

### Electrical Installation Requirements

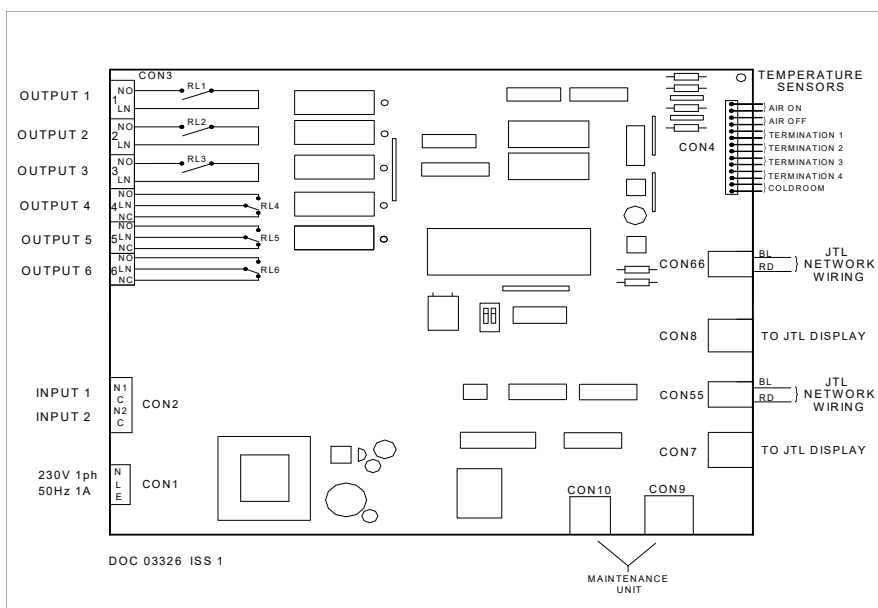
Care should be taken to separate the power and signal cables to prevent electrical interference and possible damage due to inadvertent connection.

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 **NO** or **NC**.

The plant inputs are electrically isolated. A line voltage should be connected for the logical conditions **door closed**, **man trapped**. The terminals marked **C** should be connected to the supply voltage neutral.

### CE Conformance

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



### Inputs

Input (CON 2)			
I1 C	INPUT 1	(LINE) (NEUTRAL)	DOOR CLOSED
I2 C	INPUT 2	(LINE) (NEUTRAL)	MAN TRAPPED
Temperatures (CON 4)			
1, 2	AIR ON TEMP		
3, 4	AIR OFF TEMP		
5, 6	TERMINATION 1		
7, 8	TERMINATION 2		
9, 10	TERMINATION 3		
11, 12	TERMINATION 4		
13, 14	ROOM TEMPERATURE		

### Outputs

Outputs (CON 3)			
1 NO 1 LN	OUTPUT 1	(N/O LOAD) (LINE)	LIQUID SOLENOID VAVES
2 NO 2 LN	OUTPUT 2	(N/O LOAD) (LINE)	FANS
3 NO 3 LN	OUTPUT 3	(N/O LOAD) (LINE)	DEFROST 1
4 NO 4 LN 4 NC	OUTPUT 4	(N/O LOAD) (LINE) (N/C LOAD)	DEFROST 2
5 NO 5 LN 5 NC	OUTPUT 5	(N/O LOAD) (LINE) (N/C LOAD)	DEFROST 3
6 NO 6 LN 6 NC	OUTPUT 6	(N/O LOAD) (LINE) (N/C LOAD)	DEFROST 4

### 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 30 to -20.0 press:

**ITEM** **3** **0** **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 bitswitches as shown in the table overleaf and then setting item 9 to 1234. From v0.005 this controller has virtual bitswitches which replace the physical bitswitches. The virtual bitswitches are set using item 960. 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.

### Temperature Display

The temperature displays the coldroom temperature. The temperature can be displayed in Celsius or Fahrenheit as selected by item 122.

The LACT controller drives the JTL LED5 and LCD13 display. Various cable lengths are available.

Display	Cable	Item 129
LED5	CAB34	LED5 (0)
LCD13	CAB75	LED1 (1)

### Control Strategy

The controller can control the air on temperature or the air off temperature selected using item 275. The temperature is controlled to the setpoint by controlling a liquid line solenoid valve with a mechanical expansion valve.

