
Spirax EasiHeat™ HTG Heating System

Compact Heat Transfer Solution

Installation and Maintenance Instructions



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

1. Safety information

Note: This document refers only to the mechanical installation and commissioning of the Spirax EasiHeat™ HTG packaged heat exchange system unit and should be used in conjunction with the relevant IMIs for the other system components and supplementary safety information for all the system components.

Warning

This product is designed and constructed to withstand the forces encountered during normal use.

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.

Before any installation or maintenance procedure, always ensure that all primary steam and condensate return lines and secondary water lines are isolated.

Ensure any residual internal pressure in the system or connecting pipework is carefully relieved.

Allow hot parts to cool before commencing work, to avoid the risk of burns.

Always wear appropriate safety clothing before carrying out any installation or maintenance work.

Lifting

The Spirax EasiHeat™ unit should be lifted by a suitable forklift truck, from the base, placed in position and securely bolted to the floor.

Warning:

On no account is the Spirax EasiHeat™ unit to be lifted by any other part, other than the base.

Note: Sufficient space should be provided around the systems location to allow access for maintenance.

Safe operation of these products can only be guaranteed if they are 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.

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. These products comply with the requirements of the European Pressure Equipment Directive 97/23/EC and fall within category 'SEP'. It should be noted that products rated as 'SEP' are required by the Directive not to carry the CE mark.

- i) The product has been specifically designed for use on steam, air or water/ condensate which are in Group 2 of the above mentioned Pressure Equipment Directive. 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.

2. General product information

2.1 General information

The Spirax EasiHeat™ HTG (Heating) incorporating S.I.M.S technology is a complete, compact and ready-to-use steam to water heat transfer solution that delivers superior energy efficient performance. It has been designed for applications with stable load conditions such as closed circuit heating applications. The Spirax EasiHeat™ HTG can help you lower costs, tackle waste and mitigate your environmental impact by reducing your CO₂ emissions and carbon footprint, making a positive change towards a more sustainable future.

The base unit of the Spirax EasiHeat™ provides the core of the system, while options (see Sections 2.2) provide additional features such as: high limit package, stop valve package and energy monitoring.

The Spirax EasiHeat™ HTG unit consists of the following core items (refer to Figure 1):

- A Plate heat exchanger.
- B Pneumatic or electrically actuated control valve and positioner.
- C PLC controller.
- D Pipeline ancillaries.

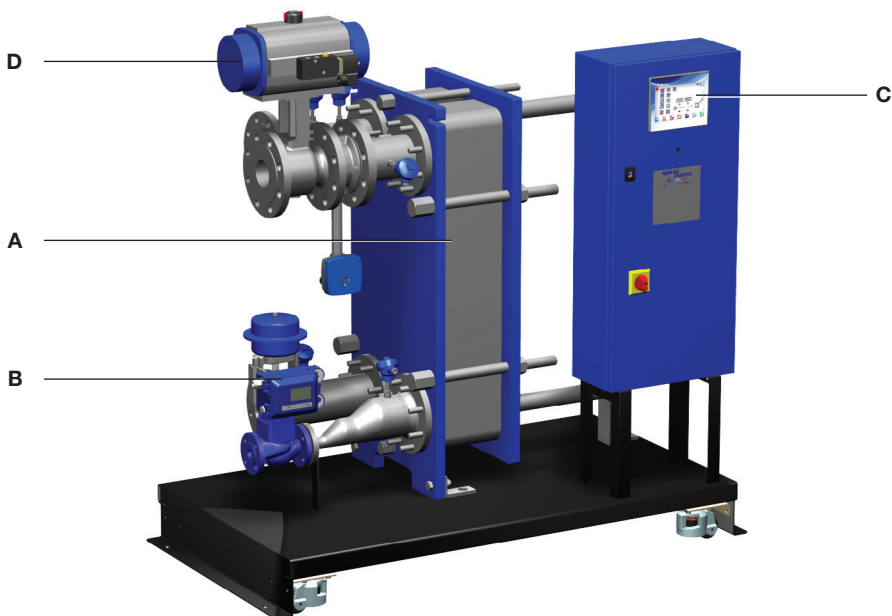


Fig. 1 Spirax EasiHeat™ HTG compact heat transfer solution

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.
2. For further technical information regarding the Spirax EasiHeat™ HTG see the Technical Information sheet TI-P481-01.

2.2 Spirax EasiHeat™ HTG nomenclature

The product nomenclature is a reflection of the core items and unit options that have been ordered and supplied – See the table below:

Spirax EasiHeat™ HTG nomenclature example:

EHH	2	P	EL	-	IHL	B	V2	G1	W	-	E	R2	C2
-----	---	---	----	---	-----	---	----	----	---	---	---	----	----

Spirax EasiHeat™ HTG nomenclature

Compulsory selection	Building heating unit	EHH = Spirax EasiHeat™ HTG	EHH
	CV size	1 = DN15 2 = DN20 3 = DN25	2
	Pressure vessel code	A = ASME P = PED	P
	Actuation	EL = Electric PN = Pneumatic	EL
Mechanical options	High limit	HL = Integrated high limit IHL = Independent high limit	IHL
	High limit actuation (EL only)	B = Battery back-up C = Super capacitor	B
	Isolation	V1 = Ball valve V2 = BSA V3 = DBB3	V2
	Gasket material	G1 = EPDMPC	G1
	Extras	W = Wheels S = EN 12828 safety option	W
	Energy monitoring	E = With energy monitoring	E
Panel options	Remote access	R1 = Level 1 – SMS and E-mail R2 = Level 2 – Full web access R3 = Level 3 – SMS + Remote	R2
	Communications	C1 = Modbus C2 = BACnet C3 = LonTalk (LonWorks) C4 = DeviceNet C5 = CANopen C6 = Profinet C7 = Profibus	C2

3. Installation

3.1 Steam and condensate connections

It is important that the steam supply (and compressed air if pneumatic actuation is selected) to the Spirax EasiHeat™ HTG unit is supplied as dry and as clean as possible, in accordance with good steam engineering practice.

