

## INSTALLATION, OPERATION, MAINTENANCE INSTRUCTIONS FOR GMS THERMAFLOW PLATE HEAT EXCHANGER PACKAGES



The operating and maintenance instructions contained within this package are for 'CPS-D' twin pump condensate pumpsets. Please refer to separate instructions for units supplied with a single pump or with a mechanical pump.

The standard CPS unit design is only suitable for a duty up to 80 metres at 99°C maximum and a maximum flowrate of 6.5 kg/sec.

Please note that an electronic version of these instructions are available from our website and also on a CD. Please contact our sales office for further information.

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## 1. Standard Unit Information & Description

GMS Thermal Products Condensate Pumping Sets are generally built to a standard design with two pumps and three level switches. These instructions apply to the standard units. In addition to these instructions installers, commissioning and maintenance engineers should consult the wiring diagram, general assembly drawing, pump maintenance instructions and pressure setting notice supplied with the unit.

Standard Material Schedule		Design Data	
Primary Pipework	Copper Stainless Steel Galvanised Steel	Maximum Working Pressure	Atmospheric
Secondary Pipework	Copper Stainless Steel	Hydraulic Test Pressure	2.0 BarG
Pump	Stainless Steel	Maximum Temperature	99°C
(Other materials on request)		Design Code	Commercial Standards & PED 1999 (SI 1999/2001)
		Higher pressures on request	

## 1. Standard Unit Information & Description

### Control Philosophy:

Starting from tank empty condition, with a steady incoming flow of water: Panel set to AUTO, pump breakers CB1 and CB2 and control circuit breaker CB3 all set to ON

- POWER ON
- *Power on* lamp lights up.
- Tank continues filling
- *Extra Low Level (ELL)* float rises and ELL switch closes – R1 Energises, R1 (ELL & Power Fail) Volt Free Contact changes state.
- *Low Level (LL)* float rises and LL Switch CLOSES – energising relays ACO (pump changeover) and R2 (pump stop/enable)
- *High Level (HL)* float rises and HL Switch CLOSES – energising relay R3. Lead Pump (say pump 1) starts.

Then

A) If pump1 is fast enough the level will fall and the following normal sequence occurs:

- HL float falls and HL switch OPENS – but because of relay interlock pump keeps running.
- LL float falls and LL switch OPENS – pump stops.

or

B) If pump 1 can't pump condensate out fast enough the level will continue to rise and the following occurs:

- *Extra High Level (EHL)* float rises and EHL Switch CLOSES – energising relay R4. Pump 2 (in this case) starts. EHL lamp lights. EHL VFC changes state. The level should then fall. (If it does not then see *fault conditions* below)
- When the level falls below EHL switch, EHL lamp goes off. EHL VFC changes state. Both pumps stay on.
- When the level falls below LL switch both pumps switch off.

Pumps 1 and 2 alternate as lead pump in AUTO setting

### Fault Conditions:

#### Extra Low Level Fault

An extra low level (ELL) fault condition will occur if the pump(s) keeps on running. (eg LL switch may be faulty).

If this happens the level continues to fall until:

- ELL float falls and ELL switch OPENS – *Extra low level* (ELL) volt free contact (VFC) changes state and *ELL (R1)* relay contact prevents pump(s) running (this is in addition to normal *low level (LL)* relay contact. This protects the pumps from "dry running").

Apart from the ELL VFC changing state there will be no visible indication of a fault and the unit will seem to run normally. However, if ELL VFC changing state happens often it indicates a fault and should be investigated. See Power Off fault also.

#### Power Off Fault:

*Extra low level/Power Fail* (ELL) volt free contact (VFC) changes state.

#### Extra High Level condition

This can occur if pumps can't keep up with incoming condensate and is described in (B) above. Eventually the vessel will overflow and hot condensate will be lost

## **1. Standard Unit Information & Description**

### Pump Trip

In AUTO setting, if a pump trips the other pump will still work.

### Other Settings:

If PUMP1 or PUMP2 setting is selected then only that pump will work.

