AoFrio

USER MANUAL

SCS controller
Standard parameters

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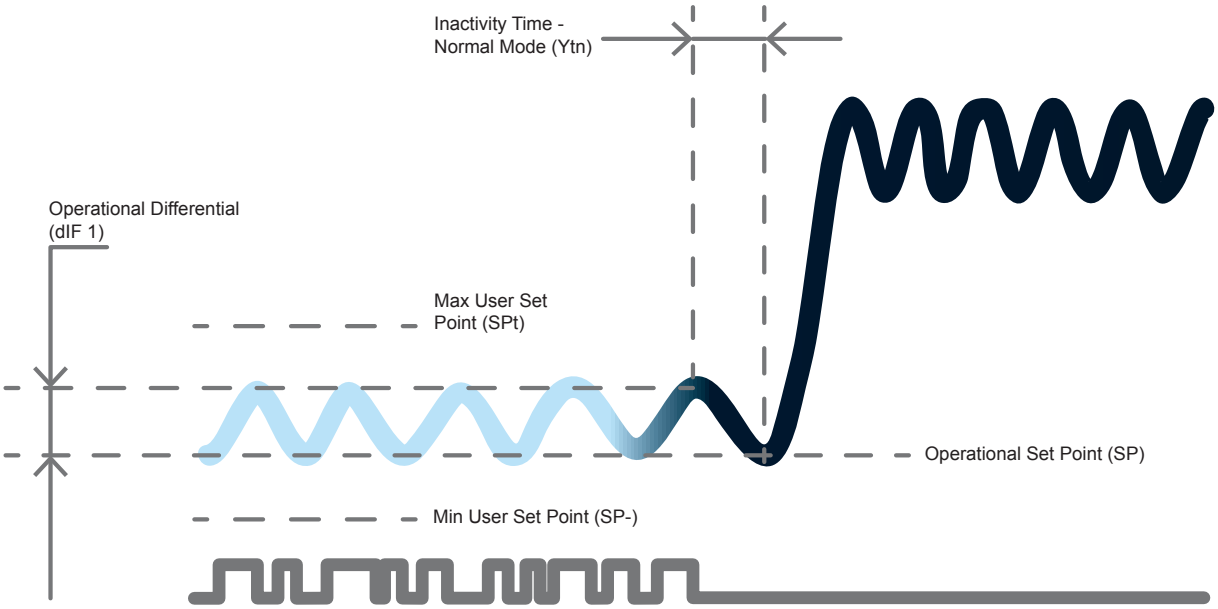
Normal Mode

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



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Operational Set Point	SP	0.1 °C	-10.0 to 15.0 °C	3.5 °C
Operational Differential	dIF	0.1 °C	0.1 to 10.0 °C	3.0 °C
Maximum User Set Point	SPt	0.1 °C	-10.0 to 15.0 °C	6.0 °C
Minimum User Set Point	SP-	0.1 °C	-10.0 to 15.0 °C	2.0 °C

Evaporator

Parameter name	Digital display	Increments & units	Range	Default
Evaporator Fan On Time - Normal Mode	Fot	1 min	0 to 30 mins	2 mins
Evaporator Fan Off Time - Normal Mode	FoF	1 min	0 to 30 mins	2 mins

Time

Parameter name	Digital display	Increments & units	Range	Default
Inactivity Wait Time - Normal Mode	Ytn	0.5 hours	0.5 to 24 hours or InFinite	2 hours

Normal Mode continued

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Display Value During Normal Mode**	dIS	integers	0 to 3	0
Light State Normal Mode - Channel A,B,C,D*	LnA,Lnb, LnC,Lnd	1%	0% to 100%	100%
Light State Normal Mode - Channel E*	LnE	1	0 or 1	1

Alarms

Parameter name	Digital display	Increments & units	Range	Default
High Temperature Alarm Set Point*	htA	0.1 °C	-10.0 to 15.0	dISabled
Low Temperature Alarm Set Point*	LtA	0.1 °C	-5.0 to 20.0	dISabled

Configuration

Install Type

Defines different controller usage types to allow functionality differences to exist in the same standard code. Parameters and functionality not relevant or counter-productive to the selected usage type will be hidden and/or disabled.

e.g. The complete system shutdown alarm “Refrigeration system failure” which occurs when the setpoint has not been reached after 48hrs(default) is forcibly disabled when one of the freezer install types is selected. This is to prevent product loss where the refrigeration system can only maintain say -27degC instead of the desired setpoint of -30degC.

Bottle Cooler

- Minimum setpoint restricted to -10degC

* FW versions 4010 and above
** Not yet implemented

Normal Mode continued

Upright freezer & Vertical Freezer

FW restrictions
- Forces perishable mode to be ON
- Disables refrigeration system failures upon set-point not being reached
- Restricts maximum user setpoint to be no higher than -10degC

Excluded params
- Standby Set Point
- Standby Differential
- Transition 1/2/3 Setpoint
- Transition 1/2/3 Differential
- Refrigeration System FailureOpenDeck

Install type specific params
- Motion Sensor 2 Port Configuration
- night curtain port
- night curtain sensor stateArctic

Install type specific params or options
- Red Light Time Interval
- Min Light Warning Temp
- Max Light Warning Temp
- Light Timer Holdoff Temperature
- Warning Temp Delay
- Option “c02” in Marketing Mode

The field app will display a different Home page image for each install type. Custom install types are not defined in the general manual.

Digital Display	Increments & Units	Parameter Range	Default
<none>	text	bottle cooler, horizontal freezer, vertical freezer or open deck	Undefined

Normal Mode continued

Operational Set Point

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	Increments & Units	Parameter Range	Default
SP	0.1 °C	-35.0 to 20.0	3.5 °C

Operational Differential

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	Increments & Units	Parameter Range	Default
dIF	0.1 °C	0.1 to 10.0	3.0 °C

Max User Set Point

The highest temperature that the Retail Staff can adjust the cabinet to run at.

Digital Display	Increments & Units	Parameter Range	Default
SPt	0.1 °C	-35.0 to 20.0	6.0 °C

Min User Set Point

The lowest temperature that the Retail Staff can adjust the cabinet to run at.

Digital Display	Increments & Units	Parameter Range	Default
SP-	0.1 °C	-35.0 to 20.0	2.0 °C

Normal Mode continued

Evaporator Fan On Time – Normal

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	Increments & Units	Parameter Range	Default
Fot	1 min	0 to 30	2 mins

Evaporator Fan Off Time – Normal

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	Increments & Units	Parameter Range	Default
FoF	1 min	0 to 30	2 mins

Inactivity Wait Time – Normal

The time the SCS 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	Increments & Units	Parameter Range	Default
Ytn	0.5 hours	0.5 to 24.0 or inf	2.0 hours

Lighting & Display – Display value during Normal Mode

Selects what is displayed during Normal Mode:

- 0 = Displays the temperature.
- 1* = Displays the Set Point Temperature.
- 2* = Display is left blank.
- 3 = Displays the temperature when compressor ON, and “ECO” when compressor OFF

*Options 1 & 2 are not functioning

Digital Display	Increments & Units	Parameter Range	Default
Display Value During Normal Mode**	dIS	intergers	0 to 3

** Not yet implemented

Normal Mode continued

Light State Normal Mode - Channel A

The illumination level during Normal Mode as a percentage of full illumination. 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	Increments & Units	Parameter Range	Default
LnA	1 %	0 to 100	100 %

Light State Normal Mode - Channel B

The illumination level during Normal Mode as a percentage of full illumination. 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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LnB	1 %	0 to 100	100 %

Light State Normal Mode - Channel C

The illumination level during Normal Mode as a percentage of full illumination. 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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LnC	1 %	0 to 100	100 %

Light State Normal Mode - Channel D

The illumination level during Normal Mode as a percentage of full illumination. 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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LnD	1 %	0 to 100	100 %

Normal Mode continued

Light State Normal Mode - Channel E

The Channel E light state during Normal Mode.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LnE	integers	0 to 1	1

High Temperature Alarm Set Point

The Absolute Temperature above which an alarm is triggered. The measured temperature must exceed this setpoint continuously for the time specified by Temperature Out-Of-Spec Alarm Delay before the alarm is triggered. If the measured temperature returns to values below this temperature, the time counter is reset.

Digital Display	Increments & Units	Parameter Range	Default
htA	0.1 °C	-35.0 to 25.0 or disabled	disabled

Low Temperature Alarm Set Point

The Absolute Temperature below which an alarm is triggered.

The measured temperature must be below this setpoint continuously for the time specified by Temperature Out-Of-Spec Alarm Delay before the alarm is triggered. If the measured temperature returns to values above this temperature, the time counter is reset.

