

# PROCESS HEAT TRACING OF COMPLEX PIPING SYSTEMS



## THE PROBLEM

Temperature Control of complex valved piping systems such as around pumping sets and manifolds can create a problem for the designer.

All pipe sections are not subjected to the same flow conditions. Often 1 or 2 pumps are operational whilst the remainder are in the standby/no flow condition. A temperature sensor located on a flowing pipe may de-energise tracing on static lines when heat is actually needed and vice versa.

## CONVENTIONAL CONTROL

To correctly control a complex system from its surface, each pipe section requires independent line switching. This is both expensive and complicated.

A second approach is to operate the heat tracing permanently, but uncontrolled. The system is designed to stabilise at a safe temperature, perhaps by means of self-regulating heating tapes. This is excessively wasteful as power is applied continuously when often only a small demand may exist, if at all, and line temperatures would often be much higher than required, usually by 30°C or more.

## POWERMATCH CONTROL

A *Powermatch* SELF-REGULATING SYSTEM provides the best control for complex piping systems. The ambient temperature is monitored and the power output from the constant wattage heaters is adjusted to precisely match the heat losses at any given time.

When required, the *Powermatch* can additionally provide line control for fine tuning. The line sensor can be positioned at a point of no flow, eg. a dead leg or 'dummy' pipe.

Static lines will always receive precisely the heat needed to maintain the desired temperatures. Any unnecessary heat received by pipe sections having flow is safely removed by flowing liquid without significantly affecting its temperature.

THIS DESIGN METHOD ALLOWS COMPLEX PIPING SYSTEMS TO BE CONTROLLED IN A SINGLE HEATING CIRCUIT IN A SIMPLE AND EFFECTIVE WAY.

A SINGLE POWERMATCH IS CAPABLE OF CONTROLLING LARGE AREAS OF PROCESS PLANT HEAT TRACING E.G. 6 x 60A CIRCUITS. THUS CABLING COSTS ARE MINIMISED.

A Powermatched constant wattage system can be continuously monitoring for correct heating function and does not suffer from high in-rush currents on start-up from cold.



## INSTALLATION EXAMPLE

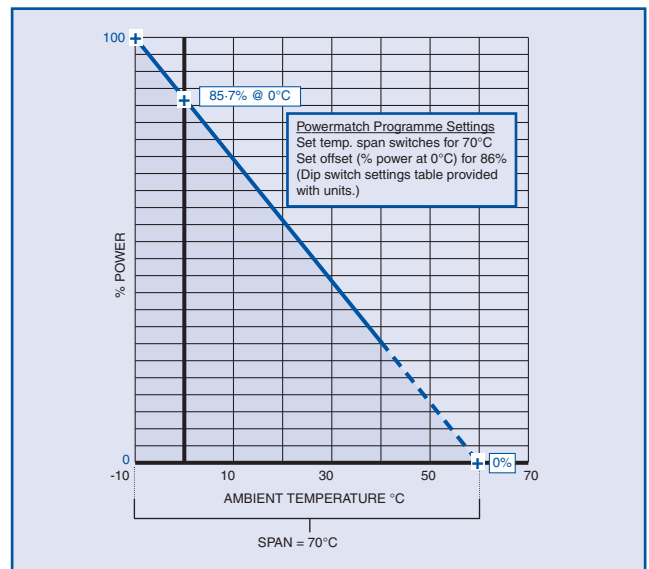
Power Plant – Heavy Fuel Oil to boilers  
 Complex Pipe Sections (see overleaf)  
 Piping total 200m  
 Total Load = 9kW (39A)

This application was considered critical and a high integrity system was specified.

In addition to *Powermatch* self-regulation, a *Watchdog* heating circuit health monitor and alarm system, and a digital *Temperature Display Unit* providing a read out of the line sensor ( $T_L$ ) temperature were specified.

The *Watchdog* alarm raised by circuit damage allows time for repairs before the line can cool and solidify, whilst the temperature display indicates a properly calibrated and programmed system.

