

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

The plant inputs are electrically isolated. Voltage free closed contacts should be connected to the terminals for the logical conditions **lighting normal** and **shutdown**.

**CE Conformance**

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

**Inputs**

Input		
13 14	INPUT 1	NOT USED
12 14	INPUT 2	PLANT FAULT
Temperatures and Pressure		
25, 26	AIR ON TEMP	
23, 24	AIR OFF TEMP	
21, 22	EVAPORATOR TEMP	
19, 20	SUCTION LINE TEMP	
17, 18	TERMINATION OR AIR ON 2 TEMP	
15, 16	SUCTION PRESSURE - +	

**Outputs**

Outputs				
2 3	LD 1 LN 1 & 2	OUTPUT 1	(N/O LOAD) (LINE)	LIGHTING & BLINDS CONTACTOR
4 3	LD 2 LN 1 & 2	OUTPUT 2	(N/O LOAD) (LINE)	FANS / HEATERS
5 6	LD 3 LN 3 & 4	OUTPUT 3	(N/O LOAD) (LINE)	TRIM HEATER
7 6	LD 4 LN 3 & 4	OUTPUT 4	(N/O LOAD) (LINE)	DEFROST
8 9	LD 5 LN 5	OUTPUT 5	(N/O LOAD) (LINE)	PULSED EXPANSION VALVE

**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:

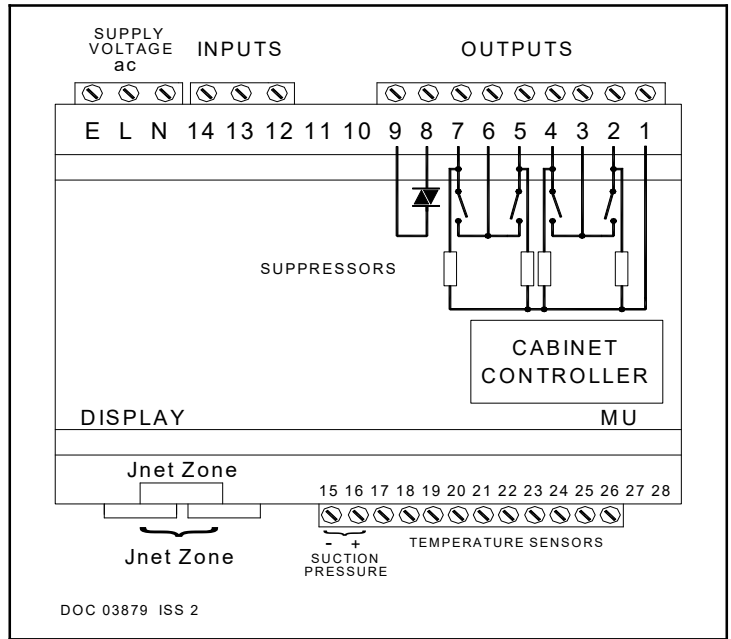
To read item 21 press: **ITEM** **2** **1** **ENTER**

To set item 31 to -20.0 press:

**ITEM** **3** **1** **ENTER** **SET** **-** **2** **0** **0** **ENTER**

To correct errors **CANCEL** press:

To select next or previous items press. **+** and **-**



**Initial Commissioning and Bitswitch Settings**

The controller has 6 sets of data built in to its program for use during commissioning. These can be accessed by setting the virtual bitswitches as shown in the table overleaf and then setting item 9 to 1234. The virtual bitswitches are set using item 966. This loads into the controller a suitable set of data for the selected type of case. Adjustments should then be made as necessary. The range over which the settings can be adjusted is also defined by the bitswitch setting.

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

**Second Case Option**

The controller can control and monitor a single evaporator half glass door (HGD) and well case. This option is selected on item 500.

Where the second case option is selected the second case unit number should be set on item 501.

**Temperature Sensors**

UAPI - PT1000  
UAPJ - 5k Thermistor

**Temperature Display**

The temperature displayed is computed from the air on and air off temperatures. A factor is used to proportion the air off and air on temperatures. The temperature can be displayed in Celsius or Fahrenheit as selected by item 122.