When set for air off control the controller uses the computed air off temperature setpoint (item 28) which is calculated by comparing the air on temperature with the coldroom temperature setpoint. The computed setpoint is raised or lowered depending on whether the air on temperature is below or above the temperature setpoint. The computed air off setpoint cannot go more than 4°C below the air on setpoint.

If the control temperature falls below the setpoint the liquid valve is closed. There is a deadband setting on item 140.

In the event of an air on sensor fault the control automatically switches to air off and vice versa.

From v0.00.8 in the event of an air on sensor fault the coldroom temperature is used.

### Defrost Initiation Strategies

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

When real time defrost is selected items 51-56 set the start of defrost. The schedule can be set for 12 or 24 hour sequence (item 160). Each timed defrost can be programmed for electric or off cycle using items 351-356.

Network initiated defrost can be divided into 2 groups; coordinated and scheduled.

Coordinated time defrost requires defrost coordinator to be present in the network. When coordinated time 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 controller will control up to 4 defrost heaters with independent termination. This allows up to 3 slave evaporators to be controlled. The defrost output relay is energised during the defrost period.

The liquid solenoid is closed during defrost. During defrost the fans can be stopped.

Pump down delay can be applied (item 61) before the defrost/output and heater are energised. During pump down the liquid 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. Each evaporator has its own termination sensor. If the termination temperature is reached before the minimum defrost time then the defrost heater is cycled.

### Defrost Recovery

The number of evaporators is set on item 76.

When all the evaporators have terminated or time is reached the controller enters defrost recovery.

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

A drain down time delay can be applied (item 59) after defrost before the liquid valve is reopened.

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" or "fans off during electrical 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.

### High Temperature Alarm

The coldroom temperature is monitored continually. The temperature is averaged over the period set on item 47. If the average temperature exceeds the alarm level then an alarm is given which is shown on the display and available, for remote indication, on the JTL alarm system.

The temperature tolerance is set on item 32. Setting the tolerance to 0.0°C disables the alarm.

### 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.

### Coldstore Door Functions

When the coldstore door is opened, refrigeration is stopped by shutting the liquid solenoid valve and stopping the evaporator fans. If the door remains open for a time longer than the value set on item 64 then refrigeration is restarted. If the door remains open for a time longer than set on item 33 then an alarm is given. The door open alarm can be set to be critical using item 126.

### Man Trapped Alarm

A man trapped alarm input is available for alarm indication locally and on the JTL network. The alarm is activated when there is no input.

### 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				LACT
	Item	Function	Range	Units
TEMPS & ALARMS	36-39	Sensor selections	0=off 1=on	
	147 - 150	Termination sensors selection	0=off 1=on	
	32	Overtemperature tolerance	0 to +20	°C
	47	Alarm averaging time	00:30 to 03:00	hr:mn
CONTROL	275	Control temperature	0=Air off 1=Air on	
	30	Temperature setpoint	-30 to +25	°C
	140	Temperature deadband	0.4 to 3.0	°C
	48	Compressor starts/hour	unlimited /10/15/20	
DEFROST INITIATION	107	Defrost strategy	2=Network (learned backup)3=Time 7=Network (real time backup) 8=Coordinated (learned) 9=Coordinated (real time)	
	69	Number of defrosts expected or required	0 to 6	hr:mn
	61	Pump down time	00:00 - 00:10	hr:mn
	51-56	Defrost schedule	00:01 - 23:59	
	351-356	Defrost type for times 51-56	0=Electric 1=Off cycle	
	60	Defrost schedule 12/24 hour clock	0=24hr 1=12hr	
	65	Invert defrost input	0=no 1=yes	
	211	Evaporator group	0=none 1=Lt 2=Ht 3=Satellite	
	210	Electrical supply distribution panel no	0 to 15=panel no	
	213	Electrical supply circuit	0=none 1-15=circuit	
DEFROST TERMINATION	214	Defrost method	0=brown phase 1=black phase 2=grey phase 3=3 phase 4=2 pipe gas 5=3 pipe gas 6=off cycle	
	223	Defrost requirement priority	1 to 8	
	76	No of evaporators	1-4	
	50	Defrost termination temp	0 to +20	
	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
	108	Fan control	1=run always 2=off during defrost 3=off during electric defrost	
	109	Fan delay after defrost	00:00 - 00:10	hr:mn
DOOR FUNCTIONS	128	Select door functions	0=off 1=on	
	126	Door alarms critical	0=not critical 1=critical	
	33	Door open alarm delay	00:00 to 00:30	hr:mn
	64	Door open refrigeration delay	00:00 to 00:30	hr:mn
Jnet FUNCTIONS	1	Unit number	0.1 - 899.8	
	62	Jnet network shutdown selection	0=disabled 1=enabled	
	134	Enable plant to cut off refrigeration	0=disabled 1=enabled	
	200	Exclude from suction optimisation	0=include 1=exclude	
	18	Daylight saving operation	0=standard time 1=daylight saving time	
DISPLAY	122	Temperature display choice	0=Celsius 1=Fahrenheit	
	129	Temperature display type	0=LED5 1=LCD15	

