

Electrical Installation Requirements

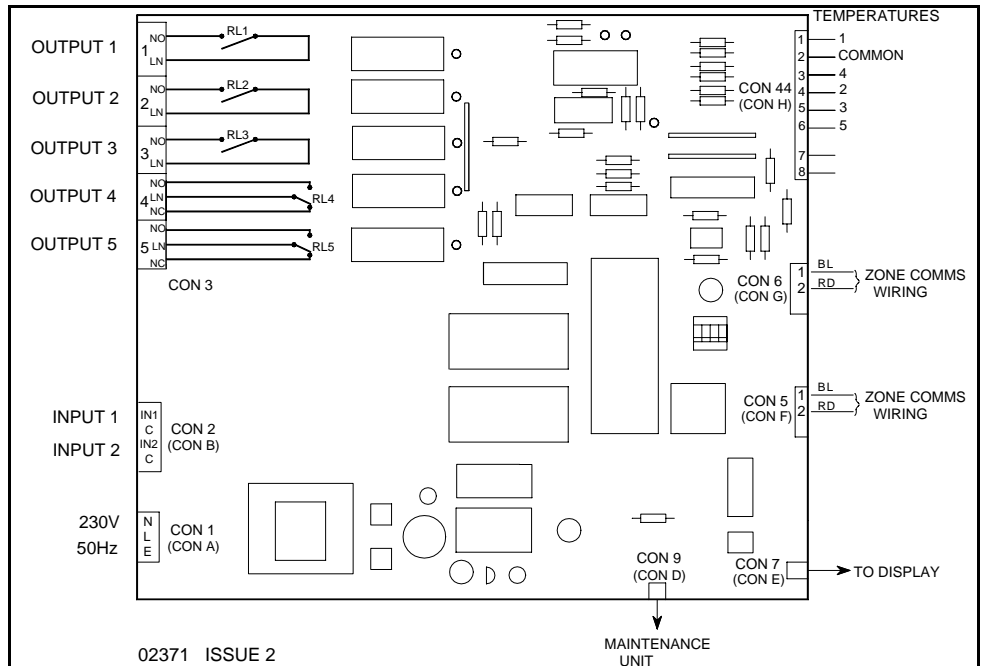
Care should be taken to separate the power and signal cables to prevent electrical interference and possible damage due to inadvertent connection.

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 loads to **NO** or **NC**.

The plant inputs are electrically isolated. A line voltage should be connected for the logical conditions **door closed, defrost on or plant alarm**. 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 (Connector B)			
IN1 C	INPUT 1	(LINE) (NEUTRAL)	DOOR CLOSED
IN2 C	INPUT 2	(LINE) (NEUTRAL)	DEFROST ON OR PLANT ALARM OR SHUTDOWN
Temperatures and Pressure (Connector H)			
1	TEMP 1		AIR ON
2	COMMON		
3	TEMP 4		SUCTION LINE
4	TEMP 2		AIR OFF
5	TEMP 3		EVAPORATOR
6	TEMP 5		TERMINATION
7			
8			

Outputs

Outputs (Connector C)			
1 NO 1 LN	OUTPUT 1	(N/O LOAD) (LINE)	PAN HEATER or SUCTION VALVE
2 NO 2 LN	OUTPUT 2	(N/O LOAD) (LINE)	FANS
3 NO 3 LN	OUTPUT 3	(N/O LOAD) (LINE)	LIQUID SOLENOID VALVE
4 NO 4 LN 4 NC	OUTPUT 4	(N/O LOAD) (LINE) (N/C LOAD)	DEFROST
5 NO 5 LN 5 NC	OUTPUT 5	(N/O LOAD) (LINE) (N/C LOAD)	ALARM RELAY

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 **+** s **-** 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. 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 display shows the coldroom temperatures.

The LCCU controller will drive the following JTL displays when used with the extension cables shown in the table.

Display	Cable	Item 129
LCD13	CAB51	LED1 (1)
LED1	CAB40	LED1 (1)
LED5	CAB34	LED5 (0)
LED8	CAB34	

The cables are available in various lengths.

Control Strategy

The controller can control the coldroom 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.

