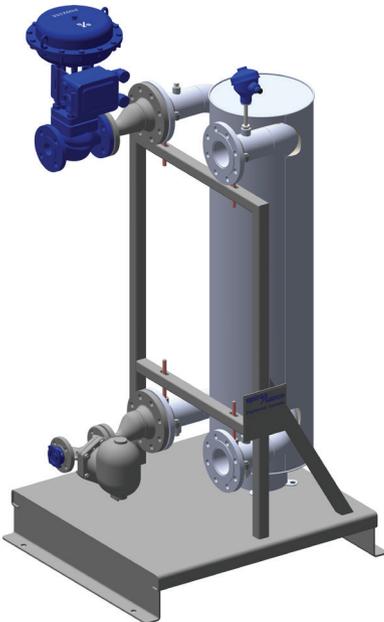




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TES Issue 2

Spirax SpiraHeat™ Heating System Process Controller Based Compact Heat Transfer System Installation and Maintenance Instructions



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

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1. Safety information

In addition to putting your personnel at risk of death or serious harm, failure to comply with the instructions, recommendations and guidance set out in this document may jeopardise your warranty rights. Further, use of the product(s) otherwise than in accordance with this document will be undertaken entirely at your own risk. To the fullest extent legally permitted, Spirax Sarco excludes all responsibility and liability for any and all loss or damage caused in the event that the practices and procedures detailed in this document have not been followed.

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 mechanical installation and commissioning of the Spirax SpiraHeat™ packaged heat exchange system and should be used in conjunction with the relevant IMLs for the other system components and supplementary safety information for all the system components.

Warning - Lifting

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

On no account is the Spirax SpiraHeat™ 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.

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. Before any installation or maintenance procedure, always ensure that all primary steam and condensate return lines and secondary water lines are isolated.
4. Ensure any residual internal pressure in the system or connecting pipework is carefully relieved.
5. Allow hot parts to cool before commencing work, to avoid the risk of burns.
6. Always wear appropriate safety clothing before carrying out any installation or maintenance work.
7. This product is not fitted with a high limit temperature or pressure switch. In the event of a failure of the control system or components within the product, secondary side water could be heated to temperatures above the set point. The risks associated with this should be assessed during installation as part of the system's integration. The hot water system into which this product is installed should have appropriate safety systems installed to mitigate any risk.

An independent high limit temperature safety device should be integral to the overall system into which the SpiraHeat is installed. Electrical provisions have been made for an appropriate control device to be connected to the product should this be required, please see Section 3.5.

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 over-pressure or over-temperature 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 and consider whether protective clothing (including safety glasses) are required.

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.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of these products may reach temperatures of 392°F (200°C).

These products are not self-draining. Take due care when working around, dismantling or removing the product from an installation (refer to 'Maintenance instructions').

2. General product information

2.1 Description

The Spirax SpiraHeat™ system uses steam to provide accurate heating of low temperature hot water for processes and heating. Systems are supplied fully assembled, configured and pressure tested ready for installation.