It should also be ensured that all connecting pipework is stress free and adequately supported.

The steam supply should always be maintained at the specified design pressure and temperature for the unit. The Spirax EasiHeat™ HTG must not operate above the maximum steam pressure and temperature indicated on the name-plate attached to the plate heat exchanger.

The installation of an appropriately sized safety valve, to protect any lower pressured equipment on either the hot or cold side of the plate heat exchanger, is strongly recommended.

Spirax Sarco supplies a range of traps, strainers, separators, safety valves and pressure reducing equipment.

3.2 Air supply

If a pneumatic control system is installed, connect a compressed air supply (4.5 to 8 bar g (65 to 116 psi g)) to the pressure regulator mounted on the control valve.

3.3 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 (shown with the IP2X cover removed) and main earth terminal as shown in Figure 2.

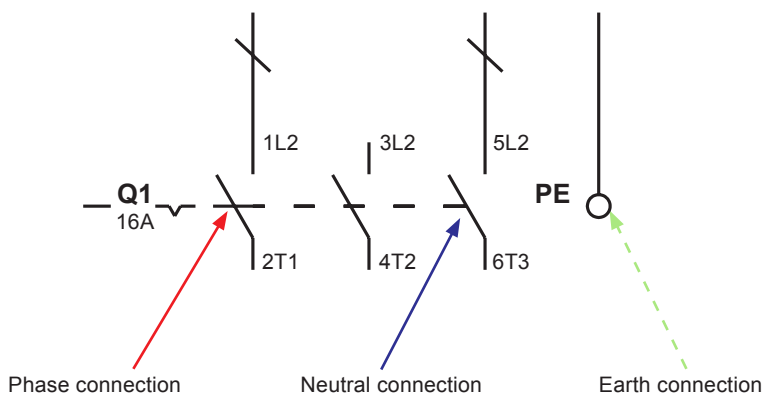


Fig. 2

3.4 Electrical specifications

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

Control panel supply voltage	110 Vac/60 Hz
	240 Vac/50 Hz
Control panel load requirements	Internally fused at 5 amps
Electrical control actuator	24 Vac
	4 - 20 mA control
Pneumatic control actuator	-
	4 - 20 mA control
High Limit isolation valve (optional)	24 Vac
Steam flowmeter TVA (optional)	4 - 20 mA control
PT100 temperature sensors	3 wire

3.5 Electrical connections

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

Volt free contacts

Terminal designation	Description	Type
X14	Enabled / running signal	1 x N/O contact
		1 x N/C contact
X15	High Limit alarm	1 x N/O contact
		1 x N/C contact
X16	Band Alarm	1 x N/O contact
		1 x N/C contact

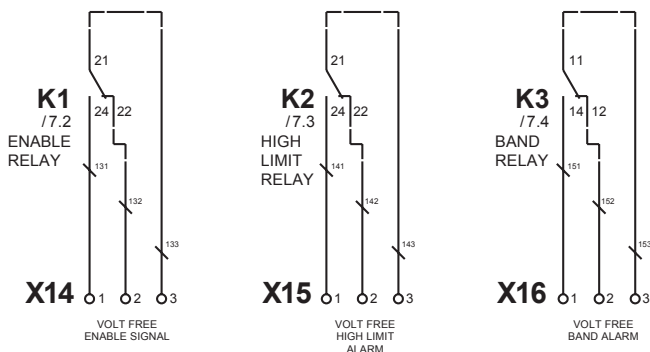


Fig. 3

Remote operation and retransmission connections

Terminal designation	Description	Type
X7	Remote set point	4-20 mA input
X17	Remote enable	24 Vdc signal
X9	Retransmission value	4-20 mA output

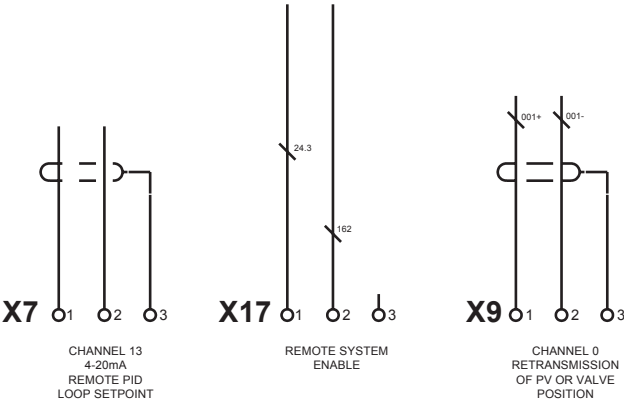


Fig. 4

Terminal layout overview

X1 - X5 PT100 inputs	X6 - X8 4-20 mA inputs	X9 - X10A 4-20 mA outputs	X10B - 10C actuator signals	X11 Bypass pump
X12 Bypass valve	X13A-C High limit valve	X14 - X16 volt free signals	X17 remote enable	

Fig. 5

Terminal layout detailed

Note: for detailed wiring schematic options please refer to the 'Operations manual'.

