

## OD400-4

### SKOPE Open Deck Chiller



OD400-4  
SKOPE Open Deck Chiller  
Service Manual

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# 1 Specifications

## Models

This service manual is applicable to the SKOPE chillers detailed below. The type is used to distinguish between different models throughout this manual.

Model	Description	Type
OD400-4	2 × interior lights	O44CY

### OD400-4 Cabinet

Description	Open Deck Chiller	
Type	O44CY	
Construction		
Insulation	40mm thick, polyurethane foam. Cyclo-iso Pentane blowing agent: C <sub>5</sub> H <sub>10</sub> /C <sub>5</sub> H <sub>12</sub>	
Doors	n.a.	
Dimensions	External	Internal
Height	1400mm	850mm
Width	900mm	820mm
Depth	660mm (includes rear spacer)	350-450mm
Floor area	0.59m <sup>2</sup> (includes rear spacer)	
Internal volume	251 litres	
Shelves	2 × ducted, flat or angled (6°), adjustable height shelves, and 1 × fixed, angled bottom shelf. Top shelf: 807mm wide × 259mm deep. Middle shelf: 807mm wide × 284mm deep. Bottom shelf: 800mm wide × 338mm deep.	
Operating conditions		
Climate class:	3. Tested at 25°C	
Product temp. range	1°C to 5°C (2°C to 4°C product mass average)	
Electrical	220-240 Volts a.c. 50 Hz, single phase supply	
Total run Amps	4.0 Amps	
Sign lighting	n.a.	
Internal lighting	2 × 9 Watt LED strip side lights (18 Watts total)	

### Refrigeration Unit

<b>Description</b>	Electronically controlled, bottom mounted SKOPE refrigeration unit
Unit model	UB84ANF-106IE
Compressor	Embraco NEK6212Z
Controller	Carel S4 Evo
Nominal capacity	885 Watts
Refrigerant	R134a / 380 gms

## 2 Electronic Controller

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### Electronic Controller Operations

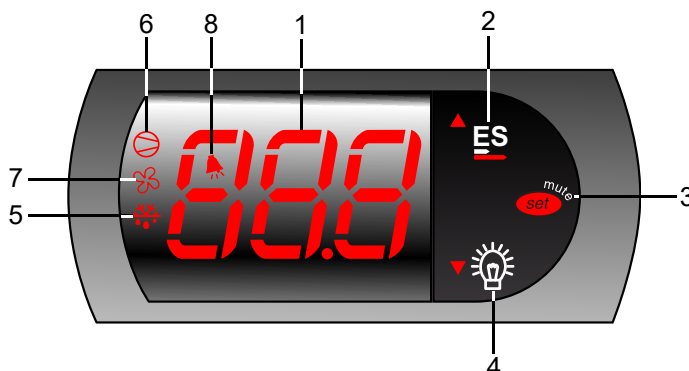
**Introduction** The chiller is fitted with a Carel S4 Evo electronic controller which is visible through a cutout in the cabinet front panel, and is housed inside the electronic controller box assembly in front of the refrigeration unit.

The electronic controller controls and displays the chiller temperature, and signals temperature alarms.

To ensure efficient operation, the electronic controller automatically forces a defrost cycle when required.

The electronic controller is pre-programmed. SKOPE does not recommend that settings be changed unless it is absolutely necessary.

**Faceplate** Because the electronic controller plays such an important role, it's helpful to know the parts of the faceplate you may use.



No.	Item	Description
1		<b>Digital display</b> of cabinet temperature or messages. The temperature is what the sensor inside the chiller detects, and not necessarily the product temperature. However, they may be very close depending on how the controller is set to sense temperature.
2		<b>Up:</b> Button. Used for programming.
3		<b>Set (mute):</b> Button. Press to mute the alarm. Press and hold to access parameters. Also used for programming.
4		<b>Light (down):</b> Button. Press to switch the cabinet light on and off. Also used for programming.
5		<b>Defrost:</b> Indicator. ON when the defrost is activated. Flashes when the activation of the defrost is temporarily delayed due to procedures in progress.
6		<b>Compressor:</b> Indicator. ON when the compressor and condenser fan starts. Flashes when activation of the compressor is temporarily delayed.
7		<b>Fan:</b> Indicator. ON when the internal cabinet fans are activated. Flashes when activation of the fans is temporarily delayed.
8		<b>Alarm:</b> Indicator. ON when alarm is signalled.

## Running the Chiller

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**Operating Modes** The electronic controller runs the chiller in constant 'Normal' mode. The OD400-4 does not use an energy saving/night mode (or similar).

**Note:** Normal mode is suitable for perishable product (all shelves maintain temperature below 5°C).

During some conditions or refrigeration system alarms, the electronic controller may run the chiller in cold climate protection mode, or may shut down the lights and/or refrigeration system. Refer to "Cold Climate Protection" on page 10, or "Messages and Alarms" on page 9 for more information.

**Compressor and Fans** The compressor and condenser fan will start just after the chiller is turned on. The compressor and condenser fan will stop when the control probe temperature reading reaches 1.7°C (parameter St), and on again when it reaches 2.7°C (parameter St + rd).

The evaporator fan starts approximately 3 seconds (parameter F0) after the compressor and condenser fan. To verify, check that the FAN light is lit on the electronic controller faceplate.

**Temperature Probes** Three temperature probes feed data to the electronic controller: the control probe, the evaporator probe, and the condenser probe.

The control probe monitors and controls the chiller temperature, provides the chiller temperature for the electronic controller to display, and notifies the electronic controller of any erratic or abnormal temperatures that could identify an issue within the refrigeration system.

The evaporator probe controls the refrigeration system defrost initiation and termination.

The condenser probe monitors the refrigeration system condenser temperature and notifies the electronic controller of any abnormally high temperatures that could identify an issue within the refrigeration system.

**Defrost Cycle** The defrost cycle will begin after 2 hours (parameter dl) of compressor run time. During the defrost cycle the compressor stops and the evaporator fan runs continuously. The defrost cycle will terminate when the evaporator probe reaches 4°C (parameter dt), or after the defrost cycle has been running for 30 minutes (parameter dP).

**Lighting** Press the Light button on the electronic controller faceplate to manually switch the lights on and off.






## Messages and Alarms

**Controller Display** The following table explains messages and alarms that the electronic controller displays.

Alarms signal unexpected operational changes in the chiller and can be muted by pressing the set (mute) button on the electronic controller faceplate (see page 7).

### Messages

Display	Description
	The chiller is in Normal mode and the electronic controller displays the chiller temperature.
	The chiller internal temperature is above 6°C.
	The chiller is in Cold Climate Protection mode. The chiller enters Cold Climate Protection mode if the control probe detects the interior temperature below -0.3°C (parameter St - CCt) for more than 30 minutes (parameter CCd). The lights remain on and cannot be switched off (see over page for more information).