The computed air off temperature setpoint is calculated by comparing the air on temperature with the air on 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 temperature falls below the computed setpoint the liquid valve is closed. There is a deadband which is set on item 140.

Defrost Initiation Strategies

The defrost strategy can be initiated in 4 ways using item 107. Defrost initiation can be by real time clock, by deduction from the suction temperature, by command on the JTL communications network, or by contact input.

There is a choice of 2 methods of defrost operation, termination or control, using item 75. In termination mode the defrost output relay is energised during defrost recovery period and at any time when the termination temperature is exceeded. In control mode the defrost output relay is energised during the defrost period.

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.

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 backups the defrost schedule as set up for real time defrost on items 51-56 is used. If network communication fails, the selected strategy method 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 liquid solenoid is closed during all forms of 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 "

For network, real time and contact initiated defrost a pump down delay can be applied (item 61) before the defrost/output and heater are energised. During pump down the liquid output is deenergised.

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 termination method can be chosen using item 144.

For network, real time and contact initiated defrost 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. During drain down if the auxiliary heater output is selected it is energised.

During defrost recovery the fans can be controlled depending on the evaporator temperature. When the evaporator temperature is low enough, the fans start. There is a 5 degree deadband. The display shows "dEFr". If the item 109 is set to a time then the fans are held off until the time delay has occurred.

Forced Refrigeration and Defrost

The maintenance unit can be used to force the 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. **NOTE** this feature was introduced in Oct 1996 and requires the JTL defrost scheduler and JTL network controller to support this function.

High Temperature Alarms

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. High temperature alarms can be cancelled or left enabled during defrost and defrost recovery using 127.

Network Shutdown and Fans Only Mode

This controller supports the JTL Network shutdown and fans only facilities. When these facilities are enabled. 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.

Coldroom Isolation

The controller can be isolated for standby operations using item 67. When isolated, all output relays are de-energised and the alarms disabled.

Switch Controlled Shutdown

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

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				LCCU
	Item	Function	Range	Units
TEMPS & ALARMS	36-39	Sensor selections	0=off 1=on	°C hr:mn
	147	Termination sensor selection	0=off 1=on	
	32	Overtemperature tolerance	0 to +20	
	47	Alarm averaging time	00:30 to 03:00	
CONTROL	275	Control temperature	0=Air off 1=coldroom	°C °C
	30	Temperature setpoint	-30 to +25	
	140	Temperature deadband	0.4 to 3.0	
	48	Compressor starts/hour	unlimited /10/15/20	
	75	Defrost control mode	0=termination 1=control	
	76	Auxiliary output selection	0=Auxiliary heater 1=Suction valve	
	67	Isolate coldroom	0=normal 1=isolated	
DEFROST INITIATION	107	Defrost strategy	0=none 1=Suction 2=Network (learned backup)3=Time 4=Contact 7=Network (real time backup) 8=Coordinated (learned) 9=Coordinated (real time)	hr:mn hr:mn °C hours
	69	Number of defrosts expected or required	0 to 6	
	61	Pump down time	00:00 - 00:10	
	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	
	58	Defrost initiation temp (suction)	-5 to +30	
	65	Invert defrost input	0=no 1=yes	
	211	Evaporator group	0=none 1=Lt 2=Ht 3=Satellite	
	213	Defrost heater circuit	0=none 1-7=circuit	
214	Defrost method	0=red phase 1=yellow phase 2=blue phase 3=3 phase 4=2 pipe gas 5=3 pipe gas 6=off cycle		
223	Defrost requirement priority	1 to 8		
DEFROST TERMINATION	144	Defrost termination method	1=Evaporator 2= Air off 3=Termination 4=Time only	°C hr:mn hr:mn hr:mn hr:mn
	50	Defrost termination temp	0 to +20	
	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		
FAN CONTROL	108	Fan control	1=run always 2=off during defrost	hr:mn
	109	Fan delay after defrost	00:00 - 00:10	
DOOR FUNCTIONS	128	Select door functions	0=off 1=on	hr:mn hr:mn
	126	Door alarms critical	0=not critical 1=critical	
	33	Door open alarm delay	00:00 to 00:30	
	64	Door open refrigeration delay	00:00 to 00:30	
Jnet FUNCTIONS	1	Unit number	0.1 - 899.8	
	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	
	18	Daylight saving operation	0=standard time 1=daylight saving time	
DISPLAY	122	Temperature display choice	0=celsius 1=fahrenheit	
	129	Select display type	0=LED5 1=LED1	
INPUTS	138	Input 2 function NOTE defrost when 107 set to 4	0=Unused 1=Shutdown 2=Plant alarm	
	66	Input plant alarm input	0=Alarm when input present 1=Alarm when input absent	