1. Basic
2. Independent high limit
3. Independent high limit with safety
4. American standard

- X1 - Water temperature IN
- X2 - Water temperature OUT
- X3 - Steam temperature
- X4 - Condensate temperature
- X5 - High limit temperature

Group X6 to X10A

- X6 - Linear actuator feedback
- X7 - Remote PID loop set point
- X8 - Steam flow
- X9 - Retransmission value
- X10A - Linear actuator control position

Group X10B to X11

- X10B - Linear actuator closed signal
- X10C - Linear actuator supply voltage (Electric actuator only)
- X11 - Bypass pump
- X12 - Bypass valve
- X13 - High limit valve
- X13A - High limit valve control output signal
- X13B - High limit valve supply voltage (electric actuator only)
- X13C - High limit valve battery signal

Group X14 to X17

- X14 - Volt free signal for enabled
- X15 - Volt free high limit
- X16 - Volt free band alarm
- X17 - Remote enable signal

4. Commissioning

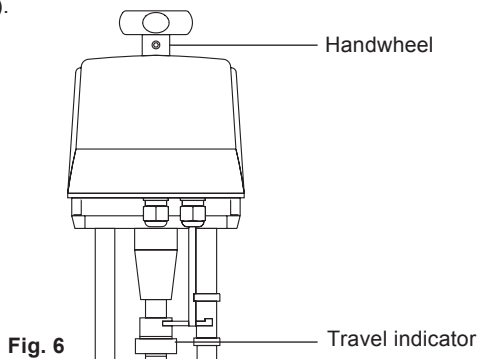
We recommend that you use the service and support of a Spirax Sarco commissioning engineer. Details of this service can be found by contacting Spirax Sarco.

Note: Pre commissioning requirements:

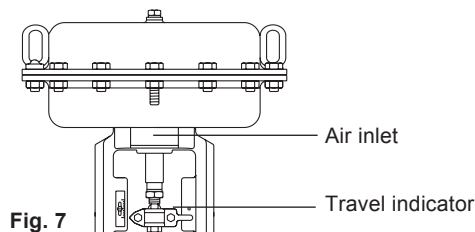
- In most new installations, dirt collects in the steam pipeline during construction of the system. It is essential to flush this out prior to commissioning.
- Ensure the secondary (cold side) of the system is charged and all air is bled from the system.
- Ensure that all main isolation valves for both 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 Mechanical commissioning procedure:

- Check all electrical connections are secure and as per the wiring diagram (Section 3.3, Figure 2).
 - Dry commissioning valve stroke check - An initial valve stroke check should be carried out to ensure free movement of the valve stem.
1. For the electric actuated control valve, use the manual override on top of the actuator to raise and lower the actuator spindle between the two travel indicators located on the side of the pillar (Figure 6).



2. For the pneumatic actuated control valve, remove the existing air supply and connect an independent air supply to the actuator (pressure not to exceed 6 bar g (87 psi g)), allow the valve to fully open, remove the air supply from the actuator allowing the valve to close. Reconnect the original pipework (Figure 7).



- Open the secondary (cold side) isolating valves downstream of the Spirax EasiHeat™.
- Start the main secondary water circulating pump(s) if fitted.
- Check and confirm there is secondary water circulation through the Spirax EasiHeat™.
- If the circulation is okay, switch on the main power to the control panel (local isolator).
- Turn the control panel isolation switch to 'ON'.
- Follow the quick start-up guide (WHERE) before opening the steam isolations valves.

4.2 TVA quick commissioning:

The TVA flowmeter is factory set to display data in metric units (changeable to imperial if required by following the flow chart, Figure 10, or the individual product Installation and Maintenance Instructions (IMI)).

All commissioning of the TVA is through the arrow buttons located on the front display see Figure 8.

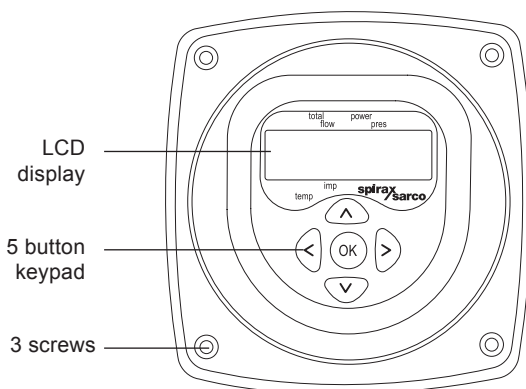


Fig. 8

Press and hold down the 'OK' button and hold for 3 seconds, then enter the default pass code.

Use the up and down arrows to set the number then press OK to confirm your selection, repeat until all numbers are entered.

