Phasefale Presscon

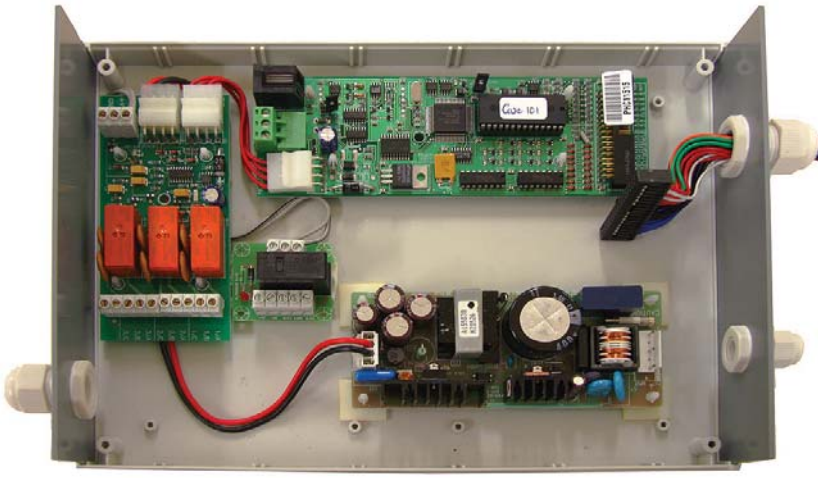
Case Control System

Electronic Suction and Electronic Expansion Valve Control System for Refrigerated Cabinets

Phasefale Pty. Ltd.

83 Taunton Drive, CHELTENHAM
VICTORIA 3192, AUSTRALIA
Tel +613 9553 0800 Fax +613 9553 3993
Web Site www.phasefale.com.au
Email sales@phasefale.com.au

Presscon Dual Channel Case Control

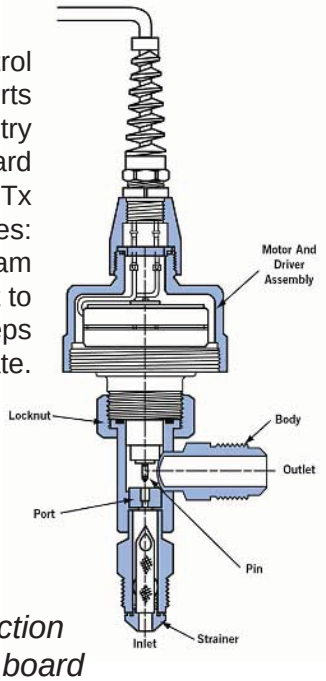


Case control from Phasefale is affordable and offers clear benefits to the control of refrigeration systems. It is considered to be an ideal way to control refrigerated cabinets; precision control right at the cabinet using electronic suction side or electronic expansion valve control. But until now it has been far from affordable....

Phasefale's case control; affordable, powerful and a single model to suit all type of valves. Designed and manufactured to ISO9001 standards in Australia for Australian conditions.

Case control can be controlled from a regular Phasefale refrigeration controller, or setup and monitored from Phasefale's Pressnet Software. Once configured and running, the case control can operate with stand-alone and provide independent temperature, defrost and alarm control.

Case control supports all industry standard EEPR And ETx stepper valves: the program can be set to number of steps and step rate.



Advanced Features

- *2 complete channels on each main board*
- *Electronic Suction Valve Stepper control*
- *Electronic Expansion valve Stepper control*
- *Electric/Hotgas Defrost Control with 12 defrosts per day*
- *Anti-Sweat Heater control*
- *Temperature & Alarm control - up to 11 probes*
- *Evaporator Fan control*
- *Defrost Heater Control*
- *Case Lighting Control*
- *Supports all major valve types*
- *Wiring Looms included and supplied*
- *Case cleanout function*
- *2 Valves per Main board*
- *2 self contained control channels per board*
- *Up to 2 Expansion boards with 3 each 240VAC 10A Relays per main board supported.*
- *Add expansion boards to suit requirements*
- *Fully Integrated with Presscon/Pressnet Refrigeration Control System standard controller to program unit.*
- *Remote Digital Display*
- *Small Size & different mounting options*

PHASEFALE

CONTROL

MONITOR

PROTECT

Quality System
Quality Endorsed Company
ISO9001 QEC12298
Standards Australia

www.phasefale.com.au sales2@phasefale.com.au +6139553 0800

Phasefale Presscon Case Control

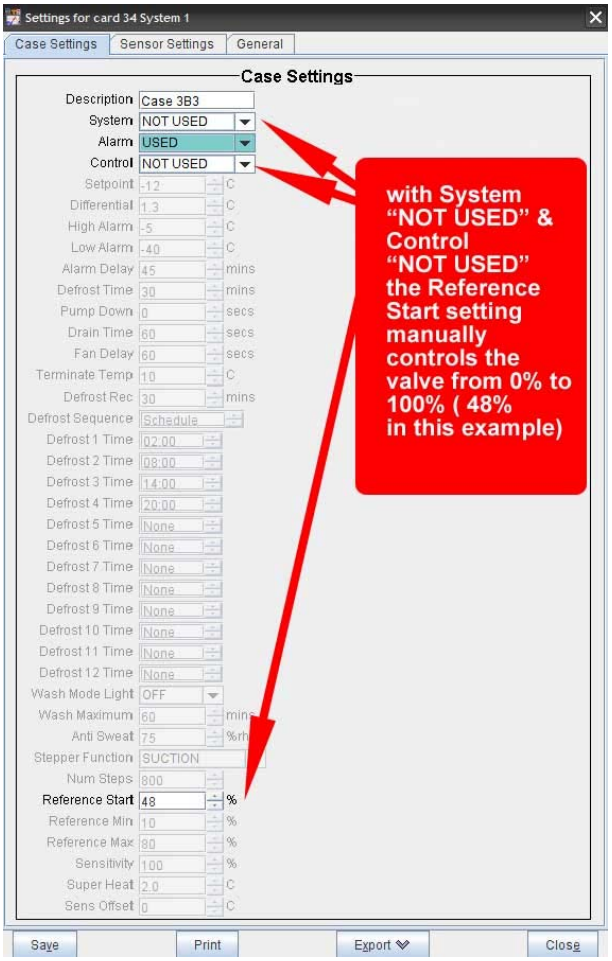
Manual Valve Operation, Load Defaults
New feature Case Control Versions 1.1 and above

With the release of Case Control Software Version 1.1 (and higher) there are 2 new Features designed to aid in installation, commissioning and diagnostics:

1. The EEPR Electronic valve can be Shut off. The examples below show this function activated from Pressnet, but it can also be activated via the Case Monitor (all Versions).

2. The EEPR Electronic valve can be set to any desired % position. The examples below show this function activated from Pressnet, but it can also be activated via the Case Monitor (all Versions).

3. A new Load defaults option allows the Stepper valve settings to be set to 200 steps/second and 6400 steps (suitable for Sporlan CDS types). The “Load Defaults” option is only in the Case monitor software (Version 1.13 and above) in the Hardware Menu of the particular Case control.



Above: To SHUT OFF Valve (0%) Set the Control to “NOT USED”

Left: to set the valve to any position from 0-100%, set System and Control to “NOT USED” then adjust the “Reference Start” Value to desired position and save. Note: after manual operation, reset Reference Start value to desired setting (default is 25% recommended)

***** !!! IMPORTANT !!! *****
DO NOT PLUG OR UNPLUG
THIS CONNECTOR UNLESS POWER IS OFF!

all "GND" wires are the same
and can be separate or
all joined- which-ever is convenient

INPUT 1	1	INP1
INPUT 2	2	INP2
INPUT 3	3	INP3
INPUT 4	4	INP4
INPUT 5	5	INP5
INPUT 6	6	INP6
INPUT 7	7	INP7
INPUT 8	8	INP8
INPUT 9	9	INP9
INPUT 10	10	INP10
INPUT 11	11	INP11
GROUND	12	GND
GROUND	13	
GROUND	14	
NOT FITTED	15	
NOT FITTED	16	
NOT FITTED	17	
NOT FITTED	18	
NOT FITTED	19	
NOT FITTED	20	
NOT FITTED	21	
NOT FITTED	22	
NOT FITTED	23	
NOT FITTED	24	
STEPPER 1-2 ORANGE	25	S1-2Y
STEPPER 1-1 WHITE	26	S1-1Y
STEPPER 1-4 GREEN	27	S1-4Y
STEPPER 1-3 RED	28	S1-3Y
STEPPER 2-2 ORANGE	29	S2-2Y
STEPPER 2-1 WHITE	30	S2-1Y
STEPPER 2-4 GREEN	31	S2-4Y
STEPPER 2-3 RED	32	S2-3Y
NOT FITTED	33	
NOT FITTED	34	

34PIN

Power to Case Controller

Motor 1

Motor 2

Power Supply 240VAC- 12V DC

LINE | NEUTRAL | GROUND | GND | +12V DC

240 VAC Power to Case Controller

Local Earth Connection

Example: Sensor 1 is extended using a sheileded twisted data cable - the shield wire shown in black

Junction- SOLDER connections and make waterproof!