The UAPI controller will drive the following JTL displays when used with the CAB55 extension cable.

Display	Cable	Switch
LCD8	CAB55	None
LCD9	CAB55	3 position

Where the second case option is selected, 2 displays can be driven. This is selected using item 502. If this option is selected a JTL display splitter is required. Either of the displays support the keyswitch function but it is not recommended that both displays be keyswitch type.

The LCD9 display incorporates a keyswitch. This switch can be used to select various functions as described below. A maximum of 2 additional functions can be selected. On LCD9 if only one additional function is selected, then it is available in either of the extra 2 positions.

The CAB55 cable is available in various lengths.

## Refrigerant Type

This controller will operate for Carbon Dioxide (R744) and various HFC refrigerants as well as HCFC type R408A. The refrigerant choice is made on item 157. Carbon Dioxide can be set for subcritical or transcritical operation. It is essential that item 157 is set correctly as the controller automatically selects the correct pressure transducer. -1 to 34 bar for subcritical CO<sub>2</sub>, 0-60 bar for transcritical CO<sub>2</sub>.

## Control Strategy

The controller can control to the cabinet temperature or the optimised air off temperature selected using item 275 by modulating the output to the pulsed expansion valve.

The control strategy for HGD/well operation is that the temperature is controlled to the worst case of the 2 sections. Each case section has its own temperature factor to enable the case temperature to be calculated from the air on and air off temperatures.

When the control temperature is set to air off the air off temperature is controlled to a computed setpoint shown on item 28.

The computed air off temperature setpoint is calculated by comparing the displayed temperature with the cabinet temperature setpoint. The computed setpoint is raised or lowered depending on whether the cabinet temperature is below or above the cabinet temperature setpoint. The computed air off setpoint cannot go below the value set on item 31.

The UAPI controller can be set to operate from 2 cabinet temperature setpoints by setting item 123. The setpoint to be used is then selected using the display keyswitch. The setpoints are set on items 124 and 125 and the current setpoint is displayed on item 30.

## Superheat Control

The superheat is calculated using the suction pressure and temperature. A backup strategy uses the evaporator and suction line temperatures to calculate the superheat.

The superheat control can be set to operate in 3 ways using item 188.

a) SUCCEEDS. In SUCCEEDS strategy the air temperature is controlled and the superheat allowed to float.

The pulsed expansion valve opening is controlled primarily using a PI strategy on the control temperature. The valve is opened and shut over a fixed period of time (6.25 s) to meter the appropriate amount of refrigeration. The proportional gain and the integral time constant for the PI control are adjustable.

b) SUCCEEDS with limit. The superheat is allowed to float to the maximum set on item 189. If the case control temperature error is negative and the superheat is greater than the maximum set on item 189 the expansion valve is closed. It is reopened again with a deadband adjustment on item 140.

c) Fixed. The superheat is controlled using PI control on the superheat temperature. When the case temperature is achieved the PEV is shut. It is reopened again with a deadband adjustment on item 140.

In SUCCEEDS control if the superheat falls below the minimum level set on item 162 or 186, the PEV is progressively shut to effect recovery from excess liquid supply. This is called override.

After override is complete, ie. superheat recovers, PI control will be resumed but with a modified (reduced) value. The modifier is shown on item 190 and the output to the PEV valve is shown on item 168.

## Suction Pressure

The pressure has two source options.

- a) local transducer
- b) from broadcast or multicast

The local transducer is enabled using item 340.

When the transducer is disabled or faulty pressure is available from a broadcast.

There is a choice of two suction lines using item 349. Setting Item 349 to 0 disables the broadcast pressure function.

The broadcast pressures can be viewed on items 341 and 342.

If the local transducer is faulty or the broadcast failure timeout occurs the controller defaults to two temperature control and SUCCEEDS control and a transducer alarm is raised.

## Pressure Transducer Failure Strategies

There are 3 strategies (set on item 177):

1. Open circuit. Automatic switch to 2 temperature control and raise transducer fault alarm.
2. Auto zero adjust.
3. Network zero range check against average plant pressure, high pressure gives automatic switch to 2 temperature control. Outside range raise transducer fault alarm.