Fig. 9

**ENTER
PASS**

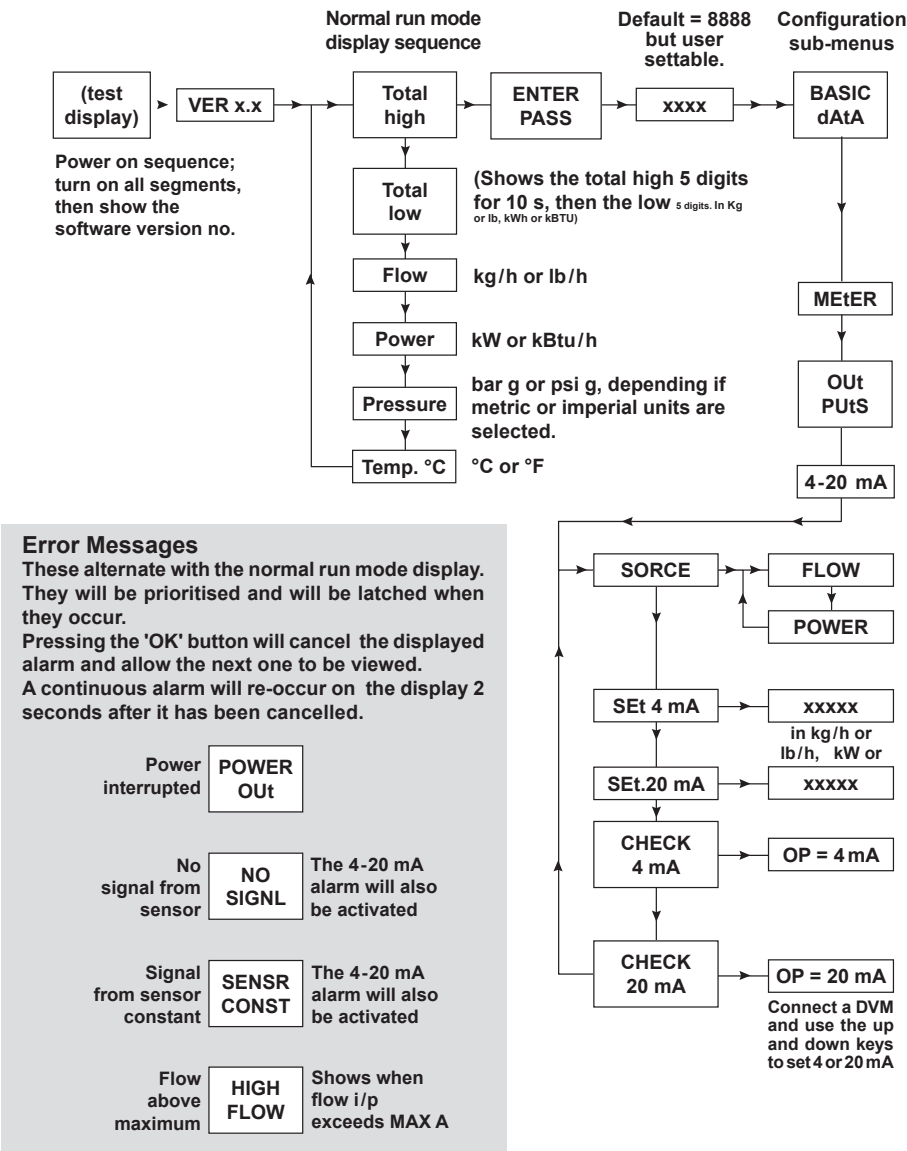
Followed by:

7452

TVA flowmeter commissioning chart

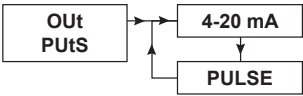
To navigate around the first level menu use the up and down arrows, to enter any sub menu use the right arrow.

Fig. 10 TVA configuration displays



From the Basic dAtA menu navigate to OutPUtS and press the right arrow to enter the sub menu of 4 - 20 mA.

Fig. 11

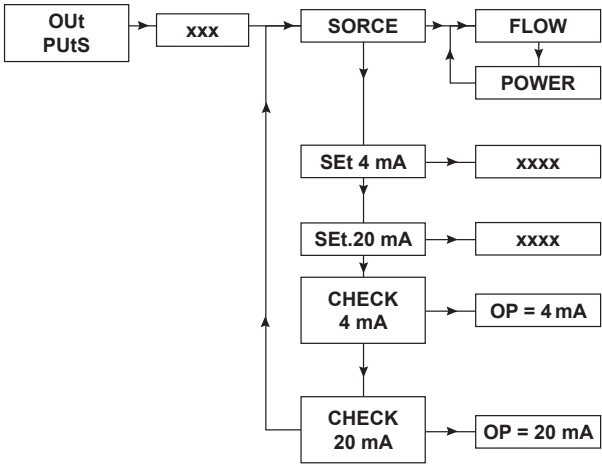


The next menu Sorce will need FLOW to be selected.

Obtain the correct flow data from the Spirax EasiHeat™ specification sheet supplied for accuracy, thereafter navigate down the menu and input: -

Minimum flow = 4 mA
Maximum flow = 20 mA

Fig. 12



After this data has been input, continually press the left arrow button to take you back to the run mode.

This completes the basic requirement for scaling of the TVA flowmeter suitable for integration with the HMI.

4.4 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. A more detailed description of each individual feature can be found in the full operation and maintenance manual.