### Alarms

E0	Probe 1 error.	See parameters (page 12) for probe function.
E1	Probe 2 error.	
E2	Probe 3 error.	
LO	Low temperature alarm. An alarm sounds. The temperature inside the chiller is too cold and an alarm sounds. The controller will automatically reset the alarm once the temperature inside the chiller raises.	
HI	High temperature alarm. An alarm sounds. The temperature inside the chiller is too warm and an alarm sounds. The controller will automatically reset the alarm once the temperature inside the chiller drops.	
cht	Refrigeration system high temperature Pre-warning (auto reset)	1. Check refrigeration ventilation and ensure the cabinet is installed in a suitable location (see page 24).  2. To reset the 'CHt' alarm - unplug the cabinet from the power supply for 1 minute, then reconnect to power supply.
CHt	Refrigeration system high temperature Shutdown (manual reset)	
EL0	Low voltage alarm. An alarm sounds. The mains voltage is low. An alarm sounds and the controller switches off the compressor. The controller will automatically reset the alarm once the mains voltage raises.	
EHI	High voltage alarm. An alarm sounds. The mains voltage is high. An alarm sounds and the controller switches off the compressor. The controller will automatically reset the alarm once the mains voltage drops.	
EE	Electronic controller fault.	
EF		

**Cold Climate Protection** The chiller will enter cold climate protection (CCP) mode if the ambient temperature becomes too cold. This happens if the control probe (at the evaporator air out) detects the interior temperature below  $-0.3^{\circ}\text{C}$  (parameter St - CCt) for more than 30 minutes (parameter CCd). The lights will stay on and cannot be switched off while the chiller is in CCP mode. The chiller will return to Normal operation mode once the control probe reading raises to  $1.7^{\circ}\text{C}$  (parameter St).

## Hardware Setup

**Hardware Inputs** The controller has three hardware inputs as detailed in the table below. All use pin 9 as common.

### Electronic controller hardware inputs

Pins (on rear of controller)	Hardware description
9-8	Control probe
9-10	Condenser probe
9-11	Evaporator probe

**Temperature Settings** Standard temperature settings are set-up for perishable product. All product temperatures are continuously below 5°C. The temperature can be altered by changing the set point (parameter St).

**Temperature Probe Readings** **Control probe**  
If parameter /4 is set to 1, the control probe temperature reading is displayed on the controller faceplate during normal operation. If parameter /4 is not set to 1, it can be changed to 1 to view the control probe temperature reading.

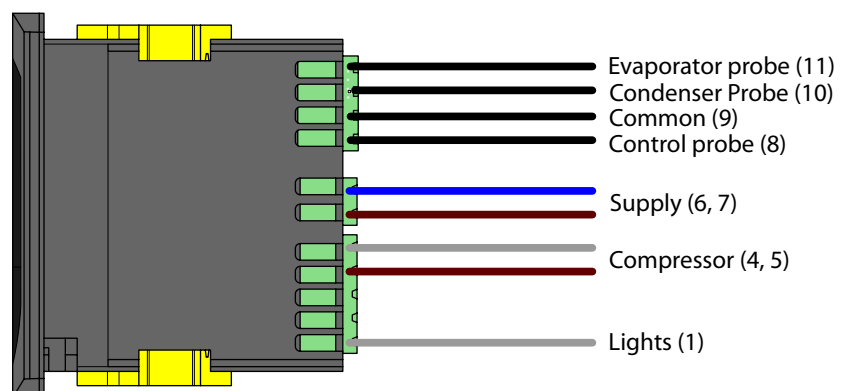
### Condenser probe

To view the condenser probe temperature reading, press the **ES (up)** and **Set (mute)** buttons simultaneously. The temperature reading will display on the controller faceplate.

### Evaporator probe

To view the evaporator probe temperature reading, enter the parameter menu and navigate to parameter d/2 to display the evaporator probe reading.

**Wiring Termination** Refer to the diagram below for controller termination details.



## Programming the Electronic Controller

The electronic controller parameter configuration program is set by SKOPE at the factory. A label on the controller box indicates the parameter configuration program number (e.g. the OD400-4 uses program 106).



The electronic controller parameters can be modified using the keypad. Frequent parameters can be accessed and changed without entering a password (e.g. temperature setpoint). Locked parameters are protected by a password to prevent accidental or unauthorised modifications.

### Temperature Setpoint

The chiller temperature setpoint is factory set at 1.7°C for storage of perishable products (all shelves maintain temperatures below 5°C). The cabinet setpoint can be adjusted between 0°C and 3.5°C if required (see over page).

SKOPE do not recommend that the setpoint be changed unless it is absolutely necessary, and then only by small increments at a time.

#### To view and adjust the temperature setpoint

1. Press and hold the **Set (mute)** button for 3 seconds until **PS** is shown on the display, indicating entry into the controller settings menu. 
2. Press the **up** or **down** button to scroll the menu until **St** is shown on the display. 
3. Press the **Set (mute)** button. The current setpoint value is shown on the display.
4. Press the **up** or **down** button to increase or decrease the setpoint value to the required temperature.
5. Press the **Set (mute)** button to temporarily save the setpoint value.
6. Press and hold the **Set (mute)** button for 3 seconds to permanently save the setpoint value and exit the controller settings menu.

### Parameters





Follow the steps below to access the locked parameters.

#### To access the locked parameters

1. Press and hold the **Set (mute)** button for 3 seconds until the display shows **'PS'**.
2. Press the **Set (mute)** button to access the password parameter, **'0'** is displayed.
3. Use the **ES (up)** and **Light (down)** buttons to display the password **'22'** (default password).
4. Press the **Set (mute)** button to confirm the password. The display shows **'PS'**.
5. Use the **ES (up)** and **Light (down)** buttons to scroll the parameter codes and locate the required parameter.

Parameter categories can be identified by the initial symbol or letter of the code, and the icon displayed on the electronic controller faceplate:

*Continued over page*

Category	Initial	Icon
Probe parameters	/	-
Control parameters	r	-
Compressor parameters	c	
Defrost parameters	d	
Alarm parameters	A	
Fan parameters	F	

6. Press the **Set (mute)** button to display the value associated with the parameter code.
7. Use the **ES (up)** and **Light (down)** buttons to increase or decrease the value of the parameter.
8. Press the **Set (mute)** button to temporarily save the new value. The display shows the parameter code.

#### IMPORTANT

If no buttons are pressed for 60 seconds or the power is disconnected before the temporarily saved values are permanently saved, the temporarily saved values will be cancelled and the previous setting will be restored.

9. If necessary, repeat steps 5 - 7 to change other parameters as required.
10. Press and hold the **Set (mute)** button for 3 seconds to permanently save the parameters and exit the parameter menu.

#### Parameter History

To see if the parameters have changed from the factory settings, check the H5 parameter. If it is a positive value the parameters are still at factory settings. If H5 is a negative value, the parameters have been changed and are not at factory settings.