Digital Display	Increments & Units	Parameter Range	Default
LtA	0.1 °C	-40.0 to 20.0 or disabled	disabled

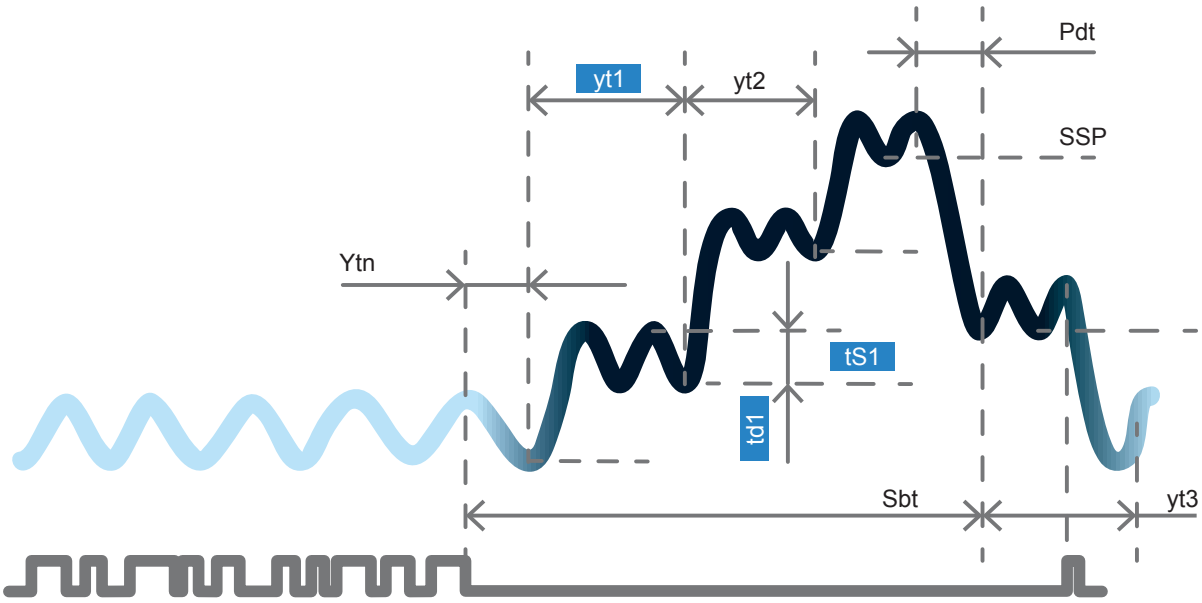
Temperature Out-Of-Spec Alarm Delay

The length of time the return-air temperature must be continuously above or below the alarm setpoints before an out-of-spec alarm is triggered. If the measured temperature returns to values between the high and low alarm setpoint range, this time counter is reset.

Digital Display	Increments & Units	Parameter Range	Default
-	1 min	1 to 240	30 mins

Transition 1 Mode

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.



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Transition 1 Set Point	tS1	0.1 °C	-10.0 to 15.0 °C	5.0 °C
Transition 1 Differential	td1	0.1 °C	0.1 to 10.0 °C	3.0 °C

Time

Parameter name	Digital display	Increments & units	Range	Default
Inactivity Wait Time - Transition 1	yt1	0.5 hours	0.0 to 24.0 hours	1 hours

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Light State Transition 1 Mode - Channel A, B^, C^, D^*	L1A, L1b, L1C, L1d	1%	0% to 100%	50%
Light State Transition 1 Mode - Channel E^*	L1E	1	0 to 1	1

^ Not available on SCS500 variants

* FW versions 4010 and above

Transition 1 Mode continued

Transition 1 Set Point

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	Increments & Units	Parameter Range	Default
tS1	0.1 °C	-10.0 to 20.0	5.0 °C

Transition 1 Differential

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	Increments & Units	Parameter Range	Default
td1	0.1 °C	0.1 to 10.0	3.0 °C

Inactivity Wait Time - Transition 1

The maximum time permitted in Transition 1 Mode without any detected activity, before switching to Transition 2 Mode.

Digital Display	Increments & Units	Parameter Range	Default
yt1	0.5 hours	0.0 to 24.0	1.0 hour

Light State Transition 1 Mode - Channel A

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	Increments & Units	Parameter Range	Default
L1A	1 %	0 to 100	50 %

Transition 1 Mode continued

Light State Transition 1 Mode - Channel B

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L1b	1%	0 to 100	50 %

Light State Transition 1 Mode - Channel C

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L1C	1 %	0 to 100	50 %

Light State Transition 1 Mode - Channel D

The illumination level during Transition 1 Mode of Channel D as a percentage of full illumination.

Note: Light levels of between 0% and 100% are only available if Channel D is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L1d	1 %	0 to 100	50 %

Transition 1 Mode continued

Light State Transition 1 Mode - Channel E

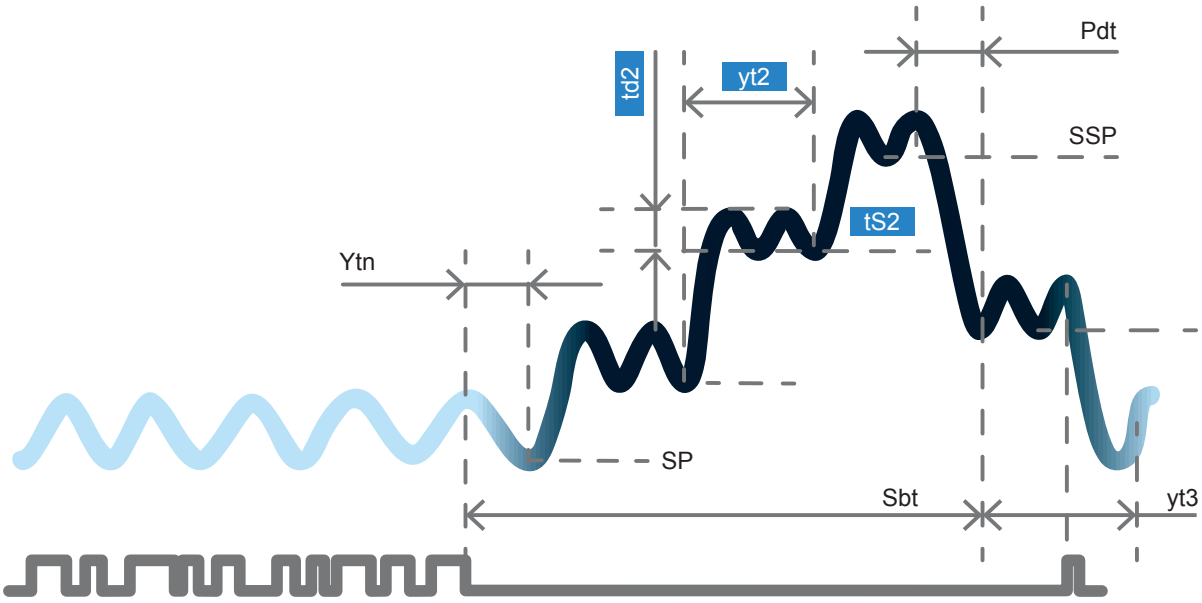
The light state during Transition 1 Mode of Channel E.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L1E	integers	0 to 1	1

Transition 2 Mode

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.



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Transition 2 Set Point	tS2	0.1 °C	-10.0 to 15.0 °C	7.0 °C
Transition 2 Differential	td2	0.1 °C	0.1 to 10.0 °C	2.0 °C

Time

Parameter name	Digital display	Increments & units	Range	Default
Inactivity Wait Time - Transition 2	yt2	0.5 hours	0.0 to 24.0 hours	1 hour

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Light State Transition 2 Mode - Channel A, B^, C^, D^*	L2A, L2b, L2C, L2d	1%	0% to 100%	0%
Light State Transition 2 Mode - Channel E^*	L2E	1	0 to 1	0

^ Not available on SCS500 variants

* FW versions 4010 and above

Transition 2 Mode continued

Transition 2 Set Point

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	Increments & Units	Parameter Range	Default
tS2	0.1 °C	-10.0 to 20.0	7.0 °C

Transition 2 Differential

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	Increments & Units	Parameter Range	Default
td2	0.1 °C	0.1 to 10.0	2.0 °C

Inactivity Wait Time - Transition 2

The maximum time permitted in Transition 2 Mode without any detected activity, before switching to full Standby Mode.

