Calorifiers Heat Exchangers Pressurisation Units
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Installation, Operation and Maintenance Instructions

PlantPac Steam Plate Heat Exchanger

OM014

The operating and maintenance instructions contained within this package are for PlantPac Steam Plate Heat Exchanger Package. Please note that an electronic version of these instructions is available from our website. Please contact our sales office for further information.

Rev	Date	By	Details
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Revision Details			

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1.0 Standard Unit Information & Description

The 'PlantPac' range comprises steam/water plate heat exchanger packages. These are mostly used in systems to heat domestic hot water or low temperature hot water. In the majority of applications the water is heated by steam. Other applications may also arise with different water temperatures and materials of construction.

Standard Material Schedule	
Primary Pipework	Carbon Steel
Secondary Pipework	Stainless Steel Copper Carbon Steel
Exchanger Plates	Stainless Steel
Exchanger Gaskets	NBR EPDM
(Other materials on request)	

Design Data	Primary	Secondary
Maximum Working Pressure	Refer to Unit Nameplate	Refer to Unit Nameplate
Hydraulic Test Pressure	Refer to Unit Nameplate	Refer to Unit Nameplate
Complies with	Refer to Unit Nameplate	

CONTROL PANEL SPECIFICATION

General
Panel to IP55 or better
Steel Enclosure with hinged door, painted finish.

Inputs
Power supply with neutral & earth
Thermocouple Type T (West 6100+ controller)
Thermostat - Hi-Limit - Self-resetting (OPEN = Hi-Limit)
Remote Start Signal - 240V ac (continuous) = ON
(Late 1999 onwards units provide this internally and require only connection to an external switch for remote start)

Outputs
Pump Power: details will be specific to each unit
Hi-Temperature limit volt-free contact (fail-safe - opens on power failure)
Pump Trip volt-free contact (fail-safe - opens on power failure)
Control Valve Positioning & Actuation - 2 at 240V AC
Optional Output: 0-10V DC for remote temperature indication

Panel Facia

Door Interlock Isolator
Door Lock with key
LOCAL/STAND-BY/REMOTE switch
Power on light
High Temperature Light (red)
High Temperature Reset Button (reset at thermostat)
Pump Run light(s)
Pump Trip light(s) (red)
West Instruments 6100+ Digital Temperature Controller/Indicator
Traffolyte Label (black print on white background).

Other Items
Pump starter and protection devices
Control circuit protection device
Terminal blocks for user connections to pump(s), switches etc.
Relays and wiring to ensure correct operation.
Earth block studs with connectors for pump(s) plus 4 spare

2.0 PED Information

The standard range of 'PlantPac' packages are designed in accordance with the requirements of the Pressure Equipment Directive 97/23/EC. Units classed as SEP in the PED category are not supplied with a CE mark. Units in category 1 and above are CE marked and appropriate markings and certification is supplied with each unit.

It is the responsibility of the user and/or installer to ensure that the unit is installed and operated safely, and in accordance with the instructions supplied within this manual.

3.0 Installation

Lifting & Handling: Use lifting eyes where fitted. Do not lift using the insulation (if fitted). Straps may crush the insulation. Do not allow operatives to stand on the pipe-work or other components.

Siting: Unless specifically ordered for outside siting the unit must be sited indoors. Foundations must be firm and level to prevent settling, pipe strain or distortion of the unit. Ensure enough room exists around the unit to gain access for servicing all components.

Protective Covers/Plugs: Plugs may be fitted to connections to protect them in transit. These must be removed prior to use. If a connection is not required seal it appropriately. Check for and remove any foreign material which may have got into the unit.

Pipe-work: Pipework connected to the unit should be supported to prevent loads being transmitted to it. Provide for thermal expansion with bends and expansion joints as necessary.

Isolation Valves: Fit good quality isolation valves prior to the unit connections (not to vents, overflows, safety valve discharge ports) to facilitate servicing.

Making Connections: For flanged connections tighten bolts in a diametrically opposite sequence to load the flanges evenly onto the gasket. For screwed connections use a thread sealant (approved if applicable for use with potable water by the local water authority).

Venting: Ensure adequate venting for air removal during filling and operation. "Sealed" systems should have auto and manual -air-vents for this. Automatic air vents on the steam side can release some steam momentarily and should have pipe-work to discharge this to a safe place.

Safety Valves etc: On the secondary side pressure relief valves should have their outlets piped away to a safe disposal point, preferably via an air-break and Tundish so that discharge is unrestricted and easily visible.

Steam Safety Valves: (If fitted) should have discharge pipe-work to discharge steam to a safe place outside. Also fit a small-bore (typically 15mm) pipe to drain the main discharge pipe-work to low level.

Water Expansion: Must be accommodated by separate expansion vessel on the cold feed side (on sealed systems) or via the vent pipe on vented systems. Allowing expanded water back into the cold feed tank on vented systems is not recommended as the resultant warm water will encourage bacterial growth.

Condensate Removal: Steam pressure in the heat exchanger can vary considerably as the steam control valve modulates. If there is back-pressure in the condensate line the heat exchanger may flood ("stall") when steam pressure is low. This can cause control and reliability problems. In this case drain condensate via float type trap with thermostatic vent condensate to a receiver with condensate pump. When back-pressure is too low to cause the heat exchanger to flood drain condensate via float type trap with thermostatic vent to a condensate return line at a lower level. Condensate removal equipment may have been supplied with the unit – consult the general assembly drawing for details.
Compressed Air: The unit requires a compressed air supply. This should be fitted with a coalescing filter/regulator to clean the air for the control valve and regulate its pressure.

Electrical: A qualified electrician should make electrical connections in accordance with the wiring diagram supplied with the unit and in accordance with applicable national and local standards and regulations.

