Unit 4, Tudor Industrial Estate, Ashton Street, Dukinfield SK16 4RN
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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR THE WORLD HEAT NEROPLATE RANGE OF PACKAGED WATER/WATER PLATE HEAT EXCHANGERS

1.0 DESCRIPTION

World Heat NeroPlate range of Packaged Water/Water Plate Heat Exchangers are typically used for the generation of instantaneous Domestic Hot Water (DHW) but can be modified to suit other applications. Low Temperature Hot Water (LTHW) is commonly used on the primary side but again, the package can be easily modified to suit other temperature ranges.

WARNING: This equipment may use dangerous high voltage and can present an electrical shock hazard.

- **Only suitably qualified personnel should carry out installation and commissioning of this equipment.**
- **Ensure that the equipment is correctly earthed.**
- **Ensure that the equipment is fully powered down before attempting any work on the unit.**
- **The equipment must be installed to relevant standard and good practices, only appropriate tools should be used.**

2.0 PED INFORMATION

The World Heat standard NeroPlate range of Packaged Water/Water Plate Heat Exchangers are designed and manufactured in accordance with the requirements of the Pressure Equipment Directive 2014/68/EU. As per the requirements of the directive, units that fall within the SEP (Sound Engineering Practice) category are not supplied with a CE Mark. Units that fall within categories I to IV are CE Marked and provided with the necessary markings, certification and inspectorates.

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 detailed within this document.

3.0 COSHH

Research has suggested that there are no specific items to highlight during normal operating conditions. However, during manufacture, dye-penetrant may be used as part of our pre-inspection process of testing welds. It is therefore essential that adequate flushing and sterilization is carried out before use and that the quality of water produced is to acceptable standards.

4.0 INSTALLATION

4.1 LIFTING AND HANDLING

a) Lifting lugs, where fitted, should be used for lifting purposes.
b) For units without lifting lugs, the user must arrange suitable lifting arrangements (i.e. the use of slings, lifting eyes etc.) to avoid damaging the vessel or its attachments during installation, taking into consideration the weight and design of the unit.
c) Where fitted, insulation should not be used for lifting purposes.
d) Pipe-work and pipe-line ancillaries should not be used for lifting purposes.
e) Due to the insulation and case character tics, care should be taken when lifting and handling the vessel to prevent damage.

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f) Avoid the use of lifting straps where insulation is fitted, as they may damage or crush the insulating material or case.
g) Do not lift the vessel using chains which are directly in contact with the actual unit (skid-base only).
h) Do not allow operatives to stand on the actual unit (skid-base only).
i) Care should be taken so as to not damage the control panel or wiring.

WARNING: When lifting, please ensure a clean lift of the unit using the lifting lugs or skid-base provided. The skid-base is not designed for pivoting during lifting/siting/installation. Units should be kept in the upright position.

4.2 STORAGE – ***If storing the unit for any period of time before installation***

a) Upon receipt of the unit, please check the packaging to ensure that it has not been damaged during transport. Any damage to the packaging should be fixed or replaced as necessary.
b) Due to the electrical aspect of the unit, it must be stored indoors within a dry frost-free environment with ambient temperatures between 4°C and 40°C.
c) The integrity of the packaging should be checked monthly. Should the seal be found to have broken or its condition found to have deteriorated (i.e. become wet, hardened or split), the packaging should be repaired or replaced.
d) Once sited and the packaging has been removed, the condition of the unit should be thoroughly examined for any signs of corrosion or contaminant ingress.

4.3 SITING

a) Unless specified at enquiry stage and specifically ordered to suit an external installation, the unit must be sited indoors.
b) Foundations or plinths must be firm and level to prevent settling, pipe strain or distortion of shell.
c) Unless specified at enquiry stage and specifically ordered, the unit must be installed in a level position.
d) Ensure that there is sufficient maintenance space surrounding the unit, in particular the control panel should be easily accessible and the panel door able to be opened fully.

