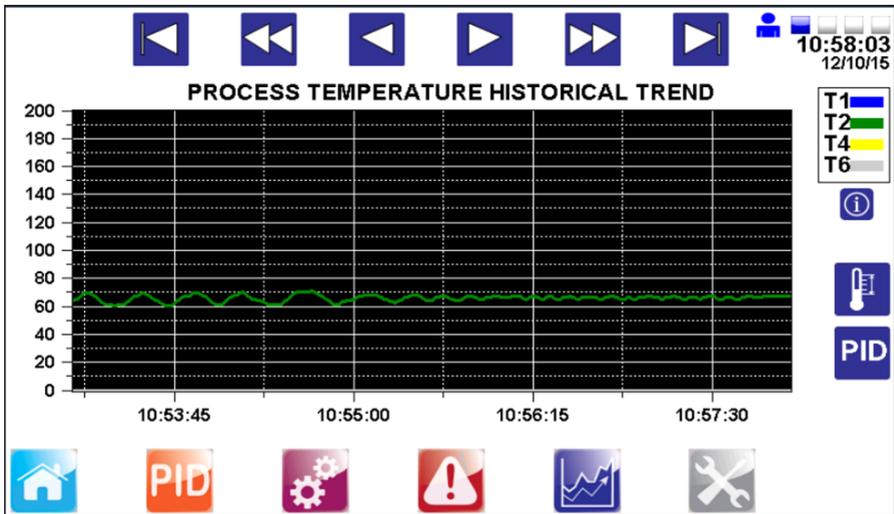


Fig. 31



## 4.2.6 Service menu

The following page provides service information and allows engineering level users to navigate to pages containing process information.

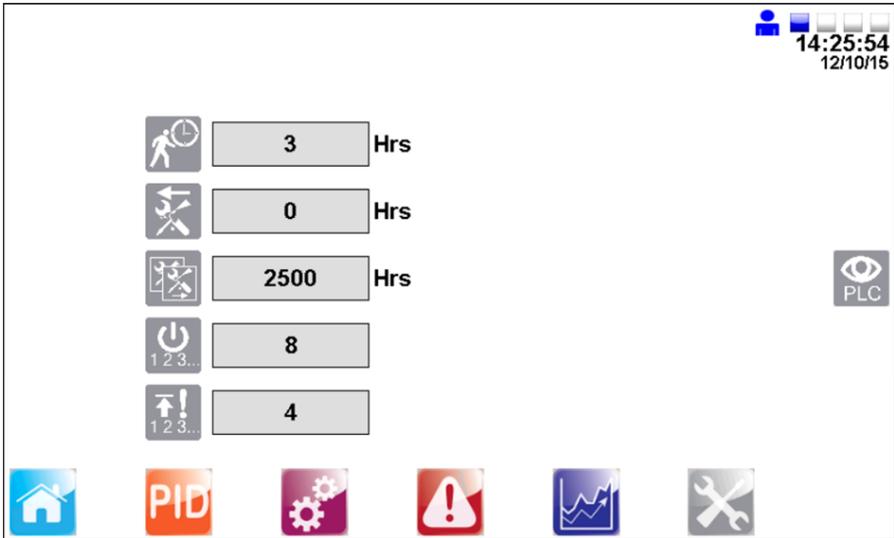


Fig. 32



Total unit run time



Last service number hours run



Next service set running time before alarm



Process enable event count



High-limit event count



Local Spirax Sarco engineer contact details dialog page



Hardware monitoring pages (input/output overview)



## 4.2.7 Hardware monitoring

The following pages provide only an overview of the input and outputs; it is not possible to set any set points.



Fig. 33

Figures 35, 36, 37 and 38 display the analogue input and output values.