* maximum 6 metres

Mprobe Sensor #?

Shield wire from data cable

Example: Sensor 2 is extended using a sheileded twisted data cable - the shield wire shown in black

Junction- SOLDER connections and make waterproof!

* maximum 6 metres

Mprobe Sensor #?

Shield wire from data cable

Example: Sensor 3 is extended using a sheileded twisted data cable - the shield wire shown in black

Junction- SOLDER connections and make waterproof!

* maximum 6 metres

Mprobe Sensor #?

Shield wire from data cable

Example: Sensor 4 is extended using a sheileded twisted data cable - the shield wire shown in black

Junction- SOLDER connections and make waterproof!

* maximum 6 metres

Mprobe Sensor #?

Example: 3 sensors extension using a 4 wire twisted pair cable
Note: in this example sensors have "shared" a common GND wire

Junction- SOLDER connections and make waterproof!

* maximum 6 metres

Mprobe Sensor #?

Mprobe Sensor #?

Mprobe Sensor #?

Shield wire from data cable

W1 W2 W3 W4

Example EEPR stepper motor #1 with extended wiring longer than 6 metres
*** !!! IMPORTANT !!!!***
MOTOR CABLE WIRING must BE 0.50mm2 DIAMETER COPPER MINIMUM!

Junction- SOLDER connections and make waterproof!

EEPR Stepper Motor 1

Shield wire from data cable

W1 W2 W3 W4

Example EEPR stepper motor #2 with extended wiring longer than 6 metres
*** !!! IMPORTANT !!!!***
MOTOR CABLE WIRING must BE 0.50mm2 DIAMETER COPPER MINIMUM!

Junction- SOLDER connections and make waterproof!

EEPR Stepper Motor 2

This is an example of the sensor and wiring to a Case controller with 7 temperature sensors and 2 stepper motors connected.
The example shows some general principles of wiring RULES for the case control which can be summarized:

1. A good quality local EARTH connection is required

2. All temperature and stepper motor cables extended beyond 6 metres must be in data cable with the folowing: TWISTED, SHIELDED.

3. The conductor copper required for temperature sensor cables can be fine, although we recommend 0.25mm2 conductors minimum for mechanical strength.

4. The conductor copper required for stepper motors cables we recommend 0.50 mm2 conductors minimum for electrical load.

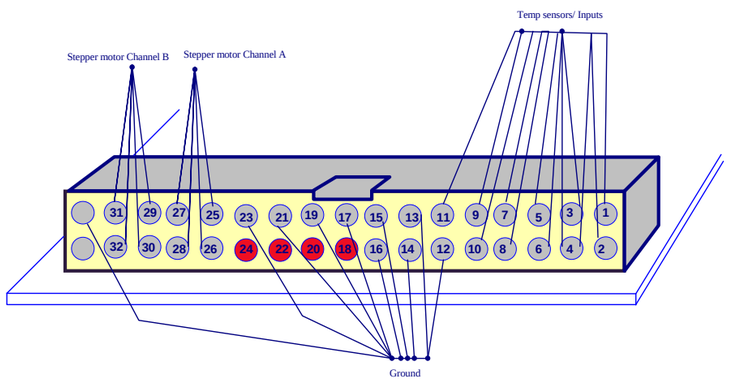
5. All data cable should be shielded. The Data cable shiled to be directly connected to EARTH

6. Temperature sensor cabling may be run in multicore twisted shielded cable

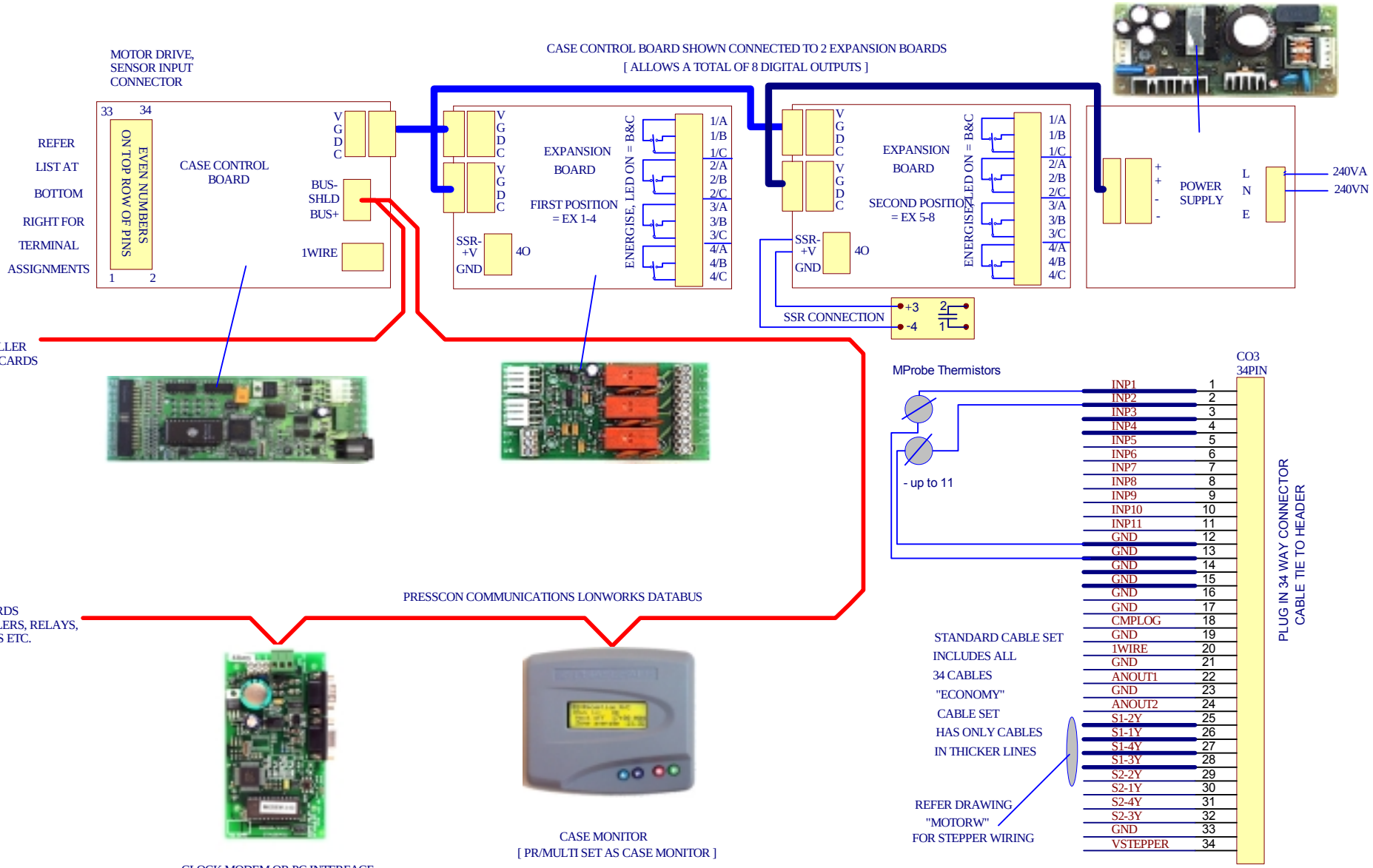
7.Temperature sensor cabling may be SHARE a common Ground return conductor

8. All the Ground terminals on the 34 way pluggable connector as internally joined, so this terminal can be treated as all the same.

