Electrical Installation Requirements
Care should be taken to separate the power and signal cables to prevent electrical interference and possible damage due to inadvertent connection.

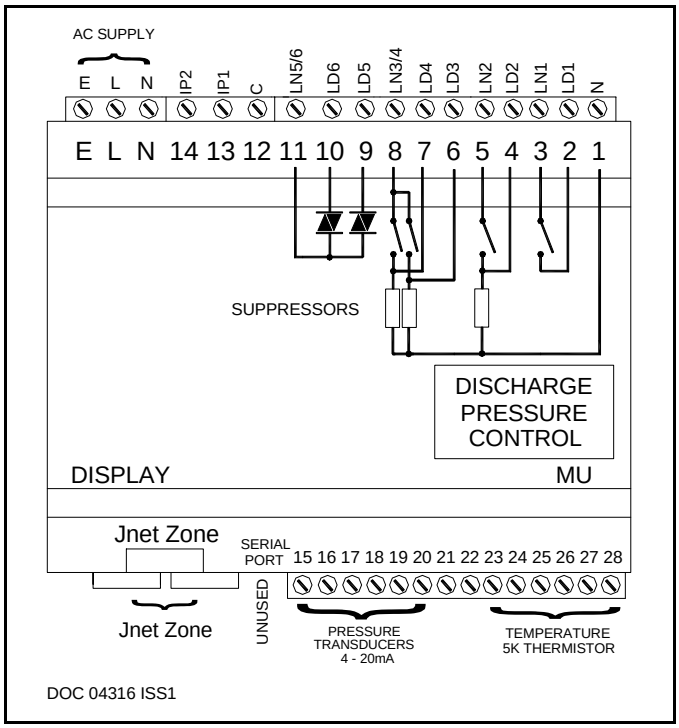
The power outputs are fitted with suppressors to protect against electrical interference when switching off solenoid valves or contactors. It is therefore essential to observe the output polarity. The line voltage should be connected to the terminals marked **LN** and the switched loads to **LD**.

The plant inputs are electrically isolated. A volt free contact should be connected for the logical conditions stated below between the input and common **C** (12).

The control supply neutral must be connected to terminal 1 for EMC operation.

CE Conformance
This unit conforms with the relevant EU standards when installed according to the JTL Installation Requirements for this product.

Digital Outputs				
1	LN LD	3 2	Unsuppressed	High discharge pressure
2	LN LD	5 4	Suppressed	2nd stage (Heat exchangers)
3	LN LD	8 6	Suppressed	Cooler fans
4	LN LD	8 7	Suppressed	1st stage (Gas cooler)
5	LN LD	11 9	Solid state	Heat exchanger 1 enable OR pulsed expansion valve 1
6	LN LD	11 10	Solid state	Heat exchanger 2 enable OR pulsed expansion valve 2
Digital Inputs				
1		12 13	Volt Free	Auto
2		12 14	Volt Free	Fault
Pressure Inputs				
1	+ -	20 19	4-20 mA	Heat exchanger 1
2	+ -	18 17	4-20 mA	Heat exchanger 2
3	+ -	16 15	4-20 mA	Discharge pressure
Temperature Inputs				
1	+ -	28 27	5k Thermistor	Heat exchanger 1
2	+ -	26 25	5k Thermistor	Heat exchanger 2
3	+ -	24 23	5k Thermistor	Cooler return
4	+ -	22 21	5k Thermistor	Not used



Use of Maintenance Unit
The controller can be checked and the operation adjusted using a JTL portable maintenance unit which plugs into the controller.
Each item of information has an item number. The more important items are listed in the tables overleaf.
Examples:

To read item 22 press: ITEM 2 2 ENTER

To set item 50 to &150.0 press:

ITEM 5 0 ENTER SET 1 5 0 0 ENTER

To correct errors press: CANCEL

To select next or previous items press: + and −

Initial Commissioning and Bitswitch Settings
The controller has 1 set of data built in to its program for use during commissioning. Initialize to this data by setting item 9 to 1234. This loads into the controller a suitable set of data, adjustments should then be made as necessary.

If a JTL communications network is connected to the controller then the unit number should be set on item 1.

Pressure Display
The pressure can be displayed in psi, bar or kPa as selected by item 179. This also affects pressure readings on the maintenance unit.

The HP250 controller drives the JTL LCD14 display using a CAB75 cable. Various cable lengths are available.

Temperature units
The temperature on the maintenance unit can be displayed in Celsius or Fahrenheit by setting item 122.

Discharge Pressure Control Strategy
The HP250 is essentially a 3 stage controller using three setpoints. When the discharge pressure exceeds the lower set point (Item 79), the first stage of control is applied. When the discharge pressure exceeds the next setpoint (Item 70), then the second stage of control is applied. When the next set point (item 76) is exceeded the 3rd stage of control is applied a deadband (Item 73) is applied to stage 2 & 3.

Stages 2 & 3 are run and stopped on the basis of stage timing. When unloading the stage that has run the longest is unloaded. When loaded the stage that has been stopped longest will be loaded.

There is also a time delay (Item 77) which delays the change between the stages.

Stage 1 control
Stage 1 enables output 4 which enables the gas cooler.

Stage 2 control options.
There is a choice of control for stage 2 on item 40.
1) Output 2 is energised to enable other equipment to control the discharge pressure.
Output 5 is energised for heat exchanger 1 enable.
Output 6 is energised for heat exchanger 2 enable.
2) As 1) except superheat monitoring of externally controlled plate heat exchange is enabled.
3) Superheat control of the two plate heat exchanger using pulsed expansion valves on outputs 5 & 6.