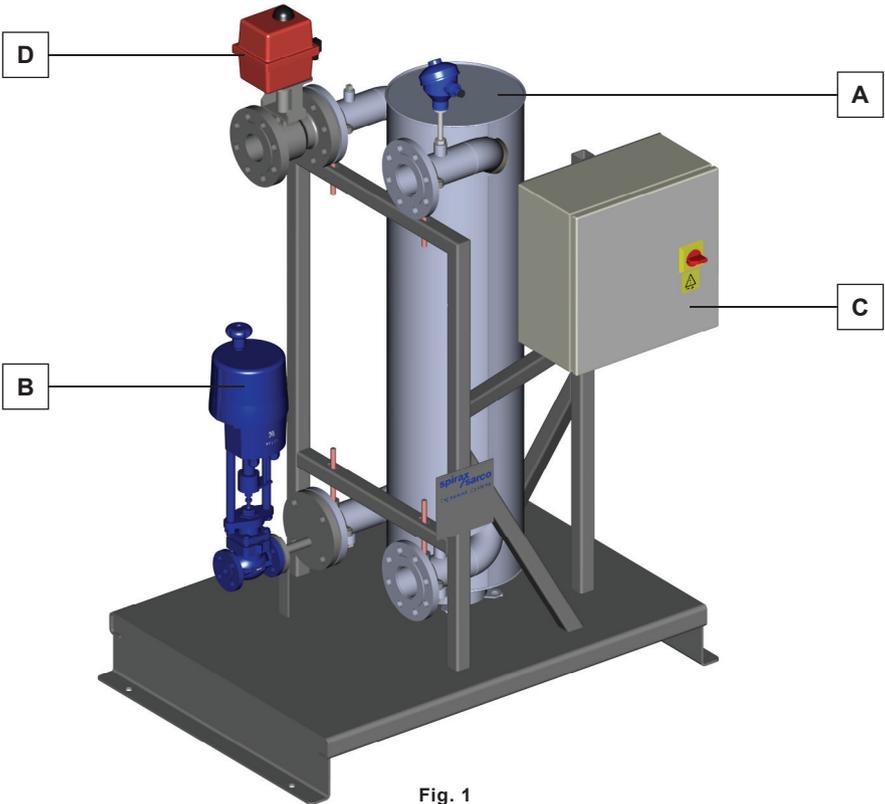


Fig. 1

The Spirax SpiraHeat™ unit consists of the following core items (refer to Figure 1 and 2):

- | | |
|----------|--|
| A | Heat exchanger. |
| B | Pneumatic or electrically actuated control valve and positioner. |
| C | Process controller (available without, see section 2.3). |
| D | Steam isolation valve (optional on steam side control). |

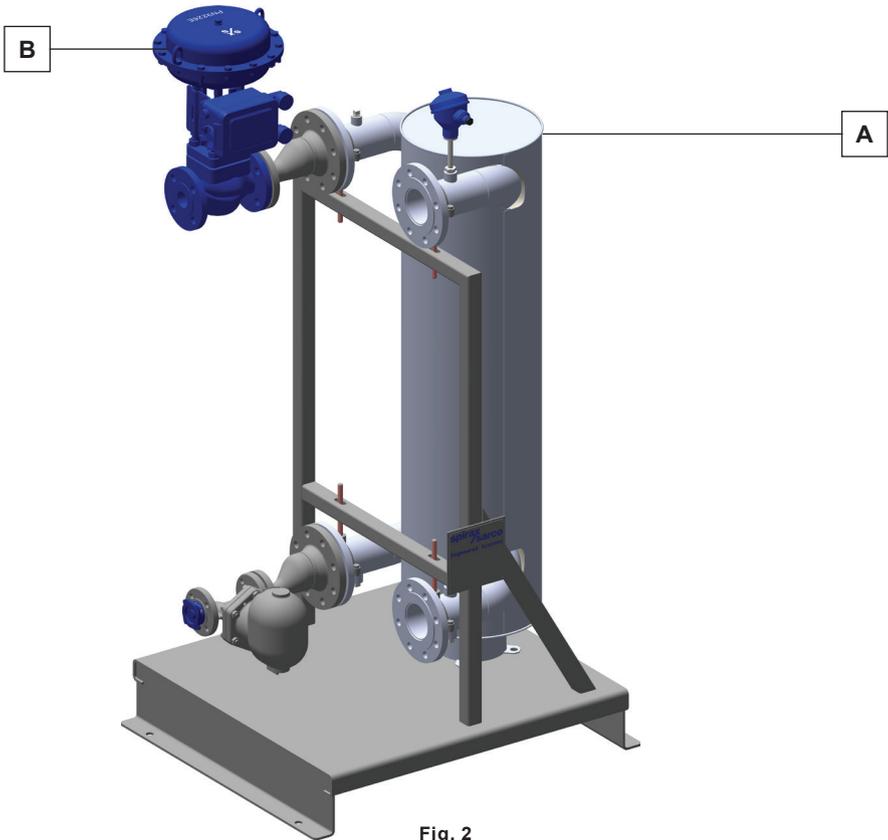


Fig. 2

2.2 Operating conditions

Operating ambient temperature	32°F to 131°F (0°C to 55°C)
Relative humidity	5 to 85% non-condensing
Atmosphere	Not suitable for use above 6500ft or in explosive or corrosive atmospheres
IP rating	IP54*

*Excluding some 'EL' option systems which are reduced to IP31

2.3 How to order

All systems are designed for the required heat load with controls to suit the application. The best way of ensuring that we have all the necessary information for quotation and manufacture is to contact your local Spirax supplier who will size the appropriate SpiraHeat™.