Fig. 13

When ready the above screen will appear, touch the screen. If the unit has not been configured for previous use; or if it has been returned to factory default one of the following four pages (Figures 14 to 17) will appear (configured for a designated region).



Fig. 14



Fig. 15



Fig. 16



Fig. 17

Choose the relevant flag for your Country, common default engineering units and language are automatically selected. These can be readjusted if required by revisiting the settings page a little later.

The system shall then advance automatically to allow you to make a selection on the Type of Spirax EasiHeat™ unit.



Select the HTG option, the selection shall be confirmed by the icon becoming highlighted with a blue surround and a continue button shall be revealed.

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



Fig. 19

The system configuration is now required to be entered on this page; again a selection is highlighted by a blue surround around the icon.

The system configuration should match the mechanical configuration of the Spirax EasiHeat™ and control system of the plant Spirax EasiHeat™ plant and are detailed as follows:-

Fig. 20 High limit selection



Fig. 21 High limit valve selection

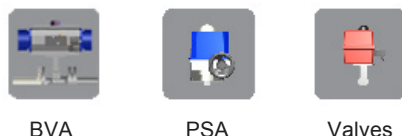


Fig. 22 Linear Actuator Selection and configuration

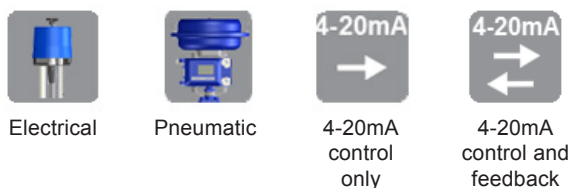


Fig. 23 Enable control selection

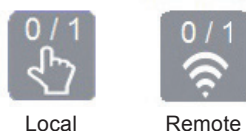


Fig. 24 Outside weather compensation



Fig. 25 TVA flowmeter selection



4.5 TVA not installed and outside weather compensation selected

If the SpiraxEasiHeat™ unit is not fitted with a TVA flowmeter but has outside weather compensation selected, then enter the minimum and maximum conditions. The system the system configuration is now complete and the global navigation buttons at the base of the screen can be used to navigate around the system.

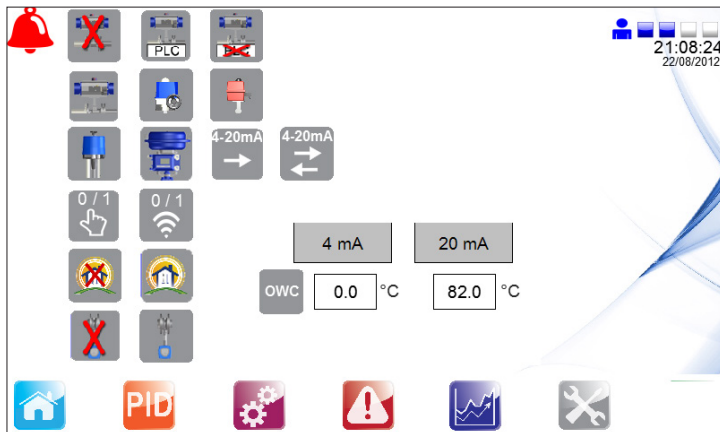


Fig. 26

4.6 TVA installed

On TVA flowmeter selection a data entry point shall be displayed in order for effective scaling of the flowmeter - This is the full engineering range for the 4 - 20 mA signal input to the Spirax EasiHeat™ system.

The full range values entered at this point should match exactly those that are programmed in the TVA flowmeter parameters (refer to Section 4.3 TVA commissioning).

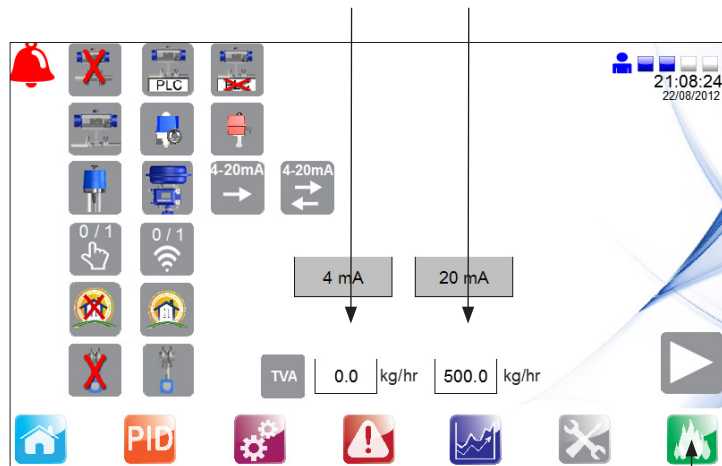


Fig. 27

A new global screen navigation button shall be displayed allowing navigation to the logged energy data for the Spirax EasiHeat™ system.

