

PROGRAMMABLE ELECTRICAL HEATER FOR PROGRESSIVE CAVITY PUMPS

INTELLIGENT, PROGRAMMABLE HEATERS THAT PROVIDE ACCURATE TEMPERATURE CONTROL AND FROST PROTECTION FOR INDUSTRIAL EQUIPMENT, SUCH AS PUMPS, VALVES AND METERS

The patented **Limpet** heating system consists of a compact, intelligent, microprocessor-controlled and waterproof heating module that can be fitted on a wide range of equipment to provide heat for industrial processes or frost protection. It is particularly effective for preventing large progressive cavity pumps from freezing, which can result in cracking of the casting. An **AlphaLimpet™** is attached to the pump using a profiled aluminium adaptor block that transmits heat into the body, as well as acting as a heat storage device. The AlphaLimpet controls secondary 'slave' **BetaLimpets** or **MicroLimpets** which are fitted to other parts of the pump, which is then insulated, thereby ensuring that the entire pump is heated and remains frost free.

Advantages

- No control panel required
- Accurate temperature control
- Automatic power using an air sensor
- IP67 rating
- Low power consumption
- Optional supervisory port performance status/alarm

ALPHALIMPET FEATURES

The main features of the patented **AlphaLimpet** heating system are as follows:

Operation:

- Adjustable temperature range up to 80°C.
- 110 / 230 Volts ac; up to 120W power output.
- IP67 flexible conduit, Phoenix connectors or IP68 glands for power in.
- An insulated jacket is essential for maximum performance and even temperature distribution.

Programmable:

- A programmable control board is mounted inside the device.
- Removable IP-rated top plate giving user access to a simple temperature adjustment setting using two rotary switches. This would normally be done during installation (factory pre-set is 40°C unless otherwise requested).
- Fully user-programmable, multi-mode operation using a 6-way DIP switch.
- Temperature ramp rate control for sensitive applications.
- Internal programming LED indicator. This confirms correct programming and then indicates that the unit is operating.
- External power and supervision status LED.

Robust Construction:

- The product is sealed to ensure that all the connections and components are waterproof.
- Robust IP67-rated aluminium case.

Heat Transfer through Profiled Adaptor Block:

- An aluminium adaptor block ('AB') is pre-profiled to fit onto the equipment (user to provide CAD drawings showing exact equipment dimensions).
- T-nuts are used to secure the AlphaLimpet and slave heaters onto the AB and stainless steel straps or bolts are used to secure the AB onto the equipment body.

Available in several different configurations:

- The AlphaLimpet is available in several different configurations. There are currently 4: Series 1, 3, 5 & 7. A series 5 or Series 7 unit is used for frost protection on CP pumps.
- There are three different connection options: conduit, Phoenix or gland. The standard lengths are 75cm, 50cm and 100cm respectively. Conduit connections are provided with a 1m length of mains cable. For non-standard lengths, please

TECHNICAL INFORMATION

- Dimensions: 176mm long (excluding connectors) x 63mm wide x 52mm high.
- Voltage: 110Vac or 230Vac.
- Power rating: up to 120W.
- Temperature range: 0°C to 80°C.
- Ambient: -30°C to +50°C.
- Temperature control: $\pm 0.8^\circ\text{C}$.

CP PUMP HEATING CONFIGURATIONS

For heating CP pumps, the AlphaLimpet can be set up in a number of configurations, depending upon the size of the pump:

Small pumps:

- On pumps where the barrel is less than 400mm long, an AlphaLimpet can be used on its own and is mounted on a profiled aluminium adaptor block ('AB') that fits tightly onto the barrel.
- The heating assembly can be secured onto the barrel using stainless steel straps.
- The barrel and suction casing are clad with insulation (installed by a third party to the user's account).
- An external air sensor is located near the pump and the AlphaLimpet programmed to turn on when the temperature starts to fall towards freezing point.
- The heater will turn on and warm the pump to a pre-set temperature. For example, the trigger temperature may be 5°C and the set temperature 20°C.

Larger pumps:

- For larger pumps, a Series 7 AlphaLimpet will be connected to one or more 'slave' BetaLimpets of MicroLimpets. These will be located at intervals along the pump barrel of the pump and secured onto an AB that runs the length of the barrel. These will be secured with stainless steel straps.
- A second pair of 'slave' heaters will be positioned on each side of the suction casing, again on profiled aluminium ABs. Alternatively, one of more slave heaters can be fitted onto the inlet flange.
- The power out to the various slave heaters is not constant but mimics the power delivered to the AlphaLimpet's own internal heater.