## 2. PED Information

The standard range of 'CPS' condensate pumpset 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 I & II 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. The standard ThermaFlow unit is designed for a primary medium up to 110°C

# EC DECLARATION OF CONFORMITY

**We**

**Manufacturer Name:** GMS Thermal Products Ltd  
**Address:** Riverside Works, Egmont Street  
Mossley, OL5 9NE  
**Country:** England

**declare, in sole responsibility, that the following equipment**

**Product:** CPS Condensate Pumpset Packages  
**Country of Origin:** England

**are in accordance with the requirements of the Pressure Equipment Directive 97/23/EC**

**GMS PED Certificate Number:** PED-CP-11-05  
**Date of issue:** 4<sup>th</sup> November 2005

**Applicable Design Standards:** Commercial Standards

**Subject products are designed, manufactured and tested according to the appropriate quality control procedures.**

**Date:** 4/11/05  
Steve Rawlins  
Technical Director  
GMS Thermal Products Ltd

Size (Litres)	Fluid Group	PED Category	Module
All Sizes From CPA-2.2 to CPF-52.4 (Refer to brochure for actual Duties)	Chart 4 Group 2 Liquids	SEP	A

### **3. Installation**

#### **IMPORTANT NOTES.**

**NOTE:**

Connecting pipework should be supported and arranged so that no undue strain is put on the unit, due to thermal expansion etc.

1. Position, level and secure the set.
2. Connect the receiver to a vent to atmosphere. NB Some flash steam and droplets of hot condensate may be emitted from the vent - choose a suitable venting position.
3. Connect an overflow pipe to the receiver (on some units the overflow connection is common with the vent). The overflow pipe must incorporate a U-trap to prevent flash steam passing through it.
4. Connect incoming condensate line/s to inlet connection/s on receiver via isolation valve/s and strainer/s.
5. Connect outgoing condensate line/s to discharge connection/s via isolation valves. NB Most units are fitted with a pressure gauge, non-return valve and a lock-shield trim valve on the discharge side of each pump. If these are not supplied they must be fitted by the installer, in addition to the isolation valve. The non-return valve prevents back-flow. The trim valve and pressure gauge allow adjustment of discharge rates to prevent pump cavitation (see "Commissioning" below)
6. Connect power supply into control panel through a suitably protected isolation switch and in accordance with the wiring diagram supplied with the unit.
7. Earth the set efficiently and perform an electrical safety check on the installation.

## 4. Commissioning & Operation

1. Ensure pipework is clean and flushed out, and there is no debris in the receiver.
2. Ensure both the pump isolating valves are fully open and that the trim valve (lock-shield type) is approximately one quarter open.
3. Ensure both pump impellers are free and not seized, as a consequence of standing on site, by removing the fan casing and turning by hand; replace fan casing.

**IMPORTANT NOTE:** The pumps must not be run dry at any time

4. Switch on the electrical supply to the panel and select pump 1.
5. Allow condensate to enter vessel and check that the pump operates. With three phase pumps, check that the direction of pump operation is correct.
6. Select pump 2. Check as above.

### **IMPORTANT:** SETTING MAXIMUM PUMP FLOWRATE.

The pumps are selected to provide the design flowrate against the design resistance without cavitation. In many cases (due to uncertainty about exact resistance or non-availability of an exact pump match) the pump will be capable of pumping more than the exact design flowrate. This will increase the required NPSH and, with hot condensate, could cause cavitation in the pump. To prevent this, the flowrate should be adjusted to the correct rate. To do this set the trim valve on the pump discharge so that pump discharge pressure matches that stated on the notice supplied with the unit - this coincides with the correct flowrate on the pump curve.

## **5. Maintenance**

1. Alternate duty with standby pump on a weekly basis.
2. If an inspection cover is fitted then inspect the internal surfaces of the receiver periodically. Fit a new gasket when replacing the inspection cover.
3. For periods of inactivity drain the unit completely to prevent frost damage it may be necessary to partially disconnect pipe fittings to ensure complete draining. When bringing the unit back into operation, follow the commissioning instructions.
4. Maintain the pumps in accordance with the copy of the pump data supplied with the unit.

## 6. Recommended Spares

Please contact our sales department for recommended spares prices and availability. The recommended quantities given are per unit supplied.

Description	CPA-..	CPB-..	CPC-..	CPD-..	CPE-..	CPF-..
Sight Glass	1	1	1	1	1	1
Inspection Opening Gasket (RG250)	1	1	1			
Inspection Opening Gasket (RG380)				1	1	1
Pump Seal Kit	1	1	1	1	1	1
Red Lamp (Panel)	1	1	1	1	1	1
Green Lamp (Panel)	1	1	1	1	1	1
Contactor (Panel)	1	1	1	1	1	1
Relay (Panel)	1	1	1	1	1	1