## Parameter list - Program 106 - OD400-4 (page 1 of 2)



## Electronic Controller Parameter Sheet

Application **OD400-4 (7-Eleven)**  
 Controller Type **SKOPE S4 EVO**  
 Controller Model & Revision **PZSKC0H002K (Rev 1.414)**  
 SKOPE Part Number **ELZ11478-106**

**106**

Revision: 1.2

Full List

**SET0**

CPS1017-106-SET0

Last revised on  
12-Feb-2018

Parameter	Setting	Unit	Access Level	Range		Description
				Min	Max	
<b>Probe Parameters</b>						
PS	22		F	0	200	Password (Read Only)
/2	4		C	1	15	Measurement stability (Applies to all probes)
/4	1		C	1	5	Select probe displayed
/5	0		C	0	1	Select °C/°F ( 0=°C ; 1=°F )
/6	0		C	0	1	Disable decimal point
/8	0.0	°C	C	-99.00	99.0	Display Offset (Only if /E > 0)
/9	0.0	°C	C	-40.0	/A	Minimum Display value (Only if /E > 0)
/A	6	°C	C	/9	/b	Maximum Display Value (Only if /E > 0)
/b	199	°C	C	/A	199	Visualization Error Threshold (Only if /E > 0)
/E	1		C	0	50	Display Dampening Coefficient
/C1	-4.0	°C	C	-50.0	50.0	Probe 1 Calibration Offset
/C2	0.0	°C	C	-50.0	50.0	Probe 2 Calibration Offset
/C3	0.0	°C	C	-50.0	50.0	Probe 3 Calibration Offset
<b>Regulation Parameters</b>						
St	1.7	°C	F	r1	r2	Set point
rd	1.0	°C	C	0.0	19.0	DAY differential
r1	0.0	°C	C	-50.0	r2	Minimum set point value
r2	3.5	°C	C	r1	150	Maximum set point value
r3	0		C	0	1	Enable Auto Day/Night Mode Switching
r4	0.0	°C	C	-50.0	50.0	Night Mode set point delta (added to St)
r5	1.0	°C	C	0.0	19.0	Night differential
r6	0	hrs	C	0	90	Night Mode Start Delay (time period with no door openings)
r7	90	hrs	C	1	90	Night Mode Timeout (time period in night mode)
r10	0	hrs	C	0	24	Light Delay On Time after entering DAY mode
<b>Cold Climate Protection Parameters</b>						
CCt	2.0	°C	C	0.1	20.0	Cold Climate Protection Temperature Delta
CCd	30	mins	C	0	199	Cold Climate Protection Delay
<b>Pull Down Mode Parameters</b>						
Pt	127	°C	C	0	127	Pull-down Mode - Activation Temperature
Pd	250	hrs	C	0	250	Pull-down Mode - Maximum Duration
<b>Compressor Parameters</b>						
c0	1	mins	C	0	200	Comp. and Fan start delay at power-up.
c1	0	mins	C	0	100	Minimum time between consecutive compressor starts
c2	3	mins	C	0	100	Minimum compressor off time
c3	3	mins	C	0	100	Minimum compressor on time
c4	10	mins	C	0	100	Compressor on time with duty setting
c5	1		C	0	1	Enable mains voltage protection (0 = disabled, 1 = enabled)
<b>Defrost Parameters</b>						
d0	0		C	0	1	Type of defrost ( 0 = Electric, 1 = Hot Gas)
dl	2	hrs	C	0	199	Defrost interval time (Time between defrosts)
d2	1		C	0	1	Run defrost interval timer only when compressor running
dt	4	°C	C	-50.0	127	Defrost Termination temperature
dP	30	mins	C	1	199	Maximum defrost duration
d4	0		C	0	1	Defrost request at power-on: (0 = no, 1 = yes)
d5	0	mins	C	0	199	Defrost delay on power-up (when d4=1)
d6	1		C	0	1	Display during defrost (0 = "dEF", 1 = Temperature at start of defrost)
dd	2	mins	C	0	15	Dripping time (compressor and fans stopped after defrost)
d8	0	mins	C	0	199	Bypass high temperature alarm after defrost or door opening

## Parameter list - Program 106 - OD400-4 (page 2 of 2)



## Electronic Controller Parameter Sheet

Application **OD400-4 (7-Eleven)**  
 Controller Type **SKOPE S4 EVO**  
 Controller Model & Revision **PZSKCOH002K (Rev 1.414)**  
 SKOPE Part Number **ELZ11478-106**