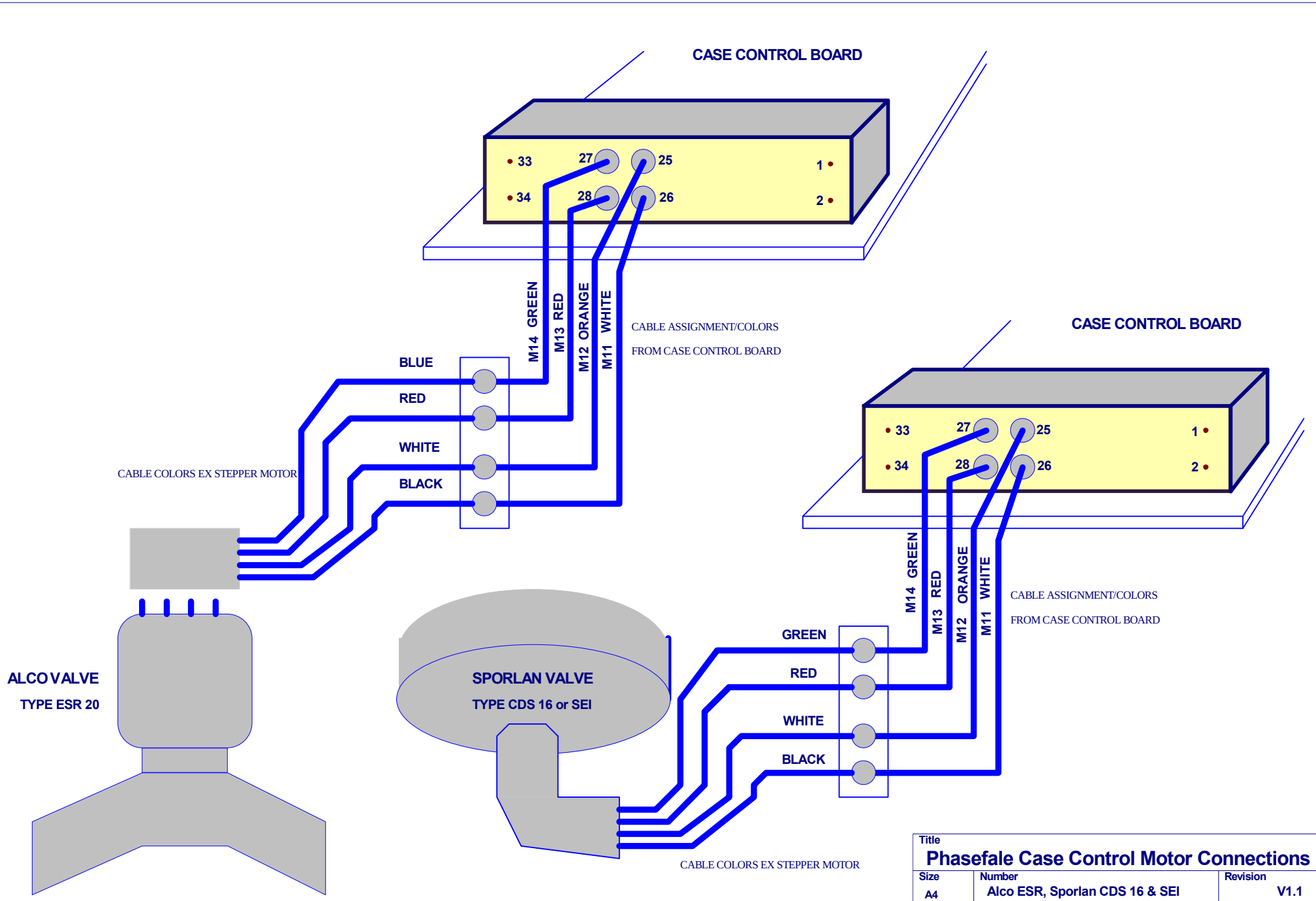
9. DO NOT plug or unplug the 34 way header connector unless POWER is OFF



Title	PRESSCON CASE CONTROLLER WIRING RULES AND EXAMPLE	
Size: A2	Number:	Revision: 1.2 30.7.9
Date: 10/08/2009	Sheet of	
File: P:\1p\..\Case Control External Wiring.SCH.DOC	Drawn By:	



Title	**Presscon Case Control: Layout**	
Size A4	Number	Revision
Date: 4-May-2001	Sheet1 of	
File: P:\1P\PF\PRCASE\PR_LAYOU.SCH	Drawn By:	



Title
Phasefale Case Control Motor Connections

Size	Number	Revision
A4	Alco ESR, Sporlan CDS 16 & SEI	V1.1

Date:	4-May-2001	Sheet o f	
File:	P:\1P\PF\PRCASE\V2\MOTORWRG.SCH	Drawn By:	bcr

Presscon Case Control: System Overview

Part	Part Number	Description
Case Monitor	PR/MULTI [set as monitor with DIP switches]	Control/display unit suitable for monitoring and communicating with up to 99 case control boards. The case monitor is used to program settings into the case control, plus when operating monitor case controls for alarm conditions.
Case Control	PR/PCC	Circuit Board with input connections from external sensors, 2 outputs for stepper motor drives (either Electronic Pressure Regulation or Electronic Expansion Valve), Data Bus Connection. Comes with a cable loom for a single or dual motor drive and track mounting enclosure suitable.
Case Control Expansion Board	PR/PCC/X	Expansion Board with 4 digital outputs including 3 5A 240VAC changeover over relays, plus 1 0-12V DC 100mA drive. Supplied with a power interface cable for connection to case control board. Up to 2 expansion boards per case control board can be fitted for a total of 8 digital outputs.
Power Supply	PR/CPS	240VAC-12VDC 4A Power Supply. Suitable for powering up 2 case control boards and 4 expansion boards
Temperature Sensor	MProbe	Precision Temperature sensor [standard Presscon unit]
Com/Clock Card	PR/CLMOD	[Optional] System Time Clock and computer interface. Provides case controls with a central time for scheduled defrosts.
PC Interface	PR/PCINT	[Optional] System Time Clock and high speed Pressnet computer interface. Provides case controls with a central time for scheduled defrosts.

The Case control components are 100% compatible with existing Presscon systems and share the same programming techniques and communications. For example, a case control can be retro-fitted to a system installed in 1992 with no updating required of the existing Presscon components.

For users familiar with Presscon, the case control programming will be very familiar and will require no special training.

The case control is supported in our Windows based remote access software P.I.N., plus the internet based Pressnet Software.

Detailed Description of System Components

Case Monitor

The Case monitor is the user interface with the Case Control: it is primarily used to

- program the case control settings - including control settings, alarm setting and defrost settings
- monitor the case control for alarms. Provide a central monitoring point for multiple case controllers.
- manually interrogate/control the case control. To look at current temperatures and settings, manually initiate case lighting, case wash down or a case defrost.

The monitor is set to “supervise” nominated case controllers which means the display will scroll through controllers which is set to monitor and interrogate the controllers for their current alarm status. When a controller is found to be in an alarm state, the monitor will display that condition on its screen, plus generate alarm relay outputs to connect with diallers, BMS system etc. The monitor treats the “A” and “B” channels of the controller as independent systems.

A standard Lonworks data bus is used to communicate with the monitor. The monitor is assigned a system address from 1-99 with its default as 90.

Case Controller

Each controller functions on independent “A” and “B” channels which have separate settings.

Once a case control is programmed via the monitor, it does not require communication with the monitor and will operate independently and control the electronic valve to maintain the programmed temperature setting, read temperatures and compute alarm conditions, read the system time and initiate and terminate case defrosts.

Case Controller - *Temperature Control*

The temperature function of the controller opens the valve to increase cooling effect and closes the valve to reduce cooling effect: proprietary algorithms plus some programmable parameters allow this valve operation to maintain very accurate and stable temperatures, even under variable load conditions.