Digital Display	Increments & Units	Parameter Range	Default
yt2	0.5 hours	0.0 to 24.0	1.0 hour

Light State Transition 2 Mode - Channel A

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	Increments & Units	Parameter Range	Default
L2A	1 %	0 to 100	0 %

Transition 2 Mode continued

Light State Transition 2 Mode - Channel B

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L2b	1%	0 to 100	0 %

Light State Transition 2 Mode - Channel C

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L2C	1 %	0 to 100	0 %

Light State Transition 1 Mode - Channel D

The illumination level during Transition 2 Mode of Channel D as a percentage of full illumination.

Note: Light levels of between 0% and 100% are only available if Channel D is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L2d	1 %	0 to 100	0 %

Transition 2 Mode continued

Light State Transition 2 Mode - Channel E

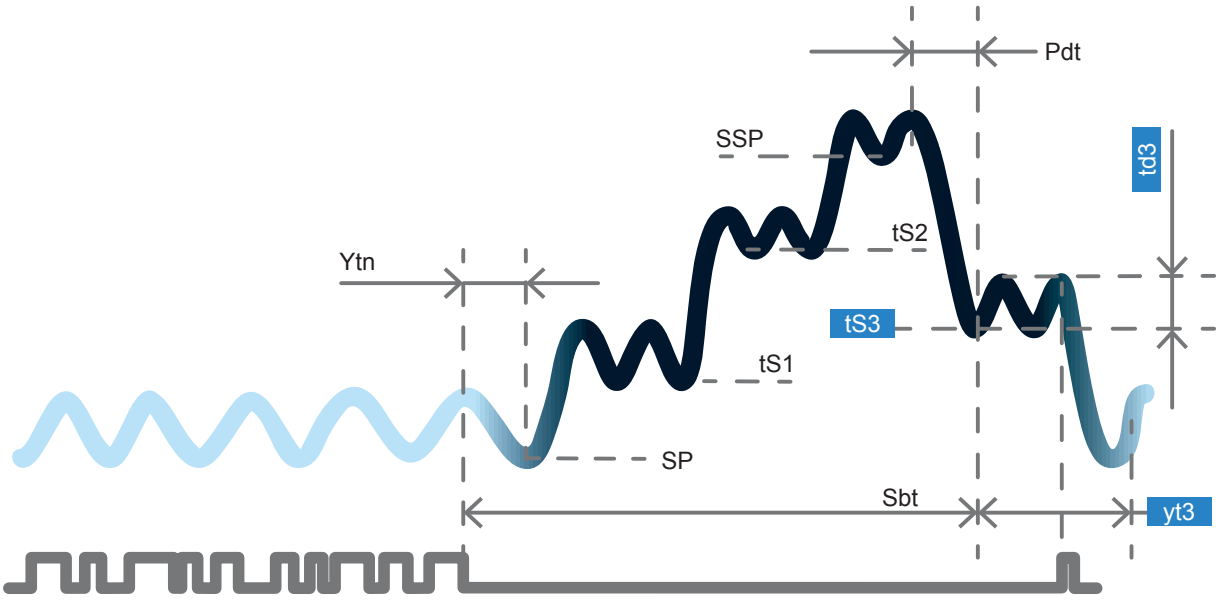
The light state during Transition 2 Mode of Channel E.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L2E	integers	0 to 1	0

Transition 3 Mode

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.



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Transition 3 Set Point	tS3	0.1 °C	-10.0 to 15.0 °C	5.5 °C
Transition 3 Differential	td3	0.1 °C	0.1 to 10.0 °C	2.0 °C

Time

Parameter name	Digital display	Increments & units	Range	Default
Inactivity Wait Time - Transition 3	yt3	0.5 hours	0.0 to 24.0 hours	1 hour

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Light State Transition 3 Mode - Channel A, B^, C^, D^*	L3A, L3b, L3C, L3d	1%	0% to 100%	0%
Light State Transition 3 Mode - Channel E^*	L3E	1	0 to 1	0

^ Not available on SCS500 variants

* FW versions 4010 and above

Transition 3 Mode continued

Transition 3 Set Point

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	Increments & Units	Parameter Range	Default
tS3	0.1 °C	-10.0 to 20.0	5.5 °C

Transition 3 Differential

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	Increments & Units	Parameter Range	Default
td3	0.1 °C	0.1 to 10.0	2.0 °C

Inactivity Wait Time - Transition 3

The maximum time permitted in Transition 3 Mode without any detected activity, before switching to full Standby Mode.

Digital Display	Increments & Units	Parameter Range	Default
yt3	0.5 hours	0.0 to 24.0	1.0 hour

Light State Transition 3 Mode - Channel A

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	Increments & Units	Parameter Range	Default
L3A	1 %	0 to 100	0 %

Transition 3 Mode continued

Light State Transition 3 Mode - Channel B

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L3b	1%	0 to 100	0 %

Light State Transition 3 Mode - Channel C

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.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L3C	1 %	0 to 100	0 %

Light State Transition 3 Mode - Channel D

The illumination level during Transition 3 Mode of Channel D as a percentage of full illumination.

Note: Light levels of between 0% and 100% are only available if Channel D is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% illumination level.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L3d	1 %	0 to 100	0 %

Transition 3 Mode continued

Light State Transition 3 Mode - Channel E

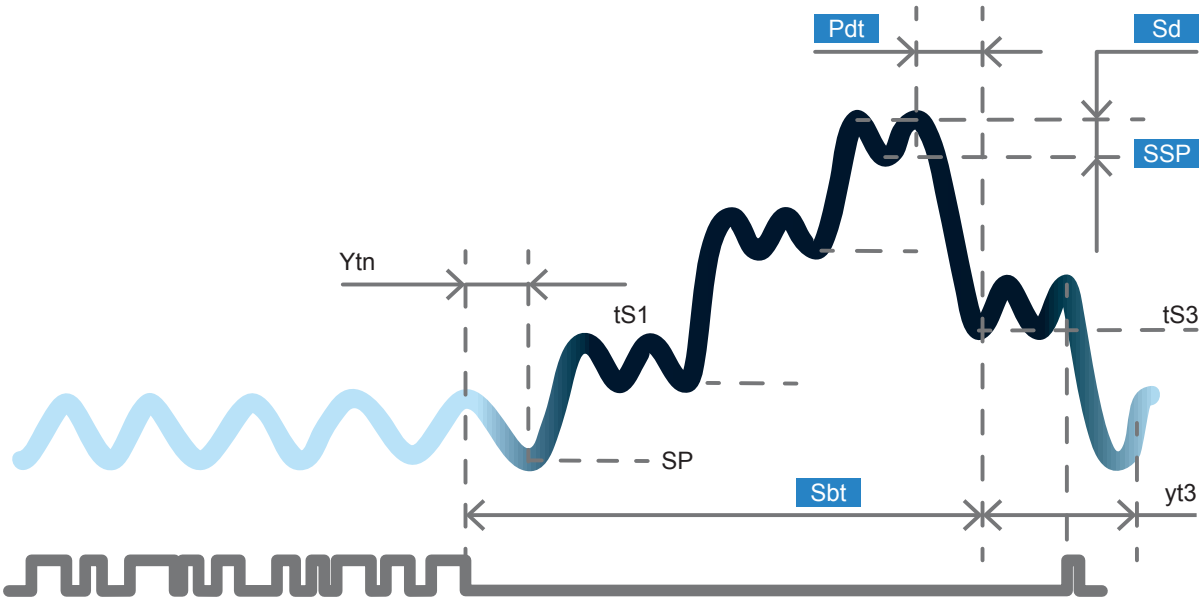
The light state during Transition 3 Mode of Channel E.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
L3E	integers	0 to 1	0

Standby Mode

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



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Standby Set Point	SSP	0.1 °C	-10.0 to 15.0 °C	8.5 °C
Standby Differential	Sd	0.1 °C	0.1 to 10.0 °C	2.0 °C
Perishable Mode	PEr	text	on or oFF	oFF

Timers & Counters

Parameter name	Digital display	Increments & units	Range	Default
Maximum Standby Time	Sbt	0.5 hours	0.0 to 24.0 hours	10 hours
Pulldown Time	Pdt	0.5 hours	0.0 to 12.0 hours	1 hour
Inactivity Wait Time - Standby Hold	yth	0.5 hours	0.0 to 24.0 hours or infinite	4 hours

Configuration

Parameter name	Digital display	Increments & units	Range	Default
Enable Time of Day Standby*	tdS	integers	0 or 1	0

* FW versions 4010 and above

Standby Mode continued

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Light State Standby Mode - Channel A, B^, C^, D^*	LSA,LSb, LSC,LSd	1%	0% to 100%	0%
Light State Standby Mode - Channel E^*	LSE	1	0 to 1	0
Display Control During Standby Mode#	dSy	integers	0 to 2	0
Marketing Mode	tnG	text	on or oFF or c01	oFF

Standby Set Point

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	Increments & Units	Parameter Range	Default
SSP	0.1 °C	-10.0 to 20.0	8.5 °C

Standby Differential

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	Increments & Units	Parameter Range	Default
Sd	0.1 °C	0.1 to 10.0	2.0 °C

^ Not available on SCS500 Variants
* FW Versions 4010 and above
# Not yet implemented

Standby Mode continued

Perishable Mode

Selects whether or not the product in the cabinet must always remain cold. 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.