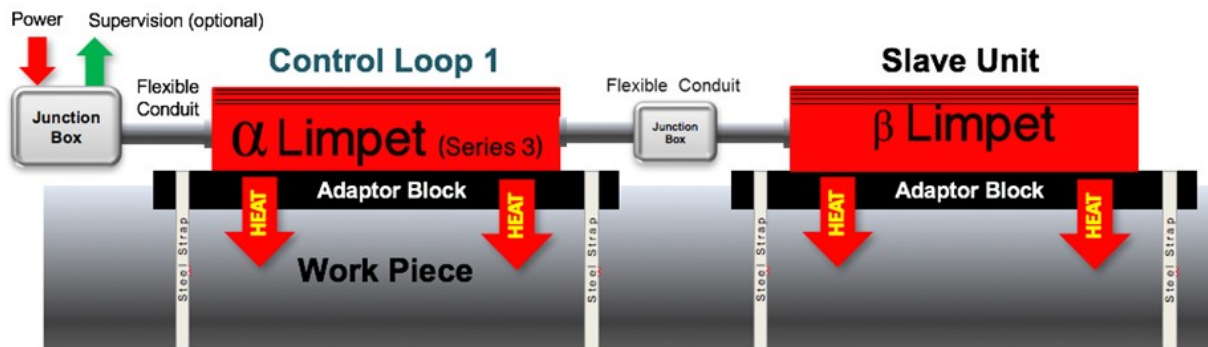


Figure 1 — Typical heating arrangement on a CP pump

CP PUMP HEATING TRIAL RESULTS

In this trial, up to six 120W Limpet heaters were used in a series of tests to heat a 100mm O/D progressive cavity pump with a length of 1 metre and a mass of 75kg. The pump contained 3 litres of water with each trial starting at ambient temperature (10°C).

A profiled aluminium AB was secured along the length of the pump barrel.

Trials were conducted with an increasing number of heaters and the water temperature was recorded at the furthest point from the heater(s). The system was insulated with a single layer of 19mm closed cell foam and each of the six trials were run for 3 hours.

The results of the trial are shown in Figure 2 below. It can be seen that energy was transferred from the Limpet heater(s), through the AB into the pump body and stator and into the water, indicating that the Limpet is not only capable of frost protection and temperature maintenance but also of raising the temperature of the pump and its contents.

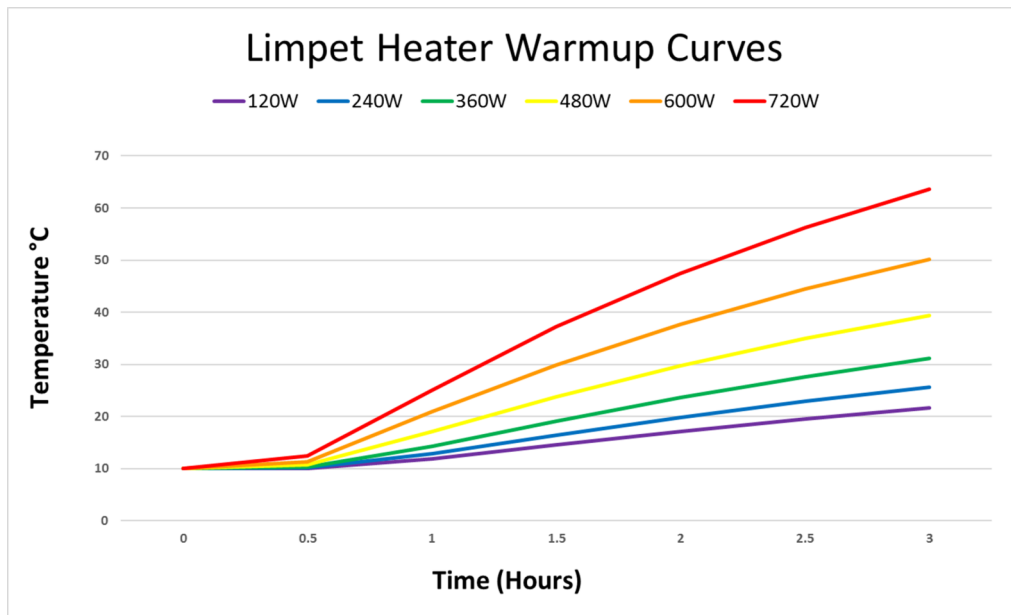


Figure 2 — Heating trial results on a 1metre CP pump barrel

Limpet

Zero Carbon Thermal Technology

The Limpet Heating Company
Registered Office: 9 Thorne Road,
Doncaster, DN1 2HJ
United Kingdom

Tel: +44 (0) 7837 337570
E-mail: sales@limpetheating.com
www.limpetheating.com