All 3 strategies are subject to a 5 minute delay timer. The delay is symmetrical i.e. the condition must be present/clear for 5 minutes to set/clear alarm.

7 bar transducers are alarmed at +/- 5 psi and auto zero range limited to +/- 7.5 psi. 34 bar transducers are alarmed at +/- 15 psi and auto zero range limited to +/- 22.5 psi. Auto switch to 2 temperature control is on upper limit of range i.e. +7.5 and +22.5 psi.

## Plant fault Shutdown Facilities

If item 273 is set on then when input 2 is energized the expansion valve is closed. This override input is to prevent "flooding back" in the event of plant failure.

## High Pressure Shutdown

There is a shutdown feature which can be enabled using item 174. High suction pressure on the transducer input will then shut the pulsed expansion valve when the saturated vapour temperature (item 259) is higher than the air off temperature.

## Evaporator Temperature Shutdown

There is a shutdown feature which can be enabled using item 198. Evaporator temperature equalization will then shutdown the pulsed expansion valve if the network communications fail (item 260).

## Defrost Initiation Strategies

The defrost strategy can be initiated in 2 fundamental ways using item 107. Defrost initiation can be by real time clock, or by command on the JTL communications network.

Network initiated defrost can be divided into 3 groups; PREDICT, coordinated and scheduled.

This controller uses the PREDICT 1 method which monitors the PEV override operation.

PREDICT defrost requires that a JTL PREDICT defrost coordinator unit is available on the network. This unit receives requests from the PREDICT controllers and coordinates these requests so that the defrosts are organised ensuring the electrical and refrigeration requirements are met. When the controller requests a defrost the PREDICT coordinator will send out a defrost command at a suitable time. If the backup strategy is invoked the controller reverts to real time schedule.

Coordinated timed defrost requires a defrost coordinator to be present in the network. When coordinated timed request is selected then the controller requests a defrost as defined by the number of defrosts a day as set on item 69. The defrost coordinator coordinates the defrost as required. The backup strategy can be chosen to fall to learned defrost schedule or real time backup.

## Backup Defrost Initiation Strategies

For network initiated defrost, 2 defrost backup strategies are included. The strategy choice is made on item 107.

For learned backup the last 24 hours defrost operation is continuously monitored and the defrost schedule is learned. For real time backup the defrost schedule as set up for real time defrost on items 51-56 is used.

If network communication fails, the selected backup strategy is automatically used. The unit reverts to network control whenever the network communications is operational.

The backup strategy is also invoked if the network signals that communications has failed to the defrost scheduler or if there is a fault at the defrost scheduler.

**Defrost**

The defrost output relay is energised during the defrost period. The liquid solenoid is closed during defrost. The auxiliary output can be selected for fan or heater control. During defrost the fans can be stopped or the auxiliary heater energised.

A pump down delay can be applied (item 61) before the defrost/output and heater are energised. During pump down the PEV output is deenergised.

The display shows "DEF "

**Defrost Termination**

The controller stays in defrost at least until the minimum defrost time, on item 145, is exceeded. If the termination temperature is reached before the minimum defrost time then the defrost heater is cycled.

**Defrost Recovery**

When the termination temperature or time is reached the controller enters defrost recovery. The heater is de-energised. The termination method can be chosen using item 144.

A time delay can be applied (item 49) after defrost before the PEV is reopened.

A drain down time delay can be applied (item 59) after defrost before the liquid valve is reopened. During drain down if the auxiliary heater output is selected it is energised.

The display shows "DEF".

**Forced Refrigeration and Defrost**

The maintenance unit can be used to force controller into a particular mode. This is done using items 77-79. While the maintenance unit is plugged in the controller will remain in the selected mode permanently. Once the maintenance unit is unplugged the controller will revert to normal control after 30 minutes.

When the network initiated defrost strategy is selected, forced defrost will send a command to the JTL defrost scheduler to initiate a defrost and does not act locally.

