TECHNICAL USER MANUAL

SCS™ CONNECT

Wellington

Saving Generation for the Next Generation

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Quick Read

WARNINGS!

Please read the following warnings to maintain the safe function and continued performance of your Wellington Drive Technologies Limited ***SCS™ Connect*** controller:

- ☐ Installation;
  Installation of the ***SCS Connect*** controller other than in accordance with the "Description & Install" section of this manual will invalidate the warranty. The SCS™ Connect must only be installed and configured by trained and authorized staff.

- ☐ Washdown;
  The front of the unit may be exposed to water jets. **Warning!** The rear of the unit must not be exposed to high pressure water jets or temporary submersion, as this will invalidate the warranty, and may damage electronic circuits leading to premature failure or unsafe operation. Mounting of the unit must be in accordance with orientation as specified in the "Description & Install" section. **Warning!** Risk of electrocution.

- ☐ Chemicals;
  The ***SCS Connect*** controller's housing is made of polycarbonate, and should not be exposed to chemicals which attack this material, as this will invalidate the warranty and may damage the housing, leading to unsafe operation. **Warning!** Risk of electrocution

- ☐ Temperature;
  The ***SCS Connect*** controller must only be subjected to temperatures as specified in the "Technical Specifications" section of this manual. Exceeding these ranges, either in operation, installation, transportation, or storage, will invalidate the warranty, and may damage electronic circuits and housing components, leading to premature failure.

- ☐ Vibration and impact;
  The unit MUST be installed in such a way as to be protected from impact in operation. Do not hit or drop the unit. Exposure to impacts, either in operation, installation, transportation, or storage, may damage electronic circuits and housing components, leading to premature failure, and may cause the ***SCS Connect*** controller to become unsafe. Any impact which causes visual damage to the controller casing will invalidate the warantee.

- ☐ No serviceable parts;
  There are no serviceable parts inside the ***SCS Connect*** controller**.** Do not open the housing, except for the rear cover, as described in the "Description and Installation" section of this manual. Opening of the electronics housing, alterating or modifying the ***SCS Connect*** controller will invalidate the warranty and can cause risk of electrocution.

Quick Read

Important Do's and Dont's:

- ☐ Do not use water jets on the rear of the unit. Warning! Risk of electrocution. If correctly installed, powerful water jets may be applied only to the front of the unit.

- ☐ Do not drop the SCS *Connect*.

- ☐ There are no serviceable parts inside the SCS *Connect*. Do not open the housing. Warning! Risk of electrocution.

Warnings - cont

☐ The following parts are considered to be subject to normal wear and tear, and as such are not covered by warranty
- Scratches and other visual damage to front panel

☐ Voltages;
The ***SCS Connect*** controller must only be connected to power supplies which comply with the acceptable voltage ranges specified in the "Technical Specification" section of this manual. Connection to supply voltages outside of these ranges can damage electrical circuits, leading to premature failure, and may cause the ***SCS Connect*** controller to become unsafe. All ***SCS Connect*** controller's ship from the factory with voltage limits enabled. Disabling this protection invalidates any warranty due to incorrect voltages. Maximum voltages are logged by the ***SCS Connect*** controller.

☐ Voltage fluctuations and surges;
SCS Connect controller has surge protection as specified in the "Technical Specification" section of this manual. Exposure to surge voltages outside these limits, or excessively repeated surges within these limits,may cause damage to electrical circuits, leading to premature failure. Failure due to excessive surge voltages is not covered by warranty.

☐ Currents;
SCS Connect controller outputs should not be connected to short circuits or to loads which exceed the currents specified in the "Technical Specification" section of this manual. Doing so may cause the controller to fail prematurely or immediately, and possibly to damage the connected load. Connection to incorrect loads voids the warranty.

Phase and relay terminals may carry currents high enough to overheat cable terminations, if these are not correctly specified and crimped. This may cause risk of electrocution or fire. Care must be taken to ensure that cables and terminations are safely terminated.

☐ Segregation of power and signal cabling;
Correct segregation of power and signal cabling must be followed. Do not run power and signal cables together in the same conduit. Induction from power cables may corrupt data signals, leading to incorrect operation.

☐ Consequential failures;
SCS Connect controller includes features to protect both itself and connected components in the event of a failure. However failure of connected components may cause damage to the ***SCS Connect*** controller, and failure of the ***SCS Connect*** controller may cause damage to connected components. Critical or vulnerable components should be protected independently against failure. SCS Connect controller is not warranted against damage caused by or to other components.

Quick Read

☐ Do not connect the SCS Connect controller to the incorrect voltage supply.

☐ Ensure phase and relay terminals are correctly crimped. Risk of fire.

☐ Do not run power and signal cables together in the same conduit. Warning! Risk of electrocution.

Warnings - cont

- Fit for purpose;
  The ***SCS Connect*** controller must only be used for the purpose and functions described in this manual. While Wellington Drive Technologies Limited may provide technical support on suitable applications and configuration of the ***SCS Connect*** controller (where such a relationship may exist), no liability, responsibility or risk is accepted in determining if the ***SCS Connect*** controller is fit for purpose for any particular application. As each different application requires a different configuration of controlling parameters, no liability, responsibility or risk is accepted by Wellington Drive Technologies Limited for the correct operational function of any particular installation or configuration.

- Continuous development;
  Wellington Drive Technologies Limited undertakes to continuously develop and improve products and services. The design and specification for the ***SCS Connect*** controller is subject to change without warning. The contents of this manual are subject to change without warning. While every endeavour is made to ensure that all specifications and documents are current and complete, Wellington Drive Technologies Limited accepts no liability, responsibility or risk due to omissions or changes caused by continuous improvement and design changes. Users of this manual should verify that they have the current released version (published on the Wellington Drive Technologies website www.wdtl.com) before proceeding.

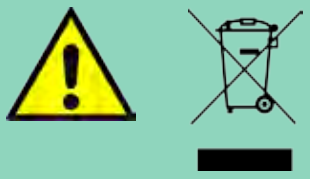
- Correct disposal;
  The ***SCS Connect*** controller is subject to EU Directive 2002/96/EC (WEEE) for e-waste. It may also be subject to other national legislation for the safe disposal of e-waste. The ***SCS Connect*** controller must not be disposed off in municipal collections; it must be disposed off through an approved WEEE collection point. Alternatively, the ***SCS Connect*** controller may be returned to an authorized Wellington Drive Technologies Limited distributor at the end of its working life. Penalties may be applicable for incorrect disposal, as specified by national legislation. The circuit board may contain hazardous substances which could affect health and the environment if disposed off incorrectly. The ***SCS Connect*** controller complies with EU Directive 2002/95/EC (RoHS).

Quick Read

- The *SCS Connect* controller must only be used for the purposes described in this manual.

- The design and specification of the *SCS Connect* controller is subject to change without warning.

- The *SCS Connect* controller must not be disposed off in municipal collections; it must be disposed off through an approved e-waste collection point.



INTRODUCTION

The ***SCS Connect*** controller by Wellington is an electronic refrigeration control unit designed to provide a very high level of flexibility for manufacturers of refrigeration units.

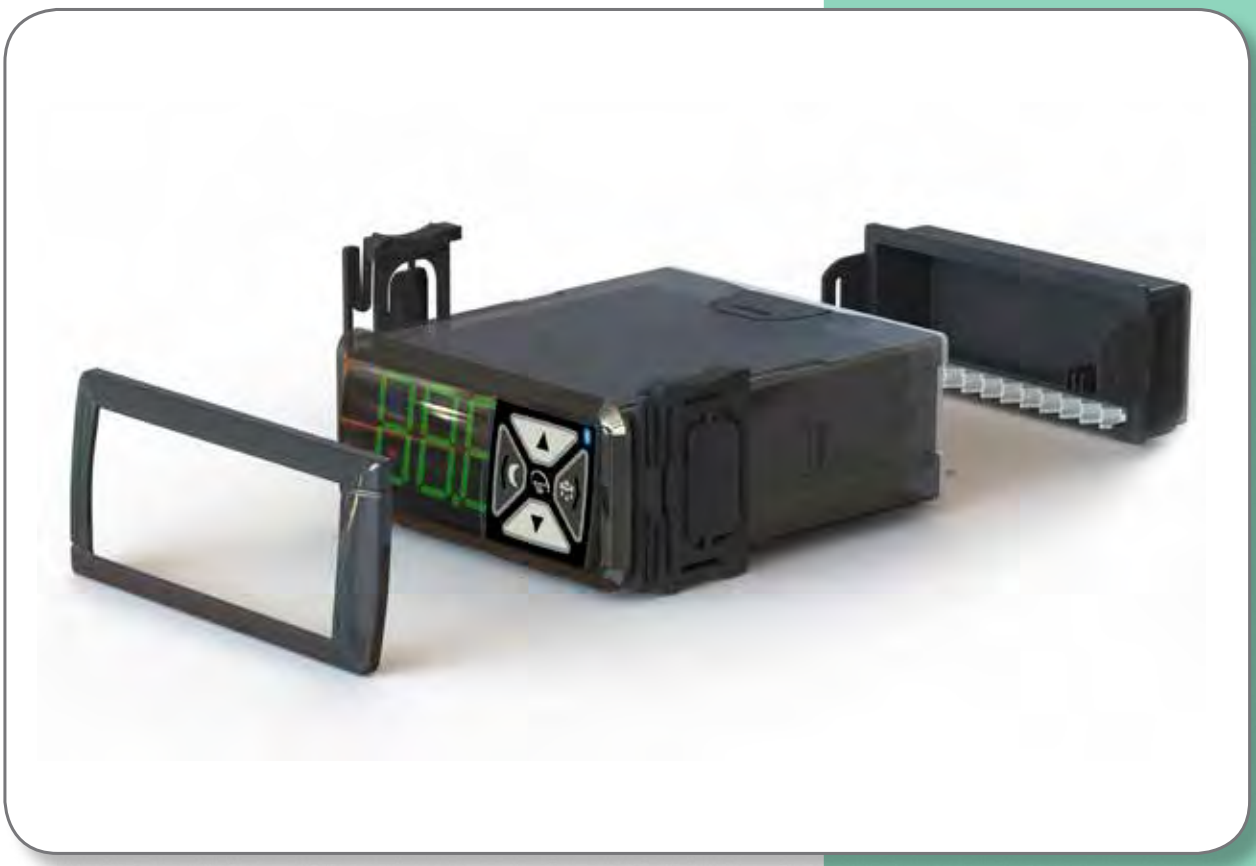
The interface system permits different groups of users to have different levels of control, based upon their levels of expertise and their actual control needs.

A unique feature is a mobile app that gives authorized Service Technicians full wireless access to data logging and diagnostic control.

The ***SCS Connect*** controller's housing meets industry benchmarks for compact size and exceeds benchmarks for sealing at the front face. The appearance of the ***SCS Connect*** controller can be customized to suit the brand requirements of end customers.

Quick Read

- ☐ Highly flexible and configurable
- ☐ Definable levels of control
- ☐ Mobile app with intuitive touch screen interface
- ☐ Wireless data logging and diagnostic control
- ☐ Compact size
- ☐ Sealed
- ☐ Customized branding available



PRODUCT DESCRIPTION

Quick Read

- ☐ Three main feature locations:
- ☐ Front Display Panel
- ☐ Rear Connector Panel
- ☐ Housing Installation Features

The ***SCS Connect*** controller consists of three main groups of features:

- ☐ The Front Display Panel with the user interface controls.
- ☐ The Rear Connector Panel where the input and output cables are connected.
- ☐ The Main Housing which includes the mounting clips, gasket and faceplate trim used for installation.

Front Display Panel

If the Indicator LEDs are lit this means that the function is currently active.

1. Night Mode Indicator (see page 18)
2. Three Digit LED Display
3. Back / Abort Button (see page 18)
   Night Mode Button (see page 18)
4. Up Button (see page 18)
5. Bluetooth® Wireless Indicator (see page 22)
6. Defrost Mode Button (see page 18)
   Next / Enter Button (see page 18)
7. Down Button (see page 18)
8. Alarm Indicator (see page 85)
9. Compressor Indicator (see page 54)
10. Defrost Mode Indicator (see page 68)
11. Fan Indicator (see page 30)

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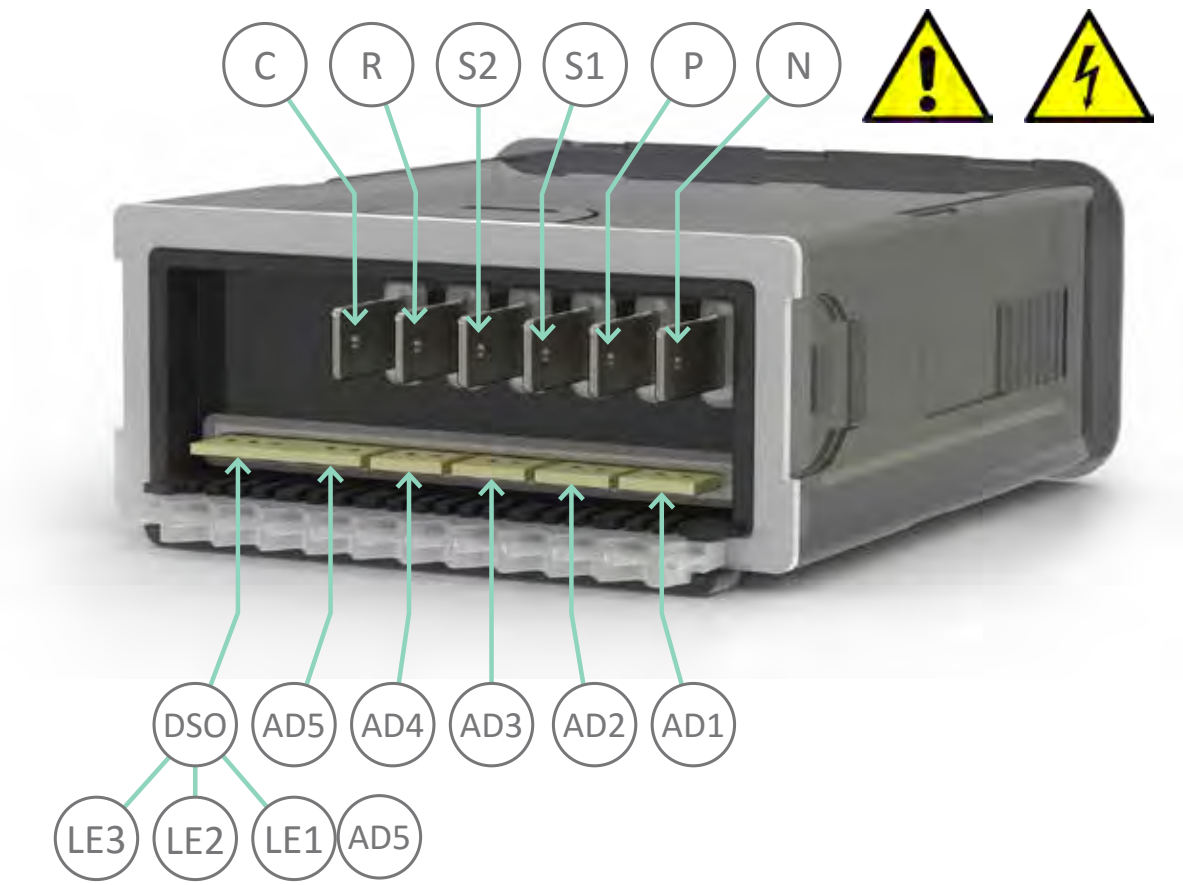
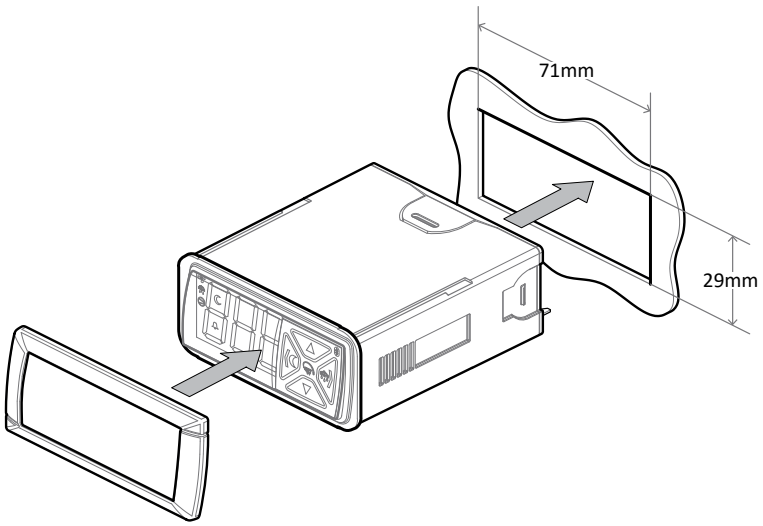
Rear Connector Panel

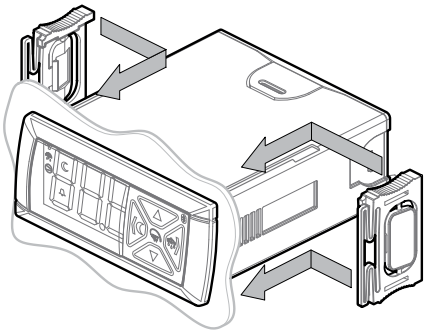


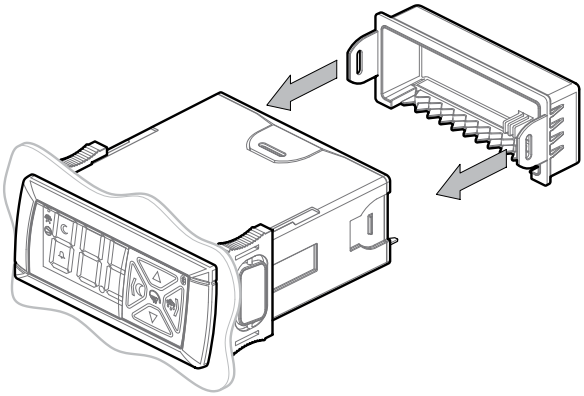
C	Compressor*	Switched 12Arms 90-240Vac o/p	AD1 – AD4	Sensor i/p* Switched o/p*	Digital 0-5V i/p Analog NTC i/p 5V 100mA o/p
R	Relay*	Switched 5Arms 90-240Vac o/p	AD5	Sensor i/p*	Digital 0-5V i/p Analog NTC i/p 0-24V switched 1A DC o/p
S1	Switch 1*	Switched 0.4Arms 90-240Vac o/p			
S2	Switch 2*	Switched 0.4Arms 90-240Vac o/p	LE1 LE2 LE3	PWM o/p	0-24V Switched 1A DC o/p per channel
P	Phase (see page 76)	90-240Vac i/p			
N	Neutral (see page 76)	90-240Vac i/p			

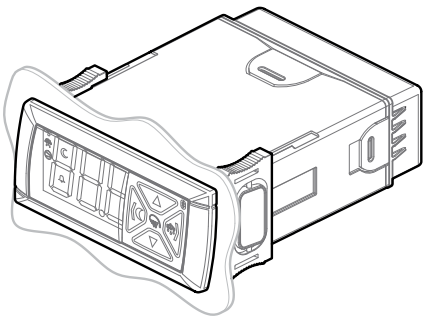
* See page 59

Installation Diagrams









INSTALLATION PROCEDURE

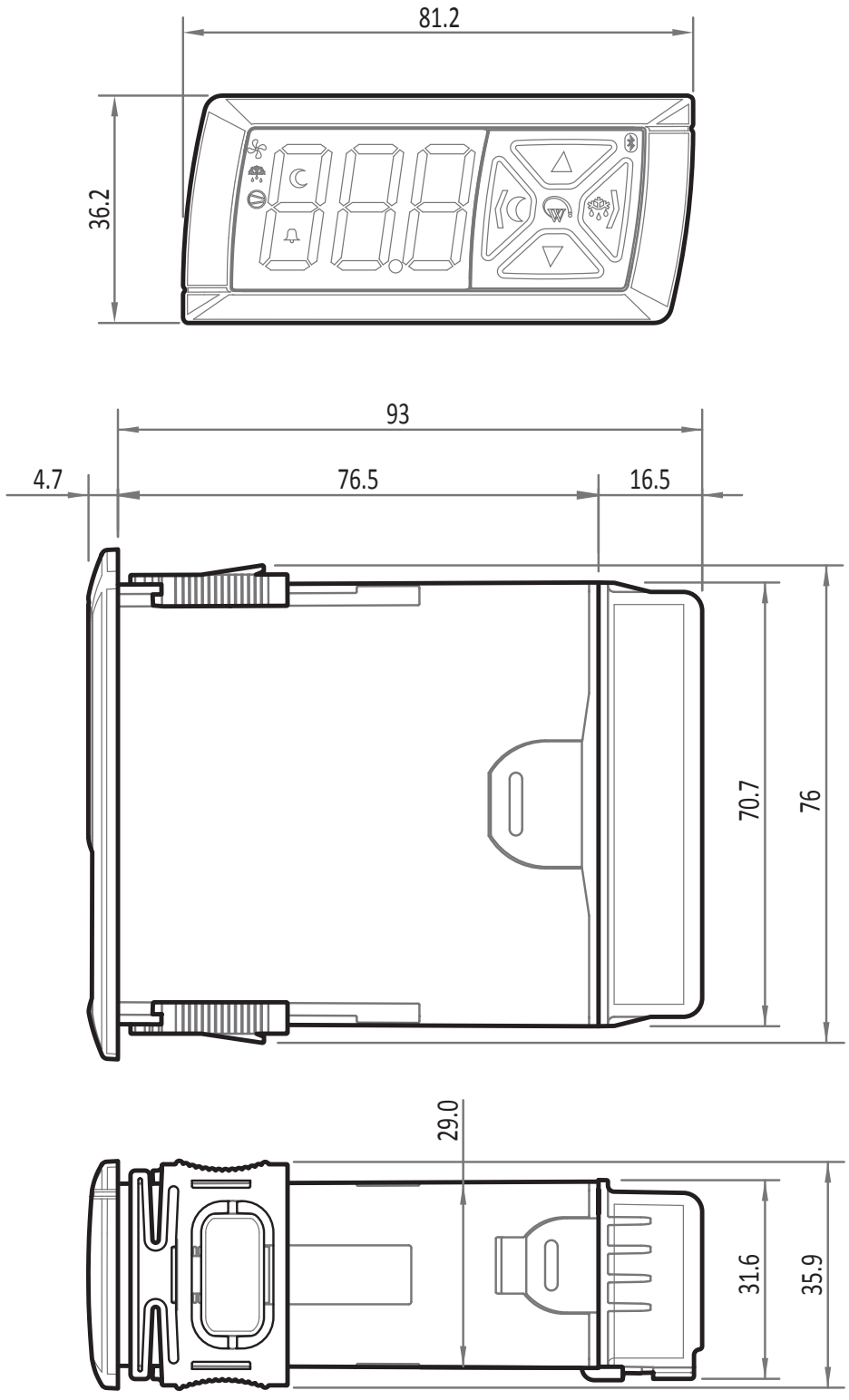
STEP 1
Clip on the Front Fascia Panel. Cut a rectangular aperture in the Mounting Panel which measures 71mm wide by 29mm high. Insert the SCS™ Connect into the hole. IMPORTANT: The maximum permitted mounting panel thickness is 9mm. Ensure there are no obstructions 7mm to the left and right of the hole, and 4mm above and below. This will ensure there is clearance with the Front Fascia. Ensure the hole is free of burrs and sharp edges.

STEP 2
Insert the Side Clips into the slots on the side of the body, and slide these forwards until the SCS™ Connect is held securely against the mounting panel. To disengage the Side Clips, press the back half of the button pad inwards, and then slide the clips backwards.

STEP 3
Attach all cables from sensors and hardware to the controller connectors. Please refer to page 11 for a list of the terminals and ports and page 11 for the Hardware Set Up (HSu) parameters.

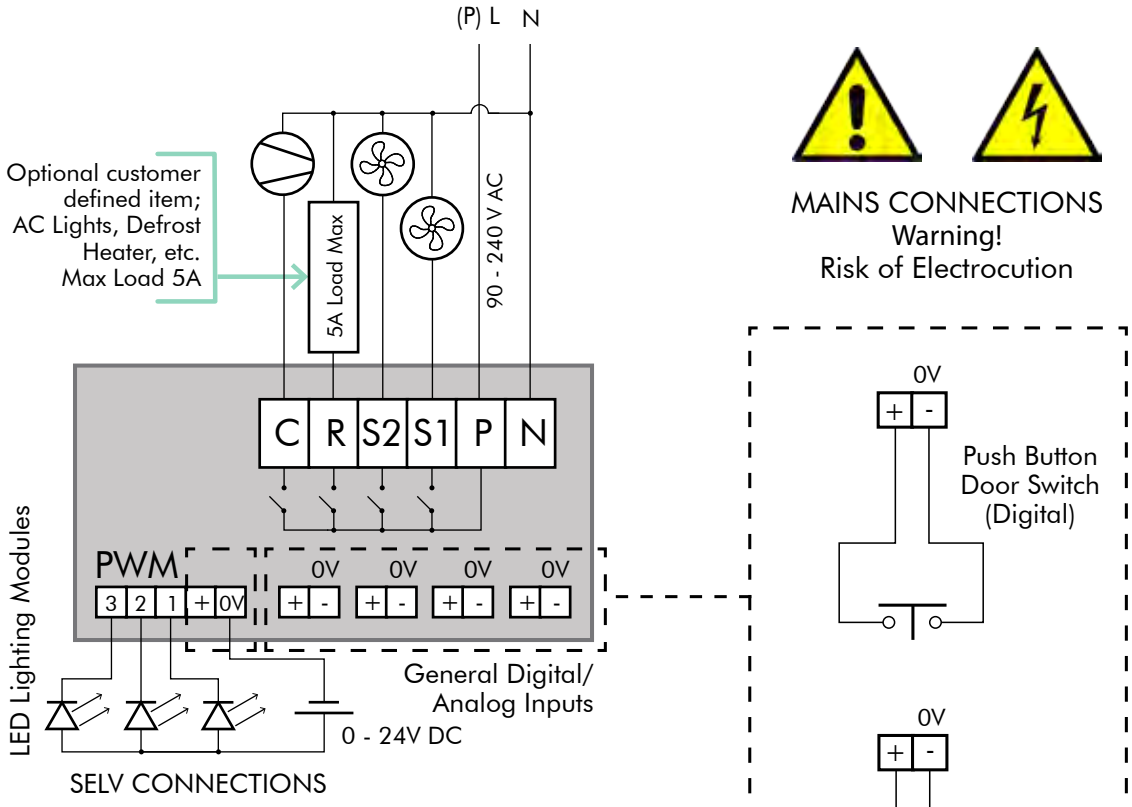
STEP 4
Slide the rear cover forwards and attach using the two outside clips. IMPORTANT: Turn off and isolate the power supply before removing this cover. Danger! Risk of electrocution!
To remove the cover, gently disengage the two clips and slide the cover backwards.
IMPORTANT: Never use an un-insulated screwdriver to remove this cover. Danger! Risk of electrocution!