4.4 INSTALLATION

a) Protective covers and plugs may be fitted to connections to protect them in transit, these must be removed prior to use.
b) If a connection is not required for any reason, the connection must be sealed appropriately.
c) Check for any signs of contaminant ingress which could have got into the unit during transportation or storage on site.
d) Pipe-work connected to the unit must be adequately supported to prevent any loads being transmitted to the vessel. Consideration must be taken with regards to thermal expansion through the use of bends and expansion joints.
e) Isolation valves should be fitted prior to the unit (EXCLUDING ANY VENT OR SAFETY VALVE CONNECTIONS) to facilitate future maintenance and servicing.
f) Strainers should be fitted prior to the unit inlets to prevent heat exchanger blockage by debris.
g) Provisions should also be made on the pipe-work prior to the unit for air venting and draining.
h) To avoid corrosion, use appropriate pipe materials to suit the unit.
i) To connect to the units screwed connections, a suitable thread sealant should be used.

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j) To connect to the units flanged connections, bolts should be tightened in a diametrically opposite sequence in order to load the flanges evenly onto the gasket. The gasket should be suitably chosen for the application.
k) Suitable safety relief valves should be fitted to the unit (if a connection supplied) or on the pipe-work going to and from the unit to prevent over-temperature and over-pressure. The discharge should be piped away to a safe disposal point, preferably an air break and tundish so that the discharge is unrestricted and easily visible.

NOTE REGARDING CONTROL PANELS

Prior to commissioning, ensure that all control circuitry and main circuit connections are tight. Remove all loose items from inside the panel and items fastened to the unit cables.

Please refer to the unit specific wiring diagrams and local regulations to determine the power supply required. If a control panel has not been included within our scope of supply, ensure that the maximum current is not exceeded.

Separate instructions can be provided by request for initial set-up instructions of the unit's digital controller or downloaded on our website www.whcylinders.co.uk/technical-literature/

NOTE REGARDING PIPE-WORK

The standard unit has a single primary pump included which should draw water from a Low Loss Header (or similar arrangement) and circulates the water through the primary side of the unit. THIS PUMP SHOULD NOT BE USED AS THE BOILER CIRCULATION PUMP.

If the boiler circulation pump installed within the system generates a high differential pressure (>10kPa) at the connections to the unit, the differential pressure should be reduced by use of a bypass.

NOTE REGARDING UNVENTED SYSTEMS

Arrangements are required on unvented systems to prevent excessive pressure, temperature and the formation of a vacuum. This includes the supply and installation of suitable equipment such as; Pressure Relief Valve, Temperature Relief Valve, Expansion Relief Valve, Expansion Vessel, Anti-Vacuum Valve, Control Thermostat, High Limit Thermostat and Cut-Out Device etc. For further information, please consult the most recent edition of the UK Building and Water Regulations.

5.0 COMMISSIONING & OPERATION

Do not operate the equipment at pressures or temperatures in excess of those specified on the nameplate of the unit. Do not subject the unit to conditions of vacuum or partial vacuum.

To access the control panel interior the DOOR INTERLOCK ISOLATOR must be switched to OFF position, this will isolate the main power to the unit. When the DOOR INTERLOCK ISOLATOR is switched to ON position, it prevents the door from opening.

WARNING: THE DOOR ISOLATOR ONLY ISOLATES THE MAIN POWER TO THE UNIT, OTHER INPUTS (I.E. VOLT FREE CONTACTS) MAY STILL BE LIVE. THESE SHOULD BE ISOLATED EXTERNALLY.

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SWITCHING ON/OFF PUMPS

There are three modes of operation available as standard LOCAL, STAND-BY and REMOTE.

If the unit is switched to LOCAL the control circuit will be energised and the pump(s) will be switched on.

If the unit is switched to STAND-BY the control circuit will be energised but the pump(s) will not run.

If the unit is switched to REMOTE the control circuit will be energised and the pump(s) will start only when the REMOTE START signal from an external source is present.

a) Assumptions
   - It is assumed that the secondary pipe-work prior to the unit is already full of water
   - On sealed systems, it is assumed that the expansion vessel has been pre-charged and that any cold water booster set and/or pressure reducing valve, has been commissioned and set to the correct pressure.