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 SpiraHeat™ 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 SpiraHeat™ 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 20 to 85 psi g (1.4 to 6.0 bar 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 means to isolate and lock the incoming power supply should be fitted adjacent to the unit.

Mains supply is directly connected to the primary side of the incoming control panel isolator and main ground terminal as shown in Figure 4.

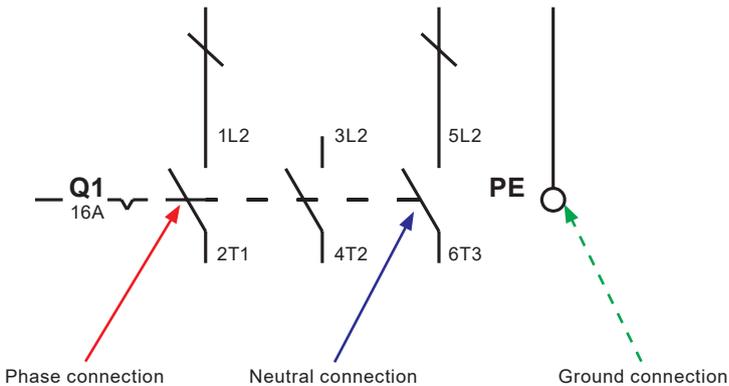


Fig. 4

3.4 Electrical specifications

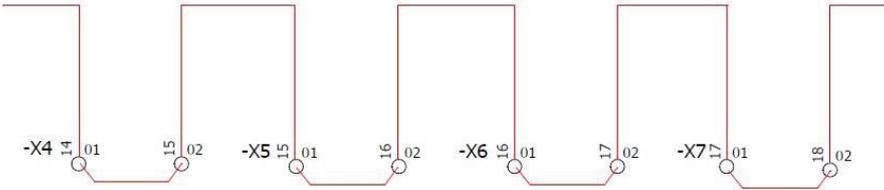
Electrical supply: Refer to the name-plate on the unit

Control panel supply voltage	115 Vac/60 Hz
	230 Vac/50 Hz
Control panel load requirements	Internally fused at 5 amps
Electrical control actuator (output)	24 Vac
	4 - 20 mA control
Pneumatic control actuator	-
	4 - 20 mA control
High limit isolation valve (output)	24 Vac
PT100 temperature sensors	3 wire

3.5 Electrical connections

The following are available for customer connection to the Spirax SpiraHeat™ system if required:
Volt free contacts

Terminal designation	Description	Type
X4	External temperature/pressure limits	1 x N/C contact
X5	External temperature/pressure limits	1 x N/C contact
X6	External temperature/pressure limits	1 x N/C contact
X7	External temperature/pressure limits	1 x N/C contact



LIMIT SWITCHES' CONNECTIONS
IF FITTED REMOVE THE LINKS/BRIDGES

Fig. 5

4. Commissioning

We strongly 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 SpiraHeat™ is isolated.
- Double check that all steam, condensate and water connections are correctly connected to the Spirax SpiraHeat™.
- Check all flange bolts are tight.

4.1 Mechanical commissioning procedure:

- Check that all of the electrical connections are secure and as per the wiring diagram (Section 3.3, Figure 4).
- 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). Siemens electric valves can be manually opened by pressing and turning the handwheel clockwise.
 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 85 psi g (6 bar 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 SpiraHeat™.
- Start the main secondary water circulating pump(s), if fitted.
- Check and confirm there is secondary water circulation through the Spirax SpiraHeat™.
- Once circulation is confirmed, switch on the main power to the control panel (local isolator).
- Turn the control panel isolation switch to 'ON'.

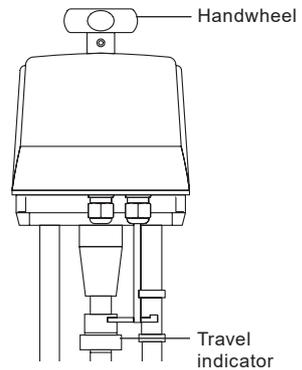


Fig. 6

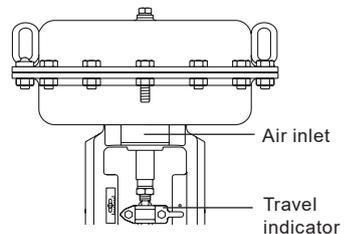


Fig. 7

4.2 EPC3008 commissioning

The EPC3008 is factory set to the correct configuration required for the Spirax SpiraHeat™. Please refer to the EPC3008 installation manual for detailed instructions and configurations.