Overall Dimensions

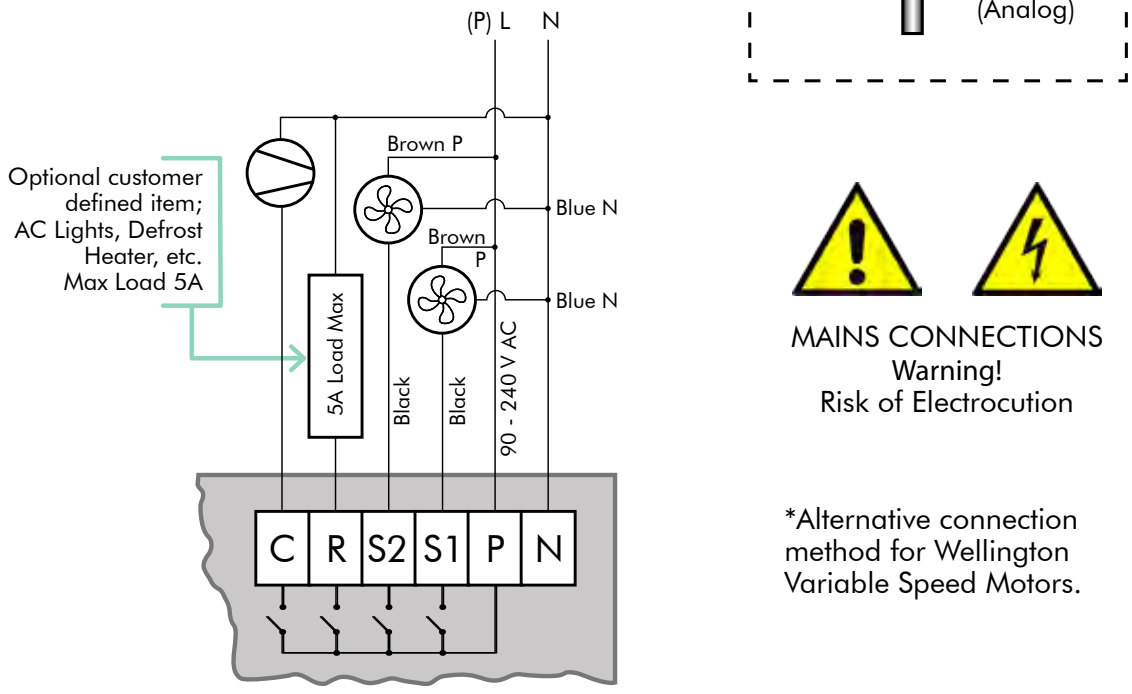


Wiring Diagrams

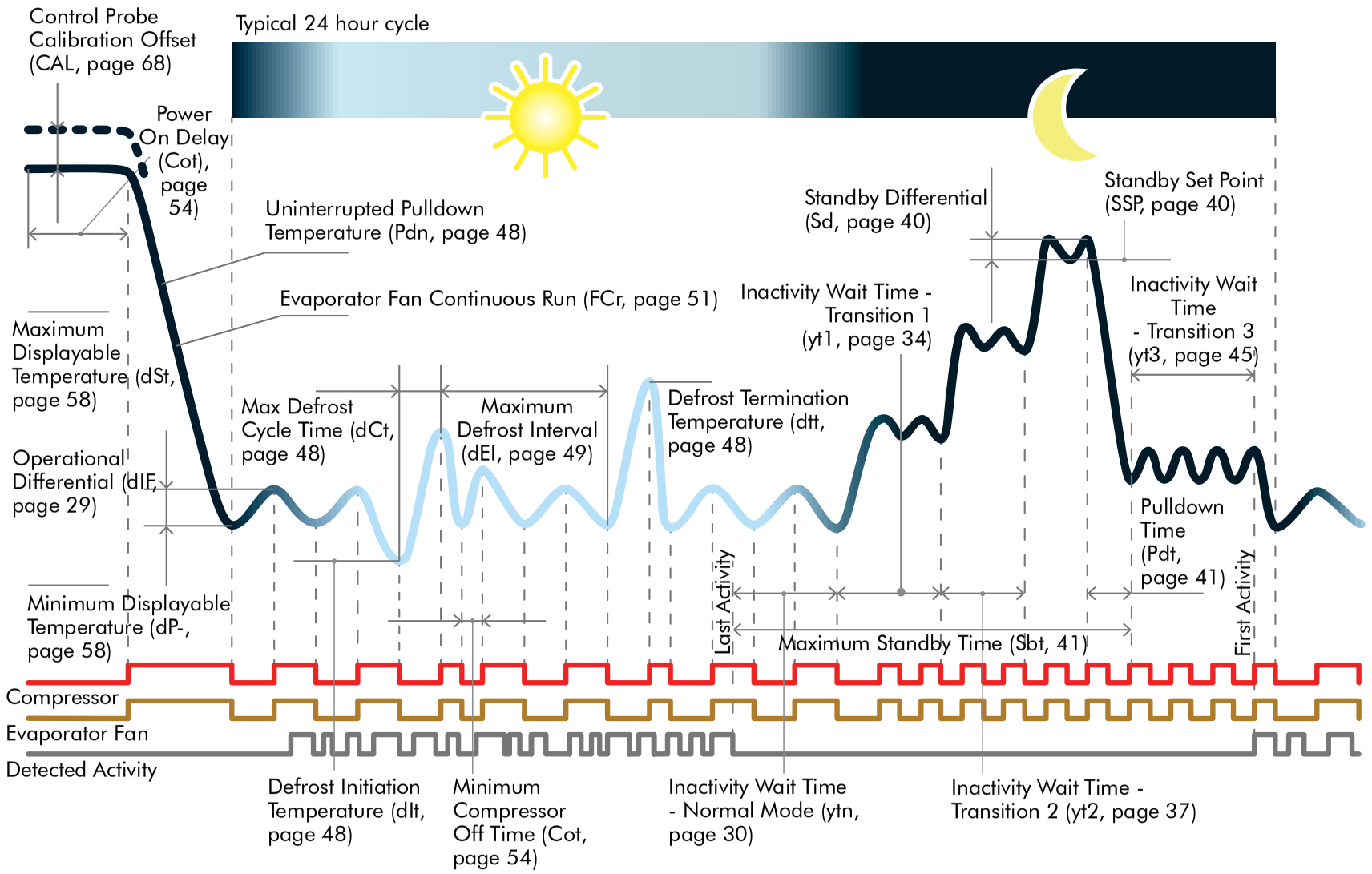
Standard Installation



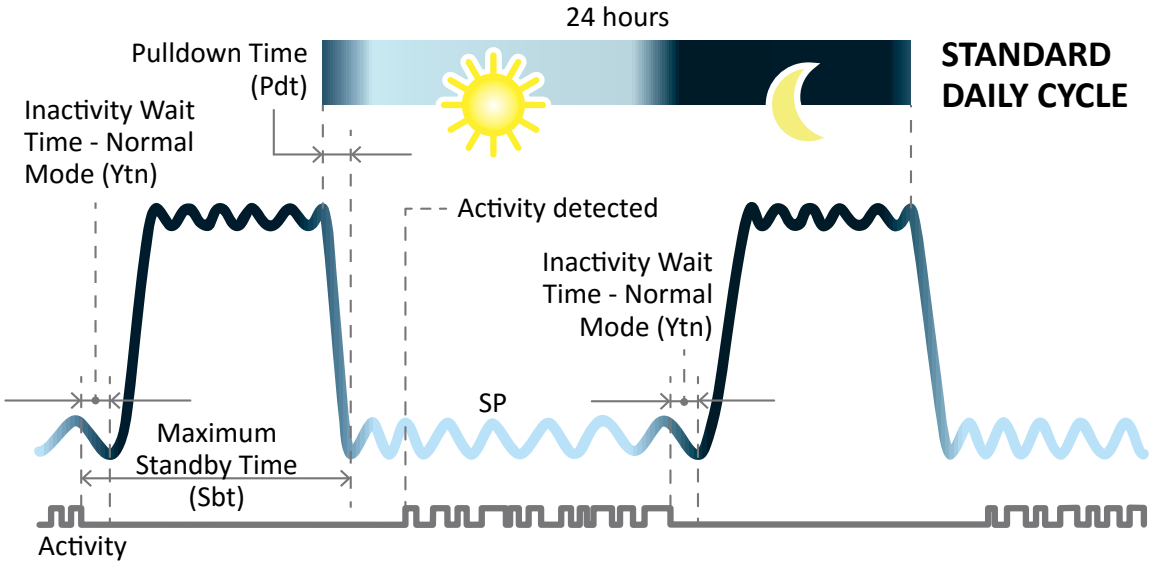
*Variable Speed Motors



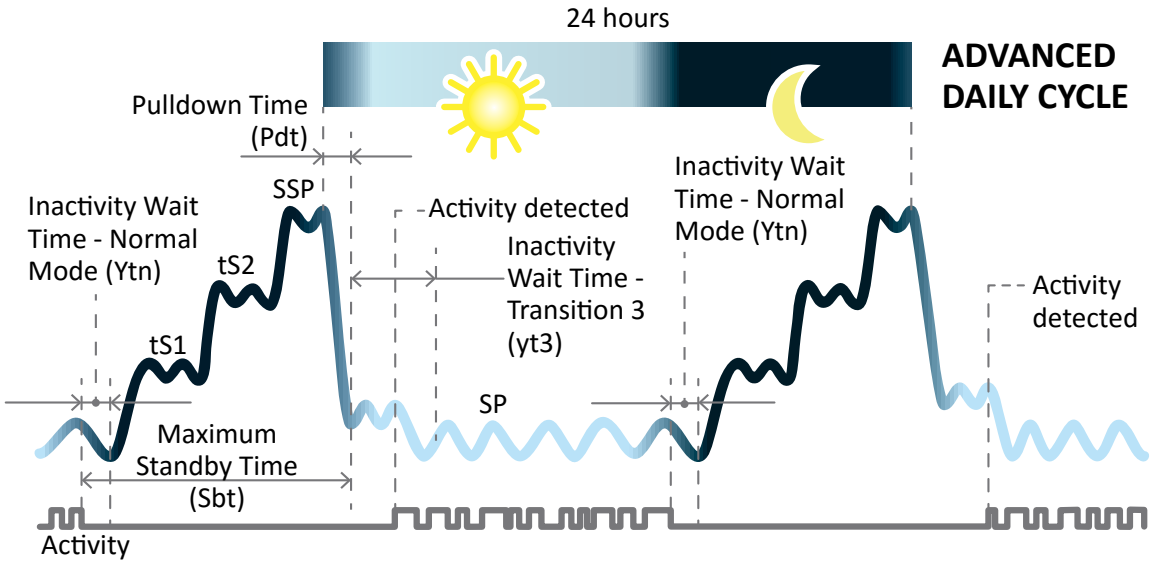
*Alternative connection method for Wellington Variable Speed Motors.


Control Probe Calibration Offset (CAL, page 68)
Typical 24 hour cycle
Power On Delay (Cot), page 54)
Uninterrupted Pulldown Temperature (Pdn, page 48)
Evaporator Fan Continuous Run (FCr, page 51)
Maximum Displayable Temperature (dSt, page 58)
Operational Differential (dIF, page 29)
Minimum Displayable Temperature (dP-, page 58)
Max Defrost Cycle Time (dCt, page 48)
Maximum Defrost Interval (dEI, page 49)
Defrost Termination Temperature (dtt, page 48)
Standby Differential (Sd, page 40)
Standby Set Point (SSP, page 40)
Inactivity Wait Time - Transition 1 (yt1, page 34)
Inactivity Wait Time - Transition 3 (yt3, page 45)
Pulldown Time (Pdt, page 41)
Last Activity
First Activity
Maximum Standby Time (Sbt, 41)
Compressor
Evaporator Fan
Detected Activity
Defrost Initiation Temperature (dIt, page 48)
Minimum Compressor Off Time (Cot, page 54)
Inactivity Wait Time - Normal Mode (ytn, page 30)
Inactivity Wait Time - Transition 2 (yt2, page 37)

Standby Refrigeration Cycles

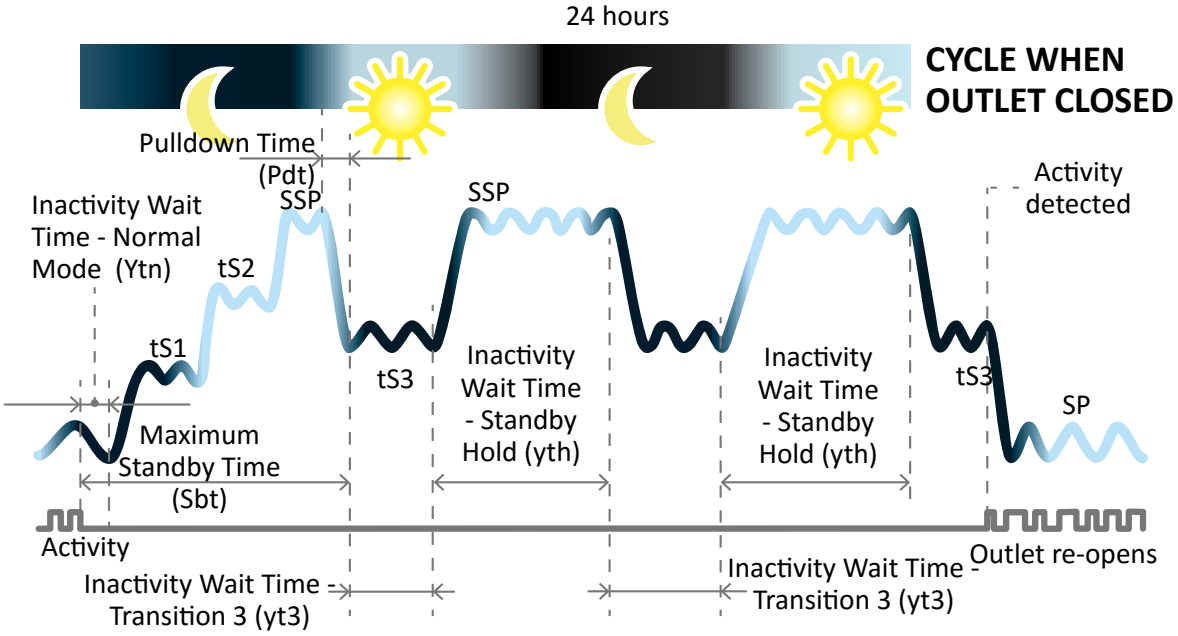


When in Non-Perishable Mode, the SCS™ Connect enters Standby Mode at night to save energy. At the start of each day, it leaves Standby Mode and commences a Pulldown. The start of the Pulldown is timed to ensure that the Operational Set Point (SP) is reached before the first customer Activity is expected. When the Operational Set Point (SP) is reached the SCS™ Connect enters Normal Mode.



When using the Advanced Daily Cycle, the SCS™ Connect enters and leaves Standby Modes in progressive stages to save energy. At the start of each day, it leaves Standby Mode and commences a Pulldown. This continues until Transition 3 Set Point (tS3) is reached and the Inactivity Wait Time – Transition 3 (yt3) commences. During this time if any activity is detected, the Pulldown continues until the Operational Set Point (SP) is reached. When this is reached the SCS™ Connect enters the Normal Mode.

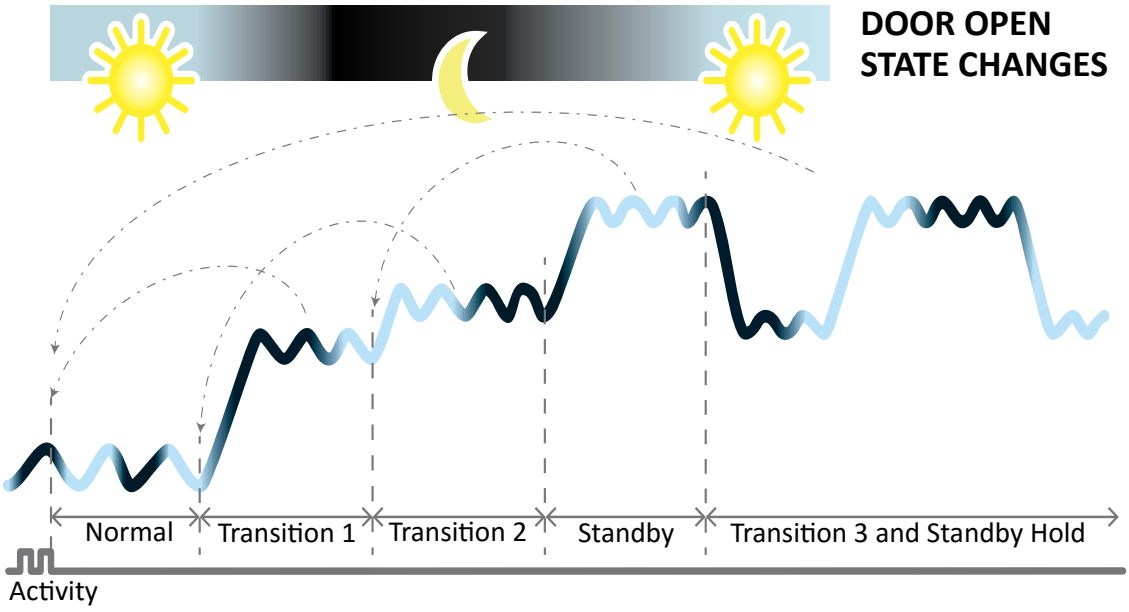
Standby Refrigeration Cycles



No activity, outlet closed

If a Retail Outlet does not open on a particular day, to save energy the system returns to full Standby. This can occur in several stages. If no activity is detected during the Inactivity Wait Time – Transition 3, the SCS™ Connect returns to Full Standby Mode, and is then ready to start the Pulldown again at the start of the next day as per normal. Should any activity be detected while in Full Standby mode, the SCS™ Connect will immediately commence a Pulldown.

Standby Refrigeration Cycles



If the cooler is in Normal mode and an activity is seen, the “Inactivity Wait Timer - Normal Mode” will be reset.

If the cooler is in Transition 1 Mode and an activity is seen, the cooler will move back to Normal Mode, and the “Inactivity Wait Timer - Normal Mode” will be reset.

If the cooler is in Transition 2 Mode and an activity is seen, the cooler will move back to Transition 1 Mode, and the “Inactivity Wait Timer - Transition 1” will be reset.

If the cooler is in Standby Mode and an activity is seen, the cooler will move back to Transition 2 Mode, and the “Inactivity Wait Timer - Transition 2” will be reset.

If the cooler is in Transition 3 Mode or Standby Hold Mode and an activity is seen, the cooler will move back to Normal Mode, and the “Inactivity Wait Timer - Normal Mode” will be reset.

START UP SEQUENCE

Start-Up Sequence

Power cycling the SCS™ Connect initiates the start up sequence, which goes through the following steps:

Step 1.
Displays “SCS”.

Step2.
The current Firmware Version is briefly displayed. This is a 6 digit number. The first 3 digits are displayed for 2 seconds, then the remaining 3 digits for 2 seconds.

Step 3. (not yet implemented)
The loaded Parameter Set Name is briefly displayed. This is a 6 character alpha-numeric name created by the customer. The first 3 characters are displayed for 2 seconds, then the remaining 3 characters for 2 seconds.

Step 4.
The SCS™ Connect cycles through the outputs displaying “CoP”, “FAn”, “LIt” as it self-tests the outputs.

Step 5.
The SCS™ Connect displays the current temperature and enters Normal Mode.

Parameter Set Name

The Parameter Set Name is a 6 character alpha-numeric code created by the customer to uniquely identify the type of refrigeration system in use and the associated parameter configuration loaded into the SCS™ Connect. For clarity on the display we recommend that the name should be created using the following characters:

Upper Case Characters:

Lower Case Characters:

Numerals:

Quick Read

- ☐ Step 1: Displays “SCS”.
- ☐ Step 2: Displays the Firmware Version.
- ☐ Step 3: Displays the Parameter Set Name. (not yet implemented).
- ☐ Step 4: Cycles through a self-test routine.
- ☐ Step 5: Displays the current temperature (running in Normal Mode).

FRONT PANEL USER INTERFACE

User Mode

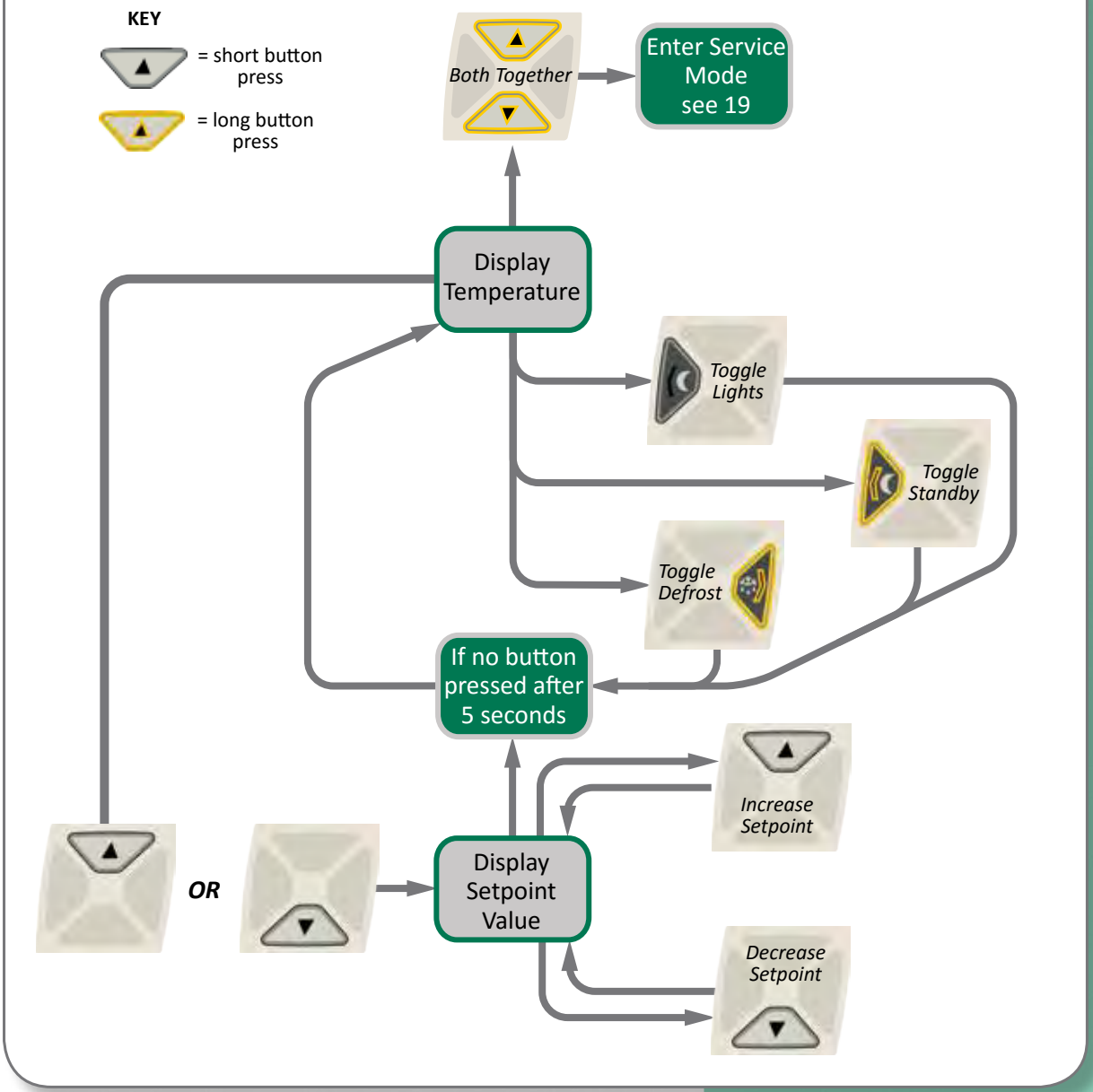
These are the essential functions that retail staff can control:

- ☐ Manually toggle the Lights on and off.
- ☐ Manually toggle Standby Mode on and off.
- ☐ Manually initiate a Defrost.
- ☐ Adjust the Set Point Temperature within a pre-determined range.

Quick Read

- ☐ Controls the essential end-user functions; Lights, Transition Mode, Defrost Mode, Set Point Temperature.
- ☐ A PIN code is required to enter the Service Mode menus.

User Mode Flow Chart

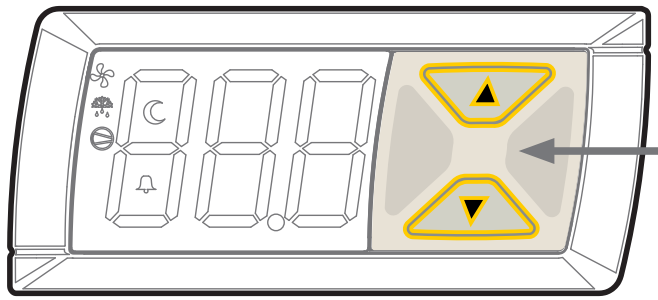


Service Mode

The Service Mode is entered from the User Mode by holding down the Up and Down buttons together.

To access the Service Mode parameters, a 9 digit PIN code must be entered, consisting of L=left, R=right, U=up, D=down. The pin code is displayed in the “SCS Field “ app against the companies you are activated to. (See page 23)

To Enter Service Mode



Press Up and Down Button together to enter Service Mode, followed by the 9-digit PIN code

There are 5 categories main Service Mode catagories:

- ☐ Parameters: For details on configuring parameters please refer to page 27.
- ☐ Reset*: Returns the ***SCS Connect*** controller back to Factory or Default Settings.
- ☐ Manual Test*: Allows Service Staff to inspect input values from sensors and check the effects of output adjustments to peripherals, and to run preset test routines.
- ☐ Statistics*: Displays logged values and event counts to help Service Staff fine tune and trouble shoot the system.
- ☐ About*: Lists the properties of the refrigeration system and the controller, including cooler model codes, firmware, hardware and software versions.

There are two different User Interface Flow Charts to follow depending on which of these categories are selected:

- ☐ For the Parameter, Reset and Manual Test categories, please refer to the UI Flow Chart on page 20.
- ☐ For the Statistics and About categories, please refer to the UI Flow Chart on page 21.