- oFF = No product temp alarms. Product set point controlled by the current Mode settings (Normal, Transition1-3 and Standby).
- on = No product temp alarms. Product set point during Transition and Standby Modes controlled by Normal Mode settings.
- on+auto(1) = Auto clear alarming. As per "on" but with high and low temperature alarming available. Alarm code on display can be manually cleared (display temperature) or will auto clear when back within temperature range
- on+manual(2) = Manual clear alarming. As per "on" but with high and low temperature alarming available. Alarm code on display can only be manually cleared (display temperature)

Displaying of the high and low temp alarm codes can be manually cleared (display temperature) by holding the left and right button keys for 5secs. The alarm symbol however is always automatic based on the actual alarm state.

Digital Display	Increments & Units	Parameter Range	Default
Per	text	on or off	off

Maximum Standby Time

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	Increments & Units	Parameter Range	Default
Sbt	0.5 hours	0.0 to 24.0	10.0 hours

Pulldown Time

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	Increments & Units	Parameter Range	Default
Pdt	0.5 hours	0.0 to 12.0	1.0 hour

Standby Mode continued

Inactivity Wait Time - Standby Hold

The time the system will remain in standby with no activity before transitioning back to Transition 3 Mode.

Note: Pulldown time will be overridden to zero, as the product will remain at temperature.

- If yth = 0, the system will instantly return to Normal Mode
- If yth > 0 and the yth 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 yth = inf, the system will remain indefinitely in standby until an activity is seen.

Displaying of the high and low temp alarm codes can be manually cleared (display temperature) by holding the left and right button keys for 5secs. The alarm symbol however is always automatic based on the actual alarm state.

Digital Display	Increments & Units	Parameter Range	Default
yth	0.5 hours	0.0 to 24.0 or inf	4.0 hours

Enable Time Of Day Standby

Selects between activity based standby and time-of-day based standby

0 = Activity based standby
1 = Time-of-day-standby times to determine when in normal mode and when in standby mode.

Even when set to 1, time-of-day-standby will only be used if the internal clock is synced to the real-time on a phone. If the SCS is powered off for more than 3-days, this syncing will be lost, and it will revert to using activity based standby until it is resynced automatically when next connected to by a phone.

Digital Display	Increments & Units	Parameter Range	Default
tdS	integers	0 to 1	0

Standby Mode continued

Light State Standby Mode - Channel A

The illumination level during Standby Mode as a percentage of full illumination. 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	Increments & Units	Parameter Range	Default
LSA	1 %	0 to 100	0 %

Light State Standby Mode - Channel B

The illumination level during Standby Mode as a percentage of full illumination. 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	Increments & Units	Parameter Range	Default
LSb	1 %	0 to 100	0 %

Light State Standby Mode - Channel C

The illumination level during Standby Mode as a percentage of full illumination. 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	Increments & Units	Parameter Range	Default
LSC	1 %	0 to 100	0 %

Light State Standby Mode - Channel D

The illumination level during Standby Mode as a percentage of full illumination. 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.
Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LSd	1 %	0 to 100	0 %

Standby Mode continued

Light State Standby Mode - Channel E

The light state during Standby Mode of Channel E.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LSE	integers	0 to 1	0

Marketing Mode

Selects whether or not the lights stay on at all times.

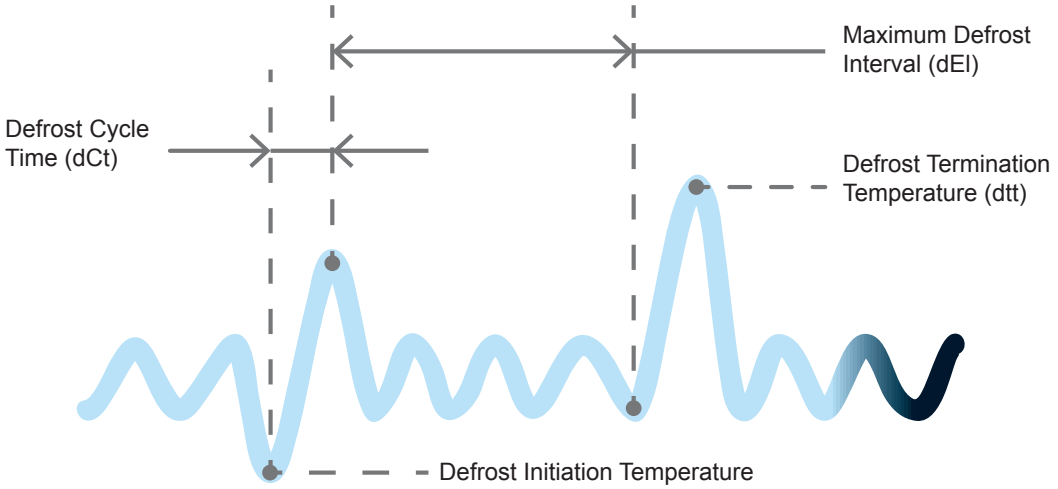
- off = Light levels and effects controlled by the current Mode settings
- on = Light levels and effects during Transition and Standby Modes controlled by Normal Mode settings
- c01 = Custom Setting 01. All 3 LED lighting channels cycle continuously from 0 to 100%. Used for RGB lighting to cycle colours. Door state and mode is ignored
- c02 = Custom Setting 02. Lighting is adjusted based on return-air-temp and door status.

Digital Display	Increments & Units	Parameter Range	Default
tnG	text	on or off	off

Defrost

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



Temperature

Parameter name	Digital display	Increments & units	Range	Default
Defrost Initiation Temperature	dIt	1°C	-15 to 10°C or dISabled	dISabled
Defrost Termination Temperature	dtt	1°C	0 to 30°C	30°C
Uninterrupted Pull Down Temperature*	Pdn	1 °C	0 to 25 or dISabled	dISabled

Time

Parameter name	Digital display	Increments & units	Range	Default
Maximum Defrost Cycle Time	dCt	1 min	1 to 120 mins	20 mins
Maximum Defrost Interval	dEI	1 hour	1 to 48 hours	3 hours
Defrost Type	dtP	integers	0 - 3,4**	3
Passive Dripping Time	dPt	1 min	0 to 30 mins	0 min
Active Dripping Time***	dAt	1 min	0 to 30 mins	0 min

* Not available on SCS500 variants
** FW Versions 1592 and above
*** FW Versions 4010 and above

Defrost continued

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Display Value During Defrost Cycle#	ddE	integers	3	3
Pre-time For Hot-gas Defrost**	n/a	1 min	0 to 240 mins	0 min

Defrost Initiation Temperature

The Evaporator Coil temperature below which a Defrost cycle will be initiated. The cycle will run until either the DEFROST TERMINATION TEMPERATURE is reached, or the MAXIMUM DEFROST CYCLE TIME is met. Operation is dependent upon the settings in DEFROST TYPE If the Evaporator Coil sensor is not connected and functioning, a temperature based defrost initiation cannot be triggered (this is the equivalent of being set to disabled).

Digital Display	Increments & Units	Parameter Range	Default
dIt	1 °C	-50 to 10 or disabled	disabled

Defrost Termination Temperature

The temperature at which the Defrost Cycle will terminate to prevent an excessive internal temperature. If an Evaporator Coil sensor is configured, this applies to the Evaporator Coil temperature, otherwise it applies to the Return-air temperature.

This applies to time based and temperature based defrosts.

This does not apply to “Manual” and “No-Downwards-Tendency” defrosts (See Safety Termination Temperature), as these defrosts are only triggered if there is an excessive evaporator freeze up that has not been successfully defrosted by the usual time and temperature based defrosts (See NDT AND MANUAL DEFROST CONFIG).

If an Evaporator Coil sensor is configured but is not functioning, a defrost cannot terminate based on DEFROST TERMINATION TEMPERATURE.

This should be set ABOVE the DEFROST INITIATION TEMPERATURE when an Evaporator Coil sensor is being used.