**106**Revision: **1.2**

Full List

**SET0**

CPS1017-106-SET0

Last revised on  
12-Feb-2018

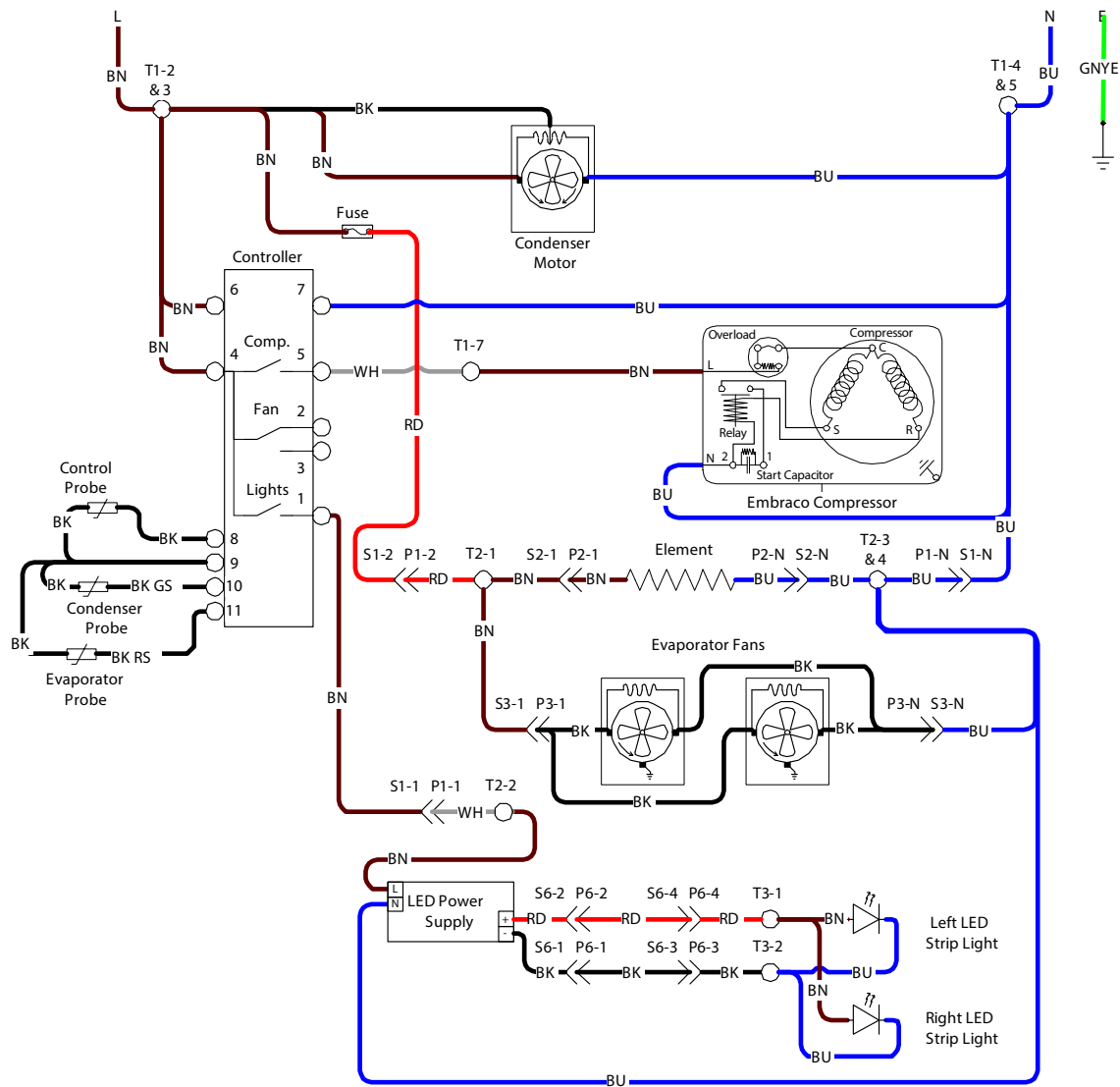
Parameter	Setting	Unit	Access Level	Range		Description
				Min	Max	
d9	0		C	0	1	Defrost priority over compressor protectors
d/1	-	°C	F	-	-	Probe reading on 2nd Input (read only)
d/2	-	°C	F	-	-	Probe reading on 3rd Input (read only)
d10	-9.0	°C	C	-50.0	127	On demand defrost Start Temperature
d11	10	mins	C	0	60	On demand defrost: start delay
d12	127	°C	C	-50.0	127	Enabling defrost condition: Control probe threshold
d13	1		C	0	1	Evaporator Fans During Defrost (0 = Off 1 = ON)
d19	25	mins	C	0	200	No Downward Tendency Defrost - Start Delay (0 = function disabled)
d20	25	mins	C	1	< d19	No Downward Tendency Evaluation (Sample Time)
d21	0		C	0	5	Number of NDT defrosts before R.S.F. "Err" alarm (0 = function disabled)
d22	0.1	°C	C	0.0	5.0	No Downward Tendency Evaluation (Temperature Delta)
<b>Alarm &amp; Input Configuration Parameters</b>						
A0	-2.0	°C	C	-20.0	20.0	Temperature Alarm Differential
AL	0.0	°C	C	-50.0	150	Low temperature alarm setpoint. (Relative if A0>0, Absolute (A0≤0))
AH	10.0	°C	C	-50.0	150	High temperature alarm setpoint. (Relative if A0>0, Absolute (A0≤0))
Ad	120	mins	C	0	199	Temperature alarm delay (0 = AL and AH alarms disabled)
A10	0	mins	C	0	10	Door Open Alarm delay (0 = door open alarm disabled)
A11	2		C	0	5	2nd Input Configuration
A12	3		C	0	16	Number of cA alarm events to trigger manual reset 'CA' alarm
A13	24	hrs	C	0	240	cA alarm counter reset delay
A14	60	mins	C	0	240	cA alarm reset delay
A15	1		C	0	1	Lights switched OFF when CHt, cA or CA alarm occurs
A18	1		C	0	1	Allow power cycle to reset CA alarm
A20	15	mins	C	A10	60	Faulty door/curtain switch E2 alarm delay
Ac	60.0	°C	C	-50.0	250	High condenser temperature alarm set point
AE	10.0	°C	C	0.1	20.0	High condenser temperature alarm differential
Acd	0	mins	C	0	250	High condenser temperature alarm delay
Acr	1		C	0	2	High condenser temperature alarm reset method
A21	1		C	0	5	3rd Input Configuration
<b>Evaporator Fan Parameters</b>						
F0	3	secs	C	1	100	Loads Activation Delay
Fd0	20	mins	C	1	100	Fan DAY Duty Cycle : ON time
FdF	0	mins	C	0	100	Fan DAY Duty Cycle : OFF time
Fn0	25	mins	C	1	100	Fan NIGHT Duty Cycle : ON time
FnF	0	mins	C	0	100	Fan NIGHT Duty Cycle : OFF time
<b>Other Parameters</b>						
H0	1		C	0	207	Supervisor Serial address
H01	1		C	0	1	Baud Rate (0 = 9600, 1 = 19200)
H02	2		C	0	2	Stop Bits
H03	0		C	0	2	Parity (0 = None, 1 = Odd, 2 = Even)
H2	2		C	0	3	Enable Keypad
H4	0		C	0	1	Disable buzzer (0 = Buzzer Enabled, 1 = Buzzer Disabled)
H5	106		F	0	199	ID code (read-only)

**Warning**

1. Only make program modifications with reference to relevant Operating Manual.
2. This programming sheet is exclusively for SKOPE refrigeration systems with its dedicated Carel controller.
3. Any alteration from this program may adversely affect the SKOPE Refrigeration System operation.
4. Specification may change without notice. Please check with SKOPE Customer Service for latest revision.

### 3 Wiring

#### Model: OD400-4



#### WIRE COLOURS

BK	Black
BN	Brown
RD	Red
OG	Orange
GN	Green
BU	Blue
GY	Grey
WH	White
GNYE	Green-Yellow
Based upon IEC 757 Standard	

#### LEGEND

GS	Grey sleeve	S5/P5	Right light ENSTO socket/plug
RS	Red sleeve	S6/P6	Light test socket/plug
S1/P1	Unit to cabinet ENSTO socket/plug	T1	Unit terminal block
S2/P2	Element ENSTO socket/plug	T2	Cabinet junction box terminal block
S3/P3	Evaporator fans ENSTO socket/plug	T3	Light terminal block
S4/P4	Left light ENSTO socket/plug	-	-
O	Terminal block terminal	>>	Plug & socket