Temperature control is by either Electronic Expansion Valve control (either pulse type or stepper type) or by Electronic Suction regulation (stepper type). For electronic expansion the control requires 3 temperature sensors (inlet, outlet and air temperatures) and a target superheat is maintained whenever the air temp calls for cooling. Suction regulation proportional modulates the suction gas to maintain the target temperature on an average, minimum or maximum of 1-12 sensors.

The monitor is assigned a system address from 1-99 with a default of 90.

Case Controller - *Defrost Control*

Defrost settings include pump down, drain, fan delay, temperature and or time termination, defrost duration. Outputs for a solenoid, fan and heater can be set as required for hot gas and electric defrosts via the expansion board.. During defrost the valve closes off. In the case of off cycle defrost the valve is shut so expansion board options may not be required.

Defrosts are initiated on a schedule (up to 12 per 24 hours at nominated times) or as a sequential function- a unique Phasefale feature which allows defrosts to follow each other and thereby maintain much more even loads on the rack and give energy savings.

If a controller is not set for or cannot find the system time on a clock modem card, it will go to “free running” time condition, in which case it schedules defrosts form its own time. If power is interrupted and resumes, the free running time starts at midnight.

Case Controller - *Alarm Control*

The alarm functions include a high/low time delay function with a defrost recovery setting. With defrost recovery, a shorter alarm delay can be set as the defrost time is eliminated from the alarm delay.

Each channel can have up to 12 alarm points which may share control probes. Product probes can also be included as inputs on the control.

Once an alarm occurs, the monitor will recognise the alarm condition and raise the alarm, alternatively via the expansion board an alarm light and or alarm dialler output can be set [in which case the monitor is not required at all]

Open circuit and shorted probes generate alarm conditions whilst the control function will ignore faulty readings.

Case Controller - *General Features*

An LED on board blinks the controller address which simplifies setting up the system.

The controller can monitor up to 11 inputs via the local terminals. This can be any combination of temperature sensors (Phasefale M Probe), switch inputs and resistor values. The switch inputs are used for defrost termination, light switch, wash cycle and master switch function. The resistor values can be used to control the valve position and state of the control.

A 1wire interface is included for future expansion using digital temperature sensors and other 1 wire devices such as a PC RS232 interface.

A standard Lonworks data bus is used to communicate with the controller. The controller is assigned a system address from 1-99 with its default as 30. The first controller channel is addressed as 30A and the 2nd as 30B.

Expansion Board

The expansion board includes 3 off 240VAC 5A DPDT relays plus a 0-10V digital output suitable to drive solid state relays for the anti-sweat heater function.

Up to 2 expansion boards plug into the expansion socket of the controller in cascade: the first expansion board automatically configures itself as [local] expansion 1-4, the second as 5-8.

Each controller "A" and "B" channel can address the points to enable outputs for; liquid solenoid, defrost heater, evaporator fan, suction solenoid, case lighting, alarm light and alarm dialler. This arrangement gives maximum utilisation and flexibility to the use of the relay points [ie. the points are not fixed and there is no wastage of unused outputs]

Power Supply

The power supply provides 240VAC -12VDC to power the case control board and the stepper valves or pulse modulation valves. It is rated to 30 Watts and 50°C with natural convention cooling [no fans] for maximum rating. A 24V DC version is also available.

Dependant on the Stepper motors used, the power supply is rated to 2 controllers each with 2 expansion boards. However the number and type of stepper motor can de-rate this number.

The power supply is also plugged into the expansion board(s) where it provides power to the expansion boards and controller via the expansion board cable.

Where a controller does not have an expansion board, the power supply plugs into the expansion socket.

Temperature Sensor

Case control uses standard Presscon MProbes which have an accuracy of 0.2°C plus are extremely durable. Standard probe cable length is 6 meters.

It is not required to shield the sensors wiring when the extension length is 10 meters or less

For pipe installation [as required for electronic expansion valve control], the metal encased MProbe(H) version is recommended.

Com/Clock Card, PC Interface

The cards are normally part of a standard Presscon installation and provide a common reference to the time in the system. The controller and monitor can access these for defrost scheduling, alarm event logs etc.

A standard Lonworks data bus is used to communicate with the Com/Clock Card and the PC Interface. The clock cards are assigned a system address from 1-99 with their default as 61.

Case Controller/Monitor Installation and Programming of ver 1.0 Cards

INDEX

NOTE: throughout the text keys referred to are:

▲ *increment value key*
▼ *decrement value key*
■ *cancel key*
▶ *select, accept key*

1. INTRODUCTION

The Case Controller [Controller] is a Presscon unit with two independent temperature control, alarm and defrost channels. Each channel is capable of operating a suction stepper or epr valve output as well as outputs for liquid solenoid, suction solenoid, defrost heater, evaporator fan, anti-sweat, case lights and alarm light and dialler. In addition each Controller has eleven inputs which can be shared by the two channels and can be programmed for a variety of uses.
The Case Monitor [Monitor] is a Presscon unit used to program and monitor up to 99 Controller units and incorporates a large display for programming and viewing temperature readings and status information.
Versatile and simple programming in plain English make both the Controller and Monitor a breeze to use.
A separate sheet reference PN420 gives a general overview of the controls capabilities.
Note: Case controller/monitor is supported by Phasefale's PIN Version 1.60 and above. Free updates to registered users of earlier software are available from our web site ***www.phasefale.com.au*** *after obtaining a password from us.*

2. INSTALLATION

The Monitor is supplied in the same enclosure as other Presscon displays, and is wired the same way.
Note the Monitor requires a supply current of 160 mA. (Refer to Presscon Network - Wiring Specification & Startup for details).
Mounting is accomplished by removing the cover using a screwdriver at the bottom of the cover and prising it upwards. The two holes through the circuit board and back of the box can then be used to mount the assembly. Do not put excessive force on the circuit board. The 20 mm hole can be used to pass wiring through the box.

3. OPERATION

Function	Keys
Cancel (any function)	■
Scroll	▲ or ▼
Select	▶

The information shown on the screen will vary depending on the way the Controller has been programmed. Typically displayed is the description of the control, the date and time, the alarm status, and the option to view the Event Log for historical information.
For example;

Case Monitor :90
) 15/04/01 4:26
All OK : No alarms
View Event Logs

The description on the top line can be changed in programming.
The cursor (on the left of the screen) can be moved between lines with the ▲ and ▼ keys.
If the cursor is shaped >, an option relevant to the displayed line is available by pressing the ▶ key.
Examples of these options are;

>Alarm on 2 Cases

Press ▶ to get the option to acknowledge the alarm.
Use ▲ and ▼ to select the desired option.
Press ▶ to activate the option or ■ cancel and make no change.

>View Event Logs

Press ▶ to gain access to logs of the last 200 events, such as:

) 31a ALM 15:14 19/06

Press ▶ to select a manual defrost of this system.

>Last Defrost 13:30

Press ▶ to see the setpoint and sensor readings.

>Control -12.3°C

If the cursor is shaped), no option is available for this line and the ▶ key will move the display on to the next system.
The ■ key will move the display back to the previous system.
When viewing cases the first information that appears is the system description and it's number, the control status, the alarm status and the maximum temperature of all the alarm and control sensors on this system.
For Example:

31a : SYSTEM 1	
) Cooling	10%
Case OK	
Control	-15.8 °C

To view more information use the ▲ and ▼ keys to move the cursor. For each system you can also view the time of the last defrost,

>Last Defrost	1:00

and manually initiate and terminate defrosts, initiate and terminate wash mode, and switch case lights between on/off/auto for each case.

*Initiate Defrost
*Terminate Defrost
*Initiate Wash
*Terminate Wash
*Lights Off
*Lights On
*Lights Auto

4. PROGRAMMING

The Monitor is programmed via its 4 keys and screen. The screen will describe the setting to be adjusted and the current value.
The programming method is the same as for other modules, except the menu items vary.