Digital Display	Increments & Units	Parameter Range	Default
dtt	1 °C	0 to 30	30 °C

** FW Versions 1592 and above
# Not yet implemented

Defrost continued

Defrost Safety Termination Temperature

The temperature at which ALL defrosts will terminate to prevent an excessive internal temperature causing damage. This applies to both the Return-air temperature and Evaporator Coil temperature (if sensor is fitted and functioning).

This allows the exception condition of a “Manual” or “No Downwards Tendency” defrost to terminate at a higher temperature to increase the chances of defrosting of a coil that has not defrosted successfully using the regular “Timed” and “Temperature” based defrost profiles.

This does includes “Manual” and “No-Downwards-Tendency” defrosts. In FW versions prior to 4010, for safety reasons a Hotgas or Electric defrost always terminated a “Manual” or “No-Downwards-Tendency” defrost at the “Defrost Termination Temperature”.

For passive defrosts, this was also achieved by setting using the advanced parameter “No Downwards Lockout Count” to 0.

To maintain continuity of functionality, when upgrading FW from pre-4010 versions, or when using older parameter files where terminating ALL defrosts at the “Defrost Termination Temperature” was the required functionality, the “Defrost Safety Termination Temperature” will be automatically set to the same value as the “Defrost Termination Temperature”.

Digital Display	Increments & Units	Parameter Range	Default
-	1 °C	0 to 80	30 °C

Uninterrupted Pull Down Activation Temperature

The temperature, which if exceeded for over 5mins 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.

Digital Display	Increments & Units	Parameter Range	Default
Pdn	1 °C	0 to 25 or disabled	disabled

Defrost continued

Maximum Defrost Cycle Time

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	Increments & Units	Parameter Range	Default
dCt	1 min	0 to 180	20 mins

Maximum Defrost Interval

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	Increments & Units	Parameter Range	Default
dEI	1 hour	1 to 48	3 hours

Defrost Type

Selects which defrost method is to be used:

- 0 = Disabled
- 1 = Defrost Cycle using electric heater. [Defrost ON - Evap OFF = Comp/Cond OFF]
- 2** = Defrost Cycle using hot gas (Reverse cycle) [Defrost ON - Evap OFF - Comp ON - Cond OFF]
- 3 =Defrost Cycle by turning off the compressor (Ambient Defrost) [Defrost OFF - Evap ON -Comp/Cond OFF]
- 4* = Defrost Cycle using electric heater + Fan. [Defrost ON - Evap ON - Comp/Cond OFF]

Digital Display	Increments & Units	Parameter Range	Default
dtP	text	Disabled (0),Electric (1),Hot Gas (2),Passive (3) or Electric + Fan (4)	Passive (3)

Passive Dripping Time

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	Increments & Units	Parameter Range	Default
dPt	1 min	0 to 30	0 min

* FW Versions 1580 and above
** FW Versions 1592 and above

Defrost continued

Active Dripping Time

The time needed to blow the last drops of moisture off of the Evaporator after Passive Dripping Time, to help prevent freeze up. Used for hot gas and electric heater defrosts only. This wait time occurs after the Passive Defrost Time has ended, but before exiting the Defrost Cycle and returning to the non-defrost operational state. During this time, the Evaporator Fan is ON, but the Condenser Fan and Compressor remain OFF.

0 = Disabled.

Digital Display	Increments & Units	Parameter Range	Default
dAt	1 min	0 to 30	0 min

Pre-Heating For Hot-Gas Defrost

The time needed prior to a hot-gas defrost to heat up the high-side gas sufficiently for the use of defrosting the evap coils once the by-pass valve has been opened. During this time, the Compressor is ON, but the Defrost Relay, Evaporator Fan and Condenser Fan are OFF.

0 = Disabled.

Digital Display	Increments & Units	Parameter Range	Default
-	1 min	0 to 15	0 min

Display Settings - Defrost Cycle

Selects what is displayed during the Defrost Cycle:

- 0[#] = Displays the live return-air temperature
- 1 = Display the Set Point Temperature.
- 2 = Display the temperature at the point the defrost started
- 3 = Display shows ‘dEF’.
- 4 = Display shows ‘dEF’ during the defrost, but display the temperature at the point the defrost started during DEFROST DISPLAY HOLD TIME

Digital Display	Increments & Units	Parameter Range	Default
ddE	integers	0 to 4	3

[#] Not yet enabled. Operates as per default

Defrost continued

Display Hold Time

In this parameter - the display setting changes during the defrost period. For example, if the temp is 3.5° when the defrost is begins then the display will be “dEF”. When the defrost ends then 3.5° will be displayed on screen for the Display Hold Time value.

After the Display Hold Time has elapsed then the display will start to change to reflect the actual temp. This will change in increments matching the Temperature Display Filter or Downwards Temperature Display Filter parameter value until the display matches the actual temperature.

Digital Display	Increments & Units	Parameter Range	Default
-	1 min	0 to 120	0 min

Door Menu

The SCS 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.

Temperature

Parameter name	Digital display	Increments & units	Range	Default
Door Open Evap Continuous Run Temp	FCr	1°C	0 °C to 30 °C or dISabled	30 °C

Time

Parameter name	Digital display	Increments & units	Range	Default
Door Open Delay	drd	10 secs	0 to 1800 secs	180 secs

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Light State Door Open - Channel A, B^, C^, D^*	LdA,Ldb, LdC,Ldd	1%	0% to 100% or dISabled	100%
Light State Door Open - Channel E^*	LdE	1%	0 or 1 or dISabled	dISabled
Light State Motion - Channel A, B^, C^, D^*	LoA,LoB, LoC,Lod	1%	0% to 100% or dISabled	dISabled
Light State Motion - Channel E^*	LoE	1%	0 or 1 or dISabled	dISabled

^ Not available on SCS500 variants
* FW versions 4010 and above

Door menu continued

Door Open Evap Continuous Run Temp

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.

Note: Door Open Evap Continuous Run Temp should be greater than the Standby Set Point + Standby Differential to ensure normal fan operation.

Digital Display	Increments & Units	Parameter Range	Default
FCr	1 °C	0 to 30 or disabled	30 °C

Door Open Delay

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 system 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	Increments & Units	Parameter Range	Default
drd	10 secs	0 to 1800	180 secs

Light State Door Open - Channel A

The illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
LdA	1%	0 to 1800	180 secs

Door menu continued

Light State Door Open - Channel B

The illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
Ldb	1 %	0 to 100 or disabled	100 %

Light State Door Open - Channel C

The illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
LdC	1 %	0 to 100 or disabled	100 %

Light State Door Open - Channel D

The illumination level when the door is open, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% light level.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
Ldd	1 %	0 to 100 or disabled	100 %

Light State Door Open - Channel E

The Channel E light state when the door is open. If disabled, then light level is unaffected by opening the door.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LdE	text	0 to 100 or disabled	1

Door menu continued

Light State Activity - Channel A

The illumination level when a motion is detected, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
LoA	1 %	0 to 100 or disabled	disabled

Light State Activity - Channel B

The illumination level when a motion is detected, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
Lob	1 %	0 to 100 or disabled	disabled

Light State Activity - Channel C

The illumination level when a motion is detected, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel 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	Increments & Units	Parameter Range	Default
LoC	1 %	0 to 100 or disabled	disabled

Light State Activity - Channel D

The illumination level when a motion is detected, as a percentage of full illumination. If disabled, then light level is unaffected by opening the door. Light levels of between 0% and 100% are only available if the Channel is assigned to an LED output. If assigned to a digital output, then any level other than 0% will result in 100% light level.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
Lod	1 %	0 to 100 or disabled	disabled

Door menu continued

Light State Activity - Channel D

The Channel E light state when motion is detected. If disabled, then light level is unaffected by motion.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LoE	text	0 to 100 or disabled	disabled

Compressor Menu

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

Temperature

Parameter name	Digital display	Increments & units	Range	Default
Condenser High Temperature Limit	Cht	1°C	60 °C to 150 °C or dISabled	85 °C

Timers & Counters

Parameter name	Digital display	Increments & units	Range	Default
Minimum Compressor Off Time	Cot	10 secs	10 to 1800 secs	180 secs
Compressor Maximum Starts per Hour	CSh	1 count	5 to 30 or dISabled	dISabled

Alarms

Parameter name	Digital display	Increments & units	Range	Default
Refrigeration System Failure Time	rSF	1 hour	0 to 100 hours or dISabled	48 hours

Compressor Menu continued: Temperature

Condenser High Temperature Limit

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

Digital Display	Increments & Units	Parameter Range	Default
Cht	1 °C	60 to 150 or disabled	85 °C

Minimum Compressor Off Time

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	Increments & Units	Parameter Range	Default
Cot	10 secs	10 to 1800	180 secs

Minimum Compressor Off Time When Condenser Overtemp

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 after a condenser over temperature trip has occurred. This time period allows the system pressures to equalize and helps prevent the Compressor from overheating.