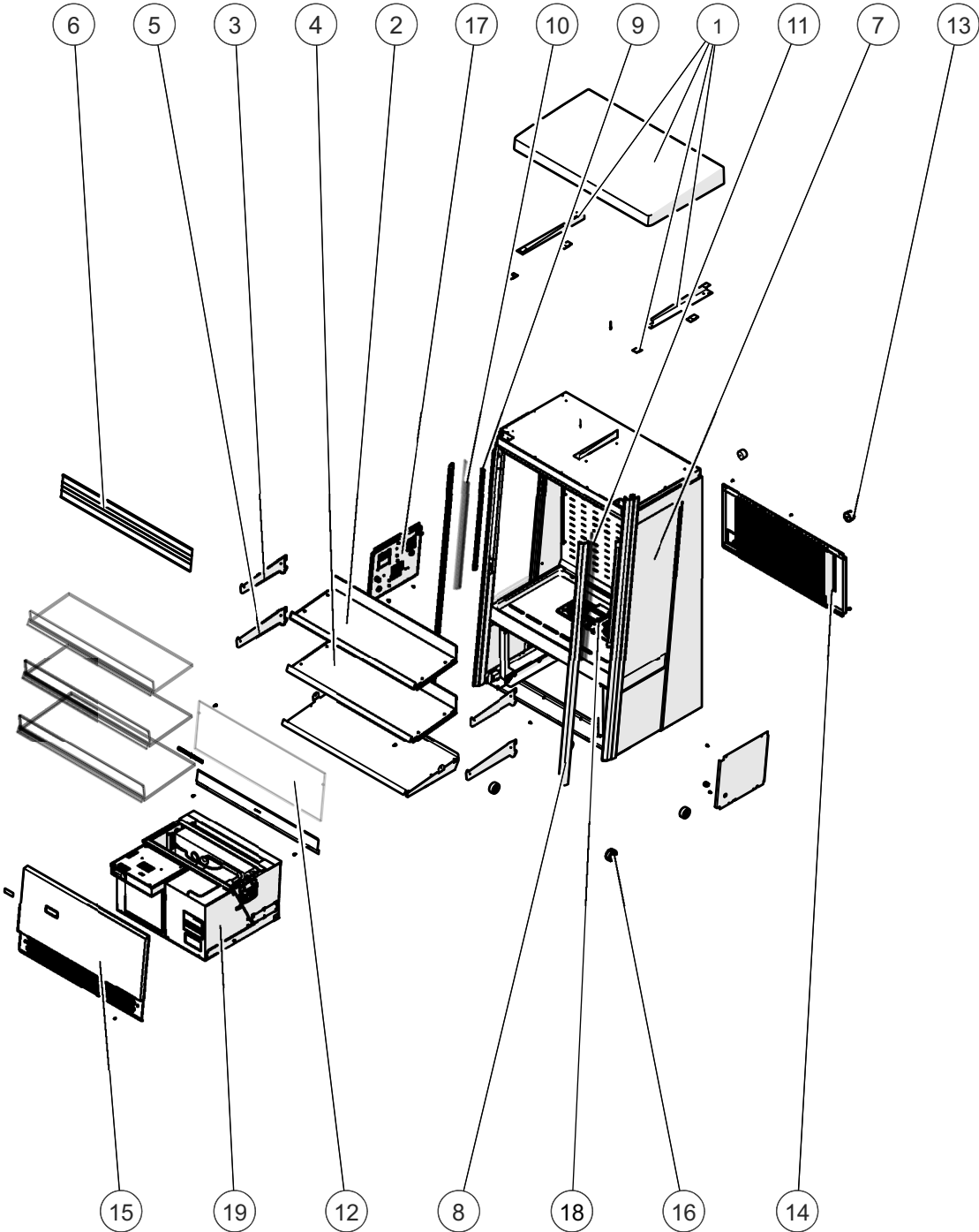


## Notes

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# 4 Spare Parts

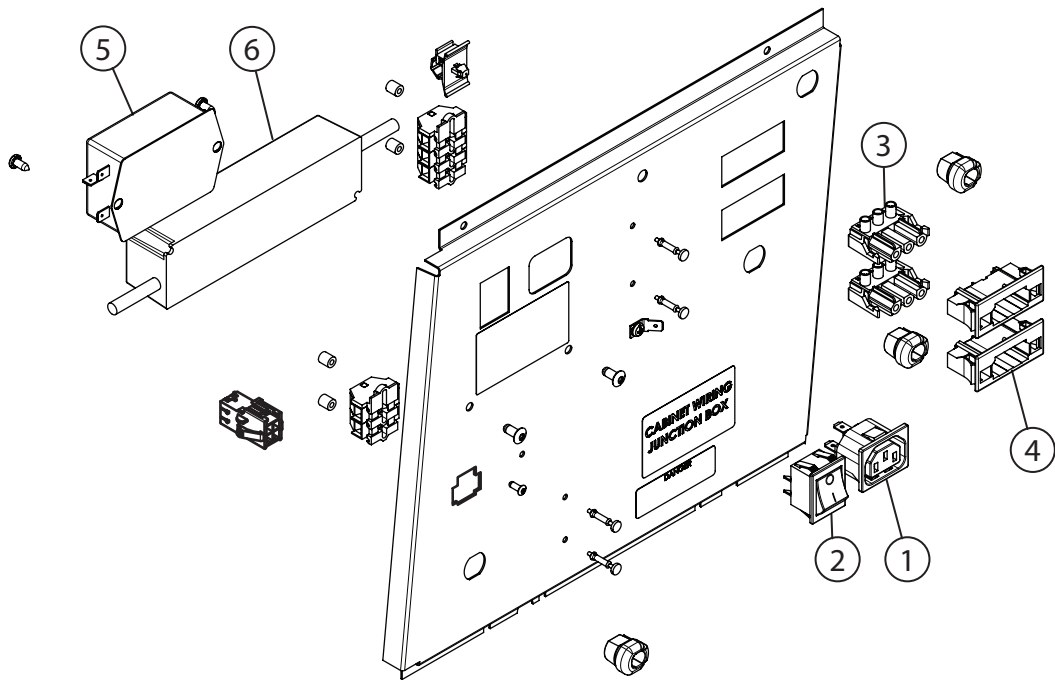
## Cabinet Assembly - OD400-4



**Parts i Cabinet OD400-4**

Item	Description	SKOPE Part No.		
		Standard	White	Black
1	Plastic lid	-	PLM4043	PLM4043-BK
	Plastic lid support bracket - LH	O402/F95L	-	-
	Plastic lid support bracket - RH	O402/F95R	-	-
	Dual Lock lid fastener	SXX2418	-	-
2	Top shelf	-	O404/590C-32	O404/590C-49
3	Top shelf bracket	-	STY11605-32	STY11605-49
4	Middle shelf	-	O404/590B-32	O404/590B-49
5	Middle shelf bracket	-	STY11604-32	STY11604-49
6	Point of sale header	-	-	O404/S22
7	Side window	GLA4062	-	-
8	Vertical bumper strip	-	-	PLE4077BK
9	Light module	ELL11123	-	-
10	Light cover - LH	O400/E71L	-	-
11	Light cover - RH	O400/E71R	-	-
12	Acrylic upstand	PLY11602	-	-
13	Rear spacer	RUM4105	-	-
14	Rear panel	-	O404/N86-32	O404/N86-49
15	Front panel	-	O404/131-32	O404/131-49
16	Wheel	SXX7520	-	-
17	Electrics plate assembly	O404/G29L	-	-
18	Evaporator fan deck assembly	O403/R39		
19	Refrigeration unit assembly	UB84ANF-106IE		