**Fan Control**

If the fans are controlled (item 106 set to 1) item, then the fans can be controlled in various ways during and after defrost. Item 108 specifies how the fans are controlled during defrost. There are choices to run or stop the fans and also to cycle the fans on evaporator or termination temperature as set on item 146.

Item 153 specifies how the fans are controlled during defrost recovery. There are choices to run the fans immediately, after a time delay (item 109) and also to cycle the fans on evaporator or termination. If when selecting temperature control the fan delay is also set then the fans are restarted after the delay regardless of the temperature.

Note: When "Fan runs always" is selected the fans do not stop, in normal control, during or after defrost.

**Auxiliary Heater**

The controller supports the use of an auxiliary heater which stays on after defrost during drain down. This heater uses the fan control output and is selected by setting item 106 to 2.

**Trim Heater Control**

The trim heaters can be controlled. There are 4 separate strategies for control selected by item 390.

- heater switched off when controller shutdown using display keyswitch.
- heater controlled to a fixed percentage output
- heater controlled to a fixed percentage output which can vary in and out of trading hours.
- heater controlled with an adjustment received from the network.

The trim heater control is achieved by pulsing relay RL3. The pulse period is 400 seconds. For example to achieve 75% output the heater is on for 300 s and off for 100s. The percentage can be set for day operation (item 392), for night setback (item 393), and adjusted further by a network command from a trim heater optimiser on the JTL network (item 394).

The current percentage in operation is displayed on item 391

**Lighting and Night Blind Control**

The cabinet lights and night blinds can be sequenced on and off by command from the JTL network. There are two sources of the network command, legacy or broadcast. The broadcast timer if chosen is selected on item 112. The lights can be switched off from the display keyswitch if item 119 is set to 1 (enabled). The lights are switched off if either fans only or shutdown are selected.

**Load Shedding**

The controller has the ability to reduce the electrical load on request by network broadcast. Up to 8 individual broadcast signals can be assigned to the following functions.

- Inhibit defrost,
- Inhibit refrigeration,
- Fans off,
- lights off,
- Raise setpoint to alternative setpoint,
- Reduce trim heat.

**High Temperature Alarms**

The cabinet and air off temperatures are monitored continually. The temperature errors are averaged over the period set on item 47. If either of the average temperature errors exceed the alarm level then an alarm is given which is shown on the display and available, for remote indication, on the JTL alarm system.

If the average cabinet temperature error exceeds half the alarm tolerance a warning alarm is given which is available on the JTL alarm system. If this alarm is present during the last 24 hours for more than the set period a trend alarm is given which is also available on the JTL alarm system. High temperature alarms are cancelled during defrost and defrost recovery.

The cabinet temperature tolerance is set on item 32 and the air off tolerance on item 34. Setting either of these tolerances to 0.0°C disables the relevant alarm.

**Low Temperature Alarms**

There is a low cabinet temperature alarm which generates in the same way as the high cabinet temperature alarm. The tolerance is set on item 480.

**Excessive Superheat Alarms**

If the measured Superheat exceeds 50°C then a sensor fault is assumed and the maximum opening of the expansion valve is reduced to 33% of the maximum allowed. When the measured Superheat is between 30 and 50°C the fault condition is activated if the suction temperature exceeds the air on temperature.

**Network Shutdown and Fans Only Mode**

This controller supports the JTL Network shutdown and fans only facilities. When these facilities are enabled by item 62. If a shutdown or fans only command is received over the JTL Network, the refrigeration is stopped and alarms are disabled. The high temperature alarm sequence is initialised.

**Display Controlled Shutdown**

The controller can be shutdown for servicing purposes using the display switch. This feature is enabled by item 138.

**Display Controlled Fans Only Mode**

The controller can be put into fans only mode using the display switch. This feature is enabled by item 136.

**Timer Controlled Shutdown**

When used in conjunction with a JTL timer on the network the controller can be put into shutdown mode. Item 238 is used to select the appropriate network timer and item 239 shows the associated network command state.

**Suction Pressure Optimisation**

When used in conjunction with JTL pack control and suction optimisers this unit is normally included in the suction pressure optimiser algorithm. It can be explicitly excluded by setting item 200 to 1.