Digital Display	Increments & Units	Parameter Range	Default
-	1 min	0 to 60	3 mins

Compressor Maximum Starts Per Hour

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

Digital Display	Increments & Units	Parameter Range	Default
CSh	1 count	5 to 30 or disabled	disabled

Compressor Menu continued

Refrigeration System Failure Time

The maximum permitted time that the Compressor can run continuously before the system is shut down and an alarm is triggered. This is forcibly set to disabled when a Freezer install type is selected.

Digital Display	Increments & Units	Parameter Range	Default
rSF	1 hour	0 to 100 or disabled	48 hours

Supply

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.

Timers & Counters

Parameter name	Digital Display	Increments & Units	Range	Default
Maximum Run/Start Voltage	hPC	1 V	100 V to 265 V or dISabled	254 V
Minimum Start Compressor Voltage	LPC	1 V	79 V to 203 V or dISabled	90 V

Maximum Run/Start Compressor Voltage

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	Increments & Units	Parameter Range	Default
hPC	1 Vac	100 to 265 or disabled	254 Vac

Minimum Start Compressor Voltage

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	Increments & Units	Parameter Range	Default
LPC	1 Vac	79 to 203 or disabled	90 Vac

Display

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

Display

Parameter name	Digital display	Increments & units	Range	Default
Temperature Display Units	tdu	°C or °F	°C or °F	°C
User Set Point Keypad Lock^	uSL	text	Unlocked, Set Point Locked or Fully Locked	Set Point Locked
Maximum Displayable Temperature^	dSt	0.1 °C	-10.0 to 30.0 °C	30 °C
Minimum Displayable Temperature^	dP-	0.1 °C	-10.0 to 30.0 °C	-10 °C

Timers & Counters

Parameter name	Digital display	Increments & units	Range	Default
Upwards Temperature Display Filter^	tdF	1 secs	0 to 30 secs	5 secs

Temperature Display Units

Selects which temperature scale is displayed; Fahrenheit or Celsius. This selection automatically converts all temperature displays, from all menus, into the selected scale.

Digital Display	Increments & Units	Parameter Range	Default
tdu	text	degC or degF	degC

User Set Point Keypad Lock

Locks the front keypad, to prevent use by the shop owners or passers-by.

Unlocked = Allows access to setpoint, toggling of lights, initiating standby and initiating defrost, password entry.

Setpoint Locked = Blocks access to setpoint.

*Fully Locked = Blocks access to setpoint, toggling of lights, initiating standby and initiating defrost

Digital Display	Increments & Units	Parameter Range	Default
uSL	text	Unlocked,Setpoint Locked or Fully Locked	Setpoint Locked

* FW versions 1580 onwards
^ Not available on SCS500 variants

Display continued

Maximum Displayable Temperature

The maximum temperature that will be displayed. Temperatures above this amount will be displayed as “-“.

Digital Display	Increments & Units	Parameter Range	Default
dSt	0.1 °C	-40.0 to 30.0	30.0 °C

Minimum Displayable Temperature

The minimum temperature that will be displayed by the unit. Temperatures below this amount will be displayed as “--“.

Digital Display	Increments & Units	Parameter Range	Default
dP-	0.1 °C	-40.0 to 30.0	-35.0 °C

Temperature Display Filter

The minimum time between display changes of 0.1degC when the temperature is trending upwards. This prevents misleading temperature spikes being shown during door openings.

Digital Display	Increments & Units	Parameter Range	Default
tdF	1 sec	0 to 30	5 secs

Hardware Set-up

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

Inputs

Parameter name	Digital Display	Increments & Units	Parameter Range	Default
Control Probe Calibration Offset	CAL	0.1 °C	-10.0 to 10.0 °C	0.0 °C
Control Probe Response#	CPb	1 sec	1 to 30 secs	5 secs
Return Air Temperature Port	rtP	Port ID	AD1 - AD4, AD5^ or N.C.	AD1
Condensor Temperature Port	CdP	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Ambient Temperature Port	tPt	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Evap' Coil Temperature Port	ELt	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Compressor Body Temperature Port	CPP	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Compressor Inlet Temperature Port	CtP	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Door Sensor Port Configuration	dSC	Port ID	AD1 - AD4, AD5^ or N.C.	AD4
Doorswitch State	drS	integers	NC(0) or NO(1)	0
Motion Sensor Port Configuration	onP	Port ID	AD1 - AD4, AD5^ or N.C.	N.C.
Motion Sensor Type*	ont	integers	0 - 3	0
NTC 1 Beta value	n1b	integers	3400-4000	3435
NTC 1 Resistance	n1r	1 ohm	1000-15000	10,000
NTC 2 Beta value	n2b	integers	3400-4000	3435
NTC 2 Resistance	n2r	1 ohm	1000-15000	10,000
AD1 NTC Type	Ad1	integers	1-2	1
AD2 NTC Type	Ad2	integers	1-2	1
AD3 NTC Type	Ad3	integers	1-2	1
AD4 NTC Type	Ad4	integers	1-2	1
AD5 NTC Type	Ad5	integers	1-2	1

^ Not available on SCS500 variants
* FW versions 1580 onwards
# Parameter settable but not yet used - uses default

Hardware Set-up continued

Outputs

Parameter name	Digital Display	Increments & Units	Parameter Range	Default
Output Interval Time#	oPt	1 second	0 secs	0 secs
Compressor Port Configuration	CPC	Port ID	R, C or N.C.	C
Compressor State	CPS	integers	0 or 1	0
Evaporator Fan Port Configuration	EFC	Port ID	S1, S2^, S1&S2^, R or N.C.	S1
Evaporator Fan Control Type	ECt	text	on/off or Var	on/off
Evaporator Fan Direction	EFd	Dir	CW or CCW	CCW
Condensor Fan Port Configuration	CdC	Port ID	S1, S2^	N.C.
Condensor Fan Control Type	CCt	text	on/off or Var	on/off
Condensor Fan Direction	CFd	Dir	CW or CCW	CCW
Defrost Port Configuration	dFC	Port ID	R, C or N.C.	N.C.
Defrost State	dFS	integers	0 or 1	0
5Vdc Port Configuration	dCC	integers	0-1	0
Lighting Port Configuration - Channel A	LCA	Port ID	LE1^, LE2^, LE3^, AD5^*, S1, S2^, R, C or N.C.	R
Lighting Port Configuration - Channel B^, C^, D^*	LCb,LCC, LCd	Port ID	LE1^, LE2^, LE3^, AD5^*, S1, S2^, R, C or N.C.	N.C.
Lighting Port Configuration - Channel E^*	LCE	Port ID	LE1^, LE2^, LE3^, AD5^*, S1, S2^, R, C or N.C.	N.C.
Lighting State Channel A, B^, C^, D^*	LEA,LEb, LEC,LEd, LEE	integers	0 or 1	0