***Note : All programming relating to the operation of the Controllers (as opposed to the Monitor) is held within the Controller board itself,* meaning that once programmed the Controller will operate with or without the Monitor unit being present on the Network.**

To begin programming, press and hold both the ■ and ▶ keys for a few seconds until the following is displayed;

PROGRAMMING MODE	
* ACCESS CODE	0000
SOFTWARE 1.02	
CHECKSUM 211228	

Entry into the programming mode can be locked via the access code. To enter the access code press the select key, then use the scroll keys to choose a number and the select key to accept and enter programming.

If the wrong access code is chosen an error message will appear and the system will leave the programming mode.
Once access has been granted then the following menu will appear.

SELECT MENU GROUP
> SYSTEM SETTINGS
HARDWARE SETTINGS
GENERAL OPTIONS
NETWORK CARDS
LOAD DEFAULTS
EXIT PROGRAMMING

Select the group you wish to program with ▲ and ▼, then select with ▶.
Pressing ■ at any time while in programming will return you to the previous menu and leave the current setting unchanged.
The menus are described in the recommended programming order for setting up a new controller. If you only wish to make an alteration you may skip to a setting and make the desired change.
To change settings move the cursor to the desired menu line. Press the ▶ key to enable editing. Edit mode is indicated by * next to the selection. Use the ▲ and ▼ keys to change the setting. Store the new setting with the ▶ key or press ■ to cancel and revert to the original setting.

4.1 GENERAL OPTIONS

This selection will allow the following settings to be altered.

Case Monitor

The name of the system during normal operation can be altered for ease of identification. All 16 characters can be altered.

TEMPERATURE UNIT °C

Set °C or °F display mode for temperature.

TIME 15/04/01 15:42

Set the date and the time.

ALARM ACK 10 min

The alarm acknowledge sets the time period that the alarm is turned off in order to rectify the fault. If the fault has not been remedied before the acknowledge time is up the system will switch back into alarm mode.

ACCESS CODE 0000

This option enables an access code to be implemented to provide security for the programming mode.

4.2 HARDWARE SETTINGS

SELECT HARDWARE
>CASE 01: NOT USED
CASE 02: NOT USED
. . .
. . .
CASE 31: MONITORED
CASE 32: MONITORED
CASE 33: MONITORED
. . .
. . .
CASE 99: NOT USED
CASE MONITOR
DONE

This menu allows the user to edit the function and physical card addresses for each of the refrigeration systems and alarm outputs. Select the group to edit using the ▲ ▼ and ▶ keys.
The Controller checks the existing hardware and will only allow you to use valid hardware it finds on the network.

4.2.1 CASES

Each Controller has the following hardware settings for A & B Channels;

CASE 31 HARDWARE				
> MONITORED			USED	
SENSOR 1A	B	IN:01		▼
SENSOR 2A	A	IN:02		
SENSOR 3A	C	IN:03		
SENSOR 4A	A	22:07		
SENSOR 5A	A	22:08		
. . .				
SENSOR 12A	N			"A" channel settings
SOLENOID A	N			
EVAP FAN A	N			
HEATER A	Y	EX:1o		
SUCTION A	N			
A-SWEAT A	N			
LIGHTS A	Y	EX:2o		▲
SENSOR 1B	B	IN:06		▼
SENSOR 2B	H	IN:07		
. . .				
SENSOR 12B	N			"B" channel settings
SOLENOID B	N			
EVAP FAN B	N			
HEATER B	Y	EX:3o		
SUCTION B	N			
A-SWEAT B	Y	EX:4o		
LIGHTS B	N			▲
AL. LIGHT	N			common settings
AL. DIALER	N			
CLOCK				
DONE				

The system can be set to USED or NOT USED. NOT USED systems are not displayed in normal operation and its system settings are not able to be edited.

There are seven options for each of the ten sensors.

Option Letter	Input Function
N	not used
A	Alarm mode
B	both alarm and control
C	Control mode
H	Humidity (for anti-sweat)
I	inlet temperature (for Electronic Expansion)
O	Outlet temperature (for Electronic Expansion)
L	Lights
M	Master lights
R	Readout display only (no control or alarm)
S	System shutdown input
T	Defrost terminate (e.g. klixon input)
W	wash down

The numbers at the end of the line ,eg. 21:01, indicate the card number, 21 and the input port, 01 that the sensor is connected to. As the controller has inputs on its own board and outputs on the expansion boards, those inputs are addressed as IN:01 to IN:11 and the outputs as EX:1o or c to EX:8o or c.
To reduce Presscon Network traffic, it is recommended to use the local INPUTS [IN:1-11] and local OUTPUTS [EX:1-8] where-ever possible.

SENSOR INPUT OPTIONS

4.2.1.1 N: NOT USED

This input point is not used.

4.2.1.2 A: ALARM MODE

This input point is only used as an alarm and does not contribute to the control function. Any alarm sensor which is beyond the system alarm limits will start the alarm timer. Typically in a freezer cabinet some modules would be set to A: alarm only because they were not considered representative for control of the group.

4.2.1.3 B: CONTROL & ALARM

This sensor is used for control, as described in CONTROL below, and also as an ALARM sensor. Typically a coolroom with one sensor would be set to B: both control and alarm.

4.2.1.4 C: CONTROL MODE

This sensor will contribute to the control function and is not used for alarm. Control takes the AVERAGE, MINIMUM OR MAXIMUM (set in System setting 4.3) of all control sensors.

4.2.1.5 H: HUMIDITY SENSOR

This sensor can be used to control Anti-Sweat heaters. An output via the Expansion board #4 is required.

4.2.1.6 I: INLET TEMPERATURE

This sensor is used to read the evaporator inlet temperature for expansion valve control

4.2.1.7 L: LIGHT INPUT

Allows connection of a switch to control case lights. A closed circuit is required to turn the lights on. If an M input is used, the M input over-rides the L input: i.e M must be closed for the lights to be on.

4.2.1.8 M: MASTER LIGHTS INPUT

Allows connection of a switch to control Case lights. A closed circuit is required to turn the lights on. This input will over-ride an L input. Typically this input is a store wide switch or time clock for all case lights.

4.2.1.9 O: OUTLET TEMPERATURE

This sensor is used to read the evaporator outlet temperature for expansion valve control

4.2.1.10 R: READOUT INPUT

Allows a temperature probe to be set as a readout only with no alarm or control function- eg. plant room, store trading area, outside ambient type sensors.

4.2.1.11 S: SYSTEM SHUTDOWN

This allows a combination of shutdown options on a system to allow store personnel to operate systems without the need to enter programming of the control. There are 3 options available when using this input;

- Shutdown both *CONTROL & ALARM and close the valve*; close (short circuit) the input
- Shutdown both *CONTROL & ALARM and open the valve*; switch in a 1 kOhm resistance across the input
- Set the controller to *OFFSET* mode, the controller will then control according to offset setting; switch in a 50 kOhm resistance across the input

The Shutdown function can be used effectively to change a cabinet or room to different alarm/control profiles, by using the Offset function and a changeover switch depending on the defrost requirements.

4.2.1.12 T: TERMINATE INPUT

Used for defrost termination input sensors or switch inputs such as klixons or pressure switches. It will treat a closed circuit or a temperature higher than programmed as a defrost termination condition. It is possible to set a terminate input to be the same sensor input point as a control/alarm point and wire a switch in parallel ACROSS the sensor. At termination, the control/alarm reading will go to error and commence alarm timing but this should only be for a short time until the temperature/pressure returns to normal operating condition. This strategy saves input points and wiring on the system but is not suitable for all applications.

4.2.1.13 W: WASH INPUT

Allows connection of a switch to put a Case into wash mode. In wash mode the case will cycle off and alarms will be inhibited. Wash duration is both programmable, after which the control returns to normal operation. A closed circuit is required to initiate wash mode. Case lighting can be programmed to be ON or OFF during wash mode (see System Settings 4.3)

4.2.1.14 RELAY OUTPUT OPTIONS

Each channel has relay output for the liquid solenoid, evaporator fan, defrost heater, suction solenoid, anti-sweat heaters and case lights. In addition each controller card has common relay outputs for alarm light and dialer. All relay outputs can be set as;

N not used

Y used and the card address and relay number entered, "o" is normally open and "c" is normally closed.