**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				UBPI/UBPJ
	item	Function	Range	Units
TEMPS & ALARMS	33	Cabinet temperature ratio	20 to 80	hr:mn
	36-39	Sensor selections	0=off 1=on	
	147	Termination sensor selection	0=off 1=on	
	32	Cabinet overtemperature tolerance	0 to +20	K
	34	Air off over temperature tolerance	0 to +30	K
	480	Cabinet under temperature tolerance	0 to -10	K
	47	Alarm averaging time	00:30 to 03:00	hr:mn
	481	Cabinet temperature warning trend	00:00 to 23:59	hr:mn
	533	Cabinet temperature ratio (second case)	20 - 100	
	532	Cabinet overtemperature tolerance (second case)	0 - 120	K
CONTROL	275	Control temperature	0=Optimised Air off 1=cabinet temp	
	123	Enable 2nd setpoint	0=disabled 1=enabled	
	124	Primary cabinet temperature setpoint	-30 to +10	°C
	125	Secondary cabinet temperature setpoint	-30 to +10	°C
	31	Air off temperature setpoint	-39 to +5	°C
	140	Temperature control deadband	0.4 to 3.0	°C
	106	Auxiliary output selection	0=off 1=Fan 2=Heater	
	500	Enable second case	0=Disabled 1=Enabled	
PULSED EXPANSION VALVE FUNCTIONS	157	Refrigerant type	1 - 15 @ type shown on MU display)	
	158	Pressure transducers zero offset	-7 to +7	psi
	161	Superheat measurement method	1=2 temperature 2=pressure	
	188	Superheat control strategy	0=SUCCEEDS, 1=SUCCEEDS with limit, 2=fixed	
	189	Superheat setpoint	6.0 - 12.0	
	162	Minimum superheat (pressure)	0 - 10	K
	186	Minimum superheat (2 temperature)	0 - 5	K
	163	Maximum valve opening (pressure)	10 - 100	K
	187	Minimum valve opening (2 temperature)	5 - 50	%
	164	Minimum valve opening	0 - 50	%
	170	PEV proportional gain	1 - 100	%
	171	PEV integral time constant	1 - 250	%
	174	High suction pressure shutdown	0=disabled 1=enabled	
	177	Auto zero pressure enable	0=disabled 1=auto 2=network	
	9393	Pressure display choice	1=psi 2=bar 3=kPa	
	273	Plant fault input override	0=disable 1=enable	
	340	Disable local transducer	0=enabled 1=disabled	
348	Local pressure broadcast timeout	30-300		
349	Select broadcast pressure reading	0 = disabled 1 = suction 1 2 = suction 2		
198	Evaporator temperature equalisation shutdown.	0=disabled 1=enabled		
260	Time since last awake initial value	0 - 10	mins	
DEFROST INITIATION	107	Defrost strategy	0=none 2=Network (learned backup)3=Time 5=PREDICT 7=Network (real time backup) 8=Coordinated (learned) 9=Coordinated (real time)	
	69	Number of defrosts expected or required	0 to 12	
	61	Pump down time	00:00 - 00:10	hr:mn
	51-56	Defrost schedule	00:01 - 23:59	hr:mn
	60	Defrost schedule 12/24 hour clock	0=24hr 1=12hr	
	211	Evaporator group	0=none 1=Lt 2=Ht 3=Satellite	
	210	Electrical supply distribution panel no	1 to 7 panel no	
	213	Defrost heater circuit	1-31=circuit	