4.2.1. Equipment and software requirements

4.2.1.1. CPI Clip-on connector and driver

The CPI Clip-on connector must be purchased separately to the controller. It has the following order code: "ITTOOLS/NONE/USB/////XXXXX".



Fig. 8 CPI Clip-on connector

To be able to use the CPI Clip-on connector its driver must be installed. The driver can be downloaded by navigating to the link: <https://www.eurotherm.com/usbcpi>

4.2.1.2. EPC3008 controller

Make sure that the controller has the right hardware configuration by comparing the code on its left side with the following order code:

"EPC3008 CC/VH/R2/D1/XX/XX/XX/E4/BS/XX/XXX/ST/XXXXX/XXXXXX".



Fig. 9 Order code of the EPC3008 controller



Fig. 12 Controller with connected clip-on connector

4.2.2.2. When you connect the cable to the controller it should power up. Open the iClone software and select scan from the toolbar.



Fig. 13. iClone software icon

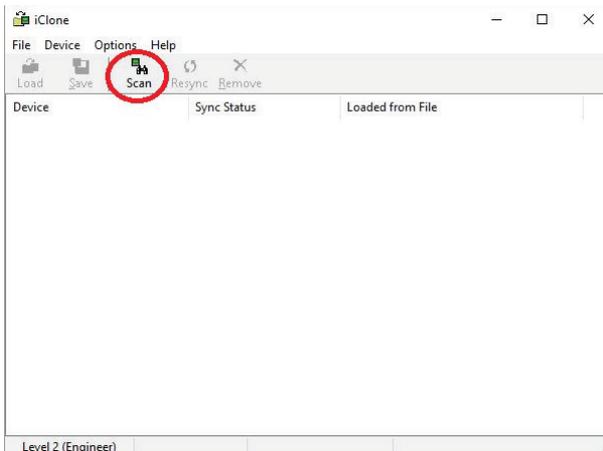


Fig. 14 Scan button in the iClone interface

4.2.2.3. The enable background scan window will appear. Set it up as follows and click OK.

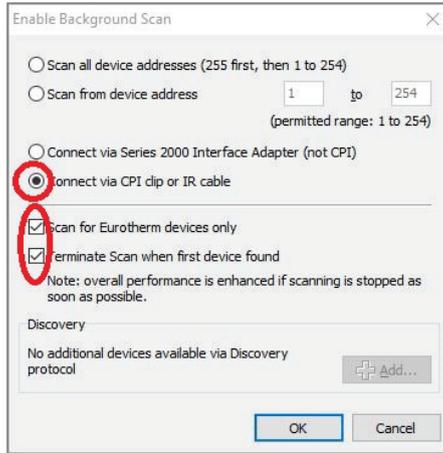


Fig. 15 Enable background Scan

4.2.2.4. A connection with the controller should be established and the controller's ID should appear in the main window of iClone.

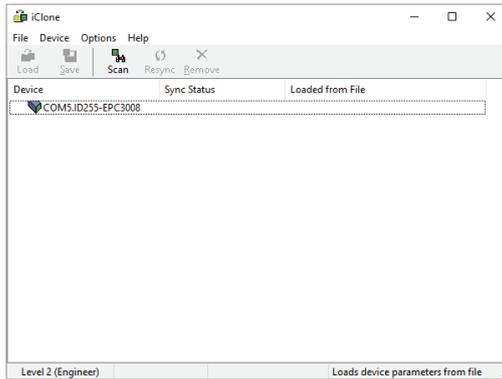


Fig. 16 iClone interface with connected controller

4.2.3. Uploading the software configuration using iClone

To configure the EPC3008 controller, obtain the latest .uic configuration file for SpiraHeat heating from your local Spirax Sarco branch.