* Not yet implemented

SERVICE MODE UI

Five main Categories to select from:

- ☐ Parameters
- ☐ Reset
- ☐ Manual Test
- ☐ Statistics
- ☐ About

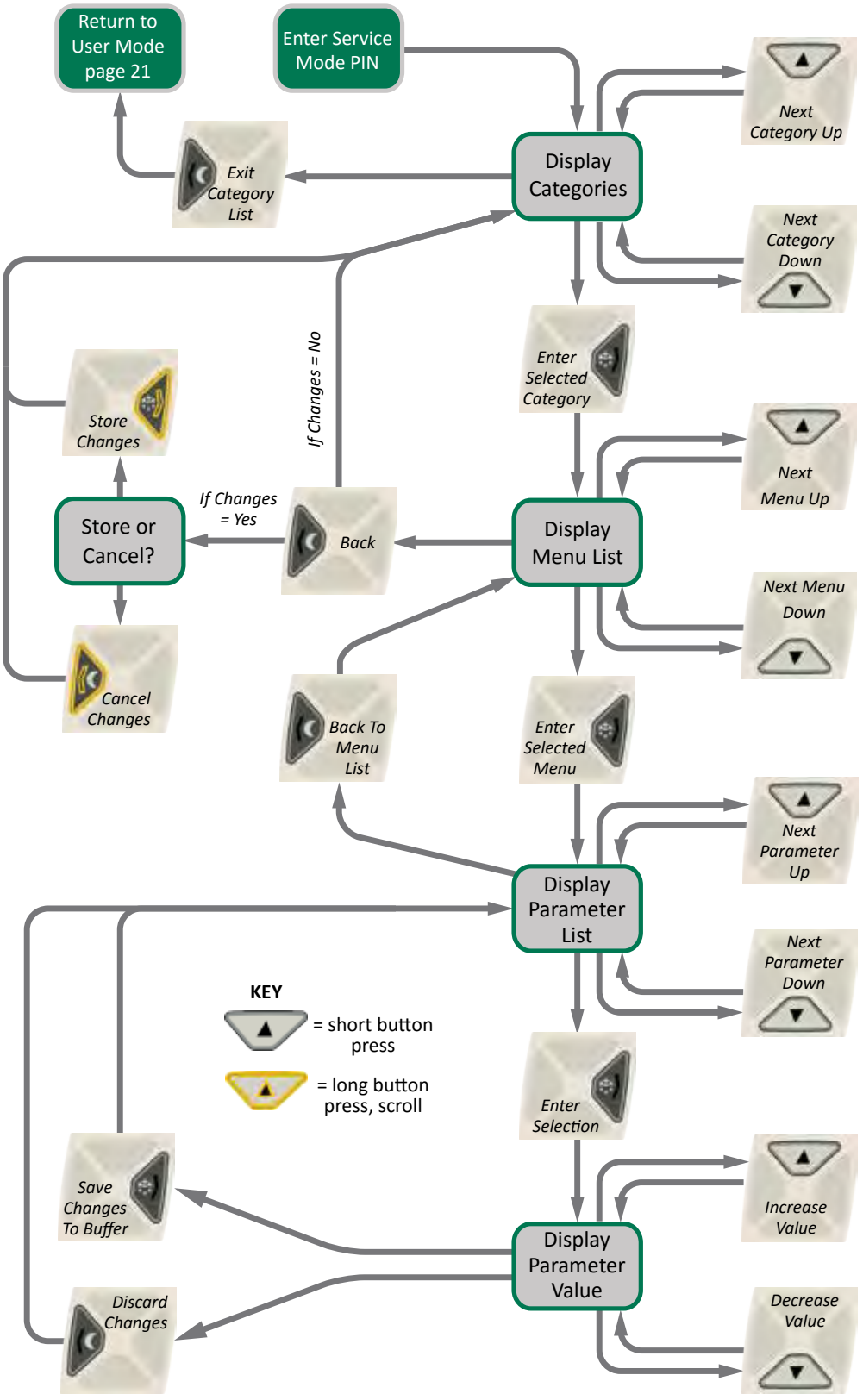
Two User Interface Flow Charts:

- ☐ Parameter, Reset and Manual Test categories, page 20.
- ☐ Statistics and About categories, page 21.

Parameters Flow Chart

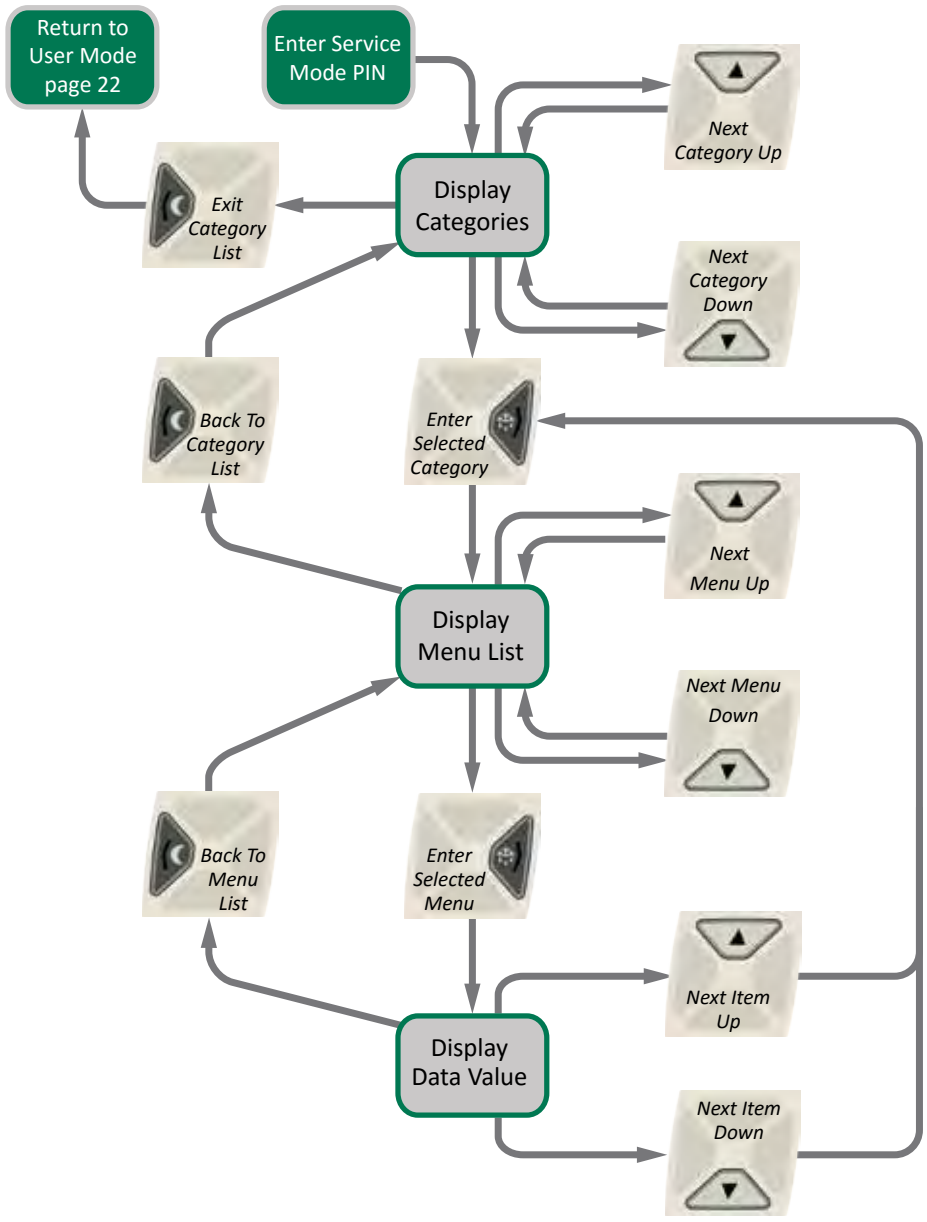
Reset Flow Chart

Manual Test Flow Chart



Statistics Flow Chart

About Flow Chart



GRAPHICAL USER INTERFACES

The Wellington ***SCS Connect*** controller App provides a wireless connection to the ***SCS Connect*** controller from mobile devices fitted with Bluetooth® LE. This gives users and technicians an unprecedented level of visibility, control and diagnostic tools to optimise the controller's performance and to troubleshoot any problems. The following guide provides an overview of the app and its capabilities.

Note: Screen shots shown are indicative only. Different devices have different screen ratios, sizes and resolutions. The actual image seen on your device may vary from the screen shots shown in this guide. Holding your device in portrait or landscape mode may have an effect on appearance and may change how the various windows and graphics are displayed and arranged on your screen.

Quick Read

- ☐ Wellington SCS *Connect* controller App:
- ☐ Bluetooth® LE compliant.
- ☐ Wireless diagnostics and control.
- ☐ Designed for mobile devices using a touch screen interface.
- ☐ Customized app branding available on special request.
- ☐ Secure, only authorized connections permitted.

User Interfaces*

* Customisation using company colours and logos are also available. Please see Wellington for further details.

Authentication

Step 1

Download and install the Connect Field app from Google Play (Search for “scs wellington” to find it)

Step 2

When you first run “Connect Field”, you will be requested to enter an activation code. Contact your User Manager or Wellington to receive your activation code (You must be connected to the internet at the time of activation).

Note:
Your activation code is unique to you, and should NEVER be shared with anyone else, as it determines your personal access level for the app. The same code will give you access to all SCS apps you are authorised to use.

Step 3

Once activation is complete, you must define a 4-digit PIN code. This can be any code unique to you. Each time you start the app, you will be required to enter this same PIN code. This is to prevent other people accessing the app from unlocked phones.

Step 4

Your 9-digit touch panel code

You can see which databases you are activated against from the “Settings” screen. You can be activated to more than one database at the same time. Simply select “ACTIVATE ANOTHER DATABASE”, and enter the new databases unique activation code, as in Step 2.

Connecting to a Device

Note: If the Bluetooth™ logo on the top right of the SCS™ Connect button panel is lit, then the Bluetooth™ signal is broadcasting and the device should be visible.
This logo will start flashing when connected to a device

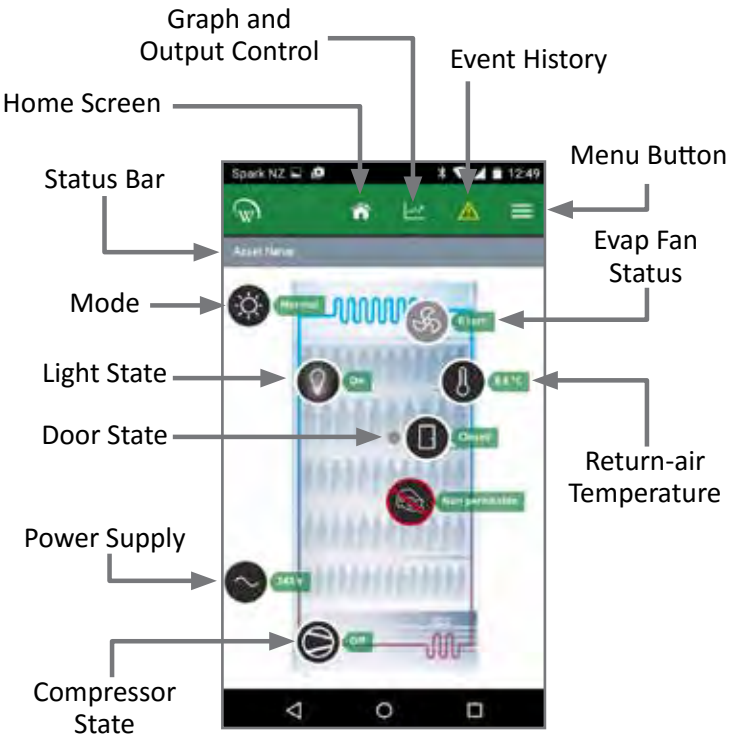
Select a device to connect to from the list of visable devices

Note: This list is filtered by your activation permissions, so devices you are not authorised to connect to will not be displayed.

Select "Connect" to connect to the cooler

Home Screen

The Home Screen shows a graphic representation of the current state of the refrigeration unit being controlled.



Home Screen
(Fridge Status)

Main Menu

Parameter Editing

Step 1

Select “EDIT PARAMETERS” from the Main menu

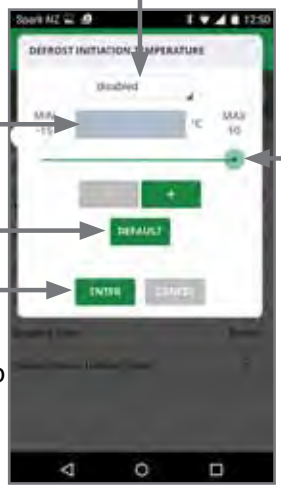
Step 2

Select the parameter Catagory you want to view

Step 3

Select the Parameter you want to edit

Step 4



Edit the parameter, then press “ENTER” to set it in the controller.

Parameter Editing - Desktop

The Desktop App is intended for OEM's and manufacturers. It supports easy creation, checking and saving of parameter files for Lab and Production use:

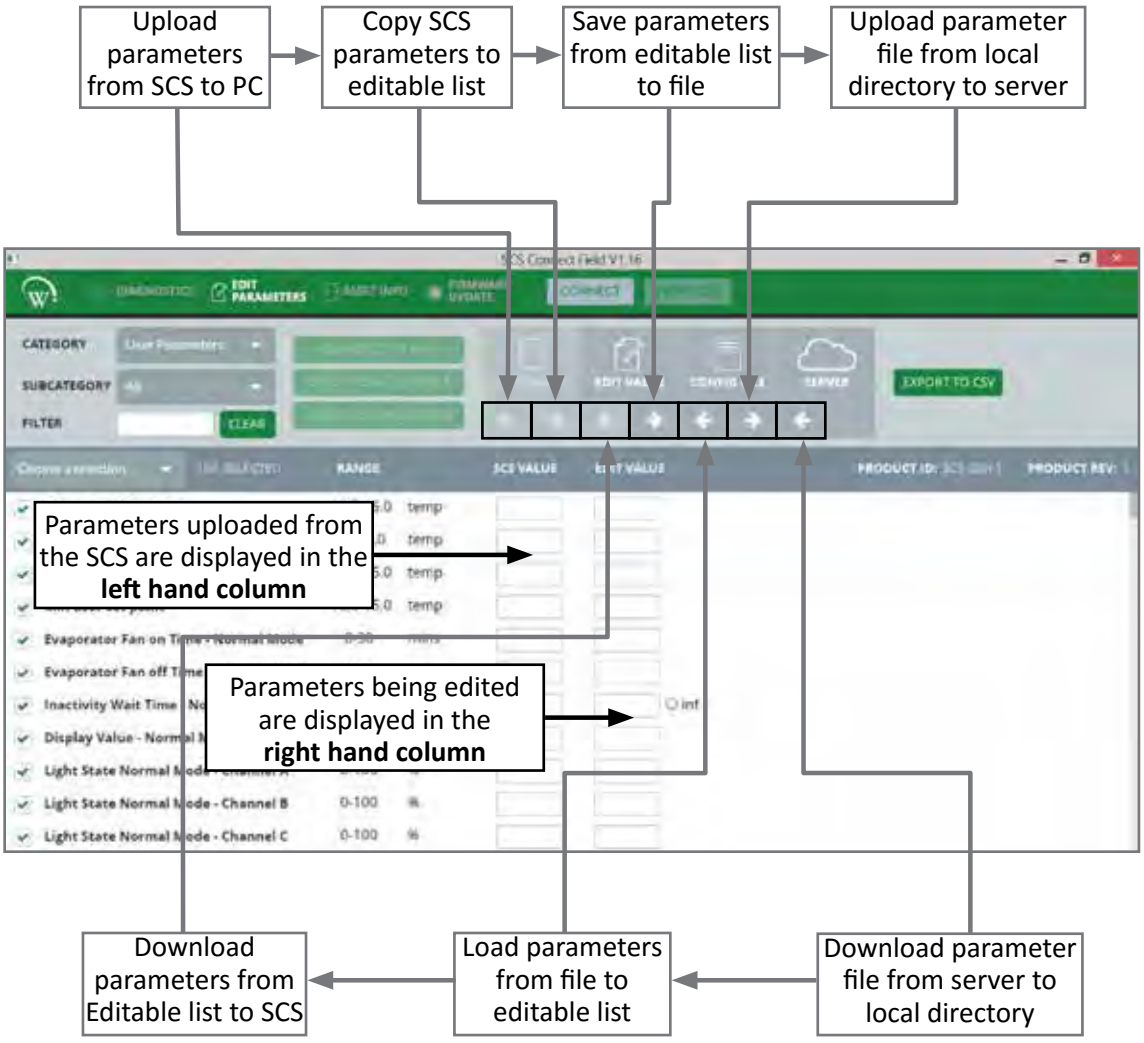
- Requires a Blue-Giga USB dongle to support BT-LE

  Due to the poor handling of Bluetooth LE by Windows, use of the desktop app on Windows computers requires an external Bluetooth device ("dongle"). The supported dongle is Blue-Giga model BLED112, available from Blue-Giga stockists or from Wellington.

- Uses the same activation code as for all other apps

- Connects to the controller in the same way as the mobile app

- Basic 4-screen interface (no hidden menus)
  - Diagnostics
  - Edit Parameters
  - Asset Info
  - Firmware Update



PARAMETERS

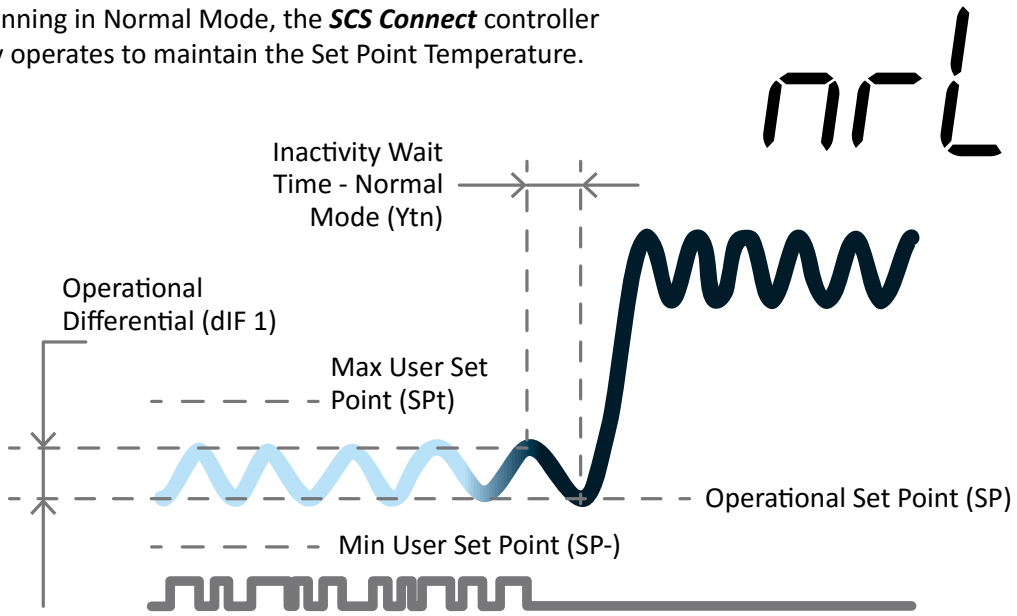
Quick Read

- A full alphabetical summary list of all available parameters can be found on Pg 96.
- Parameters shown here are correct for firmware versions 1557 to 1558. Earlier or later firmare versions may vary.

The ***SCS Connect*** parameters have been grouped together as follows:

Normal Mode (nrL)

When running in Normal Mode, the ***SCS Connect*** controller primarily operates to maintain the Set Point Temperature.



Normal Mode (nrL) - cont

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Operational Set Point	SP	29	0.1 °C	-10.0 to 15.0 °C	3.5 °C
Operational Differential	dIF	29	0.1 °C	0.1 to 10.0 °C	3.0 °C
Maximum User Set Point	SPt	29	0.1 °C	-10.0 to 15.0 °C	3.5 °C
Minimum User Set Point	SP-	29	0.1 °C	-10.0 to 15.0 °C	3.5 °C
EVAPORATOR					
Evaporator Fan On Time - Normal Mode	Fot	30	1 min	0 to 30 mins	2 mins
Evaporator Fan Off Time - Normal Mode	FoF	51	1 min	0 to 30 mins	2 mins
TIME					
Inactivity Wait Time - Normal Mode	Ytn	30	0.5 hours	0.5 to 24 hours or **InF**inite	2 hours
LIGHTING & DISPLAY					
Display Value During Normal Mode	dIS	30	integers	0	0
Light State Normal Mode - Channel A	LnA	31	1%	0% to 100%	100%
Light State Normal Mode - Channel B	Lnb	31	1%	0% to 100%	100%
Light State Normal Mode - Channel C	LnC	31	1%	0% to 100%	100%
ALARMS					
High Temperature Alarm Set Point	htA	32	0.1 °C	**dIS**abled	**dIS**abled
Low Temperature Alarm Set Point	LtA	32	0.1 °C	**dIS**abled	**dIS**abled

Normal Mode (nrL) - cont

OPERATIONAL **S**ET **P**OINT (SP)
The temperature at which the Compressor will turn off, when the system is running in Normal Mode. If the temperature is below this value, the Compressor will remain off.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SP	Temperature	-10.0 to 15.0 °C	0.1 °C	3.5 °C	dIF 1, SP-, SPt, dIt

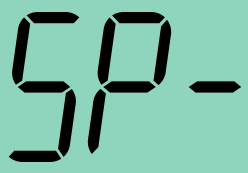
OPERATIONAL **DIF**FERENTIAL (dIF)
The temperature differential (ΔT) above the Operational Set Point (SP) temperature, which will cause the Compressor to turn on when in Normal Mode. The Compressor will remain on until the temperature reaches the Operational Set Point (SP) temperature.
Turn On Temperature = SP + dIF

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dIF	Temperature	0.1 to 10.0 °C	0.1 °C	3.0 °C	SP

MAXIMUM USER **S**ET **P**OIN**T** (SPt)
The highest temperature that the Retail Staff can adjust the cabinet to run at.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SPt	Temperature	-10.0 to 15.0 °C	0.1 °C	3.5 °C	SP, SP-

MINIMUM USER **S**ET **P**OINT (SP-)
The lowest temperature that the Retail Staff can adjust the cabinet to run at.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SP-	Temperature	-10.0 to 15.0 °C	0.1 °C	3.5 °C	SP, SPt

Normal Mode - cont

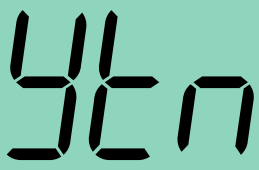
EVAPORATOR **F**AN **O**N **T**IME – NORMAL MODE (Fot)
The time the fan is on if the Evaporator Fan is set to cycling in (FCn) and the Compressor is off.
Please note: The total Evaporator Fan cycle = the on time + the off time. Please also refer to FoF.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Fot	Evaporator	0 to 30 mins	1 min	2 mins	FoF, FCr

EVAPORATOR **F**AN **OF**F TIME – NORMAL MODE (FoF)
The time the fan is off if the Evaporator Fan is set to cycling in (FCn) and the Compressor is off.
Please note: The total Evaporator Fan cycle = the on time + the off time. Please also refer to FCr.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FoF	Evaporator	0 to 30 mins	1 min	2 mins	FCr, Fot

INACTIVITY WAIT TIME – NORMAL MODE (ytn)
The time the SCS™ Connect will wait in Normal Mode without any activity being seen before it will move to Transition 1 Mode. An activity is any interaction with the cabinet which is detected by a sensor, such as the opening of the cabinet door.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ytn	Time	0.5 to 24 hours or infinite	0.5 hours	4 hours	tS1, tS2

DISPLAY VALUE DURING NORMAL MODE (dIS)
Selects what is displayed during Normal Mode:
0 = Displays the temperature.
1* = Displays the Set Point Temperature.
2* = Display is left blank.

* not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dIS	Lighting & Display	0	integers	0	SP

LIGHT STATE - NORMAL MODE CHANNEL A (LnA)
The illumination level during Normal Mode of Channel A as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LnA	Lighting & Display	0% to 100%	1%	100%	Ldn

LIGHT STATE - NORMAL MODE CHANNEL B (Lnb)
The illumination level during Normal Mode of Channel B as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Lnb	Lighting & Display	0% to 100%	1%	100%	Ldn

LIGHT STATE - NORMAL MODE CHANNEL C (LnC)
The illumination level during Normal Mode of Channel C as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LnC	Lighting & Display	0% to 100%	1%	100%	Ldn

Normal Mode - cont

*** HIGH TEMPERATURE ALARM SET POINT (htA)**
The Set Point Temperature above which an alarm is triggered. This function is linked to HACCP applications where it is critical that the product inside the cabinet stays within a specific temperature range (eg; vaccines). Please also refer to the 'Perishable' function (Per).

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
htA	Alarms	**dIS**abled	0.1 °C	**dIS**abled	PEr

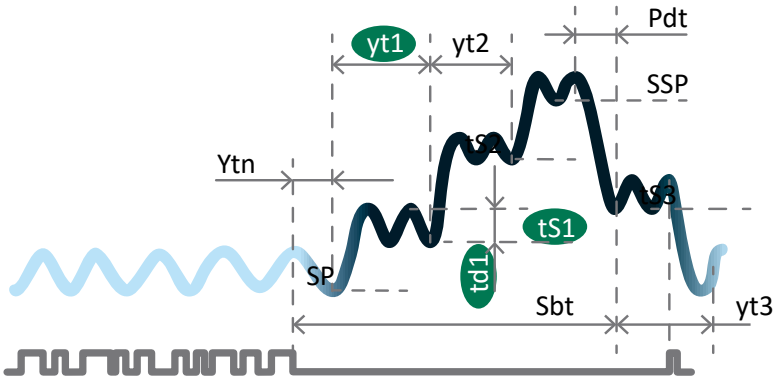
*** LOW TEMPERATURE ALARM SET POINT (LtA)**
The Set Point Temperature which triggers a low temperature alarm. This function is linked to HACCP applications where it is critical that the product inside the cabinet stays within a specific temperature range (eg; vaccines). Please also refer to the 'Perishable' function (Per).

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LtA	Alarms	**dIS**abled	0.1 °C	**dIS**abled	PEr

Transition 1 Mode (tn1)

The Transition Modes are used to minimize Pulldown times. Transitional set point temperatures are used that are in between the Operational Set Point and full Standby Set Point. The Transition Modes may be most useful if the retail outlet opening hours vary, or if customer demand varies, such that a regular Pulldown time is uncertain.



Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Transition 1 Set Point	tS1	34	0.1 °C	-10.0 to 15.0 °C	5.0 °C
Transition 1 Differential	td1	34	0.1 °C	0.1 to 10.0 °C	3.0 °C
TIME					
Inactivity Wait Time - Transition 1	yt1	34	0.5 hours	0.0 to 24.0 hours	1 hours
LIGHTING & DISPLAY					
Light State Transition 1 Mode - Channel A	L1A	35	1%	0% to 100%	50%
Light State Transition 1 Mode - Channel B	L1b	35	1%	0% to 100%	50%
Light State Transition 1 Mode - Channel C	L1C	35	1%	0% to 100%	50%

Transition 1 Mode (tn1) - cont

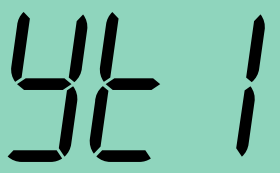
TRAN**S**ITION **1** SET POINT (tS1)
The temperature at which the Compressor will turn off, when the system is running in Transition 1 Mode. Transition 1 Mode is the first step in the Standby process to conserve power during prolonged periods of inactivity.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tS1	Temperature	-10.0 to 15.0 °C	0.1 °C	5.0 °C	td1

TRANSITION **1** **D**IFFERENTIAL (td1)
The temperature above the Transition 1 Set Point (tS1) temperature, which will cause the Compressor to turn on when in Transition 1 Mode. The Compressor will remain on until the temperature reaches the Transition 1 Set Point (tS1) temperature.
Turn On Temperature = tS1 + td1

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
td1	Temperature	0.1 to 10.0 °C	0.1 °C	3.0 °C	tS1

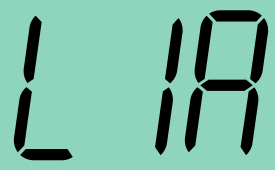
INACTIVIT**Y** WAIT TIME **- T**RANSITION **1** (yt1)
The maximum time permitted in Transition 1 Mode without any detected activity, before switching to Transition 2 Mode.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
yt1	Time	0 to 24 hours	0.5 hours	1 hours	yt2, Ytn

Transition 1 Mode (tn1) - cont

LIGHT STATE TRANSITION **1** MODE – CHANNEL **A** (L1A)
The illumination level during Transition 1 Mode of Channel A as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L1A	Lighting & Display	0% to 100%	1%	50%	LSA, L1b, L1C

LIGHT STATE TRANSITION **1** MODE – CHANNEL **B** (L1b)
The illumination level during Transition 1 Mode of Channel B as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

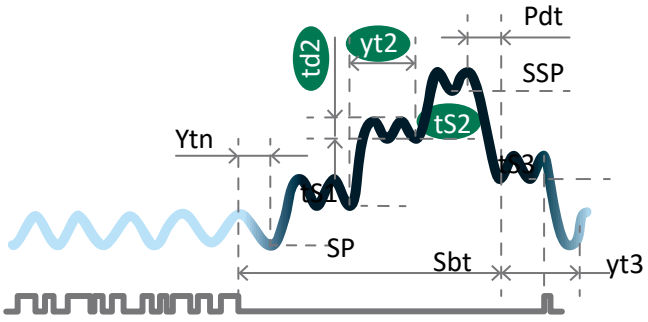
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L1b	Lighting & Display	0% to 100%	1%	50%	LSA, L1A, L1C

LIGHT STATE TRANSITION **1** MODE – CHANNEL **C** (L1C)
The illumination level during Transition 1 Mode of Channel C as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L1C	Lighting & Display	0% to 100%	1%	50%	LSA, L1A, L1b

Transition 2 Mode (tn2)

The Transition Modes are used to minimize Pulldown times. Transitional set point temperatures are used that are in between the Operational Set Point and full Standby Set Point.

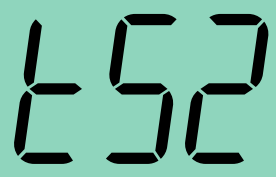


The Transition Modes may be most useful if the retail outlet opening hours vary, or if customer demand varies, such that a regular Pulldown time is uncertain.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Transition 2 Set Point	tS2	37	0.1 °C	-10.0 to 15.0 °C	7.0 °C
Transition 2 Differential	td2	37	0.1 °C	0.1 to 10.0 °C	2.0 °C
TIME					
Inactivity Wait Time - Transition 2	yt2	37	0.5 hours	0.0 to 24.0 hours	1 hour
LIGHTING & DISPLAY					
Light State Transition 2 Mode - Channel A	L2A	38	1%	0% to 100%	0%
Light State Transition 2 Mode - Channel B	L2b	38	1%	0% to 100%	0%
Light State Transition 2 Mode - Channel C	L2C	38	1%	0% to 100%	0%

Transition 2 Mode (tn2) - cont

TRAN**S**ITION **2** SET POINT (tS2)
The temperature at which the Compressor will turn off, when the system is running in Transition 2 Mode. Transition 2 Mode is the second step in the Standby process to conserve power during prolonged periods of inactivity.

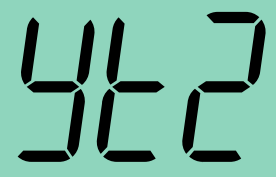


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tS2	Temperature	-10.0 to 15.0 °C	0.1 °C	7.0 °C	td2

TRANSITION **2** **D**IFFERENTIAL (td2)
The temperature above the Transition 2 Set Point (tS2) temperature, which will cause the Compressor to turn on when in Transition 2 Mode. The Compressor will remain on until the temperature reaches the Transition 2 Set Point (tS2) temperature.
Turn On Temperature = tS2 + td2

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
td2	Temperature	0.1 to 10.0 °C	0.1 °C	2.0 °C	tS2

INACTIVIT**Y** WAIT TIME **- T**RANSITION **2** (yt2)
The maximum time permitted in Transition 2 Mode without any detected activity, before switching to full Standby Mode.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
yt2	Time	0 to 24 hours	0.5 hours	1 hour	yt1, Ytn

Transition 2 Mode (tn2) - cont

LIGHT STATE TRANSITION **2** MODE – CHANNEL **A** (L2A)
The illumination level during Transition 2 Mode of Channel A as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L2A	Lighting & Display	0% to 100%	1%	0%	LSA, L2b, L3A

LIGHT STATE TRANSITION **2** MODE – CHANNEL **A** (L2b)
The illumination level during Transition 2 Mode of Channel B as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

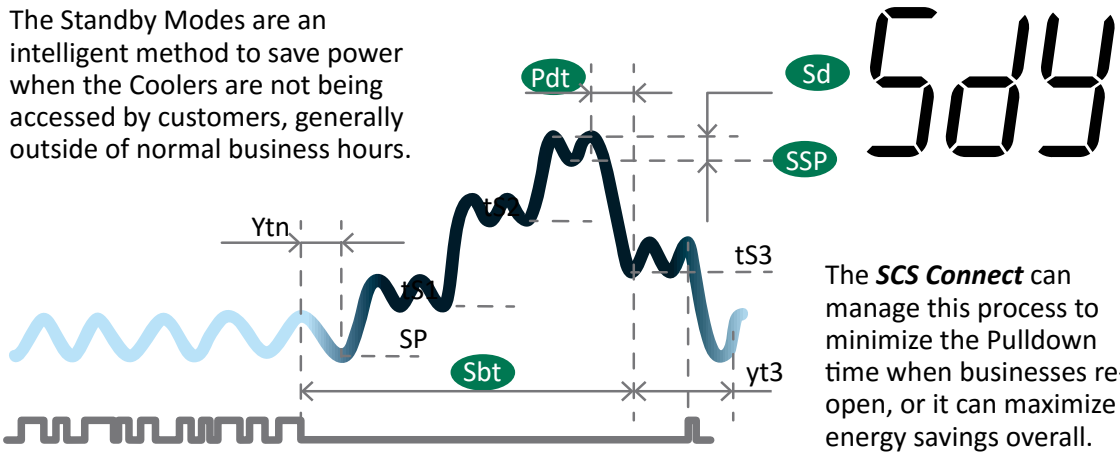
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L2b	Lighting & Display	0% to 100%	1%	0%	LSA, L2A, L2C

LIGHT STATE TRANSITION **2** MODE – CHANNEL **A** (L2C)
The illumination level during Transition 2 Mode of Channel C as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L2C	Lighting & Display	0% to 100%	1%	0%	LSA, L2A, L2b

Standby Mode (SdY)

The Standby Modes are an intelligent method to save power when the Coolers are not being accessed by customers, generally outside of normal business hours.



The ***SCS Connect*** can manage this process to minimize the Pulldown time when businesses re-open, or it can maximize energy savings overall.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Standby Set Point	SSP	40	0.1 °C	-10.0 to 15.0 °C	8.5 °C
Standby Differential	Sd	40	0.1 °C	0.1 to 10.0 °C	2.0 °C
Perishable Mode	PEr	40	text	on or oFF	oFF
TIMERS & COUNTERS					
Maximum Standby Time	Sbt	41	0.5 hour	0.0 to 24.0 hours	10 hours
Pulldown Time	Pdt	41	0.5 hour	0.0 to 12.0 hours	1 hours
Inactivity Wait Time - Standby Hold	yth	41	0.5 hours	0.0 to 24.0 hours or infinite	4 hours
LIGHTING & DISPLAY					
Light State Standby Mode - Channel A	LSA	42	1%	0% to 100%	0%
Light State Standby Mode - Channel B	LSb	42	1%	0% to 100%	0%
Light State Standby Mode - Channel C	LSC	42	1%	0% to 100%	0%
Display Control During Standby Mode	dSy	43	integers	0	0
Marketing Mode	tnG	43	text	on or oFF or c01	oFF

Standby Mode (SdY) - cont

STANDBY SET **P**OINT (SSP)
The temperature at which the Compressor will turn off, when the system is running in Standby Mode. The Standby Modes are a sequence of settings that progressively conserve power during prolonged periods of inactivity. The multi-step process meets two requirements; it conserves power and it brings the product in the cabinet back to the correct temperature as quickly as possible when sales activity restarts.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SSP	Temperature	-10.0 to 15.0 °C	0.1 °C	8.5 °C	Sd

STANDBY **D**IFFERENTIAL (Sd)
The temperature above the Standby Set Point (SSP) temperature, which will cause the Compressor to turn on when in Standby Mode. The Compressor will remain on until the temperature reaches the Standby Set Point (SSP) temperature.
Compressor Turn On Temperature = SSP + Sd

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Sd	Temperature	0.1 to 10.0 °C	0.1 °C	2.0 °C	SSP

PERISHABLE MODE (PEr)
Selects whether or not the product in the cabinet must remain cold at all times. This is required for certain food stuffs and medicines, such as those under HACCP regulations. If this function is set to 'on', all Temperature and Evaporator settings will use the Normal Mode values to maintain the temperature at the Operational Set Point (SP) temperature. All other parameters (such as Lights and Display) will use the Transition Mode and Standby Mode settings.
Note: Pulldown time will be overridden to zero, as the product will remain at temperature.
on = Product kept at Set Point Temperature. Standby & Transition Modes control Lights only.
oFF = Runs in Normal Mode.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
PEr	Temperature	on or oFF	text	oFF	SP, SP-, SPt, LnA, htA

Standby Mode (SdY) - cont

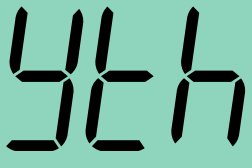
MAXIMUM **S**TAND**B**Y **T**IME (Sbt)
The maximum time permissible for the system to remain in standby without any detected activity. Pull Downs are started to ensure that the product in the cabinet reaches the Transition 3 Set Point (tS3) within Maximum Standby Time (Sbt) hours from the last detected activity.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Sbt	Time	0 to 24 hours	0.5 hour	10 hours	Pdt

PULL**D**OWN **T**IME (Pdt)
The maximum time it will take for the product in the cabinet to reach either; Operational Set Point (SP), or if it is used Transition 3 Set Point (tS3), after leaving Standby Mode. This parameter is used to determine when the Pulldown should commence to ensure that the product is at the correct temperature when the store opens at the start of the day.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Pdt	Time	0 to 12 hours	0.5 hour	1 hours	Sbt, SP, tS3

INACTIVITY WAIT TIME - STANDBY HOLD (yth)
The time the system will remain in standby with no activity before transitioning back to Transition 3 Mode.
Note:
If OCS = 0, the system will instantly return to Normal Mode
If OCS>0 and the OCS time is reached without an activity then:
If T3 > 0, The system will return to Transition 3 Mode
If T3 = 0, the system will return to Normal Mode
If OCS = inf, the system will remain indefiniately in standby until an activity is seen



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
yth	Time	0 to 24 hours or InFinite	0.5 hours	4 hours	

Standby Mode (SdY) - cont

LIGHT STATE **S**TANDBY MODE – CHANNEL **A** (LSA)
The illumination level during Standby Mode of Channel A as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LSA	Lighting & Display	0% to 100%	1%	0%	LnA, LSb, LSC

LIGHT STATE **S**TANDBY MODE – CHANNEL **B** (LSb)
The illumination level during Standby Mode of Channel B as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LSb	Lighting & Display	0% to 100%	1%	0%	LnA, LSA, LSC

LIGHT STATE **S**TANDBY MODE – CHANNEL **C** (LSC)
The illumination level during Standby Mode of Channel C as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LSC	Lighting & Display	0% to 100%	1%	0%	LnA, LSA, LSb

Standby Mode (SdY) - cont

DISPLAY CONTROL DURING **S**TANDB**Y** MODE (dSy)
Selects what is displayed during full Standby Mode:
0 = Displays the temperature.
1* = Displays the Set Point Temperature.
2* = Display is left blank.

* Not yet enabled

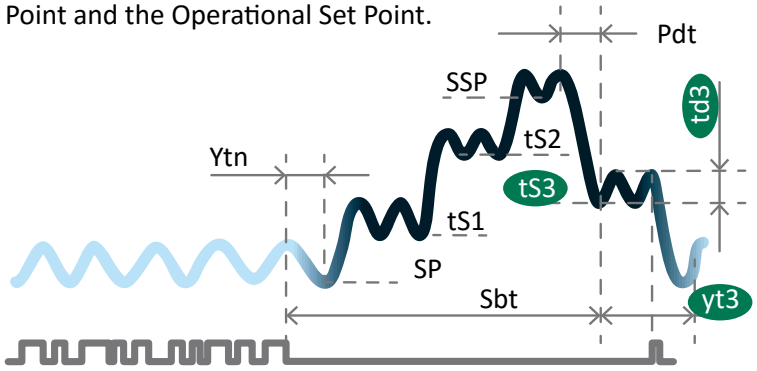
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dSy	Lighting & Display	0	integers	0	SSP

MARKE**TING** MODE (tnG)
Selects whether or not the lights stay on at all times.
on = Light levels and effects during Transition and Standby Modes controlled by Normal Mode settings.
off = Light levels and effects controlled by the current Mode settings.
c01 = Custom setting 01. All 3 LED lighting channels cycle continuously from 0 to 100%. Used for RGB lighting to cycle colours. Door state and mode is ignored

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tnG	Lighting & Display	on or oFF or c01	text	oFF	LnA, LSA, L1A, L2A, L3A

Transition 3 Mode (tn3)

The Transition Modes are used to minimize Pulldown times. Transition 3 Mode is an intermediate set point temperature in between the Standby Set Point and the Operational Set Point.

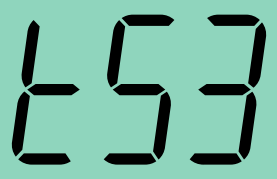


The Transition Modes may be most useful if the retail outlet opening hours vary, or if customer demand varies, such that a regular Pulldown time is uncertain.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Transition 3 Set Point	tS3	45	0.1 °C	-10.0 to 15.0 °C	5.5 °C
Transition 3 Differential	td3	45	0.1 °C	0.1 to 10.0 °C	2.0 °C
TIME					
Inactivity Wait Time - Transition 3	yt3	45	0.5 hours	0.0 to 24.0 hours	1 hour
LIGHTING & DISPLAY					
Light State Transition 3 Mode - Channel A	L3A	46	1%	0% to 100%	0%
Light State Transition 3 Mode - Channel B	L3b	46	1%	0% to 100%	0%
Light State Transition 3 Mode - Channel C	L3C	46	1%	0% to 100%	0%

Transition 3 Mode (tn3) - cont

TRAN**S**ITION **3** SET POINT (tS3)
The temperature at which the Compressor will turn off, when the system is running in Transition 3 Mode. Transition 3 Mode an intermediate step between Standby Set Point and Operational Set Point, and is used to conserve power in the event that there is no sales activity detected.

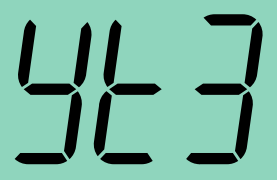


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tS3	Temperature	-10.0 to 15.0 °C	0.1 °C	5.5 °C	td3

TRANSITION **3** **D**IFFERENTIAL (td3)
The temperature above the Transition 3 Set Point (tS3) temperature, which will cause the Compressor to turn on when in Transition 3 Mode. The Compressor will remain on until the temperature reaches the Transition 3 Set Point (tS3) temperature.
Turn On Temperature = tS3 + td3

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
td3	Temperature	0.1 to 10.0 °C	0.1 °C	2.0 °C	tS3

INACTIVIT**Y** WAIT TIME - **T**RANSITION **3** (yt3)
The maximum time permitted in Transition 3 Mode without any detected activity, before switching to full Standby Mode.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
yt3	Time	0 to 24 hours	0.5 hours	1 hour	Pdt

Transition 3 Mode (tn3) - cont

LIGHT STATE TRANSITION **3** MODE – CHANNEL **A** (L3A)
The illumination level during Transition 3 Mode of Channel A as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L3A	Lighting & Display	0% to 100%	1%	0%	LSA, L3b, L3C

LIGHT STATE TRANSITION **3** MODE – CHANNEL **B** (L3b)
The illumination level during Transition 3 Mode of Channel B as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L3b	Lighting & Display	0% to 100%	1%	0%	LSA, L3A, L3C

LIGHT STATE TRANSITION **3** MODE – CHANNEL **C** (L3C)
The illumination level during Transition 3 Mode of Channel C as a percentage of full illumination.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
L3C	Lighting & Display	0% to 100%	1%	0%	LSA, L3A, L3b

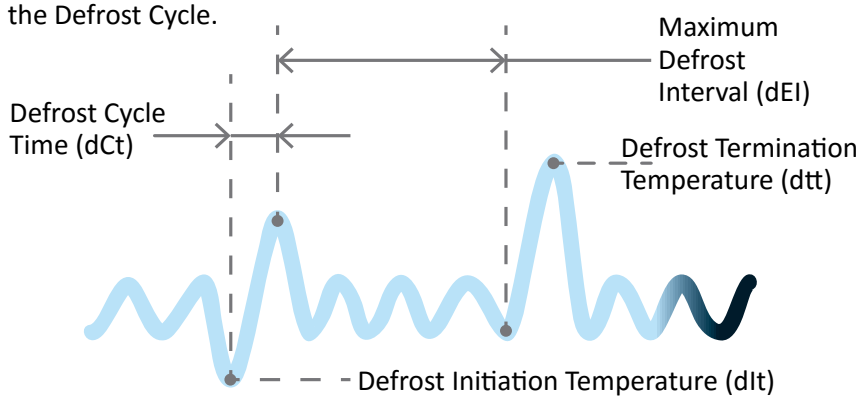
Defrost Mode (dEF)

The Defrost Cycle can be initiated or terminated by either time or temperature. During the Defrost Cycle the Normal Operational Mode is over ridden to control the Compressor, Evaporator Fan, Lights, and if used, any valves or heater elements connected to the Relay.

dEF

Supported Defrost Cycle methods are; hot gas defrost (reverse cycle), ambient defrost (with the compressor turned off), and a forced defrost (with an electric heater element).

These parameters provide the options to control and configure the Defrost Cycle.



Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Defrost Initiation Temperature	dIt	48	1°C	-15 to 10°C or **dIS**abled	**dIS**abled
Defrost Termination Temperature	dtt	48	1°C	0 to 30°C	10°C
Uninterrupted Pull Down Temperature	Pdn	48	1 °C	**dIS**abled	**dIS**abled
TIME					
Maximum Defrost Cycle Time	dCt	48	1 min	1 to 30 mins	10 mins
Maximum Defrost Interval	dEI	49	1 hour	1 to 48 hours	3 hours
Defrost Type	dtP	49	integers	0 - 3	3
Dripping Time	dPt	49	1 min	0 to 30 mins	0 min
LIGHTING & DISPLAY					
Display Value During Defrost Cycle	ddE	50	integers	3	3

Defrost Mode (dEF) - cont

DEFROST **I**NITIATION **T**EMPERATURE (dIt)
The temperature below which a Defrost cycle will be initiated. The cycle will run until either the Defrost Termination Temperature (dtt) is reached, or the Defrost Cycle Time (dCt) is met. Operation is dependent upon the settings in Defrost Type (dtP)

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dIt	Temperature	-15 to 10°C or **dIS**abled	1°C	**dIS**abled	dtt, dCt

DEFROST **T**ERMINATION **T**EMPERATURE (dtt)
The temperature at which the Defrost Cycle will terminate to prevent an excessive internal temperature.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dtt	Temperature	0 to 30°C	1°C	10°C	dCt, dIt

* UNINTERRUPTED **P**ULL**D**OW**N** TEMPERATURE (Pdn)
The temperature, which if exceeded for over an hour, will enable a Pulldown. During Pulldown, the Compressor will run continuously and Defrost Mode will be disabled. Pulldown ends when the Operational Set Point (SP) is reached.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Pdn	Temperature	dISabled	1 °C	dISabled	SSP

MAXIMUM **D**EFROST **C**YCLE **T**IME (dCt)
The maximum allowable time for a Defrost Cycle. This parameter is used to stop the Defrost Cycle if it hasn't cut out earlier due to temperature.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dCt	Time	1 to 30 mins	1 min	10 mins	dtt

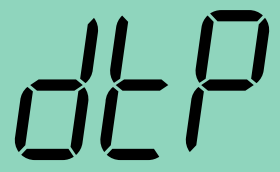
Defrost Mode (dEF) - cont

MAXIMUM **DE**FROST **I**NTERVAL (dEI)
The maximum permitted time between the finish of a Defrost Cycle and the start of the next one. This parameter is used to start the Defrost Cycle if it hasn't started earlier due to temperature.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dEI	Time	1 to 48 hours	1 hour	3 hours	dCt, dIt

DEFROST **TYP**E (dtP)
Selects which defrost method is to be used:
0 = Disabled.
1 = Defrost Cycle using an electric heater.
[Defrost ON - Evap OFF - Comp/Cond ON]
2* = Defrost Cycle using hot gas (Reverse Cycle).
3 = Defrost Cycle by turning off the Compressor (Ambient Defrost).
[Defrost OFF - Evap ON - Comp/Cond OFF]

* Not yet enabled



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dtP	Time	0 - 3	integers	3	dPt, dFS

DRI**P**PING **T**IME (dPt)
The time needed for excess moisture to drip off the Evaporator, to help prevent freeze up. Used for hot gas and electric heater defrosts only. This wait time occurs after the Defrost has been terminated by either time or temperature, but before exiting the Defrost Cycle and returning to the non-defrost operational state. During this time, the Evaporator Fan, Condenser Fan and Compressor remain off.
0 = Disabled.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dPt	Time	0 to 30 mins	1 min	0 min	dtP

Defrost Mode (dEF) - cont

DISPLAY VALUE DURING **DE**FROST CYCLE (ddE)
Selects what is displayed during the Defrost Cycle:
0* = Displays the temperature.
1* = Displays the Set Point Temperature.
2* = Display is left blank.
3 = Display shows 'dEF'.
4* = Display shows 'dEF', blinking intermittently.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ddE	Lighting & Display	0 to 4	integers	3	SP

Door Menu (dor)

The ***SCS Connect*** uses the cabinet door switch as an input device to help control the Evaporator Fan, Lights and to initiate Alarms. Please note: Should the door switch fail, these parameters will not function correctly.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Door Open Evap Continuous Run Temp	FCr	51	1 °C	0 °C to 30 °C or **dIS**abled	30 °C
TIME					
Door Open Delay	drd	52	10 secs	0 to 1800 secs	180 secs
LIGHTING & DISPLAY					
Light State Door Open - Channel A	LdA	52	1%	0% to 100% or **dIS**abled	100%
Light State Door Open - Channel B	Ldb	52	1%	0% to 100% or **dIS**abled	100%
Light State Door Open - Channel C	LdC	53	1%	0% to 100% or **dIS**abled	100%

DOOR OPEN EVAP CONTINUOUS RUN TEMP (FCr)
The temperature above which the evaporator fan will remain on, when the cabinet door has been opened, even if the fan is configured to be off when the cabinet door is opened. This helps prevent condensation build up in high humidity environments by ensuring airflow inside the cabinet.
This condition is only overriden when in defrost mode

Note: FdC should be greater than the standby setpoint + differential to ensure normal fan operation.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FCr	Temperature	0 °C to 30 °C or **dIS**abled	1 °C	30 °C	

Door Menu (dor) - cont

DOO**R** OPEN **D**ELAY (drd)
The time between the cabinet door opening (and staying open), and the Door Open Alarm triggering.
After this time, the evaporator fan and compressor will remain OFF until either the door closes, or the sytem determines that the door switch has failed open (10mins).
If the door switch is considered to have failed open, the alarm will be cleared, and the door state ignored until a closed door is seen.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
drd	Time	0 secs to 1800 secs	10 secs	180 secs	drS

LIGHT STATE **D**OOR OPEN – CHANNEL **A** (LdA)
The Channel A illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door.
Note: Light levels of between 0% and 100% are only available if Channel A is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% light level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LdA	Lighting & Display	0% to 100% or **dIS**abled	1%	100%	LnA, L1A, L2A, L3A

LIGHT STATE **D**OOR OPEN – CHANNEL **B** (Ldb)
The Channel B illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door.
Note: Light levels of between 0% and 100% are only available if Channel B is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% light level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ldb	Lighting & Display	0% to 100% or **dIS**abled	1%	100%	LnA, L1A, L2A, L3A

Door Menu (dor) - cont

LIGHT STATE **D**OOR OPEN – CHANNEL **C** (LdC)
The Channel C illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door.
Note: Light levels of between 0% and 100% are only available if Channel C is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% light level.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LdC	Lighting & Display	0% to 100% or **dIS**abled	1%	100%	LnA, L1A, L2A, L3A

Compressor Menu (CoP)

These parameters provide options to control and configure the Compressor during different parts of the refrigeration cycle and to configure the Compressor Alarms.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Condenser High Temperature Limit	Cht	68	1°C	60 °C to 150 °C or **dIS**abled	85 °C
TIMERS and COUNTERS					
Minimum Compressor Off Time	Cot	54	10 secs	10 to 1800 secs	180 secs
Compressor Maximum Starts per Hour	CSh	55	1 count	**dIS**abled	**dIS**abled
ALARMS					
Refrigeration System Failure Time	rSF	55	1 hour	0 to 100 hours or **dIS**abled	48 hours

CONDENSER **H**IGH **T**EMPERATURE LIMIT (Cht)

The temperature that turns off the Compressor for safety and protection of the system. The Compressor will turn off once this temperature has been exceed longer than 10 seconds, and will not turn back on until the temperature has dropped 20° C for 3 minutes.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Cht	Temperature	60 °C to 150 °C or **dIS**abled	1°C	85 °C	Not applicable

MINIMUM **C**OMPRESSOR **O**FF **T**IME (Cot)

The minimum amount of time that has to elapse between when the Compressor is turned off to when the Compressor is allowed to start again. This time period allows the system pressures to equalize and helps prevent the Compressor from overheating.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Cot	Time	10 to 1800 secs	10 secs	180 secs	Not applicable

Compressor Menu (CoP) - cont

COMPRESSOR MAXIMUM **S**TARTS PER **H**OUR (CSh)
The maximum number of starts a compressor can make in 1 hour, before it has to wait for the hour to elapse to start again. This is to prevent overheating where there is a fault in the system.

Note: This protective function cannot be reset by power cycling the cabinet on and off

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CSh	Counts	**dIS**abled	1 count	**dIS**abled	Not applicable

REFRIGERATION **S**YSTEM **F**AILURE TIME (rSF)
The maximum permitted time that the Compressor can run continuously before the system is shut down and an alarm is triggered.