4.2.2 CONTROLLER ALARMS

Controller alarms can be locally set with the Alarm Light and Dialler output connected to the Expansion board or centrally via the Monitor.

For local alarms the settings in the control channel hardware settings would look like;

LIGHTS B N	▲
AL. LIGHT Y EX:2o	common settings
AL. DIALER Y EX:3o	
CLOCK Y 61	
DONE	

In a centralised alarm system, the monitor checks all controllers and can then generate **common** alarm outputs for light and dialler. The monitor hardware settings would look like;

MONITOR HARDWARE
AL. LIGHT Y 11.7 o
AL. DIALER Y 11.8 o
CLOCK Y 61
DONE

Light : select Y or N for a light output on alarm. In this example "11" is the card address, "7" is the relay number and the "o" (default setting) and the "c" indicate whether normally open or closed contacts.

Dialler: enables an automatic dialler or security system to be operated in the case of an alarm In this example "11" is the card address, "8" is the relay number and the "o" (default setting) and the "c" indicate whether normally open or closed contacts. Setting the dialler to "o" gives an output which will open circuit on alarm or power loss.

NOTE: this controller supports double addressing light and dialler relays when used with a version 3.5 or later relay card. ie multiple controllers can be set to operate a common light relay and a common dialler. This function is not available with Alarm or Rack controller cards.

Clock Card: set if a clock card is installed, its card address is to be entered if this is the case.

4.3 SYSTEM SETTINGS

The following menu items set the alarm / control strategy for each monitored controller channel. If a system is set to not used in the hardware settings section, its system settings will be unavailable.

SELECT CASE
>CASE 01A
CASE 01B
CASE 02A
CASE 02B
. . .
. . .
CASE 99A
CASE 99B
DONE

Select the system to be programmed and the following menu will appear. For example system 31A is selected.

CASE 31A SETTINGS	
>Channel A	
CHANNEL	USED
CONTROL	USED
ALARM	USED
SETPOINT	0.0°C
DIFFERENTIAL	0.5°C
HIGH ALARM	10.0°C
LOW ALARM	-10.0°C
ALARM DELAY	10 min
DEFROST TIME	20 min
PUMP DOWN	60 sec
DRAIN TIME	120 sec
FAN DELAY	60 sec
TERMINATE	10.0°C
DEF RECOVERY	30 min
DEFROST BY SCHEDULE	
DEFROST 1 AT:	01:00
DEFROST 2 AT:	04:00
. . .	
. . .	
DEFROST 12 AT:	22:00
WASH MODE LIGHT	OFF
WASH MAXIMUM	60 min
ANTI-SWEAT	50%
STEPPER	SUCTION
NO OF STEPS	800
STEPS PER SEC	50
REFERENCE START	25%
REFERENCE MIN	10%
REFERENCE MAX	80%
SENSITIVITY	100%
SUPERHEAT	2.0°C
CONTROL BY	AVERAGE
OFFSET	0.0°C
DESC 1	Sensor 1
DESC 2	Sensor 2
. . .	
. . .	
DESC 12	Sensor c
DONE	

- "Channel A": is a user programmable description up to 16 characters long..
- CHANNEL/CONTROL/ALARM: Used to set these functions of the system to USED or NOT USED.
- SETPOINT: the temperature at which the solenoid output turns on and above or below which the valve opens and closes. <-90.0°C to 125.0°C>
- DIFFERENTIAL: this setting below the setpoint is the temperature at which the solenoid output turns off. <0.0°C~25.0°C>

(When the temperature is between the SETPOINT and the SETPOINT-DIFFERENTIAL, the solenoid output can be ON or OFF depending on conditions)

- HIGH ALARM: the high temperature limit to start timing an alarm. <-99.0°°C~125.0°C>
- LOW ALARM: the low temperature limit to start timing an alarm. <-99.0°C~125.0°C>
- ALARM DELAY: the period of time after an alarm limit is breached, that the alarm occurs <0 to 99 min>
- DEFROST TIME: the maximum duration of the defrost process. (Liquid solenoid OFF and heater ON condition). If a terminate sensor is used this period can be shortened. <0~99 min.>
- PUMP DOWN: the time period the suction solenoid remains ON after the liquid solenoid is OFF and before the fan and heater outputs switch to defrost condition. <0~990 sec.>
- DRAIN TIME: the time period after a defrost before cooling begins. Liquid and suction solenoids, heater and fan all OFF. <0~990 sec.>
- FAN DELAY: the time period after drain time to cool the evaporator before the fan turns on. Liquid and suction solenoids ON, heater and fan OFF. <0~990 sec.>
- TERMINATE: temperature setpoint which if exceeded by all terminate sensors will halt a defrost immediately. Drain condition is commenced from this point. <-99.0°C~125.0°C>
- DEF RECOVERY: is the period of time from the end of fan delay before the alarm sensors become active, this avoids false alarms after a defrost. <0~99 min>
- DEFROST BY SCHEDULE: each system can have defrost start times scheduled or can be set to begin defrosting after another system finishes it's defrost. By setting defrosts in this way the load on the compressors can be kept fairly even while all systems are defrosted one after another.
- DEFROST 1 (to 12): set the start times for each defrost per day. <00:00~23:50>
- WASH MODE LIGHT: allows the case lights to be either ON or OFF during wash mode.
- WASH MAXIMUM: the maximum duration of the wash mode before normal operation restarts. <0~99min>.
- ANTI-SWEAT: the setting for control of anti-sweat heaters. <0~99%>
- STEPPER: sets the function of the stepper output <NONE, SUCTION, EXPANSION>.
- NO OF STEPS: sets the number of steps the valve is capable of <0~9990>. (Alco:800, Sporlan:6400)
- STEPS PER SEC: the rate at which the stepper will travel. <10~200>.(Alco:50, Sporlan:200)
- REFERENCE START: sets the start position of the stepper <0~100%>. Default: 25%
- REFERENCE MIN: sets the minimum value of the valve reference position <0~100%>. Default: 10%
- REFERENCE MAX: sets the maximum value of the valve reference position <0~100%>. Default: 80%
- SENSITIVITY: sets the responsiveness of the stepper to changes in temperature <1~255%>. Default: 100%
- SUPERHEAT: the temperature difference between the evaporator inlet and outlet sensors which the output will attempt to maintain <0.0~25.0°C>.
- CONTROL BY: sets how the channel will use multiple sensors to control <AVERAGE, MIN, MAX>.
- OFFSET: sets the amount the setpoint, alarm high and alarm low change by if the offset input is activated <-50°C ~50°C>.
- DESC 1 (to 12): the description of each sensor can be changed to become more identifiable (8 characters).

4.4 NETWORK CARDS

The following items relate to the network system of the system controller.

NETWORK CARDS
> EXAMINE NETWORK
NETWORK STATS 99%
LAST ERROR CARD 12
DONE

4.4.1 EXAMINE NETWORK

Examine Network: identifies the cards connected to the Presscon Network and presents a list of them with itself at the top and the other cards in address order, for example;

NETWORK CARDS	
THIS CONTROL	90
RACK/CON	2
RELAY/8	11
RELAY/8	12
SENSOR/8	21
SENSOR/32	22
CASE	31
CASE	32
COM/CLK	61
DONE	

NOTE: the contents of the above menu will depend entirely on the cards connected to the Presscon network.

The address number of each card can be edited and must be unique.

4.4.2 NETWORK STATS

Network Stats: percentage of successful network communications. If this falls below 99% it indicates a programming or wiring problem may be occurring.

4.4.3 LAST ERROR

Last error card: identifies the last card that caused an unsuccessful network communication.

4.5 LOAD DEFAULTS

Selecting the load defaults brings up the following screen.

LOAD DEFAULTS	
FACTORY SETTING	YES
ARE YOU SURE?	NO
DONE	

4.5.1 FACTORY SETTINGS

To return all Monitor settings to the factory settings set both FACTORY SETTING and ARE YOU SURE to YES. The address number will be set to 90.