After following the instructions in section 4, follow the steps below in order to upload the configuration file:

4.2.3.1. Select Load from the main toolbar and navigate to the .uic file on your PC.

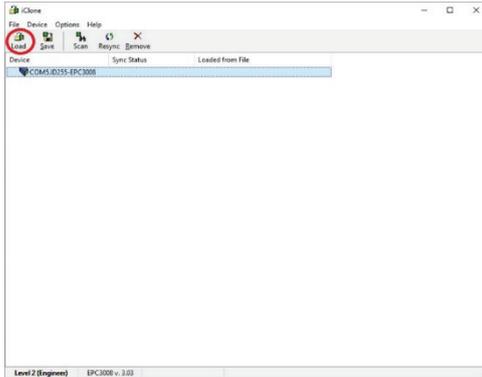


Fig. 17 Opening the configuration file

4.2.3.2. Acknowledge the warning and make sure that controller is disconnected from all of its processes. Then click Yes to start the upload.

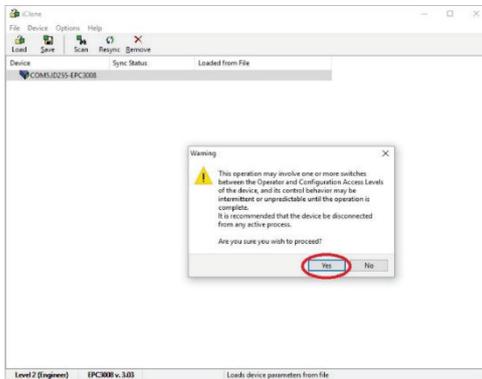


Fig. 18 Warning confirmation

4.2.3.3. The upload file pop-up window will be visible with a message log. A correct file transfer to the controller will be confirmed by the message below:

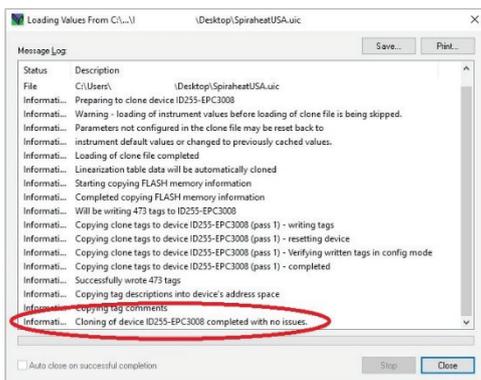


Fig. 19 Successful file upload

4.2.3.4. Close the log and iClone interface. The controller is now ready to use.

Note: The controller's parameters have to be adjusted further depending on the system's behaviour during commissioning. This software is an initial configuration file.

4.2.4. General operation

To set other settings through controller's control panel if necessary, follow the user guide provided for EPC3008 from the page below:

<https://www.eurotherm.com/products/temperature-controllers/single-loop/epc3000-programmable-controllers>

4.3. Timers settings

The T1 timer starts when the SpiraHeat™ is set to run. The T1 timer relay opens the main isolation valve prior to starting the EPC3008 controller. This allows the control valve to warm up and reduces the risk of water hammer.

T1 must be set to a value below T2. By default this is set to 50 seconds.

The T2 timer starts when the SpiraHeat™ is set to run. The EPC3008 will close the isolation valve when the control signal to the control valve is below the Alarm Control Point, A1.HI (default 1%). The T2 timer relay allows the control valve to open over the Alarm Control Point before returning control of the isolation valve to the EPC3008.

T2 must be set to a value above T1. By default this is set to 60 seconds.

5. Fault finding

Fault	Possible cause	Remedial action
Unit does not power up	Loss of incoming supply	Check incoming supply
	Internal circuit breaker tripped	Check Q2
Loss of 24 Vac	Internal fuse blown	Check fuse F1
PT100 signal not reading correctly	Field wiring fault	Check termination of 3 wire PT100 terminals and PT100 head
	Faulty PT100	Check compensated resistance
No hot water	Isolation valve failed closed	Refer to the IMI for the isolation valve and actuator
	Control valve failed closed	Refer to the IMI for the control valve and actuator
	Steam trap failed closed	Refer to the IMI for the steam trap

6. Maintenance

Note: Before starting 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 IMIs for the components concerned.

6.2 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 heat exchanger should be inspected for cleaning. If scale becomes a persistent problem, regular chemical cleaning should be considered.

