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**.

Voltage free contacts should be connected to terminals for the logical conditions shown.

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

Digital	
13, 14	Input 1 Compressor 1 healthy
12, 14	Input 2 Compressor 2 healthy
11, 14	Input 3 No refrigerant leak
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
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 & 6	OUTPUT 5	(N/O LOAD) (LINE)	RUN COMPRESSOR 1
10 9	LD6 LN5 & 6	OUTPUT 6	(N/O LOAD) (LINE)	RUN COMPRESSOR 2

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 ITEM 2 1 ENTER press:

To set item 31 to -20.0 press:
ITEM 3 1 ENTER SET - 2 0 0 ENTER

To correct errors press: CANCEL

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 UBIC 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 temperature is controlled using the cabinet setpoint, deadband and the anti short cycling compressor data for up to two compressors.

The number of starts per hour is programmable for the compressors. Once a compressor starts if it stops it cannot start again until the short cycling time times out. For example if the number of starts per hour is set to 10 then a restart after a start cannot occur until 6 minutes have elapsed since the last start.

Also once a compressor stops it must stop for a settable minimum time.

There is a compressor healthy input for each compressor. The compressor will not run if the input is not present.

The deadband is symmetrical about the setpoint eg if the setpoint is -22 and the deadband is 2 then the top of the deadband is -21 and the bottom of the deadband is -23.

When the cabinet temperature falls below the bottom of the deadband for a continuous period of 15 seconds the compressors are stopped. When the cabinet temperature rises above the top of the deadband for a continuous period of 15 seconds then the lead compressors starts, if it is allowed. If it is not allowed then the lag compressor will start if it is allowed. If the temperature stays above the top of the deadband for longer than the programmable lag compressor delay the second compressor will start if it is allowed.

The control strategy for HGD/well operation is that the controlled 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.

The UBIC 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. T he 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.

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 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.

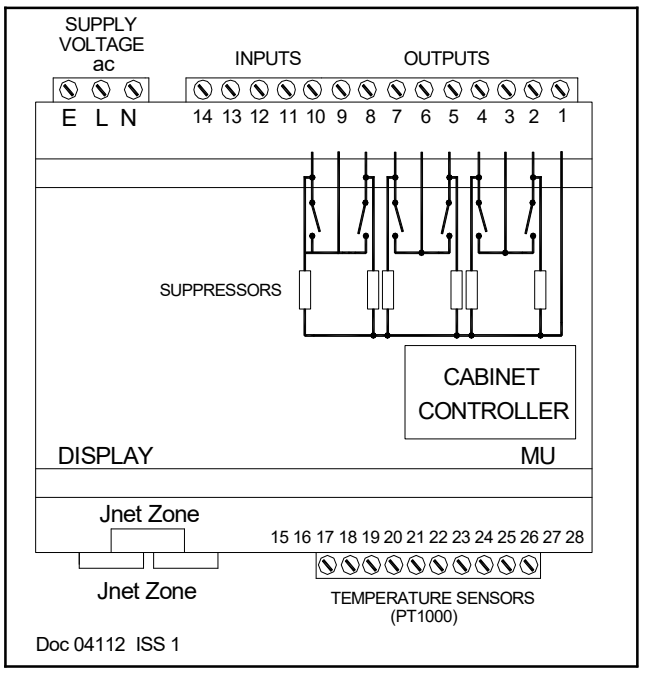
The display shows "dEF".

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. Item 108 can be set to be not controlled or run always.

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.

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 JCL 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. The network command can be from two sources, legacy or broadcast timer. Selection of the broadcast timer is 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.
Run one compressor only

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.

Compressor Fault Alarm
When a compressor is enabled if the compressor healthy input is not present an alarm is given.

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.