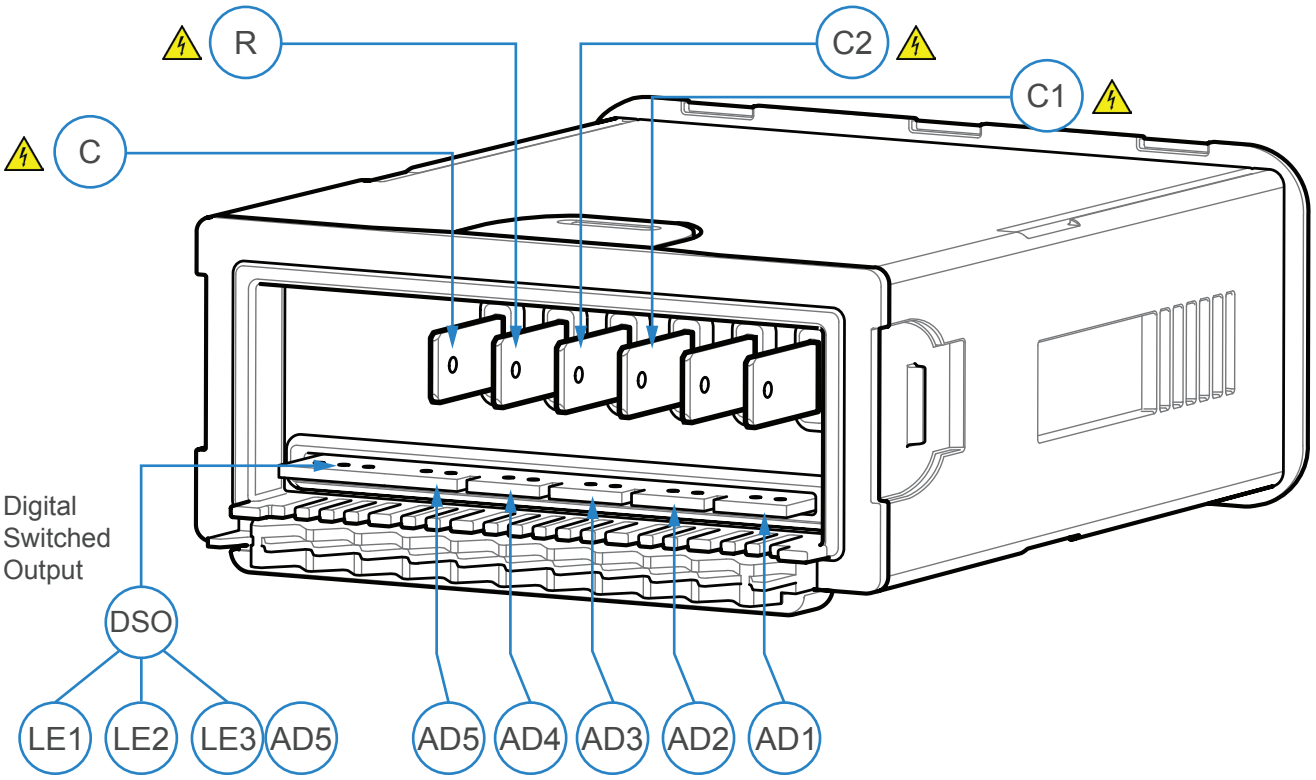
^ Not available on SCS500 variants

* FW versions 4010 and above

Parameter settable but not yet used - uses default

Hardware Set-up continued

Port identification



Inputs

Control Probe Calibration Offset

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.

Digital Display	Increments & Units	Parameter Range	Default
CAL	0.1 °C	-10.0 to 10.0	0.0 °C

Hardware Set-up continued

Return Air Temperature Port

Selects the Return Air Temperature Probe connection port:
N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
rtP	Port ID	AD1-AD5 or NC	AD1

Condenser Temperature Port

Selects the Condenser Temperature Probe connection port. This may also be called the Gas Cooler Probe in CO2 systems:

Digital Display	Increments & Units	Parameter Range	Default
CdP	Port ID	AD1-AD5 or NC	NC

Ambient Temperature Port

Selects the Ambient Temperature Probe connection port.

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
tPt	Port ID	AD1-AD5 or NC	NC

Evaporator Coil Temperature Port

Selects the Evaporator Coil Temperature Probe connection port.

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5 = Analog or Digital i/pAD4_AD5 = Analog or Digital i/p

Digital Display	Increments & Units	Parameter Range	Default
Elt	Port ID	AD1-AD5 or NC	NC

^ Not available on SCS500 variants

Compressor Body Temperature Port

Selects the Compressor Body Temperature Probe connection port.
N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default

Condenser Temperature Port

Selects the Condenser Temperature Probe connection port. This may also be called the Gas Cooler Probe in CO2 systems:

Digital Display	Increments & Units	Parameter Range	Default
CdP	Port ID	AD1-AD5 or NC	NC

Ambient Temperature Port

Selects the Ambient Temperature Probe connection port.

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
tPt	Port ID	AD1-AD5 or NC	NC

^ Not available on SCS500 variants

Evaporator Coil Temperature Port

Selects the Evaporator Coil Temperature Probe connection port.

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5 = Analog or Digital i/p
AD4_AD5 = Analog or Digital i/p

Digital Display	Increments & Units	Parameter Range	Default
Elt	Port ID	AD1-AD5 or NC	NC

Compressor Body Temperature Port

Selects the Compressor Body Temperature Probe connection port.

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
CPP	Port ID	AD1-AD5 or NC	NC

Compressor Inlet Temperature Port

Selects the Compressor Inlet Temperature Probe connection port:

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
CtP	Port ID	AD1-AD5 or NC	NC

^ Not available on SCS500 variants

Door Sensor Port Configuration

Selects the Door Sensor connection port. Please also refer to ‘Door Switch State’ (drS).

Digital Display	Increments & Units	Parameter Range	Default
dSC	Port ID	AD1-AD5 or NC	AD4

Door Switch State

Selects the switch state for when the cabinet door is open (so sensor is in free air). Please also refer to “Door Sensor Port Configuration’ (dSC)

NC(0) = The cabinet door is open when the i/p is short circuited (using Normally Closed switch). NO(1) = The cabinet door is open when the i/p is an open circuit (using Normally Open switch).

Digital Display	Increments & Units	Parameter Range	Default
drS	text	NO(0) or NC(1)	NO(0)

Motion Sensor Port Configuration

Selects the Motion Sensor connector port. Please also refer to ‘Activity Sensor State’ (SrS).

N.C. = Not Connected
AD1 – AD4 = Analog or Digital i/p
AD5^ = Analog or Digital i/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
onP	Port ID	AD1-AD5 or NC	NC

^ Not available on SCS500 variants

Motion Sensor Type

Defines which type of motion sensor is being used

0 = Elstat motion sensor
1 = WDTL motion sensor
2 = Elstat motion sensor, Activity will not bring the cooler out of standby modes
3 = AoFrio motion sensor, Activity will not bring the cooler out of standby modes

Motion sensor requires 3 motion counts in 30 min to exit a standby mode.

Digital Display	Increments & Units	Parameter Range	Default
ont	integers	0 to 3	0

Ntc 1 Beta Value

The beta value use for NTC type 1. Two different NTC types can be used simultaneously.

Digital Display	Increments & Units	Parameter Range	Default
n1b	integers	3400 to 4000	3435

Ntc 1 Resistance

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

Digital Display	Increments & Units	Parameter Range	Default
n1r	1 ohm	1000 to 15000	10000 Ohms

Ntc 2 Beta Value

The beta value use for NTC type 2. Two different NTC types can be used simultaneously.

Digital Display	Increments & Units	Parameter Range	Default
n2b	integers	3400 to 4000	3435

Ntc 2 Resistance

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

Digital Display	Increments & Units	Parameter Range	Default
n2r	1 ohm	1000 to 15000	10000 Ohms

Ad1 Ntc Type

Determines which NTC type is connected to AD1. Can be table based or defined by beta value and resistance.

0 = WDTL NTC sensor
1 = As per NTC1 Beta and Resistance values
2 = As per NTC2 Beta and Resistance values

Digital Display	Increments & Units	Parameter Range	Default
Ad1	integers	0 to 2	0

Ad2 Ntc Type

Determines which NTC type is connected to AD2. Can be table based or defined by beta value and resistance.

0 = WDTL NTC sensor
1 = As per NTC1 Beta and Resistance values
2 = As per NTC2 Beta and Resistance values

Digital Display	Increments & Units	Parameter Range	Default
Ad2	integers	0 to 2	0

Ad3 Ntc Type

Determines which NTC type is connected to AD3. Can be table based or defined by beta value and resistance.

0 = WDTL NTC sensor
1 = As per NTC1 Beta and Resistance values
2 = As per NTC2 Beta and Resistance values

Digital Display	Increments & Units	Parameter Range	Default
Ad3	integers	0 to 2	0

Ad4 Ntc Type

Determines which NTC type is connected to AD4. Can be table based or defined by beta value and resistance.

0 = WDTL NTC sensor
1 = As per NTC1 Beta and Resistance values
2 = As per NTC2 Beta and Resistance values

Digital Display	Increments & Units	Parameter Range	Default
Ad4	integers	0 to 2	0

Hardware Set-up continued

Ad5 Ntc Type

Determines which NTC type is connected to AD5. Can be table based or defined by beta value and resistance.

0 = WDTL NTC sensor
1 = As per NTC1 Beta and Resistance values
2 = As per NTC2 Beta and Resistance values

NOTE: AD5 is normally used as an analog input, digital input, or digital output. It has a minimal PWM output which means it can't be fully turned off (in terms of power/electricity). In rare situations where it is used as a lighting connection for the Controller there will be a minimum 5% ‘on time' duty, meaning it the connected light will be 'slightly dim’ rather than fully 'off'.