GENERAL OPTIONS
Case Monitor
TEMPERATURE UNIT °C
TIME DD/MM/YY HH:MM
ACCESS CODE 0000

5. DEFROST / ALARM STRATEGY

The case controller incorporates sophisticated control interlocking between the defrost and alarm functions. This advanced strategy is detailed below.

5.1 DEFROST INHIBIT

A defrost which becomes due will only occur if the channel alarm temperatures are all below the high alarm limit or the channel is in alarm. This gives the system a chance to recover from an over temperature condition before switching off the refrigeration to perform a defrost. If the system cannot recover and an alarm occurs the defrost is allowed to proceed anyway in case the alarm is caused by ice up of the evaporator. Figures 1 and 2 show timing charts of these two conditions.

5.2 DEFROST RECOVERY

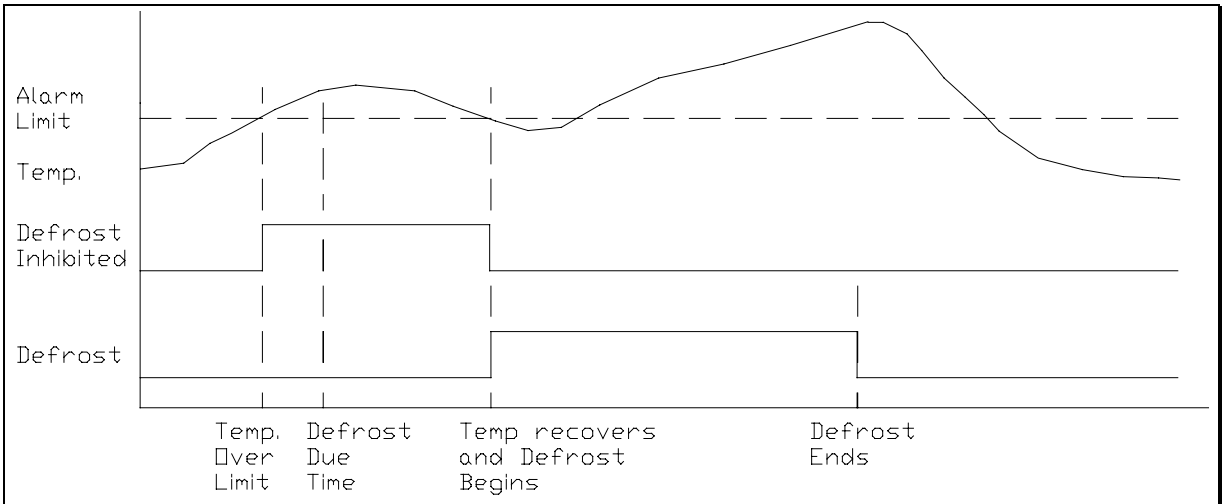


Figure 1. A defrost falls due while the temperature is above the high alarm limit. The defrost does not begin until the temperature falls back below the alarm limit.

If an alarm is occurring it continues without interruption during a defrost. If no alarm is occurring when a system begins defrosting, new alarms are prevented from occurring on that system.. No new alarm can occur during the defrost period, the drain time and the fan delay period. Alarms are also prevented for the defrost recovery period after the end of the fan delay period. If the temperature is over the high alarm limit at the end of the defrost recovery period, an alarm occurs instantly. If the temperature is below the high alarm limit at the end of the defrost recovery period, no alarm occurs and the normal alarm delay period applies from then on. Figures 3 and 4 show timing charts for these two conditions.

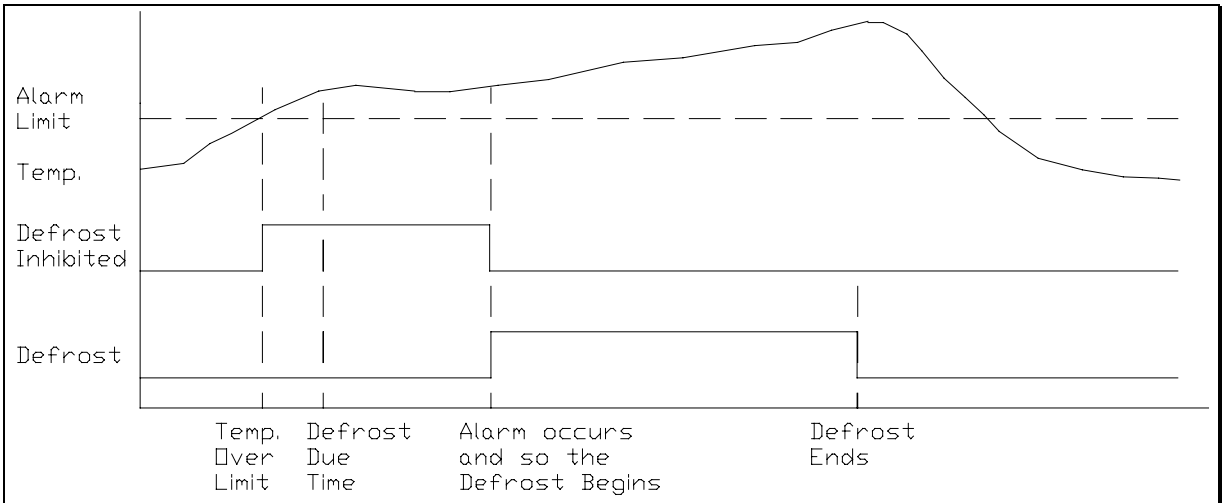


Figure 2. A defrost falls due while the temperature is above the high alarm limit. The temperature does not recover and an alarm occurs. The defrost then occurs.

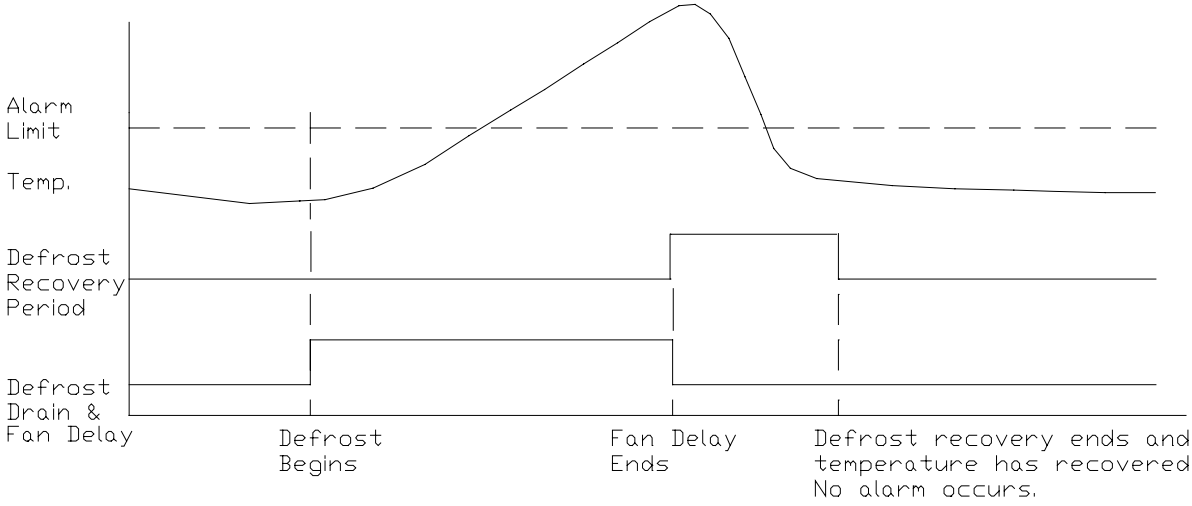


Figure 3. The temperature recovers before the defrost recovery period ends and no alarm occurs.