Press the energy button to navigate to the energy set-up page (Figure 28):

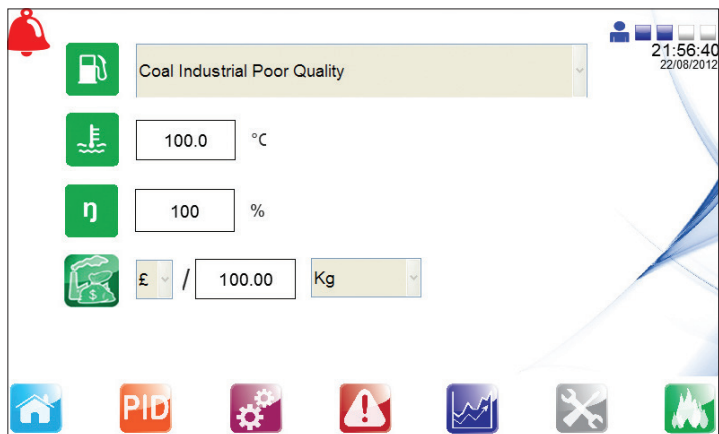


Fig. 28

Accurately enter the specific energy data to ensure that the valid energy data can be calculated.



Boiler fuel properties - Selected via the drop down menu



Boiler feedwater temperature



Boiler efficiency



Cost per unit of fuel

Fig. 29

Upon completion of the above data all of the other global navigation buttons that are displayed in Figure 30 (along the base of the screen) are available for use.

4.7 Global navigation buttons



Fig. 30



Fig. 31

The 'Home mimic' button (Figure 31) will always navigate you back to the overview of the Spirax EasiHeat™ system that has been selected and configured.

From the home screen (Figure 32) the overall status and control of the Spirax EasiHeat™ system operation can be performed.

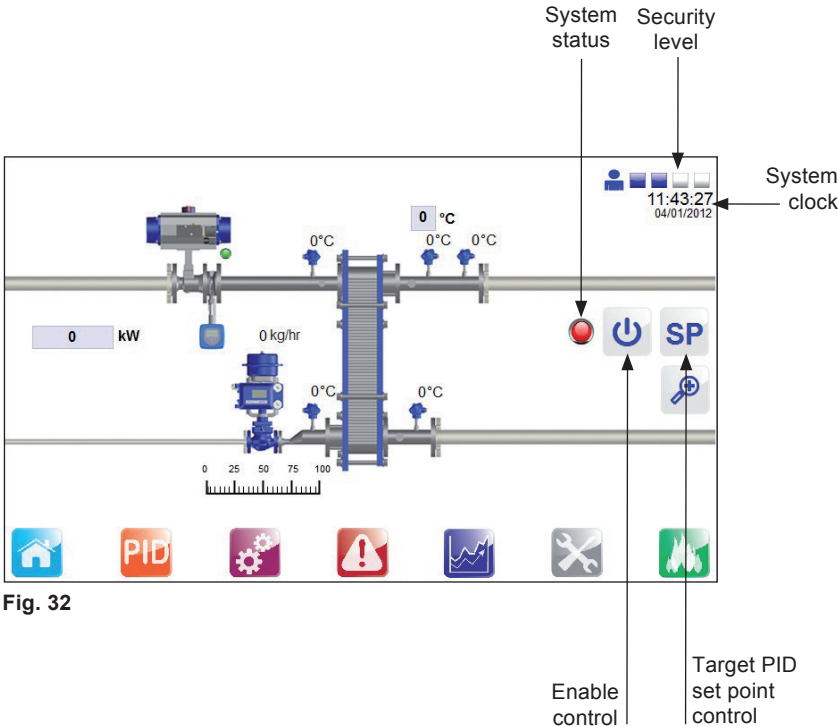


Fig. 32



PID set point

This pop-up menu allows the entry of the Spirax EasiHeat™ system target PID set point and the associated ramp up and time down time bases.

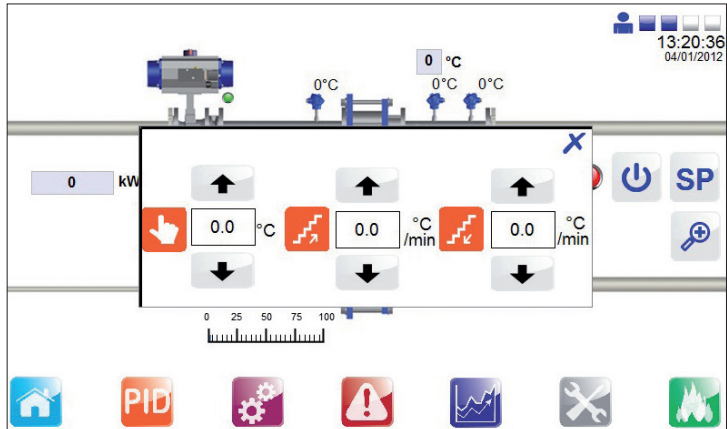


Fig. 33



Enable control

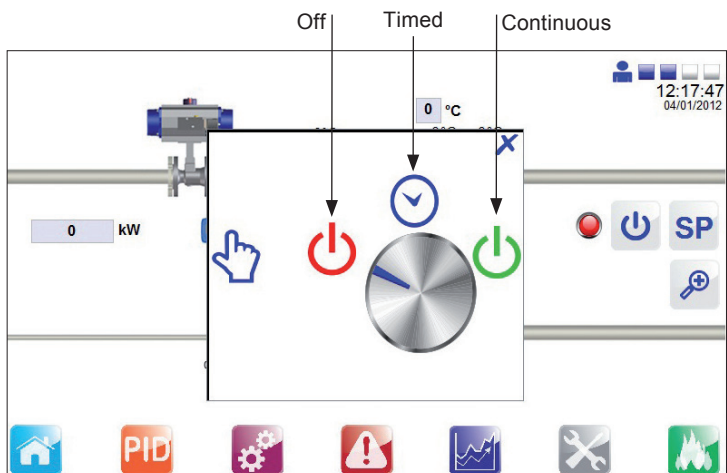


Fig. 34



Zoom

The zoom pop-up provides a more detailed view of the key process parameters.