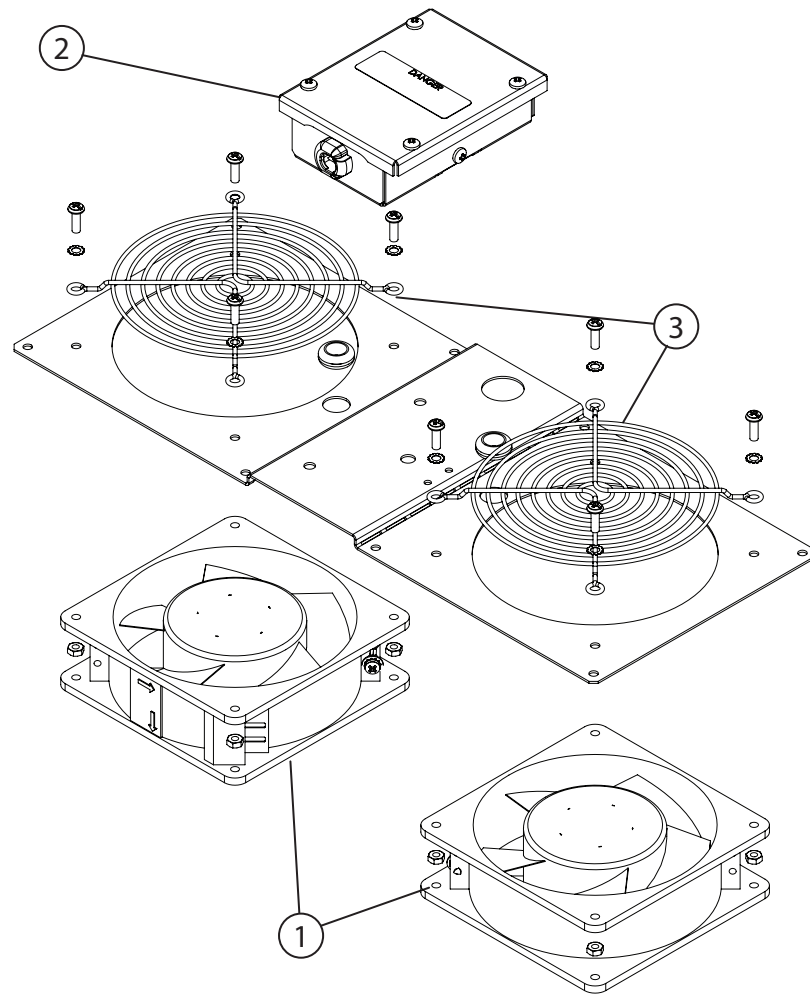
# Electrics Plate Assembly



## Parts ì Electrics Plate Assembly

Item	Description	SKOPE Part No.	Customer Part No.
0	Electrics plate assembly	O404/G29L	
1	IEC socket outlet	ELK8880	
2	2-Pole rocker switch	ELS0495	
3	ENSTO 3-Pole socket	ELZ0499-3	
4	ENSTO 3-Pole panel adaptor	PLM0497-3	
5	EMI filter	ELZ10136	
6	Light power supply	O460/K08	

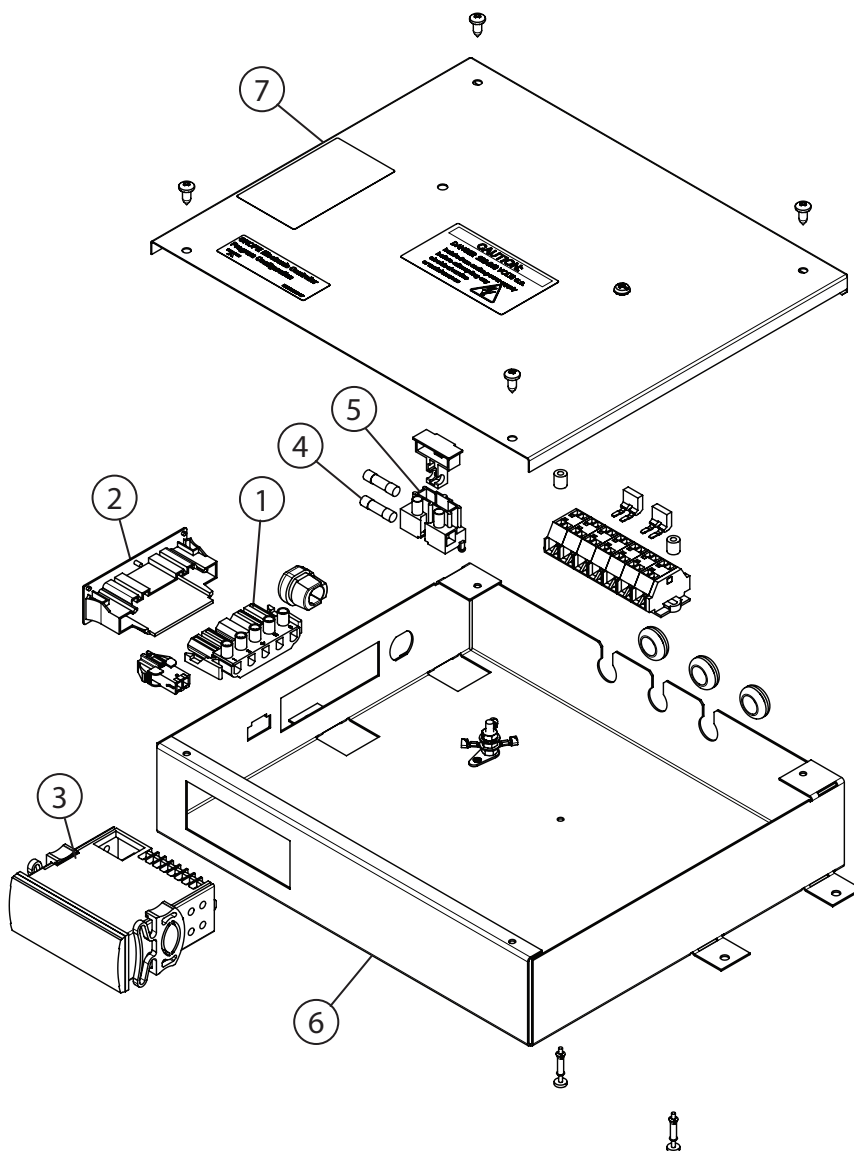
## Evaporator Fan Deck Assembly



### Parts ì Evaporator Fan Deck

Item	Description	SKOPE Part No.	Customer Part No.
0	Evaporator fan deck assembly	O403/R39	
1	Evaporator fan motor	ELM7230	
2	Terminal box	O460/E92	
3	Wire fan guard	WRK11151	