	214	Defrost method	0=brown phase 1=black phase 2=grey phase 3=3 phase 6=off cycle	
	223	Defrost requirement priority	1 to 8	hours
	225	PREDICT Minimum time between defrosts	2 to 8	hours
226	PREDICT Maximum time between defrosts	6 to 72	%	
242	PREDICT override initiation	0 - 100		
DEFROST TERMINATION	144	Defrost termination method	1=Evaporator 2= Air off 3=Termination 4=Time only	
	50	Defrost termination temp	0 to +20	°C
	145	Minimum defrost time	00:00 - 00:30	hr:mn
	57	Defrost termination time	00:05 to 00:59	hr:mn
	59	Drain down time	00:00 to 00:10	hr:mn
49	Refrigeration delay after defrost	00:00 to 00:10	hr:mn	
FAN CONTROL	106	Auxiliary output	0=not used 1= fans 2= heater	
	108	Fan control during defrost	1=run always 2=off during defrost 3=fan controlled on evaporate temperature 4=fan controlled on termination temperature 5=on during defrost	
	146	Temperature to turn fans off during defrost	-12 to +20	°C
	109	Fan delay after defrost	00:00 - 00:10	hr:mn
	153	Fan control after defrost	0 =restart immediately 1=restart after time delay 2=cycle on evaporating temperature 3=cycle termination temperature	
150	Temperature to turn fans on after defrost	-20 to +5	°C	
LOAD SHEDDING	600	Load shedding	0=off 1=enabled	
	601	inhibit defrost	0=off 1-8 broadcast input	
	602	inhibit refrigeration	0=off 1-8 broadcast input	
	603	Fans off	0=off 1-8 broadcast input	
	604	Light off	0=off 1-8 broadcast input	
	605	Raise setpoint	0=off 1-8 broadcast input	
	607	Reduce trim heat	0=off 1-8 broadcast input	
TRIM HEATER CONTROL	390	Control strategy	1 =off, 2=off when shutdown, 3 =fixed adjustment, 4= night setback, 5= network control	
	392	Normal percentage operation	0-100	%
	393	Night setback operation	0-100	%
	396	Load Shedding adjustment	0-100	%
LIGHTING CONTROL	110	Jnet lighting control selection	0=disabled 1=enabled	
	112	Select lights off broadcast timer	0=disabled 1-8=timer number	
	118	Lighting contractor selection	0=n.o 1=n.c	
	119	Enable lights during shutdown	0=disabled 1=enabled	
Jnet FUNCTIONS	1	Unit number	0.1 - 899.7	
	501	Unit number second case	0.1 - 899.7	
	62	Jnet network shutdown selection	0=disabled 1=enabled	
	133	Enable plant to override temp control	0=off 1=on	
	134	Enable plant to cut off refrigeration	0=disabled 1=enabled	
	200	Exclude from suction optimisation	0=include 1=exclude	
	238	Select network shutdown timer	0=disabled 1-8 timer number	
18	Daylight saving operation	0=standard time 1=daylight saving time		
DISPLAY	9392	Temperature display choice	0=Celsius 1=Fahrenheit	
	136	Enable fans only mode from display	0=disabled 1=enabled	
	138	Enable display controlled shutdown	0=Off 1=On	
	502	Enable 2nd display	0=Disabled 1=Enabled	
	199	Display Backlight	0=off 1=on 2=off Flashing for alarm 3=Flashing for alarm	