Important Note: This protective function cannot be reset by power cycling the cabinet on and off; it can only be reset by an authorized Service Technician.

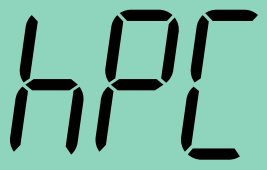
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
rSF	Alarms	0 to 100 hours or **dIS**abled	1 hour	48 hours	Not applicable

Supply Menu (nrG)

The Supply Parameters are used to configure the acceptable limits for the Voltage supply and to configure the associated alarms. This is required to protect the refrigeration system from electrical damage.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
SUPPLY					
Maxiumum Run/Start Voltage	hPC	56	1 V	100 V to 265 V or **dIS**abled	254 V
Minimum Start Compressor Voltage	LPC	56	1 V	79 V to 203 V or **dIS**abled	90 V

MAXIMUM RUN/START VOLTAGE (hPC)
The maximum Voltage at which the Compressor is allowed to start and run. After detecting an Over Voltage condition the Compressor is turned off. The minimum compressor off time must be exceeded before the compressor can turn back on. These events are logged in the SCS™ Connect. Please also refer to oPt for the restart sequence.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
hPC	Supply	100 V to 265 V or **dIS**abled	1 V	254 V	oPt, LPC

MINIMUM START COMPRESSOR VOLTAGE (LPC)
The minimum Voltage during which the Compressor is allowed to start. If it is below this Voltage then the Compressor cannot start. If the Voltage rises to an acceptable level then the Compressor can start, but only after the Voltage has been maintained for a delay period. These events are logged in the SCS™ Connect.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LPC	Supply	79 to 203 V or **dIS**abled	1 V	90 V	hPC, oPt

Display Menu (dSP)

These parameters configure what is shown on the display during different control modes and conditions.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
DISPLAY					
Temperature Display Units	tdu	57	°C or °F	°C or °F	°C
User Set Point Keypad Lock	uSL	57	text	Unlocked or Locked	Locked
Maximum Displayable Temperature	dSt	58	0.1 °C	-10.0 to 30.0 °C	30 °C
Minimum Displayable Temperature	dP-	58	0.1 °C	-10.0 to 30.0 °C	-10 °C
TIME					
Temperature Display Filter	tdF	58	1 secs	0 to 30 secs	5 secs

TEMPERATURE **D**ISPLAY **U**NITS (tdu)
Selects which temperature scale is displayed**;** Fahrenheit or Celsius. This selection automatically converts all temperature displays, from all menus, into the selected scale.
C = °C
F = °F

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tdu	Display	°C or °F	°C or °F	°C	SP, SSP, tS1, tS2

USER SET POINT KEYPAD LOCK (uSL)
Locks the front keypad, to prevent the setpoint temperature being modified by shop owners or passers by. Setpoint can still be changed via the app, or after a password has been entered into the front keypad

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
uSL	Display	Unlocked or Locked	text	Locked	

Display Menu (dSP) - cont

MAXIMUM **DIS**PLAYABLE **T**EMPERATURE (dSt)
The maximum temperature that will be displayed.
Temperatures above this amount will be displayed as "-".

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dSt	Display	-10.0 to 30.0 °C	0.1 °C	30 °C	SPt

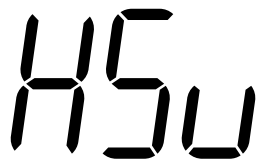
MINIMUM **DIS**PLAYABLE TEMPERATURE (dP-)
The minimum temperature that will be displayed by the unit.
Temperatures below this amount will be displayed as "--".

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dP-	Display	-10.0 to 30.0 °C	0.1 °C	-10 °C	SP-

TEMPERATURE **D**ISPLAY FILTER (tdF)
The time constant of the response of the temperature display when a temperature change is detected. This prevents the temperature display showing any misleading temperature spikes.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tdF	Time	0 to 30 secs	1 secs	5 secs	Not applicable

Hardware Set Up Menu (HSu)



The Hardware Set Up Parameters define how the peripheral Refrigeration System components are connected to the ***SCS Connect*** for input and output control.

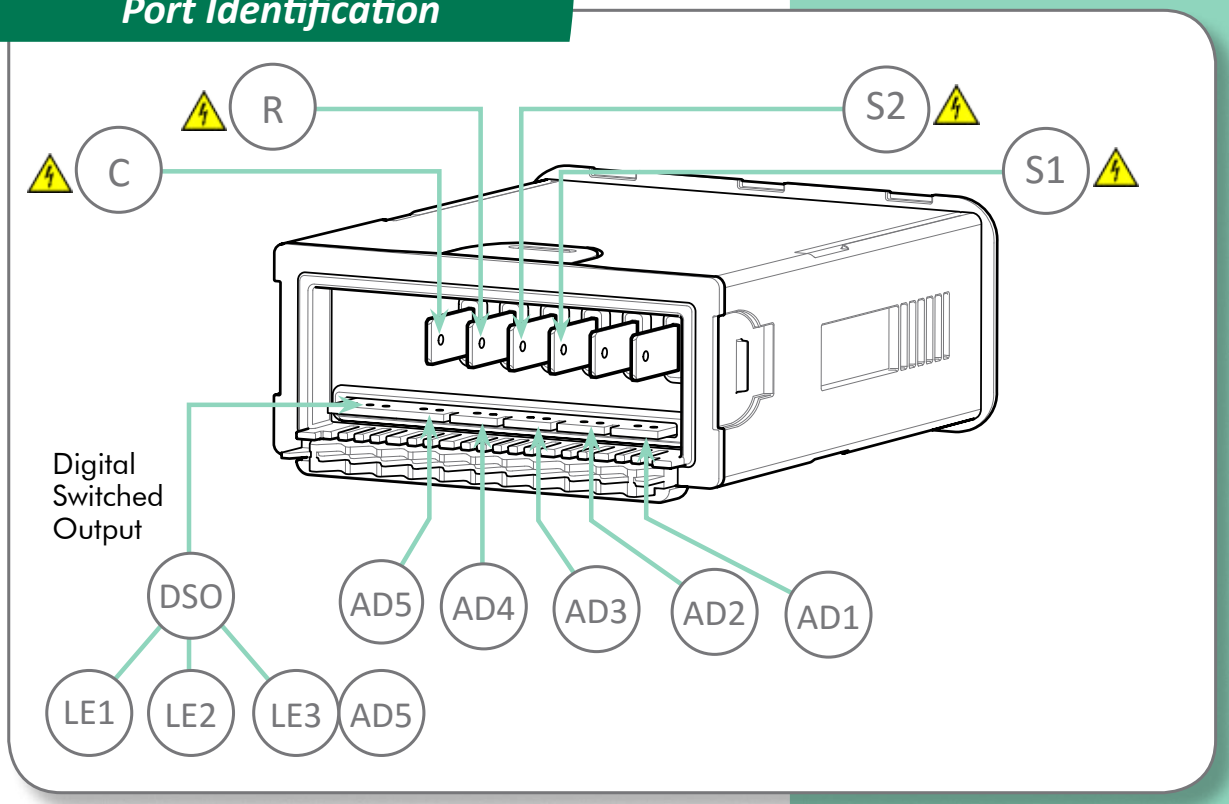
Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
INPUTS					
Control Probe Calibration Offset	CAL	68	0.1 °C	-10.0 to 10.0 °C	0.0 °C
Control Probe Response	CPb	61	1 sec	5 secs	5 secs
Return Air Temperature Port	rtP	62	Port ID	AD1 - AD5 or N.C.	AD1
Condensor Temperature Port	CdP	62	Port ID	AD1 - AD5 or N.C.	N.C.
Ambient Temperature Port	tPt	62	Port ID	AD1 - AD5 or N.C.	N.C.
Evap' Coil Temperature Port	ELt	68	Port ID	AD1 - AD5 or N.C.	N.C.
Compressor Body Temperature Port	CPP	63	Port ID	AD1 - AD5 or N.C.	N.C.
Compressor Inlet Temperature Port	CtP	63	Port ID	AD1 - AD5 or N.C.	N.C.
Door Sensor Port Configuration	dSC	63	Port ID	AD1 - AD5 or N.C.	AD4
Doorswitch State	drS	63	integers	0 or 1	0
Activity Sensor Port Configuration	SCF	64	Port ID	AD1 - AD5 or N.C.	N.C.
Activity Sensor State	SrS	64	integers	0 or 1	0
NTC 1 Beta value	n1b	64	integers	3400-4000	3960
NTC 1 Resistance	n1r	65	1 ohm	1000-15000	10,000
NTC 2 Beta value	n2b	65	integers	3400-4000	3960
NTC 2 Resistance	n2r	65	1 ohm	1000-15000	10,000
AD1 NTC Type	Ad1	65	integers	1-2	1
AD2 NTC Type	Ad2	65	integers	1-2	1
AD3 NTC Type	Ad3	66	integers	1-2	1
AD4 NTC Type	Ad4	66	integers	1-2	1
AD5 NTC Type	Ad5	66	integers	1-2	1

Hardware Set Up (HSu) - cont

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
OUTPUTS					
Output Interval Time	oPt	66	1 second	0 secs	0 secs
Compressor Port Configuration	CPC	67	Port ID	R, C or N.C.	C
Compressor State	CPS	67	integers	0 or 1	0
Evaporator Fan Port Configuration	EFC	67	Port ID	S1, S2, S1&S2, R or N.C.	S1
Evaporator Fan Control Type	ECt	67	text	on/off or Var	on/off
Evaporator Fan DIrection	EFd	68	Dir	CW or CCW	CCW
Condensor Fan Port Configuration	CdC	68	Port ID	S1, S2 or N.C.	N.C.
Condensor Fan Control Type	CCt	68	text	on/off or Var	on/off
Condensor Fan DIrection	CFd	68	Dir	CW or CCW	CCW
Defrost Port Configuration	dFC	69	Port ID	R, C or N.C.	N.C.
Defrost State	dFS	69	integers	0 or 1	0
Lighting Port Configuration - Channel A	LCA	69	Port ID	LE1,LE2,LE3, S1, S2, R, C or N.C.	R
Lighting Port Configuration - Channel B	LCb	70	Port ID	LE1,LE2,LE3, S1, S2, R, C or N.C.	N.C.
Lighting Port Configuration - Channel C	LCC	70	Port ID	LE1,LE2,LE3, S1, S2, R, C or N.C.	N.C.
Lighting State Channel A	LEA	70	integers	0 or 1	0
Lighting State Channel B	LEb	71	integers	0 or 1	0
Lighting State Channel C	LEC	71	integers	0 or 1	0

Hardware Set Up (HSu) - cont

Port Identification



CONTROL PROBE **CAL**IBRATION OFFSET (CAL)
The offset amount applied to the Control Probe output to compensate between the measured value and the actual product temperature inside the cabinet. This parameter is not configurable in the field.

CAL

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CAL	Hardware Set Up	-10.0 to 10.0 °C	0.1 °C	0.0 °C	**HSu**

*** C**ONTROL **PROB**E RESPONSE (CPb)
Dampens the response time of the Control Probe to minimize the effect of momentary temperature spikes which may otherwise trigger unnecessary system cycles. A rolling average is calculated over the chosen amount of time.

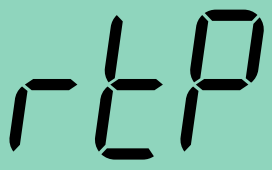
CPb

* Not yet adjustable

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CPb	Hardware Set Up	5 secs	1 sec	5 secs	**HSu**

Hardware Set Up (HSu) - cont

RETURN AIR **T**EMPERATURE **P**ORT (rtP)
Selects the Return Air Temperature Probe connection port:
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

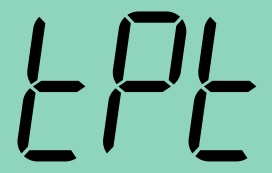


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
rtP	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	AD1	CAL, SP, SSP, tS1, tS2

COND**E**NSER TEMPERATURE **P**ORT (CdP)
Selects the Condenser Temperature Probe connection port.
This may also be called the Gas Cooler Probe in CO_2 systems:
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CdP	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	Cht

AMBIENT **T**EMPERATURE **P**OR**T** (tPt)
Selects the Ambient Temperature Probe connection port.
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tPt	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	SP, SSP, tS1, tS2, **dEF**

EVAPORATOR **C**OIL **T**EMPERATURE PORT (ELt)
Selects the Evaporator Coil Temperature Probe connection port:
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

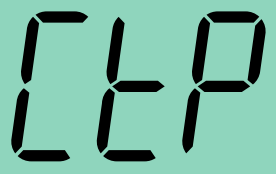
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ELt	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	EFC

Hardware Set Up (HSu) - cont

COM**P**RESSOR BODY TEMPERATURE **P**ORT (CPP)
Selects the Compressor Body Temperature Probe connection port.
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CPP	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	CPS, CtP

COMPRESSOR INLET **T**EMPERATURE **P**ORT (CtP)
Selects the Compressor Inlet Temperature Probe connection port:
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

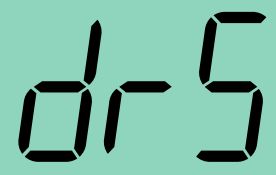


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CtP	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	CPP, CPS

DOOR **S**ENSOR PORT **C**ONFIGURATION (dSC)
Selects the Door Sensor connection port. Please also refer to 'Door Switch State' (drS).
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dSC	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	AD4	drS

DOOR **S**WITCH STATE (drS)
Selects the sensor state when the cabinet door is open. Please also refer to 'Door Sensor Port Configuration' (dSC).
0 = The cabinet door is open when the i/p has high impedance.
1 = The cabinet door is open when the i/p has low impedance.



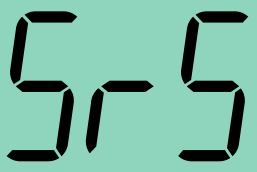
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
drS	Hardware Set Up	0 or 1	integers	0	dSC

Hardware Set Up (HSu) - cont

ACTIVITY **S**ENSOR PORT **C**ON**F**IGURATION (SCF)
Selects the Activity Sensor connector port. Please also refer to 'Activity Sensor State' (SrS).
N.C. = Not Connected
AD1 – AD5 = Analog or Digital i/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SCF	Hardware Set Up	AD1 - AD5 or N.C.	Port ID	N.C.	SrS

ACTIVITY **S**ENSO**R** **S**TATE (SrS)
Selects which state the Relay is in when the Activity Sensor detects activity. Please also refer to 'Activity Sensor Port Configuration' (SCF).
0 = The Activity Sensor detects activity when the i/p has high impedance.
1 = The Activity Sensor detects activity when the i/p has low impedance.

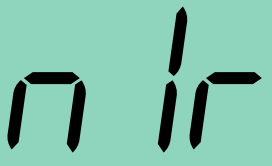


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SrS	Hardware Set Up	0 or 1	integers	0	SCF

NTC 1 BETA VALUE (n1b)
The beta value use for NTC type 1. Two different NTC types can be used simultaneously.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
n1b	Hardware Set Up	3400-4000	integers	3960	n1r

NTC 1 RESISTANCE (n1r)
The resistance at 25°C for NTC type 1. Two different NTC types can be used simultaneously.

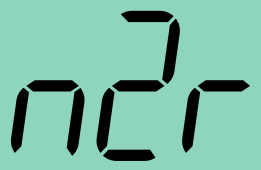


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
n1r	Hardware Set Up	1000-15000	1 ohm	10000	n1b

Hardware Set Up (HSu) - cont

NTC 2 BETA VALUE (n2b)
The beta value use for NTC type 2. Two different NTC types can be used simultaneously.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
n2b	Hardware Set Up	3400-4000	integers	3960	n2r



NTC 2 RESISTANCE (n2r)
The resistance at 25°C for NTC type 2. Two different NTC types can be used simultaneously.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
n2r	Hardware Set Up	100-15000	1 ohm	10000	n2b

AD1 NTC TYPE (Ad1)
Determines which NTC type is connected to AD1. The NTC type is defined by beta value and resistance.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ad1	Hardware Set Up	1-2	integers	1	n1b,n1r, n2b,n2r

AD1 NTC TYPE (Ad2)
Determines which NTC type is connected to AD2. The NTC type is defined by beta value and resistance.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ad2	Hardware Set Up	1-2	integers	1	n1b,n1r, n2b,n2r

Hardware Set Up (HSu) - cont

AD1 NTC TYPE (Ad3)
Determines which NTC type is connected to AD3. The NTC type is defined by beta value and resistance.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ad3	Hardware Set Up	1-2	integers	1	n1b,n1r, n2b,n2r

AD1 NTC TYPE (Ad4)
Determines which NTC type is connected to AD4. The NTC type is defined by beta value and resistance.

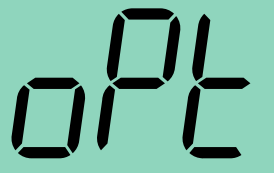
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ad4	Hardware Set Up	1-2	integers	1	n1b,n1r, n2b,n2r

AD1 NTC TYPE (Ad5)
Determines which NTC type is connected to AD5. The NTC type is defined by beta value and resistance.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Ad5	Hardware Set Up	1-2	integers	1	n1b,n1r, n2b,n2r

*** OUPUT INTERVAL TIME (oPt)**
The time delay between any two devices turning on to prevent overloading. The start up sequence for connected devices is as follows:
1. Lights
2. Evaporator Fan
3. Compressor
4. Condenser Fan

* Not yet adjustable



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
oPt	Hardware Set Up	0 secs	1 second	0 secs	hPC

Hardware Set Up (HSu) - cont

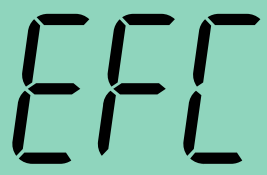
COMPRESSOR **P**ORT **C**ONFIGURATION (CPC)
Selects the Compressor connection port:
N.C. = Not Connected
R = 5A Relay o/p
C = 12A Relay o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CPC	Hardware Set Up	R, C or N.C.	Port ID	C	hPC, LPC

COM**P**RESSOR **S**TATE (CPS)
Selects the Relay state when the Compressor is on. This function is only used when an External Relay is fitted to the Compressor.
0 = Normally open (Relay contact open when Compressor is off). Default.
1 = Normally closed (Relay contact closed when Compressor is off).

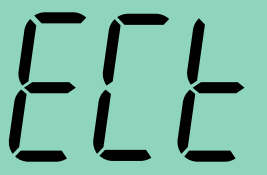
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CPS	Hardware Set Up	0 or 1	integers	0	CPP, CtP

EVAPORATOR **F**AN PORT **C**ONFIGURATION (EFC)
Selects the Evaporator Fan connection port.
N.C. = Not Connected
S1 & S2 = 0.4/0.6A Solid State Relay o/p



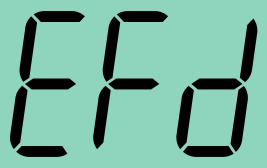
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
EFC	Hardware Set Up	S1, S2, S1&S2 R or N.C.	Port ID	S1	ECt

EVAPORATOR FAN **C**ONTROL **T**YPE (ECt)
Selects whether the Evaporator Fan Port operates as an ON/OFF switch or as a variable speed fan control output.
0 = Normal Switch
1 = Variable Speed Fan Control



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ECt	Hardware Set Up	on/off or var	text	on/off	

Hardware Set Up (HSu) - cont



EVAPORATOR FAN DIRECTION (EFd)
Selects the direction of the evaporator fan rotation

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
EFd	Hardware Set Up	CW or CCW	text	CCW	

CON**D**ENSER FAN PORT **C**ONFIGURATION (CdC)
Selects the Condenser Fan connection port:
N.C. = Not Connected
S1 & S2 = 0.4/0.6A Solid State Relay o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CdC	Hardware Set Up	S1, S2 or N.C.	Port ID	N.C.	Cht

CONDENSER FAN **C**ONTROL **T**YPE (CCt)
Selects whether the Condenser Fan Port operates as an ON/OFF switch or as a variable speed fan control output.
0 = Normal Switch
1 = Variable Speed Fan Control

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CCt	Hardware Set Up	on/off or var	text	on/off	

CONDENSOR FAN DIRECTION (CFd)
Selects the direction of the condensor fan rotation

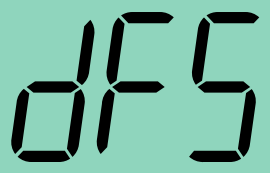
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CFd	Hardware Set Up	CW or CCW	text	CCW	

Hardware Set Up (HSu) - cont

DEFROST PORT **C**ONFIGURATION (dFC)
Selects the Defrost Coil connection port. This function is only used with a Heated Defrost Cycle. Please also refer to 'Defrost State' (dFS).
N.C. = Not Connected
R = 5A Relay o/p
C = 12A Relay o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dFC	Hardware Set Up	R, C or N.C.	Port ID	N.C.	dFS, dtP

DEFROST **S**TATE (dFS)
Selects the Relay state when the Defrost Cycle is off. Please also refer to 'Defrost Port Configuration' (dFC).
0 = Normally open (Relay contact open when Defrost Cycle not running). Default.
1 = Normally closed (Relay contact closed when Defrost Cycle not running).



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dFS	Hardware Set Up	0 or 1	integers	0	dFC

LIGHTING PORT **C**ONFIGURATION – CHANNEL **A** (LCA)
Selects the lighting connection Port. Please also refer to Lighting State Channel A (LEA).
N.C. = Not Connected
R = 5A Relay o/p
C = 12A Relay o/p
S1, S2 = 0.4/0.6A Solid State Relay o/p
LE1 – LE3 = Switched 24V o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LCA	Hardware Set Up	LE1,LE2,LE3, S1, S2, R, C or N.C.	Port ID	R	LEA, LEb, LEC

Hardware Set Up (HSu) - cont

LIGHTING PORT **C**ONFIGURATION – CHANNEL **B** (LCb)
Selects the lighting connection Port. Please also refer to Lighting State Channel B (LEb).
N.C. = Not Connected
R = 5A Relay o/p
C = 12A Relay o/p
S1, S2 = 0.4/0.6A Solid State Relay o/p
LE1 – LE3 = Switched 24V o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LCb	Hardware Set Up	LE1,LE2,LE3, S1, S2, R, C or N.C.	Port ID	N.C.	LEA, LEb, LEC

LIGHTING PORT **C**ONFIGURATION – CHANNEL **C** (LCC)
Selects the lighting connection Port. Please also refer to Lighting State Channel C (LEC).
N.C. = Not Connected
R = 5A Relay o/p
C = 12A Relay o/p
S1, S2 = 0.4/0.6A Solid State Relay o/p
LE1 – LE3 = Switched 24V o/p

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LCC	Hardware Set Up	LE1,LE2,LE3, S1, S2, R, C or N.C.	Port ID	N.C.	LEA, LEb, LEC

LIGHTING STAT**E** CHANNEL **A** (LEA)
Selects the state when the lighting is off. Please also refer to the Lighting Port Configuration – Channel A (LCA).
0 = Normally Open (Relay contact open when lights are off)
(Switched 24V open when lights are off)
1 = Normally Closed (Relay contact closed when lights are off)
(Switched 24V closed when lights are off)

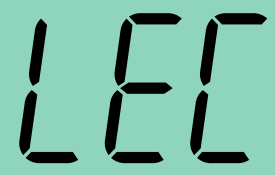
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LEA	Hardware Set Up	0 or 1	integers	0	LCA, LCb, LCC

Hardware Set Up (HSu) - cont

LIGHTING STAT**E** CHANNEL **B** (LEb)
Selects the state when the lighting is off. Please also refer to the Lighting Port Configuration – Channel B (LCb).
0 = Normally Open (Relay contact open when lights are off)
(Switched 24V open when lights are off)
1 = Normally Closed (Relay contact closed when lights are off)
(Switched 24V closed when lights are off)

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LEb	Hardware Set Up	0 or 1	integers	0	LCA, LCb, LCC

LIGHTING STAT**E** CHANNEL **C** (LEC)
Selects the state when the lighting is off. Please also refer to the Lighting Port Configuration – Channel C (LCC).
0 = Normally Open (Relay contact open when lights are off)
(Switched 24V open when lights are off)
1 = Normally Closed (Relay contact closed when lights are off)
(Switched 24V closed when lights are off)



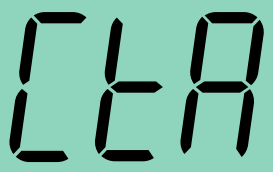
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LEC	Hardware Set Up	0 or 1	integers	0	LCA, LCb, LCC

General Alarms Menu (GAL)

The General Alarm Parameters are global parameters which apply across all Functional Categories.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
ALARMS					
Clear Terminal Alarm	CtA	72	n/a	yES or no	no

CLEAR **T**ERMINAL **A**LARM (CtA)
Clears all terminal system alarms and resets all terminal alarm counters back to zero. To clear the terminal alarms the value must be manually changed to the 'yES' option and entered. After this has been done and the terminal alarms have been successfully cleared, the display will revert back to the default 'no'.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CtA	Alarms	yES or no	text	no	rSF

Logging Menu (LoG)

The Logging Parameters define how data is logged and sent to the cloud

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
Timers and Counter					
Logging Interval	LGt	73	mins	30 to 1440	30

LOGGING INTERVAL (LGt)
Sets the time in mins between logging of statistics. Statistics are uploaded via the asset tracking application to the cloud for viewing of historical statistics.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LGt	Logging	30 to 1440 mins	1 min	30 mins	not applicable

UPGRADING FIRMWARE

SCS Programming Steps

Firmware can be updated from either the mobile or desktop app. The steps are the same for both. Screenshots used are from the mobile app, but look the same on the desktop app

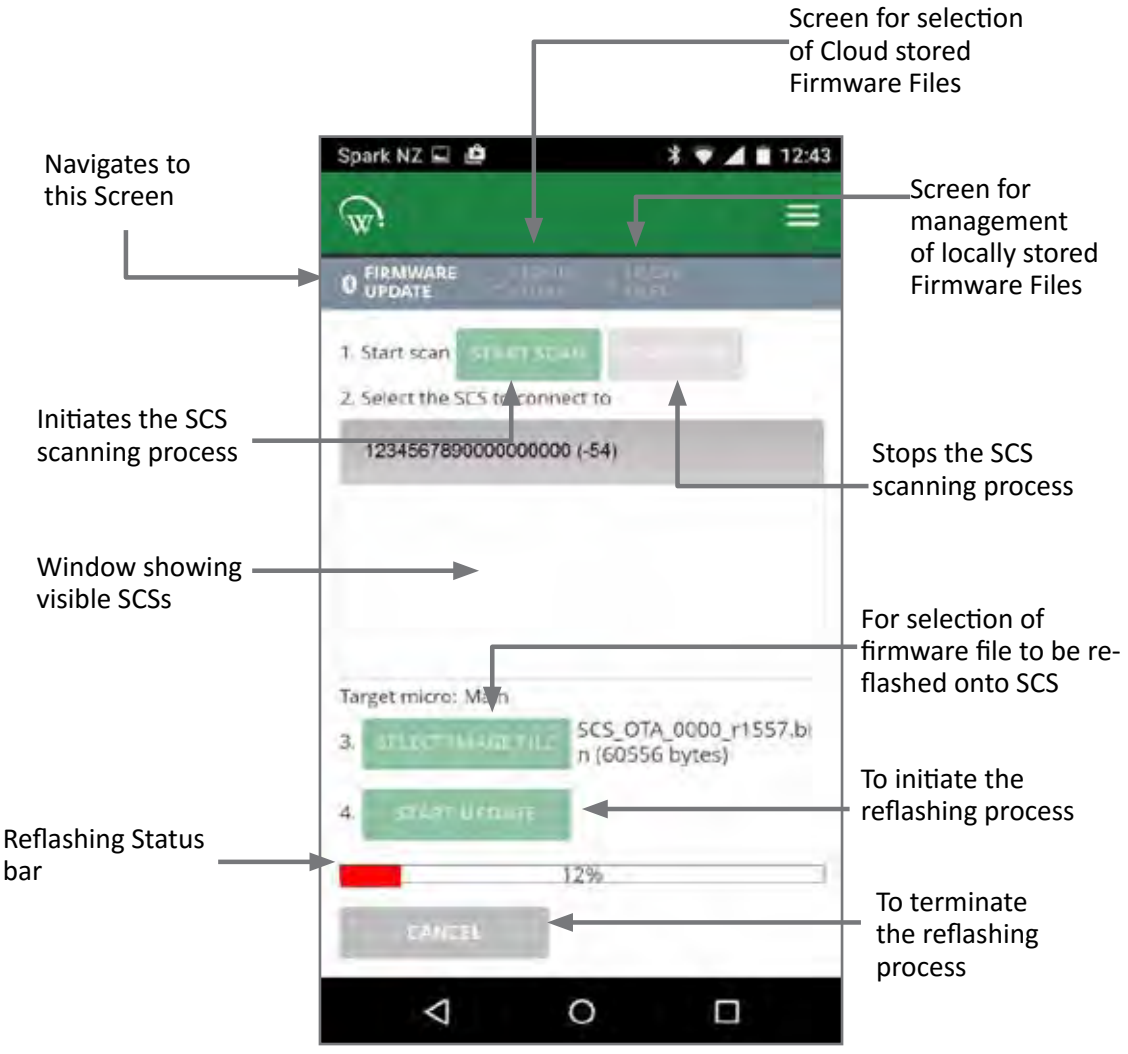
The SCS contains two microprocessors.