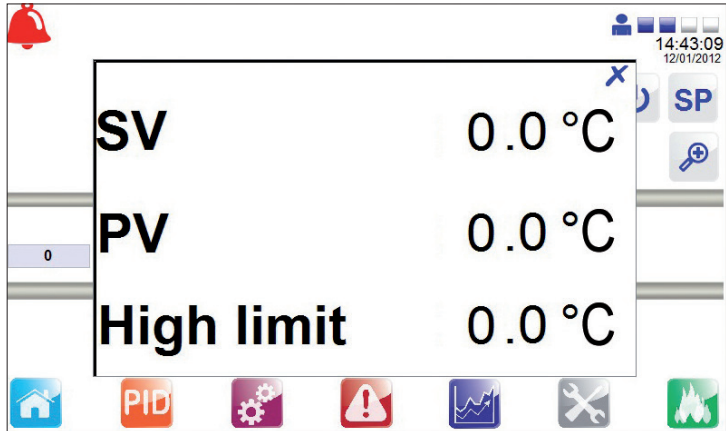


Fig. 35



Settings menu

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

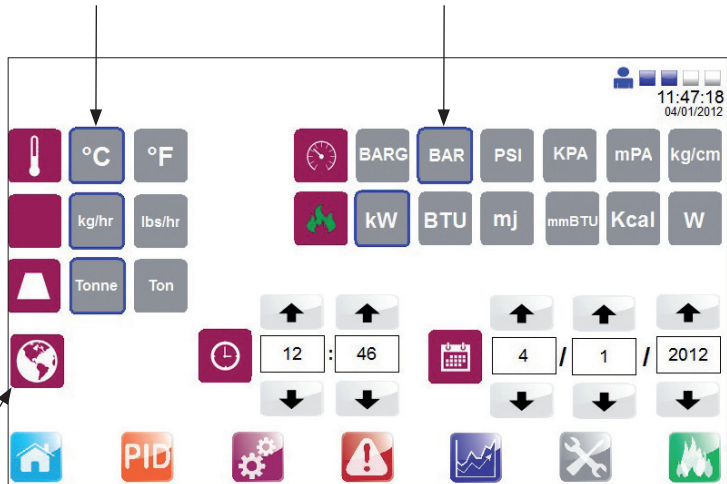


Fig. 36

The following facility is only possible in this selection menu - Changing the language will not effect any settings or engineering units. WILL NOT EFFECT ANY SETTINGS OR ENGINEERING UNITS.



Alarms menu

This 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.

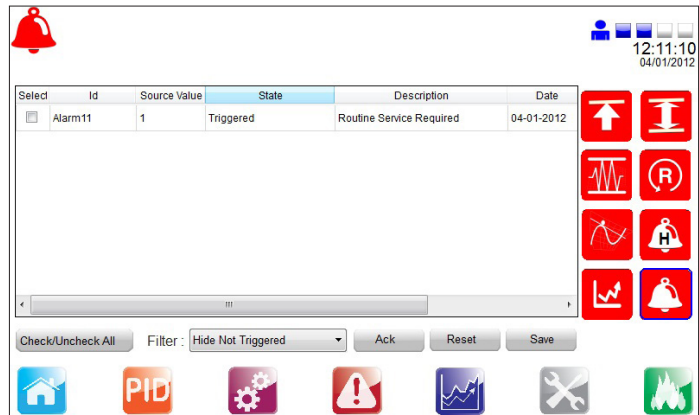


Fig. 37

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)

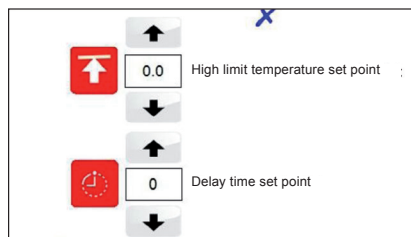


Fig. 38



Differential alarm set point

This 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.