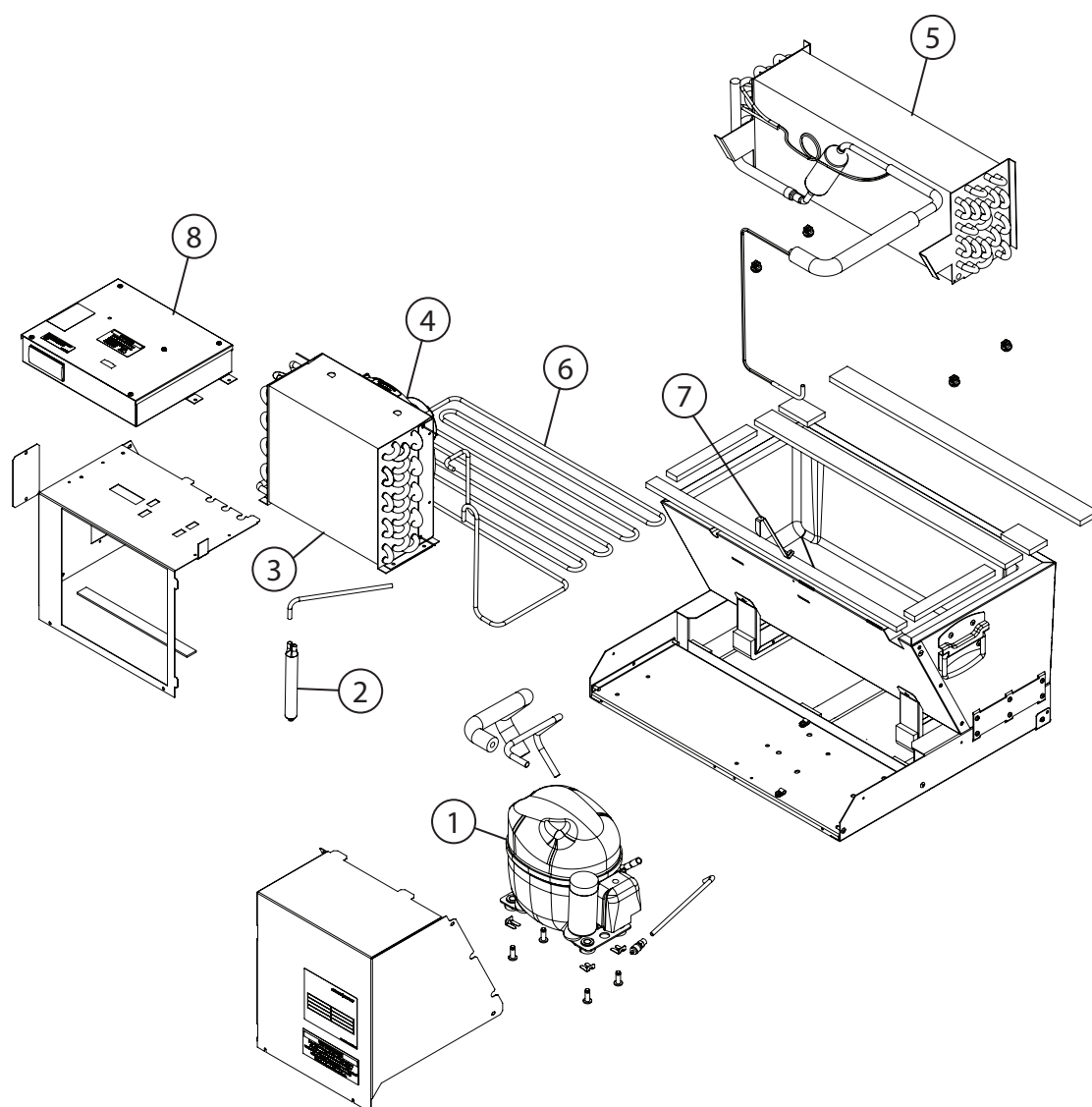
## Unit Junction Box Assembly



### Parts ì Unit Junction Box

Item	Description	SKOPE Part No.	Customer Part No.
0	Unit junction box assembly	UB84ANF/R86-106	
1	ENSTO 5-Pole socket	ELZ0499-5	
2	ENSTO 5-Pole panel adaptor	PLM0497-5	
3	CAREL S4 Evo electronic controller (program 106)	ELZ11478-106	
4	3A ceramic fuse	ELZ9654	
5	Fused terminal block	ELZ9655	
6	Unit junction box base	UB84AMD/R87-49	
7	Unit junction box lid	UB84AMD/R88-49	
	Probe assembly	UB80AA/E49C	

## Refrigeration Unit Assembly



### Parts ì Refrigeration Unit

Item	Description	SKOPE Part No.	Customer Part No.
0	Refrigeration unit assembly	UB84ANF-106IE	
1	Compressor Embraco NEK6212Z	CPR10543	
2	Drier	DRY8783	
3	Condenser coil	CLS11034	
4	Condenser fan motor	UB83AAD/404CP	
	Condenser fan blade	FAN3809	
5	Evaporator coil	CLS11033	
6	Condensate line assembly	UB84AKD/255T-99	
7	Control probe bracket	UB84AA/B19	
8	Unit junction box assembly	UB84ANF/R86-106	

## 5 Installation

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**Climate Class** The chiller is designed to operate within a climate class 3 environment (25°C @ 60% RH). We recommend that you put the chiller in the coolest place possible because it will use less power and last longer.

**Chiller Location** The location of the chiller may be the single most important decision that will extend its life and ensure economical, high performance. Ensure the cabinet sits on a level surface to prevent the condensate tray from overflowing.

**Air Movement** The cabinet must **NOT** be situated where it is affected by air-conditioning air outlets, ventilation fans or air re-circulation fans, as this will compromise the airflow and thus product temperature in the open cabinet zone.

There must be **NO** air movement directly into the cabinet opening. Air movement will cause failure of the air curtain over the product, resulting in excessive temperature rise. Detectable air draft will adversely effect the cabinet operation. Maximum air movement across the cabinet opening must not exceed 0.2 m/s.

### IMPORTANT

There must be **NO** air movement directly into the cabinet opening.

**Power Cord** The chiller has a flexible power cord fitted with a 3-pin plug, which exits the rear of the cabinet at floor level. Locate the power cord before the cabinet is moved into position so that it is not trapped behind the cabinet.

**Ventilation** Adequate ventilation must be provided around the refrigeration unit and cabinet at all times. Refrigeration exhaust air must not be restricted, and must be able to easily flow out and away from the cabinet.

Ensure there is unimpeded clearance in front of the front panel at all times. Never store cardboard cartons or other items in the front or rear of the refrigeration unit.

### CAUTION

Ensure adequate ventilation clearance around the refrigeration unit and cabinet.

Determine if the installation is free-standing or enclosed, and ensure the installation meets the ventilation requirements detailed below.

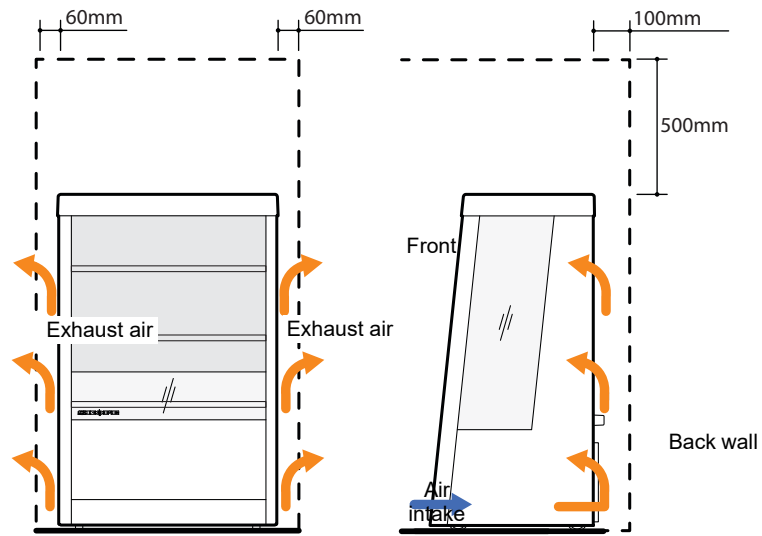
#### Free-standing installations

Free-standing cabinets must be installed with the following minimum clearances (also see diagrams over page):

- 30mm behind (provided by the rear spacers on the back of the cabinet).
- 60mm on either side of the cabinet.
- 500mm above the cabinet.

If these clearances can't be met, the installation should be treated as an enclosed installation.