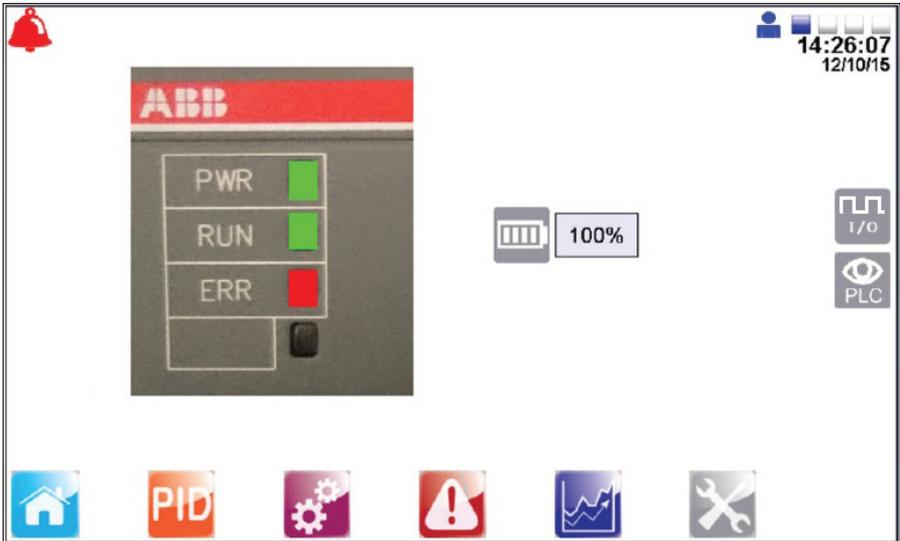


Fig. 34 CPU

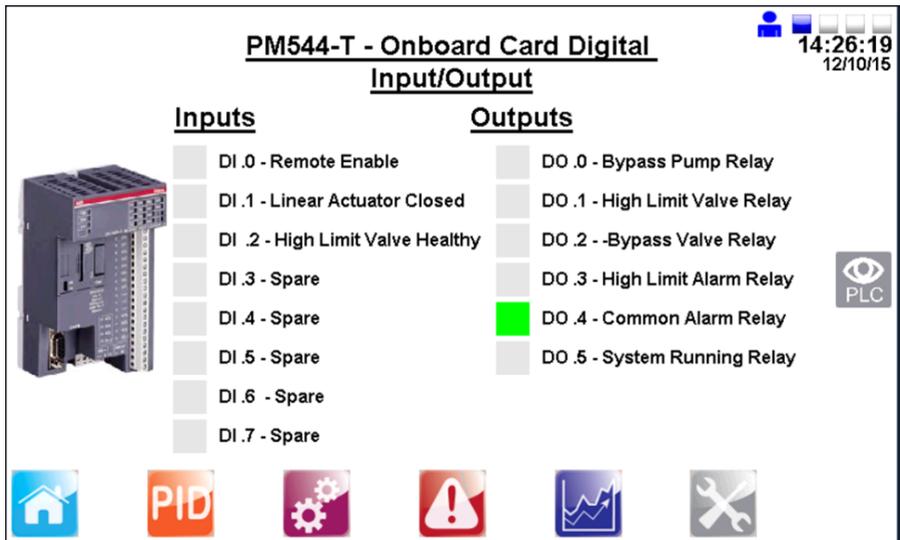


Fig. 35 CPU

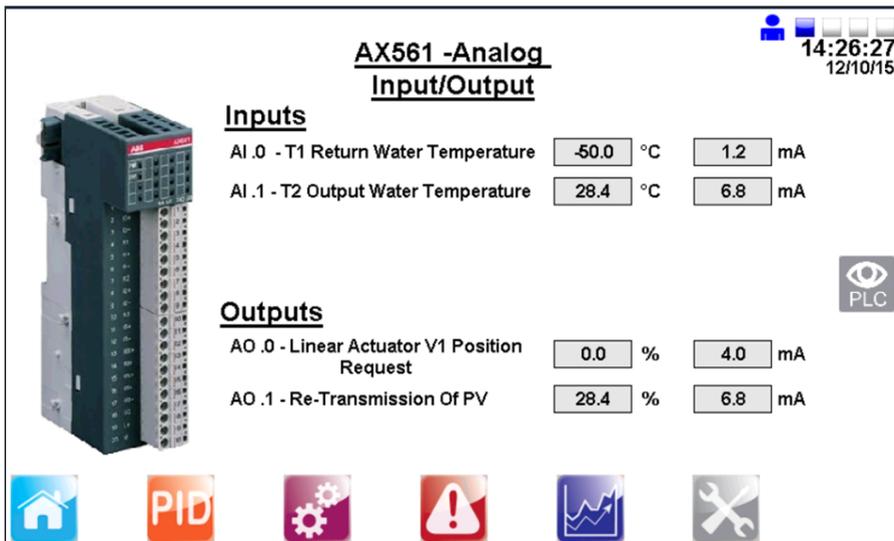


Fig. 36 CPU

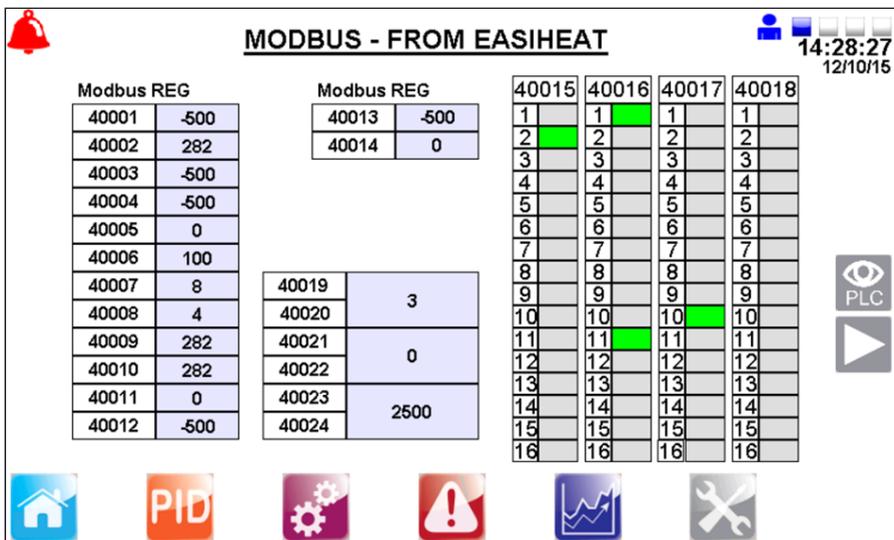


Fig. 37 CPU

# 5. Operation

Fault	Possible cause	Remedial action
Unit does not power up	Loss of incoming supply	Check incoming supply
	Internal fuse blown	Check all mains fuses F1 - F4 and Control fuses CF1 - CF7
Loss of dc supply	Internal fuse blown	Check all mains fuses F1 - F3 and Control fuses CF1 - CF7
	Field wiring fault	Sequentially disconnect the field wiring for all supplies to see if supply is restored
Loss of ac supply	Internal fuse blown	Check all mains fuses F1 and F2 and Control fuses AF1
4-20 mA signal not reading correctly (T1 - T5)	Field wiring fault	Check termination of 3 wire 4-20 mA terminals (X1 - X5) and 4-20 mA head
	Faulty 4-20 mA	Check compensated resistance
Bypass pump does not operate	Field wiring fault	Check wiring of pump to terminals X6
	Internal fuse blown	Check mains fuse F1
Bypass valve does not operate	Field wiring fault	Check wiring of bypass valve to terminals X6
	Check setting of deviation alarm on HMI	Ensure not to set 0, the setting should be 2C
Remote set point is not showing correctly	Scaling value incorrect	Ensure that the minimum and maximum engineering units from the remote set point match those on the HMI (this data is found on the Spirax Sarco engineers 4-20 mA page)
	Polarity of 4-20 mA incorrect	Reverse polarity and wire as per electrical drawings
After power cycle, commissioning mode needs to be re-set or settings are missing.	PLC Battery fault/ drained	Replace PLC battery in accordance with manufacturer's instruction manual.

# 6. Maintenance

**Note:** Before actioning any maintenance observe the 'Safety information' in Section 1.

## 6.1 General

For maintenance of the individual components that make up the system, please see the relevant product specific IMI's for the components concerned.

## 6.2 High limit device testing

The purpose of the test is to ensure that the system operates satisfactorily when required to do so.

### Method:

1. **High limit set point test** - The set point of the high limit controller should be lowered, to simulate a high temperature situation. Test personnel should ensure the high limit device operates in a satisfactory manner.
2. **Electrical power failure test** - The unit should be turned off at the PLC controller switch to simulate power failure. Examination should be made to ensure the high limit system has switched to its fail-safe mode, isolating the primary steam supply.

### Frequency

It is essential that a competent person tests the high limit device on a frequent basis. Intervals between tests should not exceed a six month period.

We do not recommend the installation of a self-acting high limit control to the Spirax Easiheat™ system.