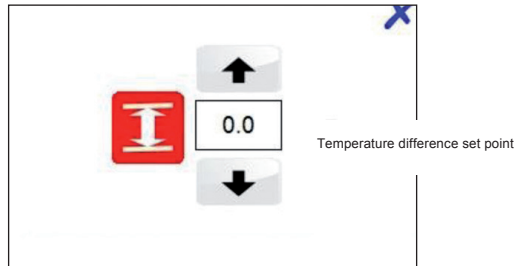


Fig. 39



Band alarm set point

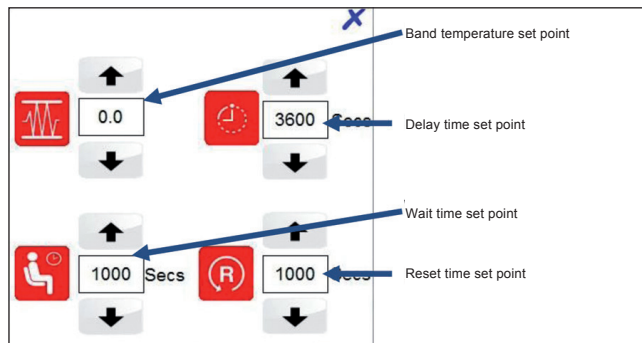


Fig. 40



Rate of change alarm set point

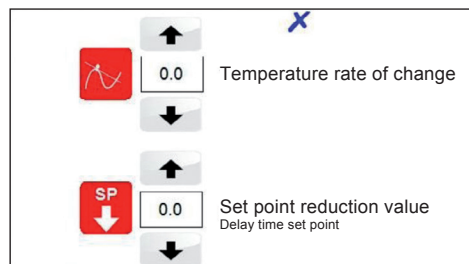


Fig. 41



Deviation alarm

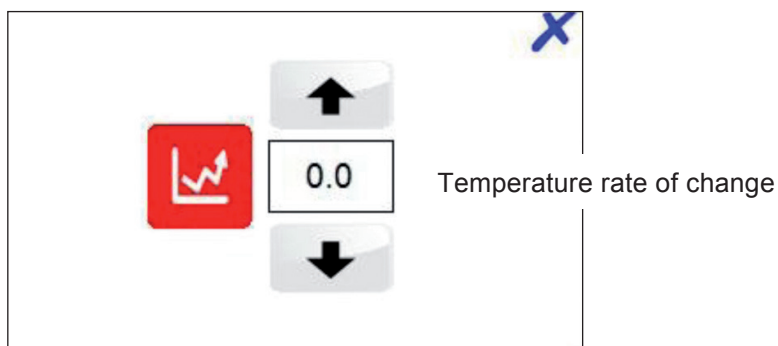


Fig. 42



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

Fig. 43



Navigation to historical alarm page

Fig. 44

Caution - high limit setting:

- If fitted, the high limit controller should be set at a suitable level to protect the 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 the PID settings. We would strongly recommend that only a suitably trained control engineer adjust these parameters.
- Check operation of steam traps / condensate pump.



Trend menu

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

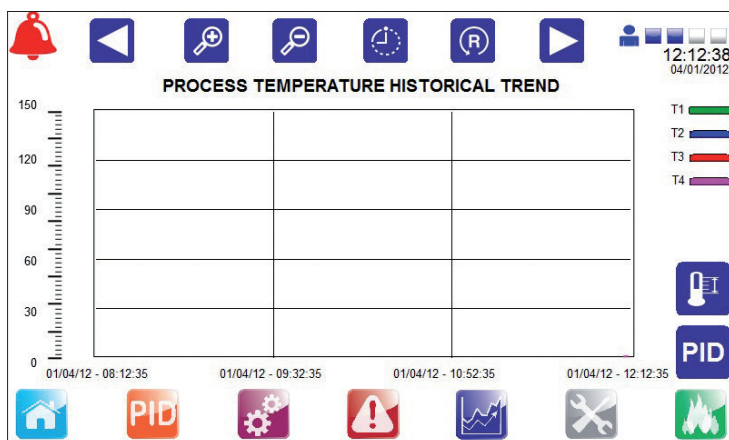


Fig. 45



Service menu

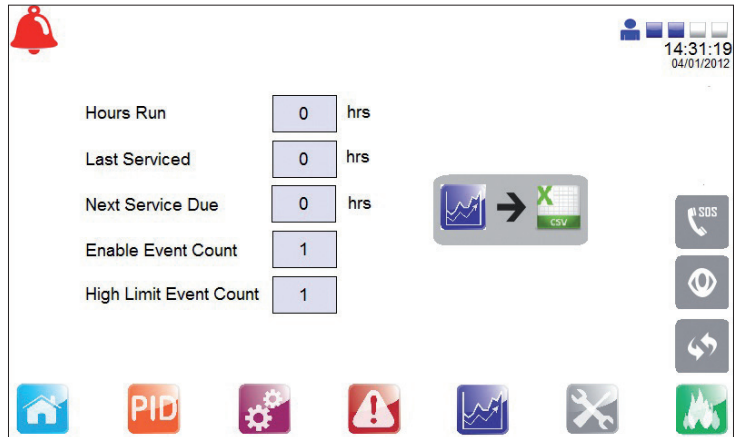


Fig. 46

This page provides key servicing information as well as the following:

- Contact details of Spirax Sarco local office.
- Facility to monitor the inputs and outputs of the Spirax EasiHeat™ system.
- Reset the system set points back to those at the time of commissioning.

To finalise the mechanical commissioning of the system:

- Open all condensate drain valves.
- Slowly open the steam inlet valve.
- Monitor the process temperature to ensure that it is within the acceptable limits.

The Spirax EasiHeat™ HTG unit is now ready to be turned on

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.

6.3 Scale formulation

Within open systems, where there is continual make-up water, there is a risk of scale formation. The extent of the scale will depend largely upon the water quality, which varies greatly from area to area. A test, conducted by a water treatment specialist, is recommended to determine the local water quality and whether problems are foreseen.

After extended service, the plate heat exchanger can be easily dismantled for cleaning. If scale becomes a persistent problem, regular chemical cleaning should be considered. ¾" ports are available on the secondary inlet and outlet piping to allow easy connection for CIP 'Clean in Place' apparatus. It should be noted that raising the steam pressure could result in an increase of scaling.