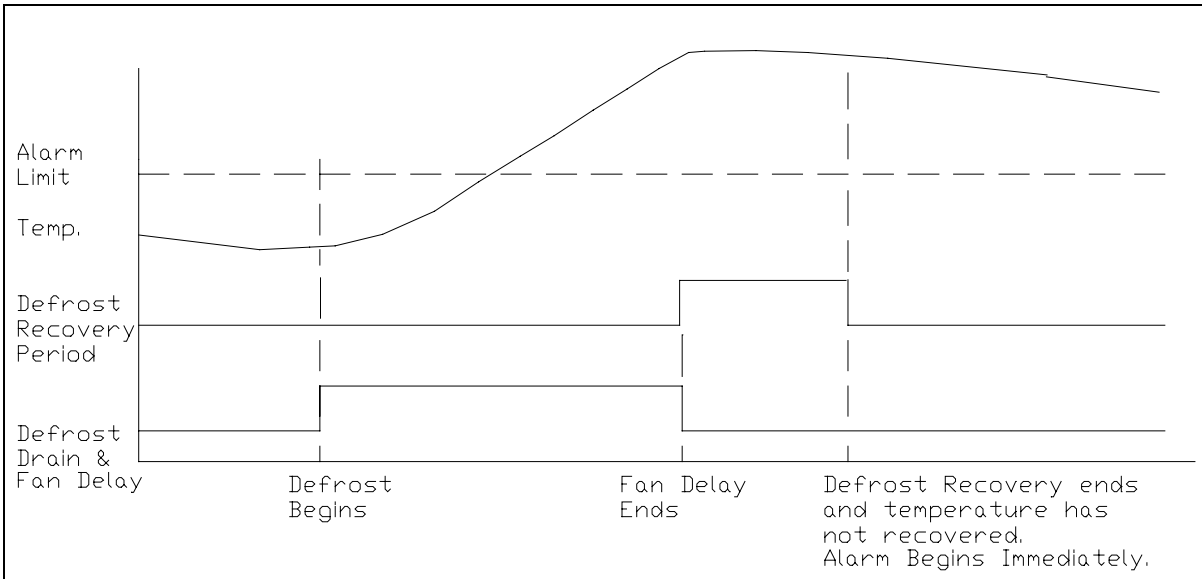


Figure 4. The temperature fails to recover before the defrost recovery period ends and an alarm occurs immediately.

Phasefale Pty Ltd

36 Bulli Street
Moorabbin VIC 3189
Ph. +61 3 9553 0800
Fax. +61 3 9553 3993
ACN 078 932 448
www.phasefale.com.au
sales@phasefale.com.au

This document requires the Lucida Stars Font when viewed as a computer document.

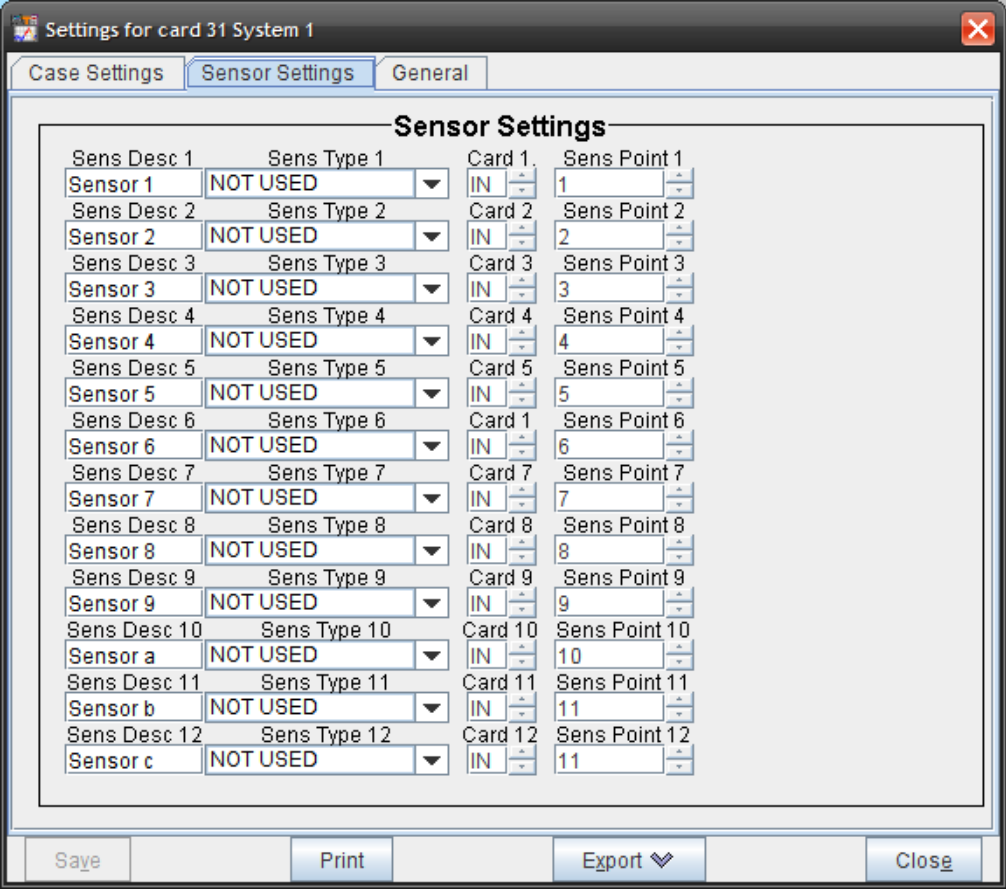
Settings for card 31 System 1

Case Settings | Sensor Settings | General

Case Settings

Description	Case Control A	Control By	AVERAGE			
System	NOT USED				Card	Output
Alarm	NOT USED	Solenoid	NOT USED	EX	1o	
Control	NOT USED	Evap Fan	NOT USED	EX	1o	
Setpoint	0.0 C	Heater	NOT USED	EX	1o	
Differential	1.0 C	Suction	NOT USED	EX	1o	
High Alarm	125 C	Anti Sweat O/P	NOT USED	EX	1o	
Low Alarm	-40 C	Lights	NOT USED	EX	1o	
Alarm Delay	30 mins					
Defrost Time	30 mins					
Pump Down	0 secs					
Drain Time	60 secs					
Fan Delay	60 secs					
Terminate Temp	10 C					
Defrost Rec	30 mins					
Defrost Sequence	Schedule					
Defrost 1 Time	02:00					
Defrost 2 Time	08:00					
Defrost 3 Time	14:00					
Defrost 4 Time	20:00					
Defrost 5 Time	None					
Defrost 6 Time	None					
Defrost 7 Time	None					
Defrost 8 Time	None					
Defrost 9 Time	None					
Defrost 10 Time	None					
Defrost 11 Time	None					
Defrost 12 Time	None					
Wash Mode Light	OFF					
Wash Maximum	60 mins					
Anti Sweat	75 %rh					
Stepper Function	SUCTION					
Num Steps	800					
Reference Start	25 %					
Reference Min	10 %					
Reference Max	80 %					
Sensitivity	100 %					
Super Heat	2.0 C					
Sens Offset	0 C					

Save | Print | Export | Close


Settings for card 31 System 1
Case Settings
Sensor Settings
General
Sensor Settings
Sens Desc 1
Sens Type 1
Card 1.
Sens Point 1
Sensor 1
NOT USED
IN
1
Sens Desc 2
Sens Type 2
Card 2
Sens Point 2
Sensor 2
NOT USED
IN
2
Sens Desc 3
Sens Type 3
Card 3
Sens Point 3
Sensor 3
NOT USED
IN
3
Sens Desc 4
Sens Type 4
Card 4
Sens Point 4
Sensor 4
NOT USED
IN
4
Sens Desc 5
Sens Type 5
Card 5
Sens Point 5
Sensor 5
NOT USED
IN
5
Sens Desc 6
Sens Type 6
Card 1
Sens Point 6
Sensor 6
NOT USED
IN
6
Sens Desc 7
Sens Type 7
Card 7
Sens Point 7
Sensor 7
NOT USED
IN
7
Sens Desc 8
Sens Type 8
Card 8
Sens Point 8
Sensor 8
NOT USED
IN
8
Sens Desc 9
Sens Type 9
Card 9
Sens Point 9
Sensor 9
NOT USED
IN
9
Sens Desc 10
Sens Type 10
Card 10
Sens Point 10
Sensor a
NOT USED
IN
10
Sens Desc 11
Sens Type 11
Card 11
Sens Point 11
Sensor b
NOT USED
IN
11
Sens Desc 12
Sens Type 12
Card 12
Sens Point 12
Sensor c
NOT USED
IN
11
Save
Print
Export
Close