Testing For Leaks: Each unit must pass a factory leak test prior to despatch. However, small leaks may be found after installation due to stresses from off-loading, positioning and installation. Therefore it is essential to perform a soundness test after installation and rectify as necessary. At all stages pressures must not exceed the maximum working pressure for the unit

4.0 Commissioning and Operation

At all stages refer as necessary to general assembly drawing (GA), wiring diagrams and detailed instructions for individual components.

At all stages temperatures and pressures must not exceed the maximum for the unit.

1. Switch to "standby" at unit control panel. Switch off secondary system return pump (if any).
2. Close all isolation valves.
3. Remove strainer baskets; remove any debris in strainers from installation, re-fit baskets.
4. Ensure secondary side is filled with water. Vent as necessary.
5. Open secondary side isolation valves.
6. Open secondary shunt pump isolation valves.
7. Switch to "local" at unit control panel. Check shunt pump works.
8. Start the secondary system return pump (if any).
9. Observe the control panel: The West 6100 controller should be displaying actual DHW temperature (top) and Set Point Temperature (bottom). If any error message shows, or if temperature displayed is not reasonable, investigate and rectify.
10. Initially configure West 6100 controller in accordance with West 6100 configuration sheet.
11. Adjust set point to 5 deg. C. (i.e. less than measured temperature).
12. Switch to "standby" at unit control panel. Check shunt pump stops.
13. Switch to "local" at unit control panel. Check high limit valve opens. (There will be a short delay of a few seconds caused by a timer in the control panel). If valve does not open investigate and rectify.
14. Set the timer (see 5.14) to give a delay of 30 seconds.
15. Adjust set point to 40 deg. C. (i.e. more than measured temperature).
16. Check control valve opens. If valve does not open investigate and rectify.
17. Switch to "standby" at unit control panel.
18. Close steam pressure gauge isolation valves.
19. Open steam drain line isolation valves and condensate line isolation valve
20. Open steam isolation valve very gradually to quarter open. There will be some noise as condensate in the steam line is drained. Check that steam drain line trap is working. Rectify if necessary.
21. Open steam isolation valve fully.
22. Switch to "local" at unit control panel. Check high limit valve opens. Control valve should open gradually.
23. Allow 5 few minutes for condensate to build up in steam pressure gauge pig-tail siphons.

24. Open steam pressure gauge isolation valves.
25. Check steam pressure is within limits for unit. If it's not, isolate steam, investigate and rectify.
26. Check that unit is controlling the secondary temperature correctly and that the steam trap is working.
27. Check that steam control valve is seating properly as follows:
28. Adjust set-point temperature to 5˚C to close control valve.
29. Switch off secondary return pump (if included within the package). Close secondary return and cold feed isolation valves.
30. Now there is effectively no load on the system.
31. Check that measured temperature does not rise. Listen for steam passing through control valve
32. If temperature rises or steam can be heard then adjust the control valve to give tight shut-off.
33. Open secondary return and cold feed isolation valves switch on secondary return pump.
34. Adjust set-point temperature to 40˚C.
35. Test unit control by running hot taps in a controlled and supervised manner to give a variety of demands.

WARNING: When testing temperature control there is always a chance that dangerously hot water will be present in the system. To avoid accidental scalding hot water use should be prohibited during testing. After testing run off water until system is at a safe temperature:

1. If necessary make adjustments to achieve stable temperature control as follows:
2. Leave set point at 40 deg. C initially – this helps keep overshoots to a lower value.
3. Consult West 6100 manual section 2.4, manual tuning.
4. Adjust West 6100 parameters until stable control is achieved. If control valve is opening too quickly restrict its air supply by adjusting the air needle valve.
5. Adjust set point to required value (usually 60-65 deg. C).
6. Check unit operates in "remote" setting. (link out terminals in panel if necessary)
7. Commissioning is now complete: Record all settings. Leave unit running or switch off as required.

<u>Operation – starting the unit:</u>

1. Operation is automatic.
2. Switch to "standby" at unit control panel.
3. Open all secondary side isolation valves.
4. Switch on secondary system return pump (if any).
5. Open secondary shunt pump isolation valves.
6. Open steam drain line isolation valves and condensate line isolation valve
7. Open steam isolation valve very gradually to quarter open. There may be some noise as condensate in the steam line is drained.
8. When noise has abated open steam isolation valve fully.
9. Switch to "local" (or "remote" if unit is BMS controlled) at unit control panel. After a short delay the high limit and control valves will open.
10. The unit should now continue to operate automatically.

<u>Operation – stopping the unit:</u>

1. Switch to "standby" at unit control panel. This will close steam control and high limit valves and stop shunt pump.

The unit is now off. If working on the unit isolate steam and water, allow to cool, drain and isolate electrically as required.

5.0 Maintenance

Routine Maintenance:

1. Periodically check strainers for blockages.
2. Periodically check traps for steam wastage.

Other maintenance:

Specific O&M's for each of the valves supplied as part of the package are available upon request, please contact the GMS Technical Team on 01457 835 700.
GMS Thermal Products Ltd provides an on-going service commitment to our products. Contact our sales office for prices and availability.

6.0 End of Life Disassembly, Recycling & Disposal

Please consult the general assembly drawing and product data sheets of the supplied unit for specific information regarding the materials used. Dispose of all material responsibly and in accordance with all local regulations. For further information, please contact the GMS Technical Team on 01457 835 700.

7.0 Recommended Spares

The recommended spares for the PlantPac Steam Plate Heat Exchanger Package are;

- Plate & Gasket Set
- Control Valve Actuator
- High Limit Valve Actuator
- Pump Seals Kit
- Digital Controller
- Control Panel Lamps

Please contact our sales department for recommended spares prices and availability.