OTHER USEFUL ITEMS					
Item	Function	Item	Function	Item	Function
20	TEMPERATURES Coldroom temperature	40	DEFROST Duration of last defrost	63	Jnet NETWORK FUNCTIONS Network shutdown and fans only command states
21	Air on temperature	41	Time since end of last defrost	203	Associated plant suction line
22	Air off temperature	42	Duration of this defrost		MODE INPUTS & OUTPUTS
23	Evaporator temperature	46	Communications defrost command	70	Operating mode
24	Suction line temperature	77	Forced defrost	71	Defrost input state
141	Termination sensor temperature	78	Inhibit defrost	72	Defrost output state
	CONTROL	79	Forced refrigeration	73	Liquid valve output state
28	Effective air off setpoint	261-272	Learned defrost schedule	74	Auxiliary output state
240	Liquid valve open %	219	Defrost arrangement from network	139	Input 2 state
241	Average liquid valve open %	221	Forced defrost requirement		DOOR FUNCTIONS
		222	Enable forced defrost requirement	34	Time door presently open
				35	Time door has been open in last 24 hours

OUTPUT STATE DIAGRAM FOR JTL CONTROLLER					LCCU	
MODE OF OPERATION	OUTPUT & FUNCTION					
	RL1	RL2	RL3	RL4		
	PAN HEATER or SUCTION VALVE (N/O)	FANS (N/O) can be set to run always [108]	LIQUID SOLENOID VALVE (N/O)	DEFROST (C/O)		
				ITEM 75 CONTROL	ITEM 75 TERMINATION	
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 (See note 2)	CYCLES ON AIR OFF TEMPERATURE (See note 2)	OFF	ON ABOVE TERMINATION TEMP
	PUMP DOWN Adjustable time [61]	OFF	OFF	OFF	OFF (from version 0.00.7)	OFF
	DEFROST Time/temp terminated [57]/[50]	ON	OFF	OFF	CYCLES ON TERMINATION TEMP (from version 0.00.8)	OFF
	DRAIN DOWN Adjustable time [59]	ON	OFF	OFF	OFF	ON
	LIQUID HOLD OFF Adjustable time [49]	OFF	OFF	OFF	OFF	ON
	RECOVERY TIME Time/temp terminated	OFF	CYCLES ON EVAPORATOR TEMPERATURE	CYCLES ON AIR OFF TEMPERATURE	OFF	ON
	REFRIGERATION	OFF	ON	CYCLES ON AIR OFF TEMPERATURE	OFF	ON ABOVE TERMINATION TEMP
PLANT FAULT	OFF	OFF	OFF	OFF	ON	
ISOLATED	OFF	OFF	OFF	OFF	OFF	
UNIT SHUTDOWN	OFF	OFF	OFF	OFF	OFF	
FORCED DEFROST	ON	OFF	OFF	ON	OFF	
FORCED REFRIGERATION	OFF	ON	ON	OFF	ON	
INHIBIT DEFROST	OFF	ON	CYCLES ON AIR OFF TEMPERATURE	OFF	ON	

NOTE 2: REFRIGERATION AND FANS CAN BE TURNED OFF WHEN DOOR OPENS (ITEM 64)

Relay Output Rating

RL1-4 5A resistive RL5 2A resistive

Supply Requirements

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

Applicable Documentation


Item Numbers
Doc No. 02744

Software Variations
Doc No. 02745

Wiring Diagrams
Doc No. In progress

Evaporator Manual
Doc No. 01923

Installation Requirements
Doc No. 01662

 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.