- Hi-side micro
  Responsible for all voltage, power and current monitoring and S1 and S2 switching
- Main micro
  Responsible for all control algorithms

Quick Read

- ☐ Step 1: Select controller.
- ☐ Step 2: Select Bin File.
- ☐ Step 3: Connect.
- ☐ Step 4: Verify and Program.

FIRMWARE UPDATE Screen



UPDATE PROCESS

Step 1

Step 1:
Select Cloud Stored Firmware Files

Step 2

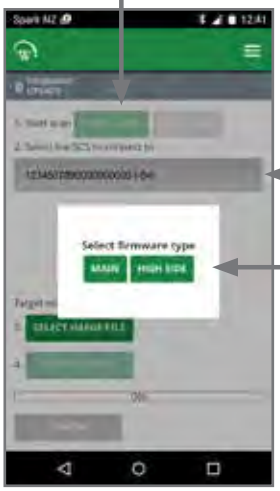
Step 2a:
Select the file you want to use

Step 2b:
Choose DOWNLOAD

Note:
SCS_OTA are Main micro files
SCS_HS are Hi-side micro files

Step 3

Step 3a:
Start scanning for SCS to upgrade



Step 3b:
Select SCS to Upgrade
(Bluetooth Indicator will flash on selected SCS once successfully connected)

Step 3c:
Choose which micro* to upgrade

Note:
If you choose “Main Micro”, the SCS will reset itself, and display “OtA”, which means it is ready to upgrade the main micro.

Step 4

Step 4a:
Select Locally Stored Firmware file for Upgrade

Step 4b:
Start the upgrade

Step 4c:
Ensure “Firmware Update Complete” is displayed after programming. Otherwise, you will need to try again.

* For hi-side upgrades, early versions of code require an additional step not documented here. Please contact Wellington for further details

TECHNICAL SPECIFICATIONS

Technical Specification Table

POWER	
Power Supply	90 - 240Vac +10/-15% 50/60Hz
Input Connectors	6.08mm x 0.81mm QC tabs Maximum rated current per terminal 12A
Power Consumption	3.5W maximum
Voltage Protection	Compressor Over Voltage Protection Compressor Under Voltage Protection
HV OUTPUTS	
Output Ratings	C: Switched 12Arms* R: Switched 5Arms* S1: Switched 0.4Arms* (Switched 0.6Arms)** S2: Switched 0.4Arms* (Switched 0.6Arms)** Maximum total rated current 12A
Relay Operating Cycles	EN60730-1: 30,000 operations UL: 30,000 operations
Output Connectors	6.08mm x 0.81mm QC tabs Maximum cable length: 10m
LV INPUTS/OUTPUTS	
Sensor Temperature Range	-50°C to 90°C @ 0.1°C (-50°C to 300°C measurement range, limited only by NTC capability)
Ratings	SELV Digital 0 - 5V i/p Analog NTC i/p 5V, 100mA o/p (AD4 only)
LV Connectors	2-way Stocko 7234-202-000-960-000-00-G 5-way Stocko 7234-005-000-960-000-00-G Maximum cable length: 10m***
Supported Temperature Sensors	NTC - 1k to 15k @ 25°C, Beta Value 3400 to 4000
Supported Digital Inputs	High impedence voltage input
PWM outputs	0 - 24Vdc, PWM, 1A (x4)
UART	Half duplex and Full duplex

* At 55°C with 105°C wire or at 42°C with 90°C wire
**At 42°C with 105°C wire
*** 2m when not installed in a cabinet (EN55014-1)

Specifications Table - cont

ENVIRONMENTAL	
Operational Temperature Range	-20°C to +55°C <90% RH non-condensing
Storage Conditions	-40°C to +80°C <90% RH non-condensing
CONNECTIVITY	
Bluetooth™ Capability	Bluetooth™ LE
Supported Windows O/S for GUI module	Windows XP SP 2 Windows Vista Windows 7 Windows 8 Windows 8.1
Supported Mobile App Devices	Android with BT 4.0 and OS 4.4.3 or above iPhone 4S or later iPAD 3rd Gen or later iPAD mini
PHYSICAL	
Dimensions	SCS Overall Dimensions: 36.2mm (H) x 81.2mm (W) x 97.7mm (D) Aperture Dimensions: 29mm (H) x 71mm (W) Maximum Mounting Panel Thickness: 9mm Clearance Required for Escutcheon: 4mm above and below and 7mm to the left and right of aperture hole.
Display	3 Digit LED Display, Digits 20mm high Minimum Resolution: 0.1°C Colours: Green, Blue, Red
Activity Indicators	Fan Indicator Defrost Mode Indicator Compressor Indicator Night Mode Indicator Alarm Indicator Bluetooth™ Indicator
Interface	4 capacitive touch buttons
Housing Materials	Escutcheon: ABS, Color: Please enquire Main Housing: PC, Color: Grey tinted clear Seals: Silicone, Color: Black Rear Cover: PC, Color: Gray tinted clear Retaining Clips: POM, Color: Black
Cleaning	Use only a damp cloth with neutral detergents

Specifications Table - cont

COMPLIANCE AND APPROVALS	
Fire Rating	UL94-V0
Electrical Insulation Rating	Class II (when correctly installed)
Immunity against Voltage Surges	4000V (per EN61000-6-2)
Software Classification	Class A
Safety Compliance	IEC-60335 IEC-60730* UL-60730* cUL*
Ingress Protection	Front Panel: IP 68 Rear (Connectors enclosure): IP x5
Explosive Environments	ATEX*, HC Compatible*
EMC	Immunity: EN6100-6-2, EN 301 489-1, EN301 489-17 Emmissions: EN55014-1 , EN301 489-17 , EN300 328 V1.8.1 EN50371 FCC Part 15B and 15C EN 300 328 ICES-001, RSS-247, RSS-102 AS/NZS 4268, AS/NZS CISPR 22
European Directive: Restriction of Hazardous Substances	EU Directive 2002/95/EC (RoHS)
European Directive: Waste Electrical and Electronic Equipment	EU Directive 2002/96/EC (WEEE)

* Pending

FCC Declaration

Information to the user (FCC Part 15.105)

CLASS B DEVICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encourage to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

This device complies with Innovation, Science and Economic Development (ISED) Canada's licence-exempt RSS standards. Operation is subject to the following two conditions:

1. This device may not cause interference; and

2. This device must accept any interference, including interference that may cause undesired operation of the device.

DÉCLARATION DE CONFORMITÉ À LA FCC/IC
Cet appareil est conforme avec Innovation, Sciences et Developpement economic Canada RSS standard exempts de licence(s). Son utilisation est soumise à Les deux conditions suivantes:

1. cet appareil ne peut pas provoquer d'interférences et

2. cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif

CAN ICES-3 (B)/NMB-3(B)

Warning: Any changes or modifications not expressively approved by Wellington Drive Technologies Ltd could void the user's authority to operate this equipment

GLOSSARY

Term Used	Definition
AC	Alternating Current.
Activity	An activity is defined as a human interaction with the cabinet, such as opening the cabinet door to access the product inside.
Activity Sensor State	Using input sensors to determine if there has been any activity or interaction with the cooler unit.
Alarm	An audible or visual signal from the controller which warns that one or more parameters are outside of requirements.
Ambient Temperature	The average air temperature outside of the cooler unit.
ATEX Mark	The ATEX Mark signifies that the product conforms to the relevant category standards for devices located in potentially explosive environments, required by the European Economic Area (EEA).
CCC Mark	The CCC Mark signifies that the product conforms to the relevant product standards required by China.
CE Mark	Conformité Européenne. The CE mark signifies that the product conforms to all applicable European Directives required by the European Economic Area (EEA).
Compressor	A device for compressing the refrigerant medium to change it from vapour to liquid in the condenser coil.
Compressor Inlet Temperature	The temperature detected on the outside of the compressor inlet.
Condenser	The part of the refrigeration system where the refrigeration medium changes phase from vapour to liquid through external cooling.
Configuration	A configuration of a given parameter is where a particular setting or value of a parameter has been saved into the ***SCS Connect*** controller. The parameter is then said to be configured.

Term Used	Definition
Control Probe	An input device which provides data about a parameter.
Cooler Unit	The unit containing the refrigeration system and an insulated space for storing and displaying product.
Counts	Counts are the number of recorded instances of a particular event, most usually associated with Alarm Parameters.
cUL Mark	The cUL Mark signifies that the product conforms to the relevant safety compliance required by the USA and Canada.
DC	Direct Current.
Defrost Cycle	A mode where the refrigeration system switches off the compressor to defrost the evaporator coil. This may be assisted by heating and by the evaporator fan blowing air across the evaporator coil.
Diagnostics	The process of analyzing data from the controller to determine the current function of the unit, particularly for initial set up and fault finding.
Differential	Used to moderate, modify or calibrate a given parameter, a Differential is an offset difference between the usual upper and lower values of the parameter and the point where something is triggered.
Duty Cycle	The ratio of Compressor on time to off time.
Energy Management	A category of parameters concerned with energy efficiency.
EU Directive 2002/95/EC (RoHS)	The EU Directive which governs the Restriction of Hazardous Substances (RoHS) in goods. This directive is closely linked with the Waste Electrical and Electronic Equipment directive (WEEE).
EU Directive 2002/96/EC (WEEE)	The Waste Electrical and Electronic Equipment directive (WEEE), which governs the collection, recycling and disposal of electrical and electronic goods. This directive is closely linked with the Restriction of Hazardous Substances directive (RoHS).
Evaporator Fan	The fan which is used to blow internal air over the evaporator coil. The evaporator coil takes heat away from the air, cooling the air down.

Term Used	Definition
Evaporator Temperature	The temperature detected on the outside of the evaporator coil.
GUI	Graphical User Interface.
HACCP	Hazard Analysis & Critical Control Points is a preventive approach to food safety and storage of medicines, where refrigeration control is recognized as a critical control point.
HC Compatible	Suitable for use with flammable refrigerants in refrigerators complying with IEC60335-2-89.
High Voltage	Any part of the refrigeration system which operates on voltages that are hazardous.
Impedence	The opposition to the flow of electrical current in an electrical circuit when a voltage is applied.
Input Ports (i/p)	These are the connector ports on the back of the controller unit for inbound control signals.
Internal Temperature	The temperature detected inside the cooler unit where the product is placed.
IRAM Mark	The IRAM Mark signifies that the product conforms to the relevant product standards required by Argentina.
LED	Light Emitting Diode.
N.C.	Not Connected', in relation to the Hardware Set Up parameters.
Normal Mode	The standard automatic running mode.
NSF Mark	The NSF Mark signifies that the product conforms to the relevant food safety regulations from the independent NSF organisation.
OEM	Original Equipment Manufacturer.

Term Used	Definition
Output Ports (o/p)	These are the connector ports on the back of the controller unit for outbound signals to controlled devices.
Over Voltage	A state where the supply power voltage is higher than the design limits of the equipment.
Parameter	A quantifiable measure of some kind. Parameters are used to control the refrigeration system. Examples of parameters are temperature and time.
Perishable Mode	The mode used when the goods being stored can be damaged if not kept continuously cool, for example medicines and dairy products. Standby modes are disabled. This function complies with rules and regulations under HACCP.
Probes	Probes are devices which generate a signal used to control devices as a result of a detected environmental change. Probes are a kind of sensor, and the two terms are often used interchangibly.
Products	Products are the items being stored inside the refrigerated cabinet, for example chilled drinks.
Pulldown Time	The time taken between when the compressor and evaporator fan starts working and when the cooled product reaches the required temperature.
PWM	Pulse Width Modulation, a method of controlling supplied power using high frequency switching.
Refrigeration System	The components comprising the complete refrigeration circuit, including controller, evaporator, expansion valve, condenser, compressor and evaporator fan.
Relays	These are the high voltage switched connectors on the back of the controller unit for controlling high voltage AC devices, such as the compressor and evaporator fan.
SELV	Safety Extra Low Voltage. An electrical system in which the voltage cannoyt exceed 50Vrms under normal conditions, and under single-fault conditions.

Term Used	Definition
Sensor	Sensors are devices which generate a signal used to control devices as a result of a detected environmental change. Probes are a kind of sensor, and the two terms are often used interchangibly.
Setpoint	The preferred target value for a given parameter.
Soft Start	A controlled time delay between when the power comes on and when the compressor is allowed to start.
Standby Modes	A sequence of control modes used to save energy during periods of lower use.
States	The state of a device (eg; 'on' or 'oFF') is used by the ***SCS Connect*** controler to make logic decisions when controlling the device.
Terminal Alarm	A Terminal Alarm is caused by a significant fault. If the Terminal Alarm fault count exceeds a certain number, then the refrigeration system is shut down to protect it against damage.
Thermostat	A switch or signal device, activated by changes in temperature.
Transition Modes	A series of “inbetween” modes that can be used to adjust set-point and lighting levels, without fully changing between Normal and Standby mode.
UL Mark	The UL Mark signifies that the product conforms to the relevant safety compliance standard published by Underwriters Laboratories Inc.
Under Voltage	A state where the supply power voltage is lower than the requirements of the equipment.
VDE Mark	The VDE Mark signifies that the product conforms to the relevant electrical equipment safety regulations from the independent VDE organisation.

FAULTS AND ALARMS

Quick Read

The ***SCS Connect*** contains the following fault protection mechanisms:

FAULTS (Displays Alarm Symbol)

- ☐ Door Fail
- ☐ Excessive Door Open Counts
- ☐ Over Voltage
- ☐ Under Voltage
- ☐ Condenser Overtemp
- ☐ Maximum Compressor Starts in 1hr *

ALARMS (Displays Alarm Symbol and Alarm Code)

- ☐ Door Left Open Alarm (AL1)
- ☐ Excessive Condenser Overtemp (AL15) *
- ☐ NTC Failure (AL17)
- ☐ Refrigeration Fail (AL19)
- ☐ Return Air Under Temp (AL20)
- ☐ Triac Overcurrent (AL22 , AL23)

FAULTS are logged, but do not affect product temperature, and require no action by the Shop Owner.

ALARMS are logged, but they can result in warm product. Some faults can be cleared by the store owner, but others can only be cleared by a service technician.

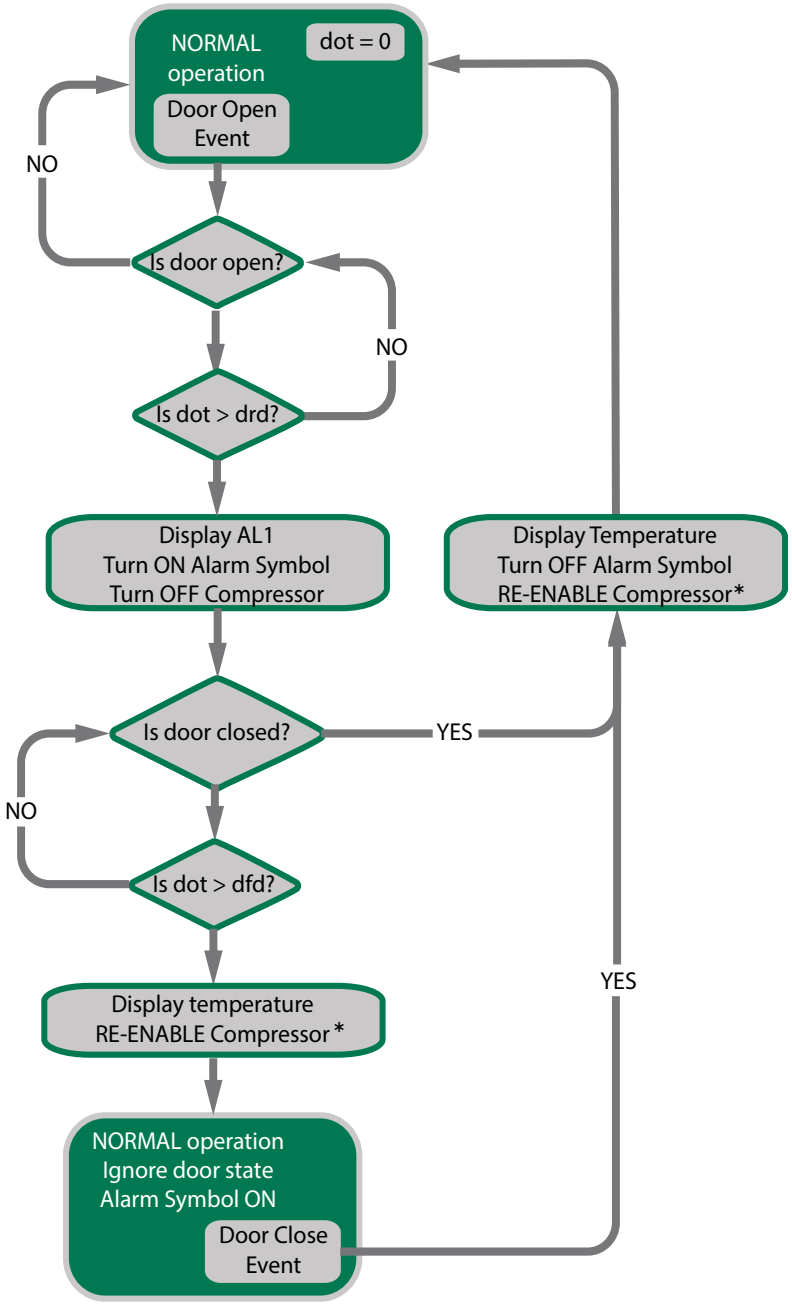
* Not yet implemented

Alarm Codes

Reporting an alarm early will minimise the down time of the cooler. An alarm code should always be supplied when reporting an alarm.

Fault Code	Fault	Possible Causes and Actions
1	**Door Open** The door has been left open	Closing the door will clear this fault. The door may not be close properly due to sagging, and may require adjustment.
15	**Excessive Condenser Overtemp** The condenser has seen multiple overtemperature conditions in a short space of time.	Check that nothing is blocking the condenser e.g. boxes, and then reset by power cycling. If this fault continues to happen, check that the condenser fan is functioning correctly.
17	**NTC Failure** Either the main temperature sensor probe or the condenser temperature probe (if fitted) has failed.	The temperature probe needs replacing. The system will not run while this fault is present.
19	**Refrigeration Failure** The compressor has run continuously for the configured time without reaching the setpint temperature	Multiple possibilities, preventing the system from acheiving temperature. The system will not reset by power cycling, only by writing to the "Clear Terminal Alarm" parameter (see page 72)
20	**Return Air Under Temp** The temperature has dropped below the normal mode setpoint by a specified amount	The product temperature keeps getting colder, even when the compressor is turned off. Check the compressor is correctly wired, and that the "Compressor State" parameter is set correctly. Can also be due to an external secondary compressor relay failure. (See page 67)
21	**Triac S1 Overcurrent** The loading on S1 draws too much current	A high current components, such as the compressor, has incorrectly been connected to the S1 output. Check the wiring.
22	**Triac S2 Overcurrent** The loading on S1 draws too much current	A high current components, such as the compressor, has incorrectly been connected to the S1 output. Check the wiring.

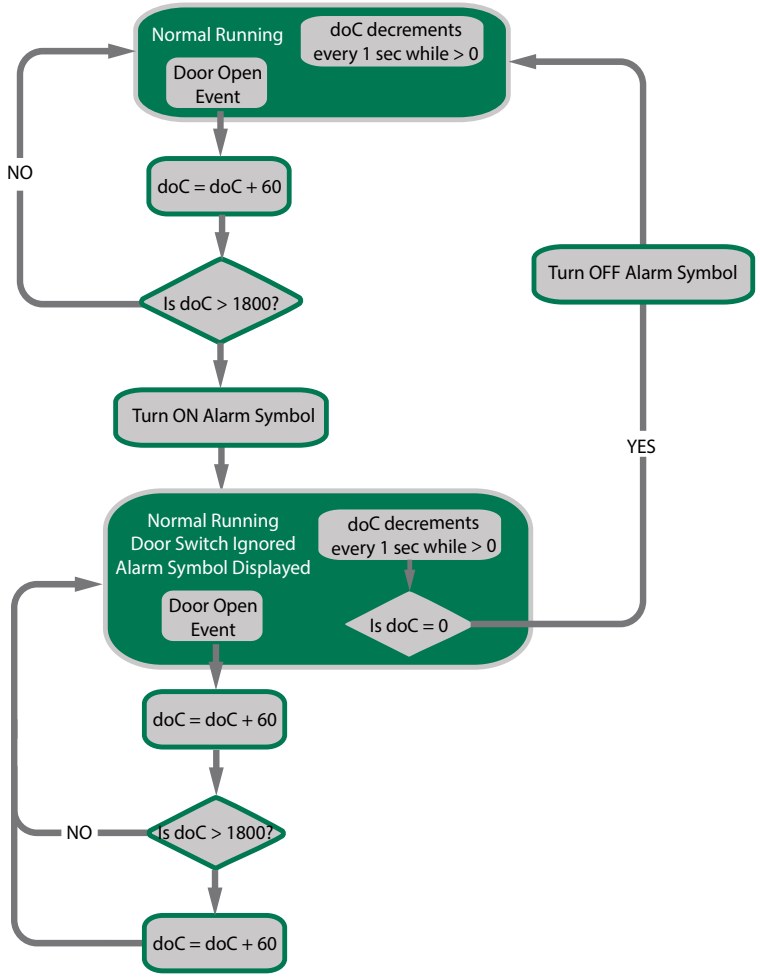
Door Open and Door Fail



Variable	Type	Description
dot	Timer	Door Open Time
drd	Limit	Door Open Delay
dfd	Limit	Door Fail Delay

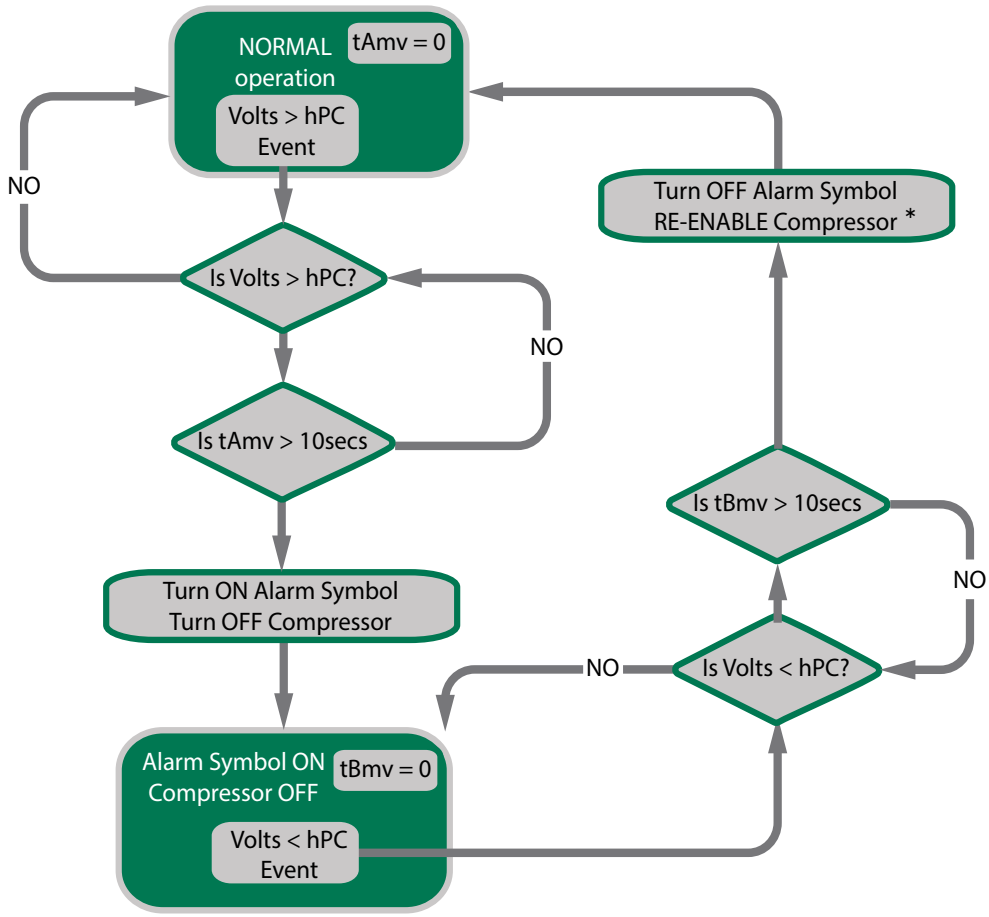
* Compressor will not re-start unless it has been off for the minimum off time