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				UBIC
	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)	0 - 80	
	532	Cabinet overtemperature tolerance (second case)	0 - 20	K
TEMPERATURE CONTROL	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
	140	Temperature control deadband	1.0 to 3.0	°C
	500	Enable second case	0=Disabled 1=Enabled	
COMPRESSORS	361	Compressor 1 enable	0=Disabled 1=Enabled	
	362	Compressor 2 enable	0=Disabled 1=Enabled	
	48/363	Starts per hour	0=Unlimited 1=10 per hour 2=15 per hour 3=20 per hour 4=6 per hour	
	366	Minimum off time	15 to 60	Secs
	367	Lag compressor delay	30 to 120	Secs
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	00:00 - 00:10	
	51-56	Defrost schedule	00:01 - 23:59	hr:mn
	60	Defrost schedule 12/24 hour clock	0=24hr 1=12hr	
	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	
	225	PREDICT Minimum time between defrosts	2 to 8	hours
	226	PREDICT Maximum time between defrosts	6 to 72	hours
	227	PREDICT Sample discard list	0 to 3	
	228	PREDICT volatility setpoint	2 to 12	%
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
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	
	606	Run one compressor only	0=off 1-8 broadcast input	
	607	Reduce trim heat	0=off 1-8 broadcast input	
FAN CONTROL	108	Fan control	0=not controlled 1=run always 2=off during defrost 3=fan controlled during defrost	°C
	146	Temperature to turn fans off during defrost	-12 to +20	hr:m
	109	Fan delay after defrost	00:00 - 00:10	°C
	150	Temperature to turn fans on after defrost	-20 to +5	
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		%
	393	Night setback operation		%
LIGHTING CONTROL	110	Jnet lighting control selection	0=disabled	
	112	Lights of broadcast timer selection	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	
	18	Daylight saving operation	0=standard time 1=daylight saving time	
	238	Select network shutdown number	0=disabled 1-8 timer number	
DISPLAY	122	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	

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		Item	Function	Item	Function
	TEMPERATURES		**CONTROL**		**MODE INPUTS & OUTPUTS**		**DEFROST**
20	Cabinet temperature	30	Cabinet temperature setpoint	70	Operating mode	40	Duration of last defrost
21	Air on temperature	240	Refrigeration %	71	Compressor input state	41	Time since end of last defrost
22	Air off temperature	241	Average refrigeration %	360	Refrigerant leak input state	42	Duration of this defrost
23	Evaporator temperature	364	Compressor 1 restart timer	72	Defrost output state	46	Communications defrost command
24	Suction line temperature	365	Compressor 2 restart timer	73	Compressor output states	77	Forced defrost
520	Cabinet temperature (second case)			74	Fan output state	78	Inhibit defrost
521	Air on temperature (second case)		**Jnet NETWORK FUNCTIONS**	391	Trim Heaters output (%)	79	Forced refrigeration
141	Termination sensor temperature	63	Network shutdown and fans only command states			261-272	Learned defrost schedule
482	Accumulated temperature warning time	394	Trim heater adjustment (%)		**LIGHTING**	219	Defrost arrangement from network
		239	Network timer command state	111	Communications lighting command	221	Forced defrost requirement
						222	Enable forced defrost requirement
				112	Lighting override input state		
				113	Lighting output state		
				114	Force lights on		
				115	Force lights off		

OUTPUT STATE DIAGRAM FOR JTL CONTROLLER — UBIC

MODE OF OPERATION		RL2	RL3	RL4	RL5 & RL6
		Fans (N/O) can be set to run always (108)	**TRIM HEATER (N/O)**	**DEFROST (N/O)**	**COMPRESSOR 1 & 2 (N/O) (SEE NOTE 3)**
NORMAL REFRIGERATION CYCLE	**REFRIGERATION**	ON	ON	OFF	CYCLE ON TEMPERATURE
	DEFROST Time/temp terminated [57]/[50]	OFF	ON	CYCLES ON TERMINATION TEMP	OFF
	DRAIN DOWN Adjustable time [59]	OFF	ON	OFF	OFF
	RECOVERY TIME Time/temp terminated	TEMPERATURE OR TIME CONTROLLED (See Note 2)	ON	OFF	CYCLE ON TEMPERATURE
	REFRIGERATION	ON	ON	OFF	CYCLE ON TEMPERATURE
UNIT SHUTDOWN		OFF	OFF	OFF	OFF
FANS ONLY SHUTDOWN		ON	OFF	OFF	OFF
FORCED DEFROST		ON	ON	ON	OFF
FORCED REFRIGERATION		ON	ON	OFF	ON
INHIBIT DEFROST		ON	ON	OFF	CYCLE ON TEMPERATURE

NOTE 1: RL1 IS FOR LIGHTING CONTROL
NOTE 2: FANS OFF UNTIL TIME SET ON ITEM 109 REACHED.
NOTE 3: CYCLING TAKES ACCOUNT OF STARTS PER HOUR (ITEM 48/363)

Relay Output Rating
2 A resistive.

Supply Requirements
85-265 Vac 47-440 Hz supply 5A maximum inputs 2 mA maximum
85-265 Vdc

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.

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. 05338	Firmware Variations Doc No. 05339	Connections Diagram Doc No. 04092
Evaporator Manual Doc No. 01923	Installation Requirements Doc No. 03852	

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