

**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.

**CE Conformance**

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

**Inputs**

Temperatures	
25, 26	AIR ON TEMP
23, 24	AIR OFF TEMP
21, 22	EVAPORATOR TEMP
19, 20	SUCTION LINE TEMP
17, 18	TERMINATION

**Outputs**

	Outputs (CON 3)			
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	LD 5 LN 5	OUTPUT 5	(N/O LOAD) (LINE)	LIQUID SOLENOID 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:

To set item 31 to -20.0 press:

To correct errors press:

To select next or previous items press: and

**Initial Commissioning and Bitswitch Settings**

The controller has 4 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 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.

**Control Strategy**

The controller can control to the cabinet temperature or the air off temperature selected using item 275 by controlling the liquid solenoid 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 UAPA 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.

**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 3 method which monitors the TEV 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**

The fans can be controlled in various ways.

If item 108 is set to "fans off during defrost" then during defrost recovery the fans can be controlled depending on the evaporator temperature or time delay after defrost. If item 109 is set to 00:00 when the evaporator temperature is low enough, the fans start. There is a 5 degree deadband. If item 109 is set to a time then the fans are held off until the time delay has occurred.

If item 108 is set to "fan control during defrost"; the fans are turned off during defrost when the evaporating temperature goes above the setting on item 146. After defrost the fans are turned on when the evaporating temperature falls below the setting on item 150 or the time delay on item 109, if it is not set to 00:00.

If energy saving is selected using item 130, then the fans will be cycled during normal refrigeration. When the energy saving temperature, item 131, goes below the energy saving setpoint, item 132, the fans stop. There is a deadband of ±0.5°C

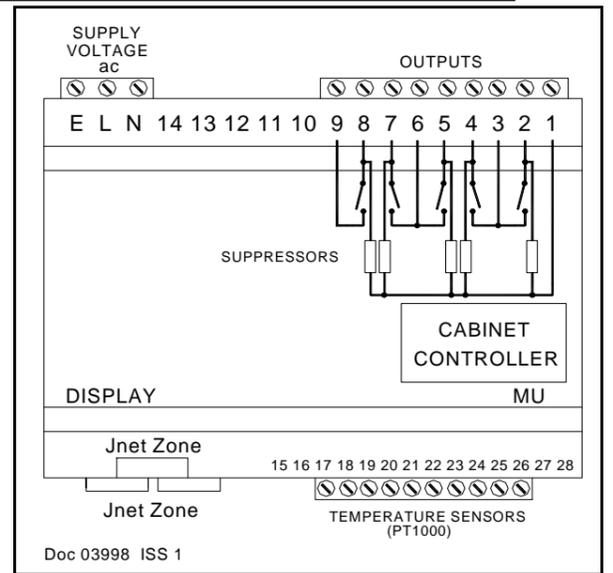
Note: When "Fan runs always" is selected the fans do not stop, in normal control, during or after defrost.

**Trim heater control**

The trim heaters can be controlled. There are 4 separate strategies for control selected by item 390.  
a) heater switched off when controller shutdown using display keyswitch.  
b) heater controlled to a fixed percentage output  
c) heater controlled to a fixed percentage output which can vary in and out of trading hours.  
d) heater controlled with an adjustment received from the network.  
The trim heater control is achieved by pulsing relay RL3. The pulse period in 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 Alarm**