Heat losses vary directly with changes in ambient temperature. The *Powermatch* is therefore set up as below:



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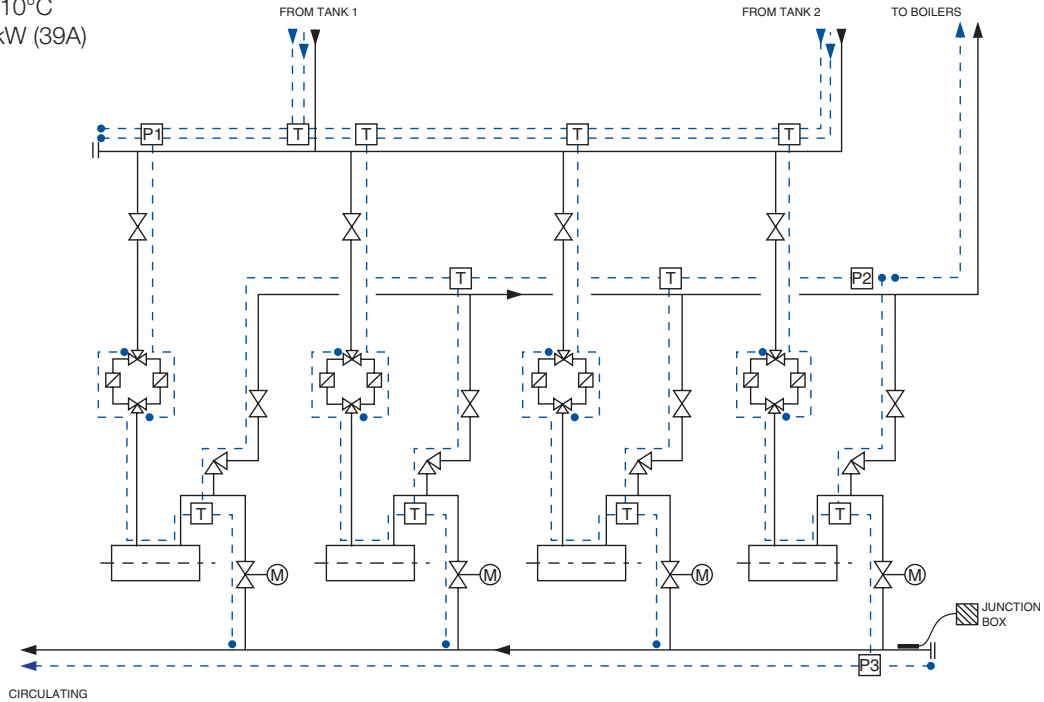
## INSTALLATION EXAMPLE

### Fuel Transfer Pumps Manifold

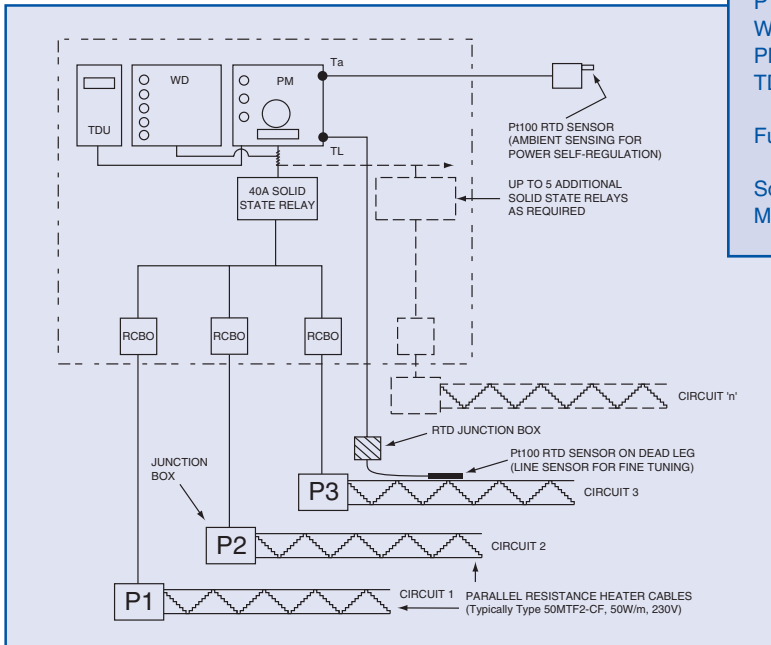
Maintain 60°C

Minimum ambient -10°C

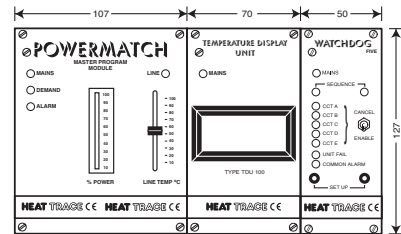
Heat tracing load 9kW (39A)



## TYPICAL CONTROL ARRANGEMENT



KEY		
T	Tee splice connections	N/A
P	Power boxes	N/A
WD	Watchdog circuit health monitor	CPDS070
PM	Powermatch self-regulating controller	CPDS030
TDU	Temperature display unit	CPDS050
Further reading . . .		
	Solid State Output Drives	CPDS130
	Minitracer Type MTF Heating Tape	HPDS100



PANEL FASCIA  
(dimensions in mm)

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