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.

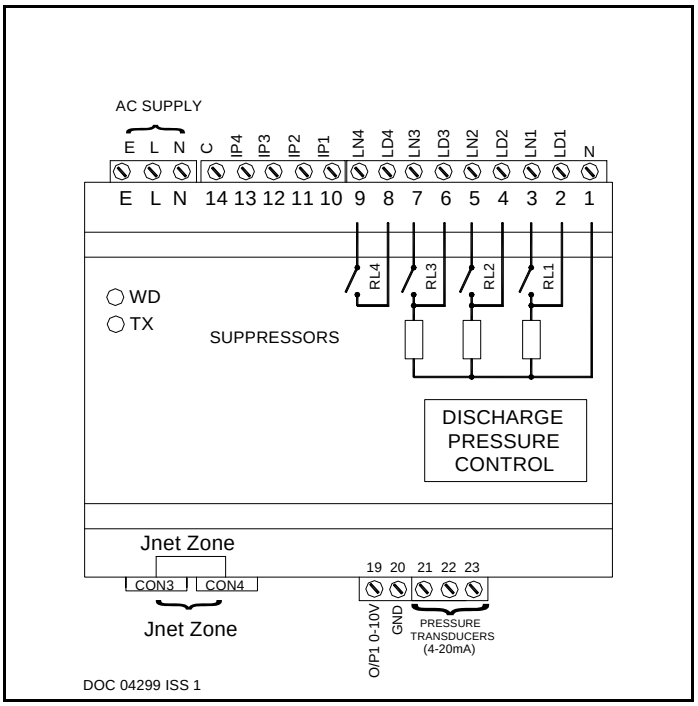
The power outputs are fitted with suppressors to protect against electrical interference when switching off solenoid valves or contactors. It is therefore essential to observe the output polarity. The line voltage should be connected to the terminals marked **LN** and the switched loads to **LD**.

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** (14).

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 Output				
1	LN LD	3 2	Suppressed	Run Inverter
2	LN LD	5 4	Suppressed	Split current control/ Alarms healthy
3	LN LD	7 6	Suppressed	Watchdog
4	LN LD	8 9	Unsuppressed	High discharge pressure
Digital Inputs				
1		14 10	Volt Free	Inverter Healthy
2		14 11	Volt Free	Fans Healthy
3		14 12	Volt Free	Plant Healthy
4		14 13	Volt Free	Auto
Analogue OUTPUT				
1	+ -	19 20	0-10 V	Inverter Speed
Analogue INPUT				
1	+ -	21 22	4-20 mA	Discharge Pressure
2	+ -	21 23	4-20 mA	Liquid Pressure



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 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.

The HP120 controller drives the JTL LCD14 display using a CAB75 cable. Various cable lengths are available.

Discharge Pressure Control Strategy
The discharge pressure is controlled against a fixed or dynamic setpoint, the floating discharge pressure setpoint, which is calculated based on the ambient and plant conditions.

The head pressure is floated to give fixed differential temperature above the ambient condition. This should be set to the condenser design condition (item 363) to give maximum condenser efficiency. Setting 0.0 disables floating head (FH) control.

The minimum pressure setpoint (item 50) is used when floating head is disabled or when the outside air temperature is not available.

The maximum pressure setpoint (item 350) for the condenser is used to limit the floating head pressure.

The refrigerant type for the plant (item 157) is used to convert pressures to temperatures and vice versa.

The outside ambient temperature from the JTL network (item 899). If the outside temperature is not available FH control is disabled.

The condenser operating (item 365) temperature is calculated from the discharge pressure and the refrigerant type.

The target temperature for the condenser control is calculated from the outside air temperature plus the design differential temperature. (item 899 + item 363).

The floating discharge pressure setpoint (item 370) is calculated from the target temperature and the selected refrigerant, limited by the minimum and maximum values above.

Liquid pressure control
When floating head control is operation in operational the control option to control on the liquid pressure is disabled.

The controller can be set to control the liquid pressure as an alternative to the discharge pressure using (item 386).