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

**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				UAPA
	Item	Function	Range	Units
TEMPS & ALARMS	33	Cabinet temperature ratio	20 to 80	hr:mn  K K K hr:mn hr:mn K
	36-39	Sensor selections	0=off 1=on	
	147	Termination sensor selection	0=off 1=on	
	32	Cabinet overtemperature tolerance	0 to +20	
	34	Air off over temperature tolerance	0 to +30	
	480	Cabinet under temperature tolerance	0 to -10	
	47	Alarm averaging time	00:30 to 03:00	
	481	Cabinet temperature warning trend	00:00 to 23:59	
CONTROL	533	Cabinet temperature ratio (second case)	0 - 80	°C °C °C °C
	532	Cabinet overtemperature tolerance (second case)	0 - 120	
	275	Control temperature	1=Air off 2=cabinet temp	
	123	Enable 2nd setpoint	0=disabled 1=enabled	
	124	Primary cabinet temperature setpoint	-30 to +10	
	125	Secondary cabinet temperature setpoint	-30 to +10	
	31	Air off temperature setpoint	-39 to +5	
DEFROST INITIATION	140	Temperature control deadband	0.4 to 3.0	hr:mn hr:mn  hours hours %
	106	Auxiliary output selection	0=off 1=Fan 2=Heater	
	500	Enable second case	0=Disabled 1=Enabled	
	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	
	51-56	Defrost schedule	00:01 - 23:59	
	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	
DEFROST TERMINATION	223	Defrost requirement priority	1 to 8	°C hr:mn hr:mn hr:mn hr:mn
	225	PREDICT Minimum time between defrosts	2 to 8	
	226	PREDICT Maximum time between defrosts	6 to 72	
	227	PREDICT Sample discard list	0 to 3	
	228	PREDICT volatility setpoint	2 to 12	
	144	Defrost termination method	1=Evaporator 2= Air off 3=Termination 4=Time only	
FAN CONTROL	50	Defrost termination temp	0 to +20	°C hr:mn hr:mn hr:mn hr:mn
	145	Minimum defrost time	00:00 - 00:30	
	57	Defrost termination time	00:05 to 00:59	
	59	Drain down time	00:00 to 00:10	
	49	Refrigeration delay after defrost	00:00 to 00:10	
LOAD SHEDDING	106	Auxiliary output	0=not used 1=fans 2=heater	°C hr:mn
	108	Fan control	1=run always 2=off during defrost 3=fan controlled on evaporator temperature 4=fan controlled on termination temperature	
	146	Temperature to turn fans off during defrost	-12 to +20	
	109	Fan delay after defrost	00:00 - 00:10	
TRIM HEATER CONTROL	153	Fan control after defrost	0 =restart immediately 1=restart after time delay 2=cycle on evaporating temperature 3=cycle termination temperature	°C
	150	Temperature to turn fans on after defrost	-20 to +5	
	600	Load shedding	0=off 1=enabled	
LIGHTING CONTROL	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	
Jnet FUNCTIONS	390	Control strategy	1 =off, 2=off when shutdown, 3 =fixed adjustment, 4= night setback, 5= network control	%
	392	Normal percentage operation		
	393	Night setback operation		
	396	Load shedding adjustment	1-8 timer number	
DISPLAY	110	Jnet lighting control selection	0=disabled 1=enabled	°C hr:mn
	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 NETWORK FUNCTIONS	1	Unit number	0.1 - 899.7	°C
	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	
TEMPERATURES	122	Temperature display choice	0=Celsius 1=Fahrenheit	°C
	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	
DEFROST	199	Display backlight	0=off 1=on 2=off Flashing for alarm 3=flashing for alarm	%

Bitswitch settings: 0 Frozen food, 1 Ice cream, 2 Chillers, 3 Produce (0 to 3 is the virtual bitswitch setting on item 966)

OTHER USEFUL ITEMS							
Item	Function	Item	Function	Item	Function	Item	Function
20	<b>TEMPERATURES</b>	30	<b>CONTROL</b>	70	<b>MODE INPUTS &amp; OUTPUTS</b>	40	<b>DEFROST</b>
21	Cabinet temperature	28	Cabinet temperature setpoint	72	Operating mode	41	Duration of last defrost
22	Air on temperature	240	Effective air off setpoint	73	Defrost output state	42	Time since end of last defrost
23	Air off temperature	241	Liquid valve open %	74	Liquid valve output state	46	Duration of this defrost
24	Evaporator temperature		Average liquid valve open %	391	Auxiliary output state	77	Communications defrost command
520	Suction line temperature				Trim Heaters output (%)	78	Forced defrost
521	Cabinet temperature (second case)	63	<b>Jnet NETWORK FUNCTIONS</b>			79	Inhibit defrost
141	Air on temperature (second case)	203	Network shutdown and fans only command states	111	<b>LIGHTING</b>	261-272	Forced refrigeration
482	Termination sensor temperature	394	Associated plant suction lin	113	Communications lighting command	219	Learned defrost schedule
	Accumulated temperature warning time	239	Trim heater adjustment (%)	114	Lighting output state	221	Defrost arrangement from network
			Network timer command state	115	Force lights on	222	Forced defrost requirement
					Force lights off		Enable forced defrost requirement

OUTPUT STATE DIAGRAM FOR JTL CONTROLLER					UAPA	
MODE OF OPERATION		OUTPUT & FUNCTION (See note 2)				
		RL2		RL3	RL4	RL5
		AUXILIARY (N/O) can be set to run always [108] See Note 1		TRIM HEATER (N/O)	DEFROST (C/O)	LIQUID SOLENOID VALVE (N/O)
		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	OFF	ON	OFF	OFF
	DEFROST Time/temp terminated [57]/[50]	ON	OFF	ON	CYCLES ON TERMINATION TEMP	OFF
	DRAIN DOWN Adjustable time [59]	ON	OFF	ON	OFF	OFF
	LIQUID HOLD OFF Adjustable time [49]	OFF	OFF	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	ON
INHIBIT DEFROST		OFF	ON	ON	OFF	CYCLES ON TEMPERATURE

NOTE 1: CAN BE SET TO OFF USING ITEM 106  
 NOTE 2: RL1 IS FOR LIGHTING CONTROL  
 NOTE 3: FANS OFF UNTIL TIME SET ON ITEM 109 REACHED.

**Relay Output Rating**  
 2 A resistive.

**Supply Requirements**  
 230 V ac 48-62 Hz Supply 3 VA maximum inputs 2 mA maximum



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

**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.

**Applicable Documentation**

Item Numbers Doc No.03980	Firmware Variations Doc No.03981	Connections Diagram Doc No. 03788
Evaporator Manual Doc No. 01923	Installation Requirements Doc No. 03852	

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