**Vital Bitswitch settings**

0 Frozen food (CO<sub>2</sub>), 1 Frozen Food (HFC), 2 Chillers (HFC), 3 Produce (HFC) 4 Frozen Food (transcritical CO<sub>2</sub>) 5 Chiller (Transcritical CO<sub>2</sub>) (0 to 5 is the virtual bitswitch setting on item 966)

**OTHER USEFUL ITEMS**

Item	Function	Item	Function	Item	Function	Item	Function
20	<b>TEMPERATURES</b> Cabinet temperature	154	<b>PULSED EXPANSION VALVE FUNCTIONS</b> Force pressure average to current reading	70	<b>MODE INPUTS &amp; OUTPUTS</b> Operating mode	40	<b>DEFROST</b> Duration of last defrost
21	Air on temperature	155	Suction pressure	274	Plant fault	41	Time since end of last defrost
22	Air off temperature	156	Superheat	72	Defrost output state	42	Duration of this defrost
23	Evaporator temperature	159	Auto zero offset	74	Auxiliary output state	46	Communications defrost command
24	Suction line temperature	166	Force PEV opening (%)	391	Trim Heaters output (%)	77	Forced defrost
520	Cabinet temperature (second case)	168	PEV valve opening (%)			78	Inhibit defrost
521	Air on temperature (second case)	169	PEV status			79	Forced refrigeration
141	Termination sensor temperature	175	Pressure transducer type	111	Communications lighting command	261-272	Learned defrost schedule
482	Accumulated temperature warning time	181	Time since last override (hr:mn)	113	Lighting output state	219	Defrost arrangement from network
259	Saturated vapour temperature (dew)	182	Duration of last override (sec)	114	Force lights on	221	Forced defrost requirement
		190	Modifier output (%)	115	Force lights off	222	Enable forced defrost requirement
30	<b>CONTROL</b>	341	Local pressure broadcast (suction 1)			243	PREDICT override av
28	Cabinet temperature setpoint	342	Local broadcast pressure (suction 2)				
240	Effective air off setpoint	197	Current superheat method				
241	Liquid valve open %	279	Current superheat strategy				
	Average liquid valve open %						
		63	<b>Jnet NETWORK FUNCTIONS</b> Network shutdown and fans only command states				
		203	Associated plant suction line				
		394	Trim heater adjustment (%)				
		239	Network timer command state				

OUTPUT STATE DIAGRAM FOR JTL CONTROLLER						UBPI/UBPJ
MODE OF OPERATION	OUTPUT & FUNCTION (See note 2)					
	RL2		RL3	RL4	RL5	
	AUXILIARY (N/O) See Note 1		TRIM HEATER (N/O)	DEFROST (C/O)	PULSED EXPANSION VALVE (N/O) Solid state output	
	Heater	Fans				
N O R M A L R E F R I G E R A T I O N C Y C L E	REFRIGERATION	OFF	ON	ON	OFF	CYCLES ON TEMPERATURE
	PUMP DOWN Adjustable time [61]	OFF	ON	ON	OFF	OFF
	DEFROST Time/temp terminated [57]/[50]	ON	ON, OFF OR TEMPERATURE CONTROLLED (See Note 4)	ON	CYCLES ON TERMINATION TEMP	OFF
	DRAIN DOWN Adjustable time [59]	ON	ON, OFF (See Note 5)	ON	OFF	OFF
	LIQUID HOLD OFF Adjustable time [49]	OFF	ON, OFF (See Note 5)	ON	OFF	OFF
	RECOVERY TIME Time/temp terminated	OFF	TEMPERATURE OR TIME CONTROLLED (See Note 3)	ON	OFF	CYCLES ON TEMPERATURE
	REFRIGERATION	OFF	ON	ON	OFF	CYCLES ON TEMPERATURE
PLANT FAULT	OFF	OFF	ON	OFF	OFF	
UNIT SHUTDOWN	OFF	OFF	OFF	OFF	OFF	
FANS ONLY SHUTDOWN	OFF	ON	OFF	OFF	OFF	
FORCED DEFROST	ON	ON	ON	ON	OFF	
FORCED REFRIGERATION	OFF	ON	ON	OFF	CYCLES ON TEMPERATURE	
INHIBIT DEFROST	OFF	ON	ON	OFF	CYCLES ON TEMPERATURE	

- NOTE 1: USE ITEM 106 TO SET OFF, HEATER OR FANS  
 NOTE 2: RL1 IS FOR LIGHTING CONTROL  
 NOTE 3: USE ITEM 153 TO SELECT CONTROL AFTER DEFROST  
 NOTE 4: USE ITEM 108 TO SELECT CONTROL DURING DEFROST  
 NOTE 5: ON WHEN ITEM 108 SET TO RUN ALWAYS

**Relay Output Rating**  
2A resistive.

**Supply Requirements**  
48-62 Hz Supply 3 VA maximum

**Applicable Documentation**

Item Numbers	Firmware Variations	Connections Diagram
UBPI Doc No.05265	UBPI Doc No.05266	UBPI Doc No. 05269
UBPJ Doc No.	UBPJ Doc No.0	UBPJ Doc No.

Evaporator Manual	Installation Requirements	Schematic Diagram
Doc No. 01923	Doc No. 03852	Doc No. 05268



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

SUCCEEDS® is the patented JTL algorithm for control of liquid injection into an evaporator using electronic expansion valves.

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

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 your supplier or JTL Systems.