Gas Cooler Fan Control
The gas cooler fans are controlled on the gas cooler return temperature (Item 33). When the return temperature exceeds the setpoint (Item 180) the fans are enabled. There is a deadband setting (item 183) to control when the fans are turned off.

Pressure Healthy
The HP250 can be used in conjunction with other controllers. There is an output which indicates if the discharge pressure is within acceptable limits which can be connected to other systems. The acceptable pressure level is set as item 75.

Pressure Alarms
The discharge suction pressure is constantly monitored and compared with the high alarm level (item 72) and low alarm level (item 71).

If the current pressure goes outside the set range for a short time period then an alarm is given.

The time delay is achieved by integrating the difference between the alarm level and the actual pressure over a period of 30 seconds. This means that the larger the difference the faster the alarm occurs.

Pressure Transducer Alarm
The pressure transducer is constantly checked and if, after a 15 minute time delay, the output goes outside the acceptable range an alarm is given (item 91).

If there is a pressure transducer fault, the number of condenser steps is set to the maximum available.

Alarm Display
Various alarms are indicated on the pressure displays. Typical messages displayed are:

P.Flt	Plant fault (auto input not present) - (highest priority)
Hi.dP	High discharge pressure
FAn	Condenser fan failure (lowest priority)

The alarm conditions are flashed alternately with the pressure. In the event of there being more than one alarm the highest priority alarm is displayed.

Daylight Saving
When connected to a JTL network this controller can operate by displaying daylight saving time for its time.
Daylight saving operation is selected by setting item 18. The connected network controller then adjusts the times automatically during the daylight saving period.

ADJUSTABLE PARAMETERS				HP250
	Item	Function	Range	Units
PRESSURE CONTROL	70	Discharge pressure setpoint (2nd stage)	350 - 550	psi
	76	Discharge pressure setpoint (3rd stage)	350 - 550	psi
	73	Discharge pressure deadband (2nd & 3rd stage)	0 - 20	psi
	157	Refrigeration type	3=404A, 4=407A, 5=407B,6=507,7=408,11=407F	psi
	79	Discharge pressure (1st Stage)	300 - 350	
	74	Discharge pressure time constant	1 - 250	s
	77	Stage delay	10 - 60	psi
	75	Discharge safety level	465 - 550	
	390	Number of stages	0 - 3	
	56	Enable heat exchanger 1	0 =off 1=on	
	66	Enable heat exchanger 2	0 =off 1=on	
SUPERHEAT CONTROL	40	Strategy	0=none 1=stage control 2=superheat monitoring 3=superheat control	
	41	Superheat setpoint	4.0 - 12.0	psi
	45	Valve proportional gain	0 - 100	
	46	Value time constant	0=disabled 1 - 250	
	47	Rate of change of output	1 - 20	%/sec
	42	Minimum Superheat	0 - 5.0	
	43	Maximum valve opening	10 - 100	%
	44	Minimum valve opening	0 - 50	%
PRESSURE ALARM	72	High discharge pressure	450 - 580	psi
	71	Low discharge pressure	250 - 350	psi
PRESSURE TRANSDUCERS	121	Suction transducer	0=disable 1 = enable	
	421	Suction transducer full scale (at 20 mA)	100 - 200	psi
	426	Suction transducer zero scale (at 4mA))	-15 to 0	psi
	123	Discharge transducer		
	423	Discharge transducer full scale (at 20 mA)	0=Disabled 1=Enabled	psi
	423	Discharge transducer zero scale (at 4mA)	550 - 900 -15 to 0	psi
TEMPERATURE	131	Suction Temperature 1	0=disable 1=enable	
	132	Suction Temperature 2	0=disable 1=enable	
	133	Gas Cooler Return Temperature	0=disable 1 enable	
	180	Gas Cooler Temperature Setpoint	40.0 - 60.0	
	183	Gas Cooler Temperature Deadband	1.0 - 10.0	k
DISPLAY	122	Temperature Units (MU)	0 - Celsius 1 - Fahrenheit	
	179	Display units	1 - psi, 2 - bar, 3- kPa	
JNET FUNCTION	1	Unit number	0.1 - 899.7	
	18	Daylight saving operation	0= standard time, 1 daylight saving time	

OTHER USEFUL ITEMS					
Item	Function	Item	Function	Item	Suction Valves
	PRESSURES		TEMPERATURES		SUCTION VALVES
21	Suction Pressure 1	31	Suction Temperature 1	51,61	Current opening (%)
22	Suction Pressure 2			52,62	Proportional output (P)
23	Discharge Pressure	32	Suction Temperature 2	53,63	Integral output (I)
148	Average discharge pressure (1hr)			54,64	Forced output (%)
		33	Gas Cooler Return		DISCHARGE CONTROL
				391	Stages running
				167	Gas cooler fan status

Relay Output Rating

2A resistive

Supply Requirements

230 V ac 48-62 Hz Supply 6 VA maximum inputs
2 mA maximum

24 Vac (optional)

CE This unit conforms with the relevant EU standards when fitted in accordance with its installation instructions.

PREDICT® is the patented JTL pattern recognition algorithm for providing defrost on demand for the cabinets on a system.

Applicable Documentation

Item Numbers Doc No.04688
Firmware Variations Doc No. 04689
Connections Diagram Doc No. 04083

Installation Information
Doc No. 04257

Note: The information contained in this document applies to the current version of the unit supplied with it. Full operating manuals, item number and software variation information can be obtained from the supplier JTL Systems.

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