**Bitswitch settings** 21, 0(CO) Frozen food, 1(CO) Ice cream, 2(OC) Chillers, 3(OO) Produce, where **C** = closed, **O** = open, closed = dot visible 0 to 3 is the virtual bitswitch setting item 966.

OTHER USEFUL ITEMS					
Item	Function	Item	Function	Item	Function
20	<b>TEMPERATURES</b>	40	<b>DEFROST</b>	63	<b>Jnet NETWORK FUNCTIONS</b>
21	Coldroom temperature	41	Duration of last defrost		Network shutdown and fans only command states
22	Air on temperature	224	Time since end of last defrost	203	Associated plant suction line
141-144	Air off temperature	42	Time since start of last defrost		<b>MODE INPUTS &amp; OUTPUTS</b>
	Termination sensor temperature	46	Duration of this defrost	70	Operating mode
28	<b>CONTROL</b>	77	Communications defrost command	71	Door input state
240	Effective air off setpoint	78	Forced defrost	72	Liquid valve output state
241	Liquid valve open %	79	Inhibit defrost	73	Fans output state
	Average liquid valve open %	261-272	Forced refrigeration	74	Defrost output state
		219	Learned defrost schedule	139	Man trapped input state
		221	Defrost arrangement from network		<b>DOOR FUNCTIONS</b>
		222	Forced defrost requirement	34	Time door presently open
			Enable forced defrost requirement	35	Time door has been open in last 24 hours

OUTPUT STATE DIAGRAM FOR JTL CONTROLLER				LACT	
MODE OF OPERATION		OUTPUT & FUNCTION			
		RL1	RL2	RL3 - 6	
		LIQUID SOLENOID (N/O)	FANS (N/O)	DEFROST	
				CONTROL	
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	CYCLES ON AIR OFF TEMPERATURE	ON	OFF	
	PUMP DOWN Adjustable time [61]	OFF	ON	OFF	
	DEFROST Time/temp terminated [57]/[50]	OFF	OFF (See Note 1)	CYCLES ON TERMINATION TEMP	
	DRAIN DOWN Adjustable time [59]	OFF	OFF (See Note 1)	OFF	
	LIQUID HOLD OFF Adjustable time [49]	OFF	OFF (See Note 1)	OFF	
	RECOVERY TIME Time/temp terminated	CYCLES ON AIR OFF TEMPERATURE	TIME CONTROLLED (Item 109)	OFF	
	REFRIGERATION	CYCLES ON AIR OFF TEMPERATURE	ON	OFF	
PLANT FAULT		OFF	OFF	OFF	
UNIT SHUTDOWN		OFF	OFF	OFF	
FANS ONLY SHUTDOWN		OFF	ON	OFF	
FORCED DEFROST		OFF	OFF	ON	
FORCED REFRIGERATION		ON	ON	OFF	
INHIBIT DEFROST		CYCLES ON AIR OFF TEMPERATURE	ON	OFF	

NOTE 1: FANS CAN BE SET TO RUN DURING DEFROST, DRAIN DOWN AND LIQUID HOLD OFF USING ITEM 108.

#### Relay Output Rating

5A resistive.

#### Supply Requirements

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



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

#### Applicable Documentation

Item Numbers Doc No. 03332	Firmware Variations Doc No. 03401	Connections Diagram Doc No. 03328
Schematic Diagram Doc No. 03327	Installation Information Doc No. 03036	
Evaporator Manual Doc No. 01923		

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