1. All isolating valves isolating the unit from the system should be closed and any circulation pumps turned off.
2. Close any drain valves supplied as part of the unit.
3. Open the secondary side isolating valves and slowly fill the secondary side with cold water.
4. Switch on any secondary circulation pumps.
5. Open the primary side isolating valves and slowly fill the primary side with water.
6. Switch on any primary circulation pumps.
7. Ensure that any vents within the system are open and operational, as required.
8. Ensure that the control panel door is closed.
9. Turn the LOCAL/STAND-BY/REMOTE switch to STAND-BY.
10. Turn the DOOR INTERLOCK ISOLATOR to ON.
11. Turn the LOCAL/STAND-BY/REMOTE switch to LOCAL.
12. The Set-Point is pre-set at our factory. This can be altered using the Digital Temperature Controller within the Control Panel of the unit. For instructions on how to adjust the controller settings please refer to the set-up instructions which can be downloaded from our website www.whcylinders.co.uk/technical-literature/ .
13. The High Limit Thermostat should be set approximately 10°C above the Set-Point temperature. (The High Limit Thermostat is used to shut the unit down in the event of Controller/Control Valve failure. Further adjustment of the High Limit Thermostat Set-Point may be required in the first couple of day's operation to prevent nuisance shut-down).
14. The unit can now be left running.

5.1 OPERATING PHILOSOPHY

Heat is transferred from the primary side of the unit to the secondary side of the unit through the Gasketed Plate Heat Exchanger. The Digital Temperature Controller within the Control Panel measures the secondary outlet temperature using a control sensor positioned on the outlet of the Heat Exchanger. If an adjustment is required to maintain the set-point temperature then the Controller's output signal voltage will change accordingly. This output signal will adjust the Primary Pump speed and the position of the Control Valve. If the Control Valve closes fully (registered by limit switch) the Control Panel shuts down the Primary Pump until the valve opens again. The bypass installed prevents pumping against a closed valve in the time it takes the pump to shut-down.

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5.2 FAULT CONDITIONS

PUMP TRIP	The "Pump Trip" light is illuminated and the "Pump Trip" Vault Free Contact opens. Units with a Twin-Headed Primary Pump, are automatically switched over if one pump trips.
HIGH TEMPERATURE	The "High Temperature" light is illuminated, the Primary Pump is stopped (if a Secondary Pump is also supplied as part of the unit this will also be stopped), the Control Valve is closed and the High Limit Volt Free Contact opens. The unit will be required to be re-set manually.
POWER FAILURE	Volt Free Contacts open. Unit self re-sets when the power to the unit is restored.

6.0 MAINTENANCE

World Heat provides an annual service contract service which covers our full range of Plate Heat Exchanger Packages, please contact our sales team for further information.

Maintenance frequency will depend on the characteristics of the fluid circulating through the unit, however it is recommended to regularly check for the following;

- Check for leaks from any pipe-work or pipe-work components
- Check that the temperature is not irregularly fluctuating
- Check that electrical connections are tight and cabling is tidy
- Check for signs of scaling

For specific information regarding the maintenance of the control valves, circulating pumps, thermostats etc., please refer to the model specific IOMs supplied separately.

For specific information regarding the maintenance of the Plate Heat Exchanger, please refer to WH-IOM-009 – Gasketed Plate Heat Exchanger which is available for download from our website www.whcylinders.co.uk/technical-literature/ .

6.1 FAULT FINDING

Scaling of the secondary side of the unit would be evidenced by the following;

- Increased pressure drop on the secondary side of the unit.
- Incorrect secondary side outlet temperature.
- Lower than expected temperature difference on the primary side of the unit, when the control valve is fully open.

7.0 RECYLING

For details on the end of life disassembly, recycling and disposal requirements of the unit, please consult the general assembly drawing and technical data sheet issued at quote/order stage, to determine the materials used.

All materials should be disposed of responsibly and in accordance with local regulations.

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Please consult our technical team for further information.

8.0 SPARES

World Heat recommends the following spares for a NeroPlate – Packaged Water/Water Plate Heat Exchanger;

- Plate Heat Exchanger Plate and Gasket Set
- Control Valve Actuator
- Pump Seals Kit
- Control Thermostat
- High Limit Thermostat
- Digital Controller
- Control Panel Lamps
- Control Panel Fuses
- Control Panel Contactors
- Control Panel Circuit Breakers

Please contact our sales department for recommended spares and availability, please quote the unit serial number in order for our sales team to correctly specify the spares required.