Excessive Door Openings



Variable	Type	Description
doc	Limit	Door Open Count

Over Voltage

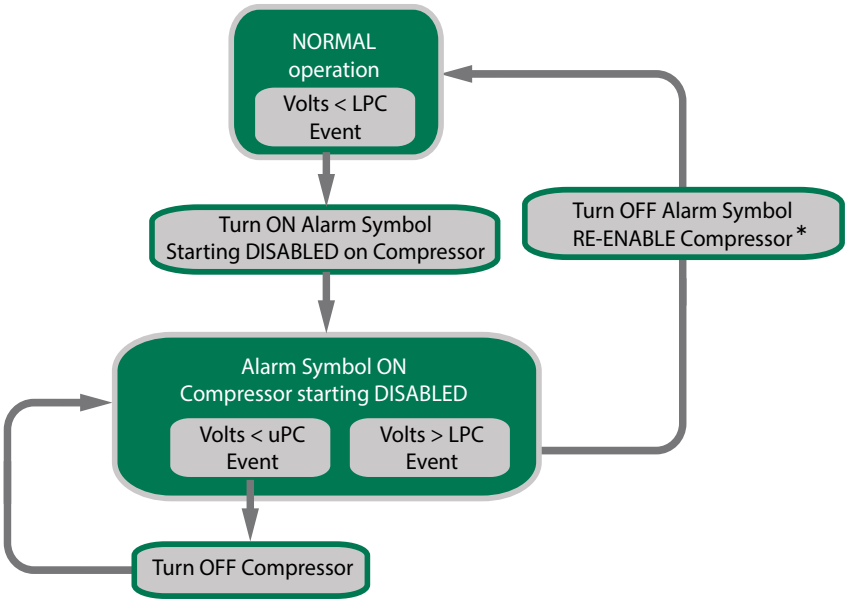


Variable	Type	Description
Volts	Input	Current voltage level
hPC	Limit	Maximum Run/Start Voltage
tAmv	Timer	Time ABOVE maximum voltage
tBmv	Timer	Time BELOW maximum voltage

* Compressor will not re-start unless it has been off for the minimum off time

Fault Logic

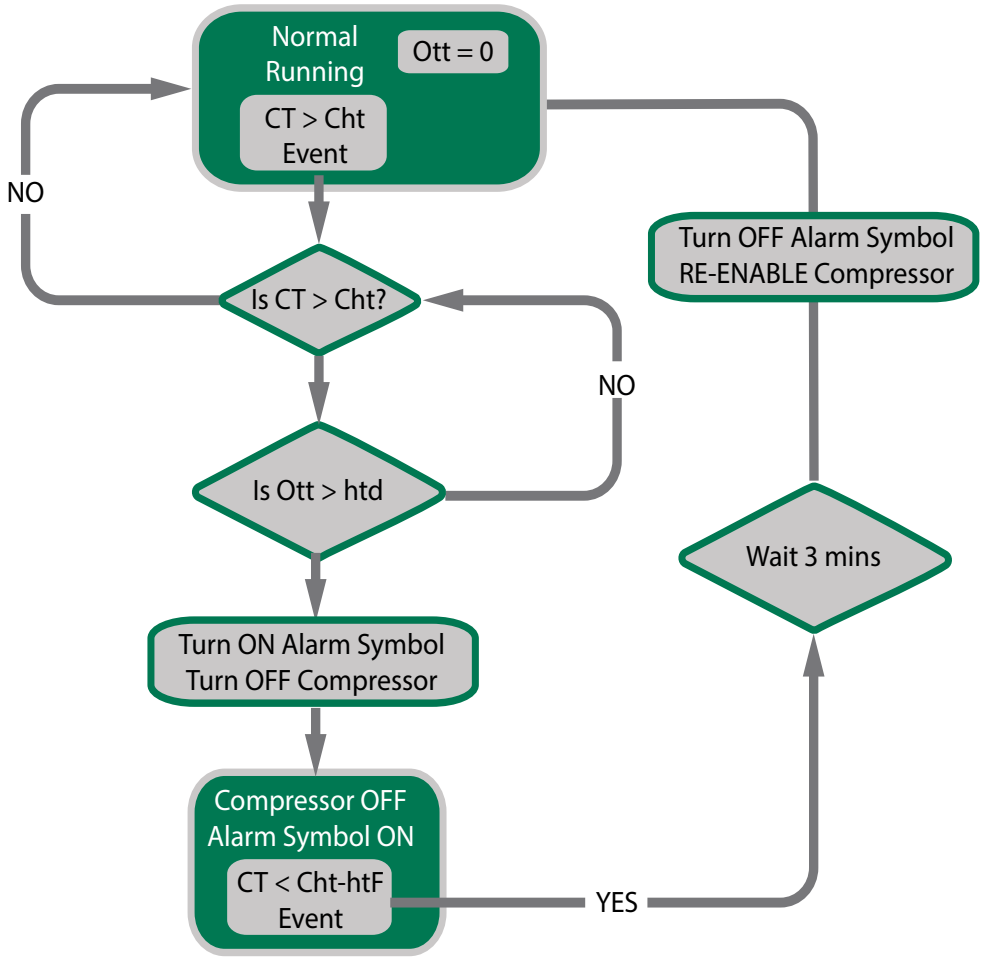
Under Voltage



Variable	Type	Description
LPc	Limit	Minimum Start Compressor Voltage
uPC	Limit	Minimum Run Compressor Voltage

* Compressor will not re-start unless it has been off for the minimum off time

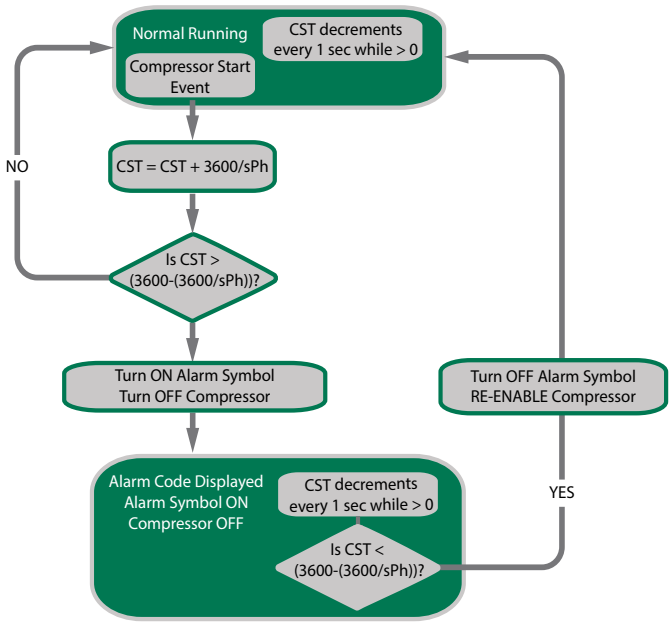
Condenser Over Temp



Variable	Type	Description
CT	Input	Condenser Temperature
ott	Timer	Over Temperature Timer

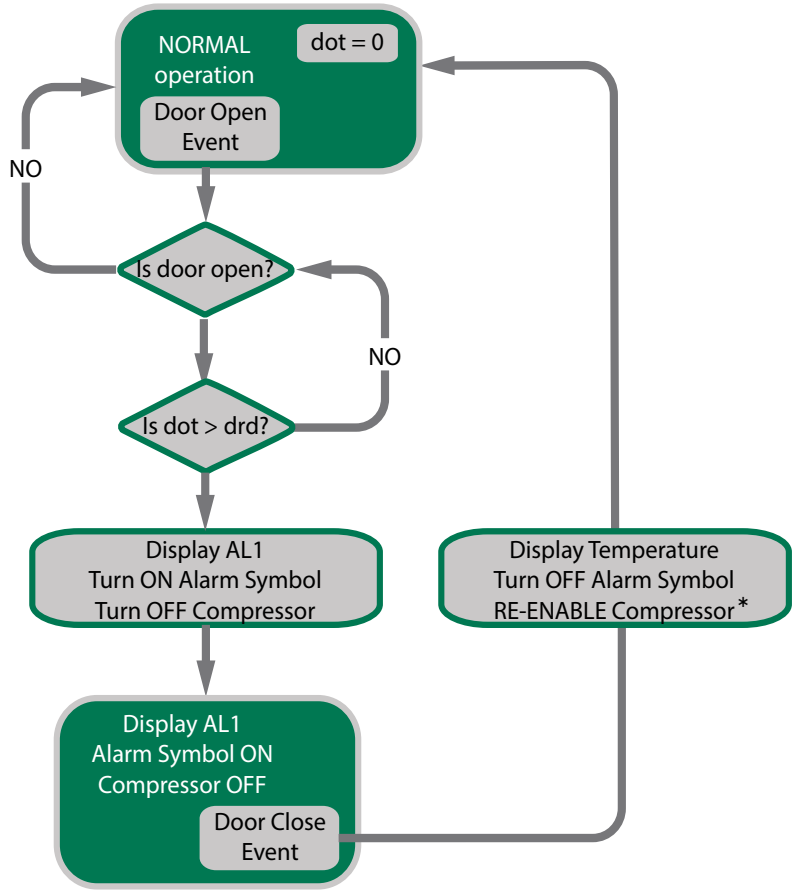
Variable	Type	Description
Cht	Limit	Condenser High Temperature Limit
htd	Limit	High Temperature Delay
htF	Limit	High Temperature Differential

Max Compressor Starts in 1 hr



Variable	Type	Description
sPH	Limit	Compressor Starts per Hour
CST	Timer	Compressor Starts Timer

Door Left Open

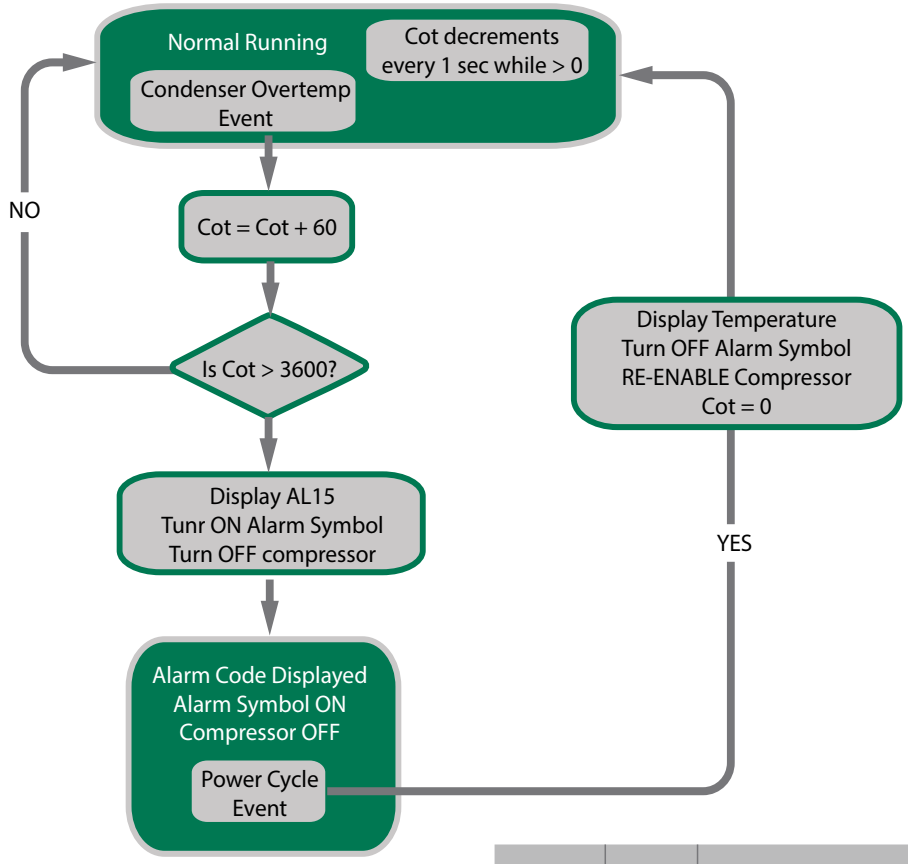


Variable	Type	Description
dot	Timer	Door Open Time
drd	Limit	Door Open Delay

* Compressor will not re-start unless it has been off for the minimum off time

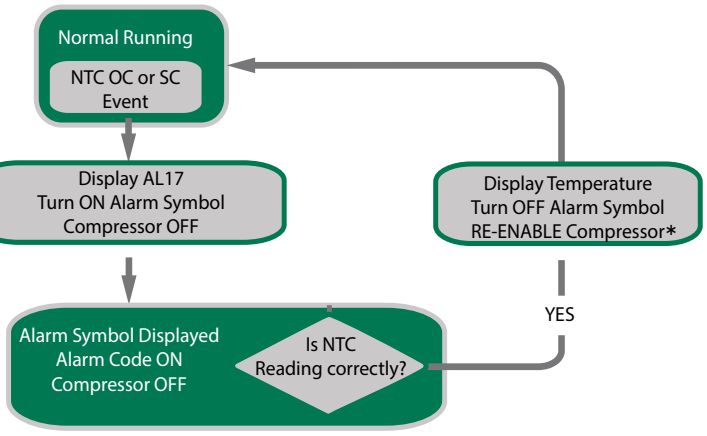
Alarm Logic

Excessive Condensor Over Temp



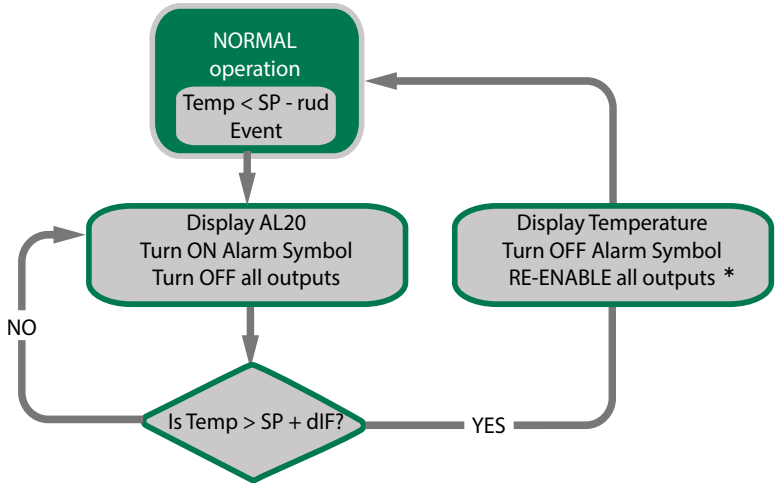
Variable	Type	Description
SP	Limit	Current Mode Set-point
Cot	Timer	Compressor Overtemp Timer

NTC Failure



* Compressor will not re-start unless it has been off for the minimum off time

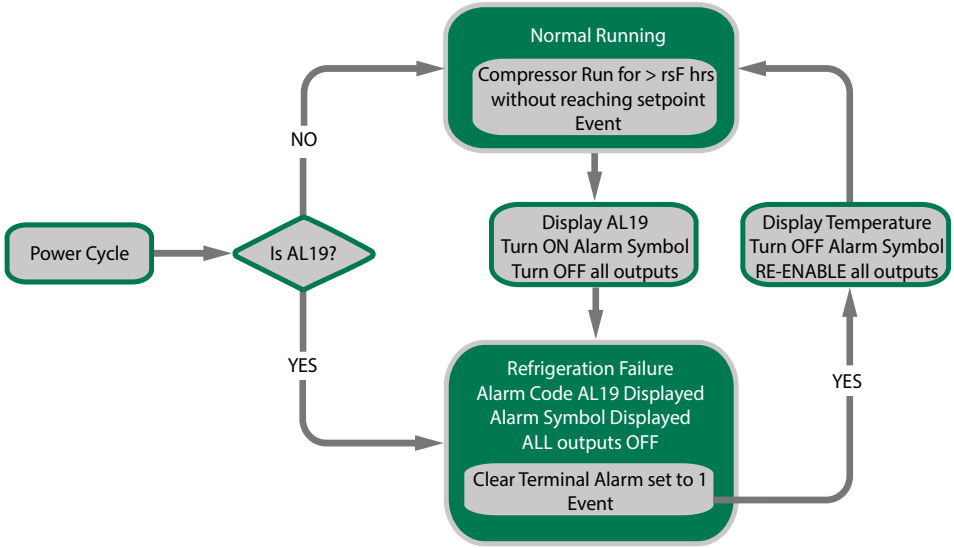
Return Air Under Temp



Variable	Type	Description
SP	Limit	Current Mode Set-point
diff	Limit	Current mode differential
rud	Limit	Return-Air Undertemp Differential

* Compressor will not re-start unless it has been off for the minimum off time

Refrigeration Failure



Variable	Type	Description
rsF	Limit	Refrigeration System Failure Time

APPENDIX 1

Quick Read

☐ Click on page numbers to go to relevant section.

The following table lists all configurable parameters. In electronic format, click on page numbers or the display code to go directly to the relevant section.

Full Parameter List

PARAMETER NAME	SCS DISPLAY	MENU	PAGES
Activity Sensor Port Configuration	SCF	Hardware Set-up	64
AD1 NTC Type	Ad1	Hardware Set-up	65
AD2 NTC Type	Ad2	Hardware Set-up	65
AD3 NTC Type	Ad3	Hardware Set-up	66
AD4 NTC Type	Ad4	Hardware Set-up	66
AD5 NTC Type	Ad5	Hardware Set-up	66
Ambient Temperature Port	tPt	Hardware Set-up	62
Clear Terminal Alarm	CtA	General Alarms Menu	72
Compressor Body Temperature Port	CPP	Hardware Set-up	63
Compressor Inlet Temperature Port	CtP	Hardware Set-up	63
Compressor Maximum Starts per Hour	CSh	Compressor Menu	55
Compressor Port Configuration	CPC	Hardware Set-up	67
Compressor State	CPS	Hardware Set-up	67
Condenser Fan Direction	CFd	Hardware Set-up	68
Condenser Fan Port Configuration	CdC	Hardware Set-up	68
Condenser Temperature Port	CdP	Hardware Set-up	62
Condensor Fan Control Type	CCt	Hardware Set-up	68
Condensor High Temperature Limit	Cht	Compressor Menu	68
Control Probe Calibration Offset	CAL	Hardware Set-up	68
Control Probe response	CPb	Hardware Set-up	61
Defrost Initiation Temperature	dIt	Defrost	48
Defrost Port Configuration	dFC	Hardware Set-up	69

Full Parameter List- cont

PARAMETER NAME	SCS DISPLAY	MENU	PAGES
Defrost State	dFS	Hardware Set-up	69
Defrost Termination temperature	dtt	Defrost	48
Defrost Type	dtP	Defrost	49
Display Value - Defrost Cycle	ddE	Defrost	50
Display Value - Normal Mode	dIS	Normal Mode	30
Display Value - Standby Mode	dSy	Standby Mode	43
Door Open Delay	drd	Door Menu	52
Door Open Evap Continuous Run Temp	FCr	Door Menu	51
Door Sensor Port Configuration	dSC	Hardware Set-up	63
Door Switch State	drS	Hardware Set-up	63
Dripping Time	dPt	Defrost	49
Evaporator Coil Temperature Port	ELt	Hardware Set-up	68
Evaporator Fan Control type	ECt	Hardware Set-up	67
Evaporator Fan Direction	Efd	Hardware Set-up	68
Evaporator Fan off Time - Normal Mode	FoF	Normal Mode	51
Evaporator Fan on Time - Normal Mode	Fot	Normal Mode	30
Evaporator Fan Port Configuration	EFC	Hardware Set-up	67
High Temperature Alarm Set Point	htA	Normal Mode	32
Inactivity Wait Time - Normal Mode	Ytn	Normal Mode	30
Inactivity Wait Time - Standby Hold Mode	yth	Standby Mode	41
Inactivity Wait Time - Transition 1	yt1	Transition 1 Mode	34
Inactivity Wait Time - Transition 2	yt2	Transition 2 Mode	37
Inactivity Wait Time - Transition 3	yt3	Transition 3 Mode	45
Light State - Channel A	LEA	Hardware Set-up	70
Light State - Channel B	LEb	Hardware Set-up	71
Light State - Channel C	LEC	Hardware Set-up	71
Light State Door Open - Channel A	LdA	Door Menu	52
Light State Door Open - Channel B	Ldb	Door Menu	52
Light State Door Open - Channel C	LdC	Door Menu	53
Light State Normal Mode - Channel A	LnA	Normal Mode	31
Light State Normal Mode - Channel B	LnB	Normal Mode	31

Full Parameter List- cont

PARAMETER NAME	SCS DISPLAY	MENU	PAGES
Light State Normal Mode - Channel C	LnC	Normal Mode	31
Light State Standby Mode - Channel A	LSA	Standby Mode	42
Light State Standby Mode - Channel B	LSb	Standby Mode	42
Light State Standby Mode - Channel C	LSC	Standby Mode	42
Light State Transition 1 Mode - Channel A	L1A	Transition 1 Mode	35
Light State Transition 1 Mode - Channel B	L1b	Transition 1 Mode	35
Light State Transition 1 Mode - Channel C	L1C	Transition 1 Mode	35
Light State Transition 2 Mode - Channel A	L2A	Transition 2 Mode	38
Light State Transition 2 Mode - Channel B	L2b	Transition 2 Mode	38
Light State Transition 2 Mode - Channel C	L2C	Transition 2 Mode	38
Light State Transition 3 Mode - Channel A	L3A	Transition 3 Mode	46
Light State Transition 3 Mode - Channel B	L3b	Transition 3 Mode	46
Light State Transition 3 Mode - Channel C	L3C	Transition 3 Mode	46
Lighting Port Configuration - Channel A	LCA	Hardware Set-up	69
Lighting Port Configuration - Channel B	LCb	Hardware Set-up	70
Lighting Port Configuration - Channel C	LCC	Hardware Set-up	70
Logging Interval	LGt	Logging	73
Low Temperature Alarm Set Point	LtA	Normal Mode	32
Marketing Mode	tnG	Standby Mode	43
Max user set point	SPt	Normal Mode	29
Maximum Defrost Cycle Time	dCt	Defrost	48
Maximum Defrost Interval	dEI	Defrost	49
Maximum Displayable Temperature	dSt	Display Menu	58
Maximum Run/Start Compressor Voltage	hPC	Supply Menu	56
Maximum Standby Time	Sbt	Standby Mode	41
Min user set point	SP-	Normal Mode	29
Minimum Compressor Off Time	Cot	Compressor Menu	54
Minimum Displayable Temperature	dP-	Display Menu	58
Minimum Start Compressor Voltage	LPC	Supply Menu	56
NTC 1 Beta value	n1b	Hardware Set-up	64

Full Parameter List- cont

PARAMETER NAME	SCS DISPLAY	MENU	PAGES
NTC 1 Resistance	n1r	Hardware Set-up	65
NTC 2 Beta value	n2b	Hardware Set-up	65
NTC 2 Resistance	n2r	Hardware Set-up	65
Operational Differential	dIF	Normal Mode	29
Operational Set Point	SP	Normal Mode	29
Output Interval Time	oPt	Hardware Set-up	66
Perishable Mode	Per	Standby Mode	40
Pulldown Time	Pdt	Standby Mode	41
Refrigeration System Failure Time	rSF	Compressor Menu	55
Return Air Temperature Port	rtP	Hardware Set-up	62
Standby Differential	Sd	Standby Mode	40
Standby Set Point	SSP	Standby Mode	40
Temperature Display Filter	tdF	Display Menu	58
Temperature Display Units	tdu	Display Menu	57
Transition 1 Differential	td1	Transition 1 Mode	34
Transition 1 Set Point	tS1	Transition 1 Mode	34
Transition 2 Differential	td2	Transition 2 Mode	37
Transition 2 Set Point	tS2	Transition 2 Mode	37
Transition 3 Differential	td3	Transition 3 Mode	45
Transition 3 Set Point	tS3	Transition 3 Mode	45
Uninterrupted Pull Down Activation Temperature	Pdn	Defrost	48
User Set Point Keypad Lock	uSL	Display Menu	57

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Saving Generation for the Next Generation

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APPENDIX 2

Quick Read

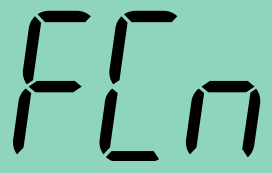
☐ Advanced parameters

Normal - Adv (nrL)

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
EVAPORATOR					
Evaporator Fan Control - Normal Mode	FCn		integers	0 - 4	0
Evaporator Fan Setpoint - Normal Mode	FSP		0.1 °C	-10 to 15 °C	3.5 °C
Evaporator Fan DIfferential - Normal Mode	Fnd		0.1 °C	0.1 to 10 °C	3 °C
Evaporator Fan Start Delay	Fod		1 sec	0 secs	0 secs
Evaporator Fan Stop Delay	FSd		1 sec	0 secs	0 secs
ALARMS					
High and Low Temperature Alarm Delay	tdy		1 min	0 to 15 mins	0
High and Low Temperature Alarm Differential	tAd		0.1 °C	0.1 °C to 5 °C	1 °C
Product Out Of Specification Alarm	PCA		1 min	**dIS**abled	**dIS**abled

Normal - Adv (nrL) - cont

EVAPORATOR **F**AN **C**ONTROL - **N**ORMAL MODE (FCn)
Selects how the Evaporator Fan is controlled in Normal Mode:
0 = The Evaporator Fan is on at DEFAULT speed when the Compressor is on, and cycles at DEFAULT speed with the duty parameters when the Compressor is off.
1 = The Evaporator Fan is on at DEFAULT speed when the Compressor is on, and cycles at LOW speed with the duty parameters when the Compressor is off.
2 = The Evaporator Fan is on or off at DEFAULT speed depending on the Evaporator Fan temperature. This is independent of the Compressor state.
3 = The Evaporator Fan is on or off at DEAFULT speed depending on the Evaporator Fan temperature when the Compressor is ON, and cycles with the duty parameters at DEAFULT speed when the Compressor is OFF.
4 = The Evaporator fan speed is variably linearly controlled from Low Speed at the current modes setpoint to Default Speed at Variable-Evap-Fan-Temp-Range ABOVE the current modes setpoint



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FCn	Evaporator	0 - 3	integers	0	SP, dIt, SSP

EVAPORATOR **F**AN **S**ET **P**OINT (°C) (FSP)
The Set Point Temperature when the Evaporator Fan is in Temperature Control Mode. This is used to control the Evaporator Fan by Fan temperature rather than Compressor cycles or duty cycles. Please also refer to FCn.

NOte: This function is only used when the Evaporator Fan is set to temperature control in the FCn Menu (1 or 2).

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FSP	Evaporator	-10 to 10 °C	1 °C	3.5 °C	EFt, FCn

EVAPORATOR **FAN D**IFFERENTIAL (°C) (Fnd)
The temperature differential when the Evaporator Fan is in Temperature Control Mode. This is used to control the Evaporator Fan by Fan temperature rather than Compressor cycles or duty cycles. Please also refer to FCn.

Note: This function is only used when the Evaporator Fan is set to temperature control in the FCn Menu (1 or 2).

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Fnd	Evaporator	0.1 to 10 °C	1 °C	3 °C	FCn

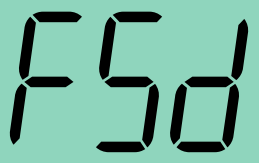
Normal - Adv - cont

* EVAPORATOR **F**AN START **D**ELAY (Fod)
The time delay between when the Compressor starts and when the Evaporator Fan is allowed to start.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Fod	Evaporator	0 secs	1 sec	0 secs	FSd

* EVAPORATOR **F**AN **S**TOP **D**ELAY (FSd)
The time delay between when the Compressor stops and when the Evaporator Fan is allowed to stop.



* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FSd	Evaporator	0 secs	1 sec	0 secs	Fod

* HIGH & LOW **T**EMPERATURE ALARM **D**ELA**Y** (tdy)
The maximum permitted time that Set Point Temperatures can be exceeded before triggering an alarm. This time delay prevents alarms triggering due to momentary temperature spikes.
This function is disabled when set to 'oFF'.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tdy	Alarms	oFF	1 min	oFF	SP

* HIGH & LOW **T**EMPERATURE **A**LARM **D**IFFERENTIAL (tAd)
The differential below the High Temperature Alarm Set Point (htA), and above the Low Temperature Alarm Set Point (LtA) which resets the audible alarm.
Note that the alarm will still be shown on the display until it is acknowledged by the user.

* Associated alarm not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tAd	Alarms	0 °C to 5°C	1 °C	1 °C	htA, LtA, tdy

Normal - Adv (nrL) - cont

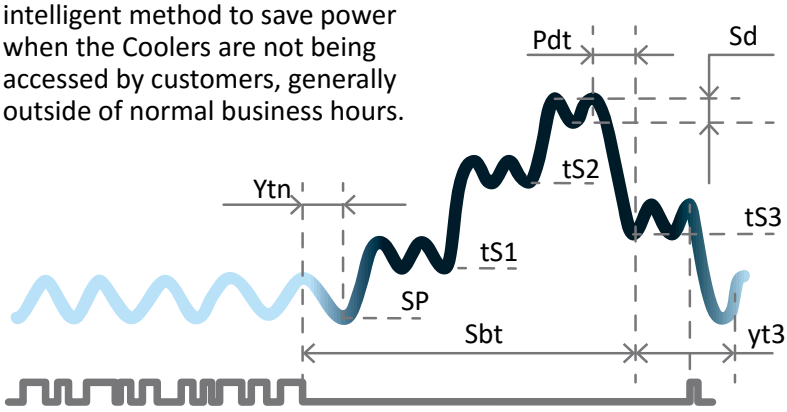
*** P**RODUCT OUT OF SPE**C**IFICATION **A**LARM (PCA)
The duration of the audible alarm due to the Product stored in the cabinet being out of temperature specification. Please also refer to the htA and LtA parameters which define the temperatures which will trigger this audible alarm. If the audible alarm times out, the alarm will still be shown on the display until it is acknowledged by the user.
oFF = Fully disabled alarm. The alarm display and the audible alarm are both disabled.
0 mins = Partially disabled alarm. The alarm shows on the display, but is disabled audibly.
Note: even when 'oFF' is chosen, the alarm event is still logged and can be viewed by Service Technicians at a later date.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
PCA	Alarms	**dIS**abled	1 min	**dIS**abled	htA, LtA 1

Standby - Adv (SdY)

The Standby Modes are an intelligent method to save power when the Coolers are not being accessed by customers, generally outside of normal business hours.

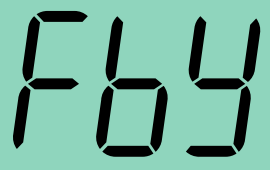


The SCS™ Connect can manage this process to minimize the Pulldown time when businesses re-open, or it can maximize energy savings overall.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
EVAPORATOR					
Evaporator Fan Control - Standby	Fby		integers	0 - 2	2
Evaporator On Time - Standby	Fts		1min	0 - 30 mins	2 mins
Evaporator Off Time - Standby	Fos		1min	0 - 30 mins	2 mins

Standby - Adv (SdY) - cont

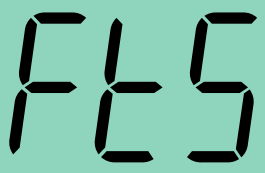
EVAPORATOR **F**AN CONTROL - STAND**BY** MODE (Fby)
This configures how the Evaporator Fan is controlled when the SCS™ Connect is in Standby Mode:
0 = The Evaporator Fan is on at LOW speed when the Compressor is on, and cycles with the NORMAL MODE duty parameters at LOW speed when the Compressor is off.
1 = The Evaporator Fan is on at LOW speed when the Compressor is on, and cycles with the STANDBY duty parameters at LOW speed when the Compressor is off.
2 = Follows ALL Normal Mode settings and parameters.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Fby	Evaporator	0 - 2	integers	2	SSP, FtS

EVAPORATOR **F**AN ON **T**IME – **S**TANDBY MODE (FtS)
The length of time the Evaporator Fan is on when the Compressor is off during full Standby Mode.
0 = The Evaporator Fan is always off.
Please note: The total Evaporator Fan cycle = the on time + the off time. Please also refer to FoS.

Note: This is only active when Fby = 1



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FtS	Evaporator	1 to 180 secs	1 sec	120 secs	FoS

EVAPORATOR **F**AN **O**FF TIME – **S**TANDBY MODE (FoS)
The length of time the Evaporator Fan is off when the Compressor is off during full Standby Mode.
0 = The Evaporator Fan is always on.
Please note: The total Evaporator Fan cycle = the on time + the off time. Please also refer to FtS.

Note: This is only active when Fby = 1

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FoS	Evaporator	0 to 180 secs	1 sec	0 secs	FtS

Variable Speeds - Adv (???)

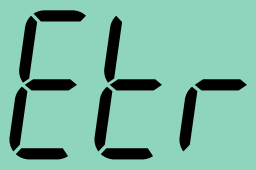
The Variable Speed settings are used to set different speeds when running in variable speed mode. If the evaporator and Condensor fan are both set to on/off mode, these parameters have no effect.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Variable Evap Fan Temperature Range	Etr	106	0.1 °C	5.0 to 50 °C	5.0 °C
SPEED					
Variable Evap Fan Speed - Default	ESd	106	10rpm	500 to 2300	1800 rpm
Variable Evap Fan Speed - Low	ESL	106	10rpm	500 to 2300	1300 rpm
Variable Cond Fan Speed - Default	CSd	106	10rpm	500 to 2300	1800 rpm
Variable Cond Fan Speed - Low	CSL	106	10rpm	500 to 2300	1300 rpm
TIME					
Variable Cond Fan Reverse Time	CRt	106	1 min	0 to 15	0 mins

Variable Speeds - Adv (???) - cont

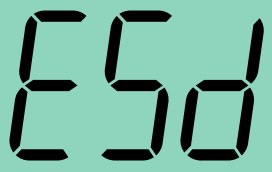
VARIABLE EVAP FAN TEMPERATURE RANGE (Etr)
The temperature ABOVE the current modes setpoint, at which the evap fan will run at the Variable Evap Fan Speed - Default. Speed increases linearly with temperature from Variable Evap Fan Speed - Default when control temperature equals setpoint temperature

Note: Only active when FCn = 4



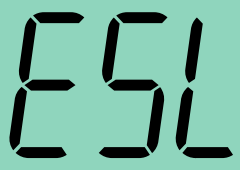
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Etr	Temperature	5.0 to 50.0 °C	0.1 °C	5.0 °C	

VARIABLE EVAP FAN SPEED - DEFAULT (ESd)
The speed used for all basic evaporator fan operation when using a speed controlled motor. If a non-speed controlled motor is being used, this parameter is ignored



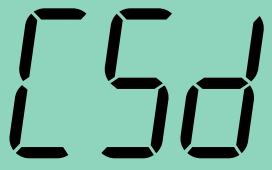
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ESd	Speed	500 to 2300rpm	10 rpm	1800 rpm	

VARIABLE EVAP FAN SPEED - LOW (ESL)
The speed used as the evaporator fan slower speed if required based on configuration



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ESL	Speed	500 to 2300rpm	10 rpm	1300 rpm	

VARIABLE COND FAN SPEED - DEFAULT (CSd)
The speed used for all basic condensor fan operation

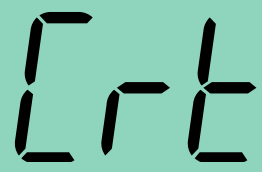


Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CSd	Speed	500 to 2300rpm	10 rpm	1800 rpm	

Variable Speeds - Adv (???) - cont

VARIABLE COND FAN SPEED - LOW (CSL)
The speed used as the condensor fan slower speed if required based on configuration

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
CSL	Speed	500 to 2300rpm	10 rpm	1300 rpm	



VARIABLE COND FAN REVERSE TIME (Crt)
The time which the condensor fan will run in reverse at the low speed, before stopping, after the compressor has just been turned off. Only active with a speed controlled motor. If a non-speed controlled motor is being used, this parameter is ignored

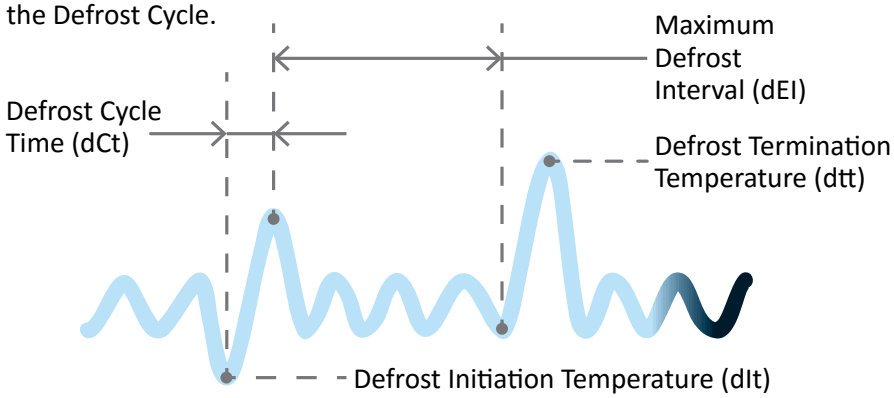
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Crt	Time	0 to 15 mins	1 min	0 mins	

Defrost - Adv (dEF)

The Defrost Cycle can be initiated or terminated by either time or temperature. During the Defrost Cycle the Normal Operational Mode is over ridden to control the Compressor, Evaporator Fan, Lights, and if used, any valves or heater elements connected to the 5A Relay.

Supported Defrost Cycle methods are; hot gas defrost (reverse cycle), ambient defrost (with the compressor turned off), and a forced defrost (with an electric heater element).

These parameters provide the options to control and configure the Defrost Cycle.

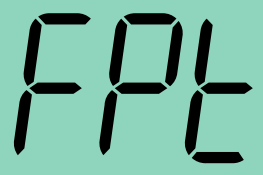


Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Freeze Up Protection Temperature	FPt		1 °C	**dIS**abled	**dIS**abled
TIME					
Defrost Initiation Delay	ddy		1 sec	0 secs	0 secs
Defrost Relay Output On Time Delay	dod		1 sec	0 secs	0 secs
No Downwards Tendency Defrost Time	ndt		1 hr	**dIS**abled	**dIS**abled
LIGHTING & DISPLAY					
Temperature Display Lock Time After Defrost	tdL		1 min	0 mins	0 mins
Force Lights On During Defrost	Lod		n/a	no	no
ALARMS					
Defrost Termination by Alarm Count	dtA		1 count	**dIS**abled	**dIS**abled
Freeze Up Protection Delay	FPd		1 min	0 mins	0

Defrost - Adv (dEF) - cont

*** F**REEZE UP **P**ROTECTION **T**EMPERATURE (FPt)
The Evaporator Coil temperature below which the Compressor will turn off and the Evaporator Fan will turn on. This is to provide smart freeze up protection of the evap coil. Evaporator Fan on/off timers will be suspended until the temperature has risen above the Freeze-up protection temperature, and normal control has resumed.
Note: Only applicable when Evaporator Fan Coil sensor is allocated

* Not yet enabled



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FPt	Temperature	**dIS**abled	1 °C	**dIS**abled	dli, dtt

*** D**EFROST INITIATION **D**ELA**Y** (ddy)
The time the control temperature must be below the Defrost Initiation Temperature (dIt) before Defrost will be activated.

Please note: If the control temperature rises above the Defrost Initiation Temperature (dIt), the Defrost Initiation Delay (ddy) counter will be reset.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ddy	Time	0 secs	1 sec	0 secs	dIt

*** D**EFROST RELAY **O**UTPUT ON TIME **D**ELAY (dod)
The time needed to build up sufficient hot gas for a hot gas type defrost. This function is only used for hot gas type Defrost Cycles. It is defined as the amount of time the Compressor keeps running after a Defrost Cycle is triggered, while the Defrost Cycle Relay remains off. After this time has elapsed the Compressor turns off and the Defrost Cycle Relay turns on. This parameter is only used when dtP is set to 2.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dod	Time	0 secs	1 sec	0 secs	dtP, dFS

Defrost - Adv (dEF) - cont

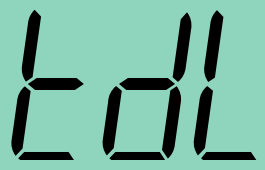
*** NO DOWNWARDS TENDENCY DEFROST TIME** (ndt)
The time allowed while the compressor is on without the temperature reducing, before a defrost cycle is forced.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ndt	Time	**dIS**abled	1 sec	0 secs	dtP, dFS

* TEMPERATURE DISPLAY LOCK TIME AFTER DEFROST (tdL)
The time the display will continue to show the value as defined by Display Value During Defrost Cycle (ddE) once the Defrost Cycle has finished. This delay allows the internal cabinet temperature to re-stabilize before displaying the actual temperature. If the cabinet temperature reaches the Operational Set Point Temperature (SP) before the Lock Time (tdL) has elapsed, the display will revert to Normal Display Mode (dIS).

* Not yet enabled



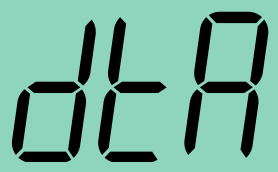
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
tdL	Lighting & Display	0 mins	1 min	0 mins	ddE, dIS, SP

* FORCE **L**IGHTS **O**N DURING **D**EFROST (Lod)
Forces the cabinet lights to come on during a Defrost, should the lights be turned off. This helps warm up the cabinet. This function is of most use when fluorescent lamps are fitted.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Lod	Lighting & Display	no	n/a	no	LSy

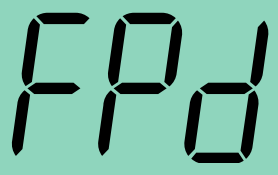
* DEFROST TERMINATION BY TIME ALARM COUNT (dtA)
The number of defrost termination by time instances that can occur before an alarm is triggered. Used where defrost termination by temperature is the expected norm.



* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dtA	Alarms	**dIS**abled	1 count	**dIS**abled	

* FREEZE UP PROTECTION DELAY (FPd)
Temperature below which the compressor will turn off and the evaporator fan will turn on, overiding any other settings. This is to prevent teh evaporator coils from freezing up in the case of a low temperature overshoot.



* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
FPd	Alarms	0 mins	1 min	0	

Door - Adv (dor)

The SCS™ Connect uses the cabinet door switch as an input device to help control the Evaporator Fan, Lights and to initiate Alarms. Please note: Should the door switch fail, these parameters will not function correctly.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Sensorless Door Threshold	sdt		0.01 °C	0 .10°C to 1.00 °C	0.5 °C
EVAPORATOR					
Evaporator Fan Control When Door Open	Fdo		integer	0 - 3	0
TIME					
Door Switch Fail Delay	dFd		1 min	5 mins to 15 mins	10 mins

SENSORLESS DOOR THRESHOLD (sdt)
The sensitivity to a temperature change for determining a sensorless door opening.

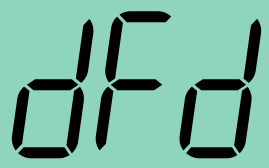
Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
sdt	Temperature	0.10 °C to 1.00 °C	0.01 °C	5.00 °C	

EVAPORATOR **F**AN CONTROL WHEN CABINET **D**OOR **O**PEN (Fdo)
Selects how the Evaporator Fan is controlled when the door is open. This is to allow the fan to continuously run, which can be beneficial by maintaining an air curtain.
0 = The Evaporator Fan is turned off while the door is open.
1 = The Evaporator Fan is turned on at DEAFULT speed while the door is open.
2 = The Evaporator Fan is turned on at LOW speed while the door is open.
3 = The Evaporator Fan is controlled as if the door was not open.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
Fdo	Evaporator	on or oFF	text	oFF	Fby, FCn

Door - Adv (dor) - cont

DOOR SWITCH FAIL DELAY (dFd)
The time after a door is seen as open, before the system determines teh door switch has failed. After ths time, the system will ignore the door switch and run normally, until a door closed state is seen, which resets the timer.



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dFd	Time	5 mins to 15 mins	1 min	10 mins	

Compressor - Adv (CoP)

These parameters provide options to control and configure the Compressor during different parts of the refrigeration cycle and to configure the Compressor Alarms.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TEMPERATURE					
Return Air Under Temp Differential	rud		0.1 °C	0.1 °C to 15.0 °C	3 °C
TIME					
Minimum Run Time	rnt		10 sec	0secs	0 secs
Sensor Failure Compressor Override Time	SCt		1 hour	**dIS**abled	**dIS**abled
Sensor Failure Compressor Off Time	SCo		1 min	1 to 60 mins	30 mins
Sensor Failure Compressor On Time	SCr		1 min	1 to 60 mins	10 mins
ALARMS					
High Temperature Delay	htd		1 sec	10 secs	10 secs
High Temperature Differential	htF		1 °C	20 °C	20 °C
High Temperature Lockout Count	htC		counts	**dIS**abled	**dIS**abled
Condenser High Temperature Alarm	ChA		1 min	**dIS**abled	**dIS**abled

Compressor - Adv (CoP) - cont

RETURN AIR UNDER TEMP DIFFERENTIUAL (rud)
The temperature below the normal mode setpoint at which all outputs will be turned off. This is to compensate for incorrect wiring, where the compressor may be wired to a different output, resulting in continuous compressor running, even though the controller thinks the compressor is off. Normal operation will resume once the setpoint + differential of the current mode is reached.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
rud	Temperatue	0.1 °C to 15.0 °C	0.1 °C	3 °C	

* MINIMUM **RUN TIME** (rnt)
The minimum time that the Compressor will run, unless a protective control limit stops it. This function is used to reduce the number of Compressor starts per hour to improve efficiency.

* Not yet adjustable

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
rnt	Time	0 secs	10 secs	0 secs	Pod, Cot

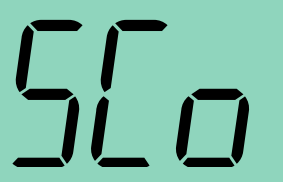
* SENSOR FAILURE COMPRESSOR OVERIDE TIME (SCt)
Time after the control temperature sensor has failed, in which the compressor will run using the ON/OFF times, before the compressor will shut down.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SCt	Time	**dIS**abled	1 hour	**dIS**abled	

* SENSOR FAILURE COMPRESSOR OFF TIME(SCo)
The OFF duty time of the compressor, when the control temperature probe has failed

* Functionality not yet enabled (See SCt)



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SCo	Time	1 to 60 mins	1 min	30 mins	

Hardware - Adv (dSP) - cont

ELECTRONIC **E**XPANSION VALVE PORT **C**ONFIGURATION (EEC)
Selects the Electronic Expansion Valve Port.
N.C. = Not Connected
DSO* = Digital Switched Output:
AD5 = Digital 0 – 5V i/p, Analog NTC i/p, 5V 300mA o/p
LE1 – LE3 = PWM 0V 2A DC per channel

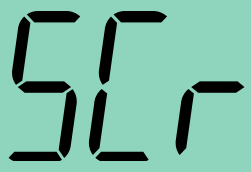
* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
EEC	Outputs	N.C.	Port ID	N.C.	

Compressor - Adv (CoP) - cont

* SENSOR FAILURE COMPRESSOR ON TIME (SCr)
The ON duty time of the compressor when the control temperature probe has failed

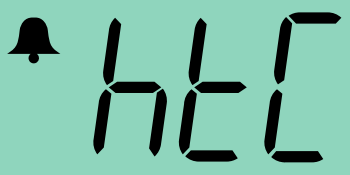
* Functionality not yet enabled (See SCt)



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
SCr	Time	1 to 60 mins	1 min	10 mins	

* **H**IGH **T**EMPERATURE LOCK OUT **C**OUNT (htC)
The number of times that the Condenser can exceed the Condenser High Temperature Limit (hCt) before it is locked out to prevent damage. Important Note: This protective function cannot be reset by power cycling the cabinet on and off; it can only be reset by an authorized Service Technician.

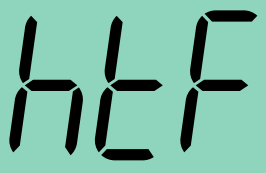
* Not yet enabled



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
htC	Alarms	**dIS**abled	single counts	**dIS**abled	ASP

* **H**IGH **T**EMPERATURE DI**F**FERENTIAL (htF)
The temperature below the Condenser High Temperature Limit (hCt), which will allow the Compressor to turn back on after a Condensor High Temperature Limit (hCt) event. The temperature must remain below this level for the time period defined in High Temperature Reset Delay (htr) before the Compressor will turn back on.

* Not yet adjustable



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
htF	Alarms	20 °C	1 °C	20 °C	htA, htr

Compressor - Adv (CoP) - cont

*** HIGH TEMPERATURE LOCK OUT COUNT (htC)**
The number of times that the Condenser can exceed the Condenser High Temperature Limit (hCt) before it is locked out to prevent damage. Important Note: This protective function cannot be reset by power cycling the cabinet on and off; it can only be reset by an authorized Service Technician.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
htC	Alarms	**dIS**abled	single counts	**dIS**abled	ASP

*** CONDENSER HIGH TEMPERATURE ALARM (ChA)**
The duration of the audible alarm due to the Condenser Temperature being continuously above normal operating temperature. Please refer to the Condenser High Temperature Limit (Cht) parameter.
oFF = Fully disabled alarm. The alarm display and the audible alarm are both disabled.
0 mins = Partially disabled alarm. The alarm shows on the display, but is disabled audibly.
Note: even when 'oFF' is chosen, the alarm event is still logged and can be viewed by Service Technicians at a later date.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ChA	Alarms	**dIS**abled	1 min	**dIS**abled	Cht

Supply - Adv (nrG)

The Supply Parameters are used to configure the acceptable limits for the Voltage supply and to configure the associated alarms. This is required to protect the refrigeration system from electrical damage.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
SUPPLY					
Minimum Run Compressor Voltage	LrC		1 V	79 V to 203 V or **dIS**abled	80 V
Voltage Cut-In/Out Delay	Plo		1 sec	10 secs	10 secs
Out Of Voltage Count Limit	oPC		counts	**dIS**abled	**dIS**abled
ALARMS					
Duration High Voltage Alarm	dhA		1 min	0 mins	0 mins
Duration Low Voltage Alarm	dLA		1 min	0 mins	0 mins

MINIMUM RUN COMPRESSOR VOLTAGE (LrC)
The minimum Voltage during which the Compressor is allowed to continue to run. If it is below this Voltage the Compressor cannot run and turns off. If the Voltage rises to an acceptable level then the Compressor can restart, but only after the Voltage has been maintained for a delay period. These events are logged in the SCS™ Connect.
oFF = Run Voltage equals Start Voltage.

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
LrC	Supply	79 to 203 V or **dIS**abled	1 V	80 V	hPC, oPt, LPC

* VOLTAGE CUT-IN/OUT DELAY (PIo)
The time that the power supply must exceed the Over Voltage or Under Voltage conditions, before devices are turned off. The purpose of this time delay is to allow for momentary spikes in the power supply.

* Not yet adjustable

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
PIo	Supply	0 to 20 secs	1 sec	10 secs	hPC, LPC, LrC

Supply - Adv (nrG) - cont

* OUT OF VOLTAGE COUNT LIMIT (oPC)
The number of Over Voltage or Under Voltage instances permitted in a 24 hour period before an alarm is triggered. Selecting '0' as the count number will cause an alarm to trigger on every event.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
oPC	Supply	**dIS**abled	single counts	**dIS**abled	hPC, LPC, LrC

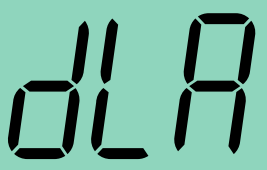
*** D**URATION **H**IGH VOLTAGE **A**LARM (dhA)
The duration of the audible alarm due to excessive High Voltage. Please also refer to the Maximum Run/Start Voltage (hPC).
oFF = Fully disabled alarm. The alarm display and the audible alarm are both disabled.
0 mins = Partially disabled alarm. The alarm shows on the display, but is disabled audibly.
Note: even when 'oFF' is chosen, the alarm event is still logged and can be viewed by Service Technicians at a later date.

* Not yet adjustable

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dhA	Alarms	0 mins	1 min	0 mins	hPC

*** D**URATION **L**OW VOLTAGE **A**LARM (dLA)
The duration of the audible alarm due to Under Voltage. Please also refer to the LPC and LrC parameters.
oFF = Fully disabled alarm. The alarm display and the audible alarm are both disabled.
0 mins = Partially disabled alarm. The alarm shows on the display, but is disabled audibly.
Note: even when 'oFF' is chosen, the alarm event is still logged and can be viewed by Service Technicians at a later date.

* Not yet adjustable



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
dLA	Alarms	0 mins	1 min	0 mins	LPC, LrC

Display - Adv (dSP)

These parameters configure what is shown on the display during different control modes and conditions.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
TIME					
Downwards Temperature Display Filter	ddF		1 secs	**dIS**abled	**dIS**abled

*** D**OWNWARDS TEMPERATURE **D**ISPLAY FILTER (ddF)
The time constant of the response of the display during a downwards temperature change when required to be different to an upwards temperature change. This prevents misleading temperature spikes being shown, while allowing a fast downwards response. If this is disabled, then the filter value used will be the same as that chosen for udF.

* Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
ddF	Time	**dIS**abled	1 secs	**dIS**abled	udF

Hardware - Adv (???)

These parameters configure what is shown on the display during different control modes and conditions.

Parameter Name	Digital Display	Pages	Increments & Units	Range	Default
OUTPUTS					
External Buzzer Port Configuration	EbC		Port ID	N.C.	N.C.
External Buzzer State	EbS		integers	0 or 1	0
Electronic Expansion Valve Port Configuration	EEC		Port ID	N.C.	N.C.

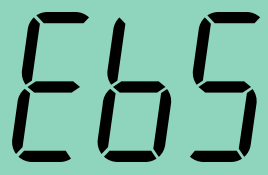
EXTERNAL BUZZER PORT CONFIGURATION (EbC)
Selects the External Buzzer Port. Please also refer to External Buzzer State (EBS)
N.C. = Not Connected
AD5* = Switched 24V o/p

*Not yet enabled

Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
EbC	Outputs	N.C.	Port ID	N.C.	

EXTERNAL **B**UZZER **S**TATE (EbS)
Selects the state when the Buzzer is off. Please also refer to the External Buzzer Port Configuration (EBC).
0 = Switched 24V open when buzzer off
1 = Switched 24V closed when buzzer off

* Functionality not yet enabled (See EbC)



Digital Display	Functional Category	Parameter Range	Increments & Units	Default	Related Menus
EbS	Outputs	0 or 1	integers	0	