Digital Display	Increments & Units	Parameter Range	Default
Ad5	integers	0 to 2	0

Outputs

Compressor Port Configuration

Selects the Compressor connection port:

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p

Digital Display	Increments & Units	Parameter Range	Default
CPC	Port ID	R,C or NC	C

Compressor State

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	Increments & Units	Parameter Range	Default
CPS	integers	0 to 1	0

Evaporator Fan Port Configuration

Selects the Evaporator Fan connection port

N.C. = Not Connected
S1 = 0.4/0.6A Solid State Relay o/p
S2^ = 0.4/0.6A Solid State Relay o/p
S1&S2^ = 0.8/1.2A Solid State Relay o/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
EFC	Port ID	S1, S2, S1&S2, R or NC	S1

Evaporator Fan Control Type

Selects whether the Evaporator Fan Port operates as an ON/OFF switch or as a variable speed fan control output.

on/off = Normal Switch
Var = Variable Speed Fan Control

Digital Display	Increments & Units	Parameter Range	Default
ECt	text	on/off or Var	on/off

Evaporator Fan Direction

Selects the direction of the evaporator fan rotation.

Digital Display	Increments & Units	Parameter Range	Default
EFd	Dir	CW or CCW	CCW

^ Not available on SCS500 variants

Condenser Fan Port Configuration

Selects the Condenser Fan connection port:

N.C. = Not Connected
S1 = 0.4/0.6A Solid State Relay o/p
S2^ = 0.4/0.6A Solid State Relay o/p
S1&S2^ = 0.8/1.2A Solid State Relay o/p

Only supported by HW:
+SCS Adv,
+SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
CdC	Port ID	S1, S2 or NC	NC

Condenser Fan Control Type

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	Increments & Units	Parameter Range	Default
CCt	text	on/off or Var	on/off

Condenser Fan Direction

Selects the direction of the condenser fan rotation

Digital Display	Increments & Units	Parameter Range	Default
CFd	Dir	CW or CCW	CCW

Defrost Port Configuration

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 = 3A Relay o/p
C = 8A Relay o/p

Digital Display	Increments & Units	Parameter Range	Default
dFC	Port ID	R,C or NC	NC

^ Not available on SCS500 variants

Defrost State

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	Increments & Units	Parameter Range	Default
dFS	integers	0 to 1	0

5V Port Configuration

Enables the 5V output on AD4

0 = output disabled
1 = continuous 5V output enabled

Digital Display	Increments & Units	Parameter Range	Default
dCC	text	NC or AD4	NC

Lighting Port Configuration - Channel A

Selects the lighting connection Port. Please also refer to Lighting State - Channel A (LEA).

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p
S1 = 0.4/0.6A Solid State Relay o/p
S2^ = 0.4/0.6A Solid State Relay o/p
LE1^ – LE3 = Switched 24V o/p
AD5^* = Switched 24V o/p (limited by HW to min duty of 5%)

Digital Display	Increments & Units	Parameter Range	Default
LCA	Port ID	C,R,S1-2,LE1-3, AD5 or NC	R

^ Not available on SCS500 variants
* FW versions 1580 onwards

Lighting Port Configuration - Channel B

Selects the lighting connection Port. Please also refer to Lighting State - Channel B (LEB).

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p
S1 = 0.4/0.6A Solid State Relay o/p
S2^ = 0.4/0.6A Solid State Relay o/p
LE1^ – LE3 = Switched 24V o/p
AD5^* = Switched 24V o/p (limited by HW to min duty of 5%)

Digital Display	Increments & Units	Parameter Range	Default
LCb	Port ID	C,R,S1-2,LE1-3, AD5 or NC	NC

Lighting Port Configuration - Channel C

Selects the lighting connection Port. Please also refer to Lighting State - Channel C (LEC).

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p
S1 = 0.4/0.6A Solid State Relay o/p
S2^ = 0.4/0.6A Solid State Relay o/p
LE1^ – LE3 = Switched 24V o/p
AD5^* = Switched 24V o/p (limited by HW to min duty of 5%)

Digital Display	Increments & Units	Parameter Range	Default
LCC	Port ID	C,R,S1-2,LE1-3, AD5 or NC	NC

^ Not available on SCS500 variants
* FW versions 1580 onwards

Lighting Port Configuration - Channel D

Selects the lighting connection Port. Please also refer to Lighting State - Channel D (LED).

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p
S1 = 0.4/0.6A Solid State Relay o/p
S2 = 0.4/0.6A Solid State Relay o/p
LE1 – LE3 = Switched 24V o/p
AD5 = Switched 24V o/p (limited by HW to min duty of 5%)

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LCd	Port ID	C,R,S1-2,LE1-3, AD5 or NC	NC

Lighting Port Configuration - Channel E

Selects the lighting connection Port. Please also refer to Lighting State Channel E (LEE).

N.C. = Not Connected
R = 3A Relay o/p
C = 8A Relay o/p
S1 = 0.4/0.6A Solid State Relay o/p
S2 = 0.4/0.6A Solid State Relay o/p

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LCE	Port ID	S1,S2,R,C or NC	NC

Light State - Channel A

Selects the relay state when the port is configured to a digital output and 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)

When associated lighting channel is configured to an LED channel, this parameter has no effect

Digital Display	Increments & Units	Parameter Range	Default
LEA	integers	0 to 1	0

Light State - Channel B

Selects the relay state when the port is configured to a digital output and 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)

When associated lighting channel is configured to an LED channel, this parameter has no effect.

Digital Display	Increments & Units	Parameter Range	Default
LEb	integers	0 to 1	0

Light State - Channel C

Selects the relay state when the port is configured to a digital output and 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)

When associated lighting channel is configured to an LED channel, this parameter has no effect

Digital Display	Increments & Units	Parameter Range	Default
LEC	integers	0 to 1	0

Light State - Channel D

Selects the relay state when the port is configured to a digital output and lighting is off. Please also refer to the Lighting Port Configuration – Channel D (LCd).

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)

When associated lighting channel is configured to an LED channel, this parameter has no effect

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LEd	integers	0 to 1	0

Light State - Channel E

Selects the relay state when the port is configured to a digital output and lighting is off. Please also refer to the Lighting Port Configuration – Channel E (LCE).

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)

When associated lighting channel is configured to an LED channel, this parameter has no effect.

Only supported by HW:
SCS Adv,
SCS Adv No Display

Digital Display	Increments & Units	Parameter Range	Default
LEE	integers	0 to 1	0

Logging

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

Parameter name	Digital display	Increments & units	Range	Default
Logging Interval	LGt	mins	30 to 1440	30

Store operation time

Compressor Port Configuration

When not configured for time-of-day standby, standby is controlled by activity such as door openings and motion sensing. Time-of-day standby however ignores all activity, and instead changes standby states based on time of day.

Lighting & Display

Parameter name	Digital display	Increments & units	Range	Default
Store opening hour	ohx	1 hour	0 to 23 hours	7 hours
Store opening minute	onx	1 min	0 to 59 mins	0 mins
Store closing hour	Chx	1 hour	0 to 23 hours	17 hours
Store closing minute	Cnx	1 min	0 to 59 mins	0 mins

Store Opening Hour - Mon To Sun

The local time (hour) of day when the store opens, in a 24-hour system.

Note: The cooler will go to transition 3 for the time set in pull down time prior to the time set in store opening hour and store opening minute, ensuring the product is close to serving temperature when the store opens.

Digital Display	Increments & Units	Parameter Range	Default
ohx	1 hour	0 to 23 hours	7 hours

* FW Version 1580 onwards

Lighting & Display continued

Store Opening Minute – Mon to Sun

The local time (minute) of day when the store opens.

Note: The cooler will go to transition 3 for the time set in pull down time prior to the time set in store opening hour and store opening minute, ensuring the product is close to serving temperature when the store opens.

- Monday: on1
- Tuesday: on2
- Wednesday: on3
- Thursday: on4
- Friday: on5
- Saturday: on6
- Sunday: on7

Digital Display	Increments & Units	Parameter Range	Default
onx	1 minute	0 to 59 minutes	0 minutes

Store Closing Hour - Mon To Sun

Monday to Sunday (where x is 1 to 7). The hour when the store closes. The cooler will then go directly into standby.

Digital Display	Increments & Units	Parameter Range	Default
Chx	1 hour	0 to 23 hours	17 hours

Store Closing Minute - Mon To Sun

Monday to Sunday (where x is 1 to 7). The minute past the hour when the store closes. The cooler will then go directly into standby.

Digital Display	Increments & Units	Parameter Range	Default
Cnx	1 minute	0 to 59 minutes	0 minutes

SCS Controller user manual

Standard parameters

www.aofrio.com

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