Fan Speed Control
The controller can vary the speed of the fans using a 0 - 10 signal. 0 V is for minimum speed and 10 V is maximum speed.

There is a minimum fan speed control setting on Item 352. When this is set >0 then there is also a minimum pressure cutout setting on Item 351. When the fans reach minimum speed they stay running until the cutout level is reached.

Split Circuit Operation
The HP120 can operate with a split circuit condenser.
The split circuit valve is opened at the fan speed set on Item 366 and closed when the fan speed falls to the setting on Item 367.

Control Response
The controller uses proportional and integrated control algorithms to control the fan speed. These require speed gain (item 395) and time constant (item 54) to adjust the response of the control.

Pressure Healthy
The HP120 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 55.

Pressure Alarms
The discharge suction pressure is constantly monitored and compared with the high alarm level (item 52) and low alarm level
(item 51).

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.

The low level alarm can be delayed for up to 20 minutes.

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 output is set to a settable backup value.

General Alarm Output
Relay 2 can be programmed to run as a split circuit control or a general alarm output.
The alarm output is energized (contact closed) for no alarms.
The alarms indicated are

- Plant fault
- Pressure transducer fault
- High discharge pressure
- Condenser fan fault

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
Lo.L.p	Low liquid differential 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 and defrost schedule. 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				HP120
	Item	Function	Range	Units
PRESSURE CONTROL	50	Discharge pressure setpoint (minimum)	100 to 250	psi
	350	Discharge pressure (maximum)	175 to 380	psi
	157	Refrigeration type	3=404A, 4=407A, 5=407B,6=507,7=408,11=407F 13=407C, 14=448A, 15=449A	
	363	Floating discharge temperature differential	0 - 15	K
	386	Control pressure selection	0=Discharge 1 = Liquid	
	55	Discharge safety level	140 - 400	psi
	351	Discharge pressure cutout	100 - 200	psi
PRESSURE ALARM	52	High discharge pressure	140 to 300	psi
	51	Low discharge pressure	100 to 200	psi
	362	Low discharge pressure alarm delay	0 to 20	mins
	384	Minimum liquid pressure differential	0 to 15	psi
PRESSURE TRANSDUCERS	122	Discharge transducer	0=Disabled 1=Enabled	
	422	Discharge transducer full scale (at 20 mA)	300 to 500	psi
	426	Discharge transducer zero scale (at 4mA)	-15 to 0	psi
	123	Liquid transducer	0=disable 1 = enable	
	423	liquid transducer full scale (at 20 mA)	300 to 500	psi
	428	liquid transducer zero scale (at 4mA)	-15 to 0	psi
FANS SPEED CONTROL	54	Time constant	0 - 250 %	
	395	Gain	0 - 100	
	368	Maximum speed at night	50 - 100	%
	369	Timer for nighttime operation	0=disabled 1-8=timer selection	
	397	No of steps in backup	0 - 100	%
	366	Full circuit enable level	0 - 100	%
	367	Full circuit disable level	0 - 100	%
	352	Minimum fan speed	0 - 25	%
OUTPUT CONTROL	166	Relay 2 function	0=Split circuit 1=General alarm	
DISPLAY	179	Display units	1 - psi, 2 - bar, 3- kPa	
	189	Backlight control	0 - off 1 - on 2 - off flashes alarm 3 - on flashes alarm	
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
	PRESSURE		SPEED CONTROL
22	Discharge Pressure	391	Steps running
23	Liquid pressure	392	Forced speed
383	Liquid pressure differential		
148	Average discharge pressure (1hr)		
149	Average liquid pressure (1hr)		
	CONTROL		
370	Optimised setpoint		
364	Minimum discharge temperature		
365	Condenser operating temperature		
899	Outside Temperature		

Relay Output Rating

2A resistive

Supply Requirements
Installation Information
230 V ac 48-62 Hz Supply 3 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.

Applicable Documentation

Item Numbers Doc No. 03722
Firmware Variations Doc No. 03723
Connections Diagram Doc No. 03711

Installation Requirements
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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