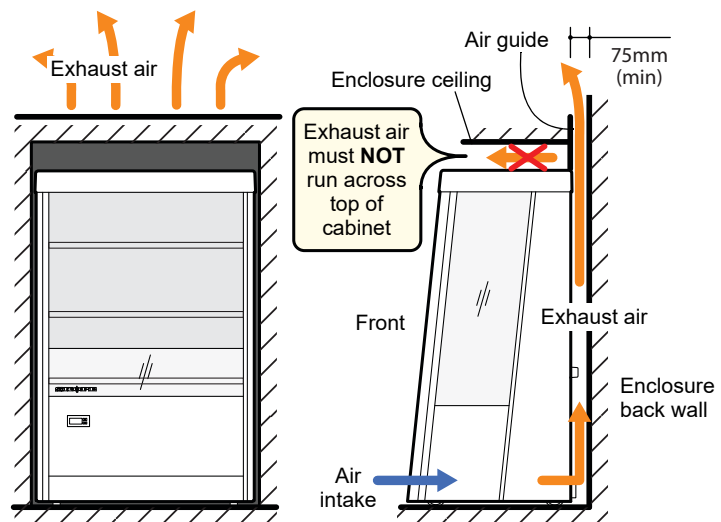
Free-standing installation ventilation requirements

### Enclosed installations

Enclosed installations must have the following minimum clearances around the cabinet, and include the following features:

- 75mm behind the cabinet.
- An air guide must be used to ensure all refrigeration exhaust air is directed up and away from the cabinet.
- The air guide must also ensure the air exhaust outlet cannot be blocked by product or other items above the cabinet.

Refrigeration exhaust air must **NOT** be allowed to run horizontally across the top of the cabinet, as it may be pulled down into the cabinet interior.



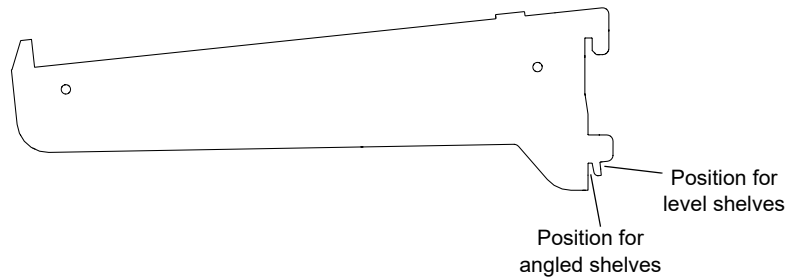
Enclosed installation ventilation requirements

## Shelves

### Installing the Shelves

The chiller is supplied with three metal shelves. The shelves are different depths, with the top shelf being the shallowest and the bottom shelf the deepest. The bottom shelf is angled and fixed in position. The two top shelves are height and angle adjustable, and removable.

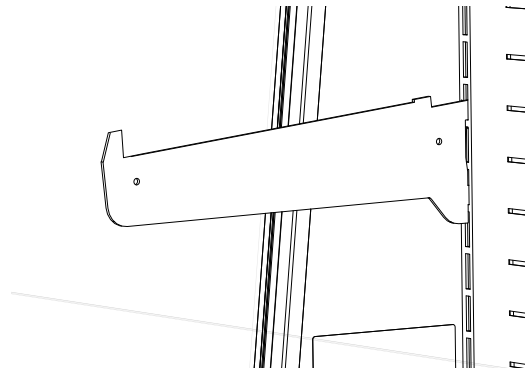
The two top shelves are each held in place by two cantilevered shelf brackets which clip into cut-outs in the cabinet back duct.



### To fit the shelves

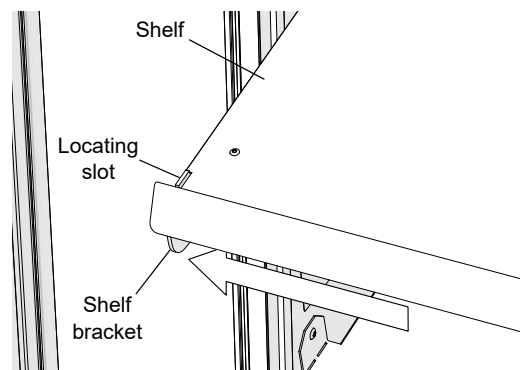
1. Clip the cantilevered shelf brackets into the slots in the cabinet back duct.

Use the different positions on the bracket to set the shelf angled or level (see image above).



2. Sit the corresponding metal shelf on the cantilevered brackets ensuring the back of the shelf clips over the rear of the brackets.

3. Push the cantilevered brackets outwards until they clip into the edge locating slots on the side of the shelf.



To remove, lift the shelf up from the back first to unclip from the bracket.

## 6 Replacement Procedures

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### Isolating the Electrics

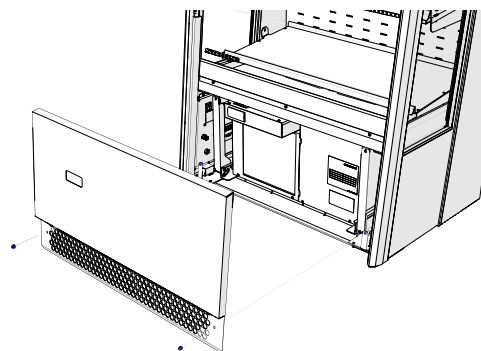
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Ensure the chiller is isolated from the power supply before performing any maintenance or servicing.

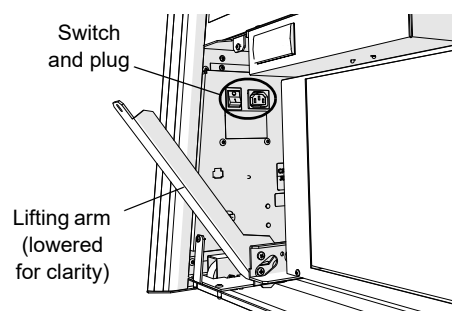
#### To isolate the electrics

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1. Remove the front panel from the cabinet by undoing the fixing screws near the bottom of the panel, and lifting it up and off the cabinet.



2. Switch off (O) the power at the mains isolation switch and unplug the mains IEC plug on the LH side of the refrigeration unit compartment.



## Lighting

The chiller is fitted with two LED side lights powered by a 24V 25W LED driver power supply.

The cabinet interior lights will switch on when the cabinet is plugged in, and will stay on permanently while the cabinet is connected to the power supply.

LED modular lighting components are all non-serviceable items. If a component is faulty, it should be removed and a new replacement component fitted. Before replacing a lighting component, determine the part number, and replace with the same type. **Note:** Fluorescent tubes cannot be used in place of LED light modules.

Refer to the diagnostics table below to determine what component may be at fault, and the procedures over the next few pages for component replacement instructions. Ensure the cabinet is isolated from the power supply before cleaning or removing parts.

### Modular lighting fault diagnostics

Problem	Possible Cause	Repair
No lights working. Cabinet is dark.	Lights switched off.	Switch lights on at controller faceplate.
	Plug not connected properly.	Check cabinet light supply plug on side of refrigeration unit.
	LED driver power supply fault.	Replace LED driver power supply.
Modular light component not working.	Plug not connected properly.	Check and clean plug connection.
	Faulty modular lighting component.	Replace faulty modular lighting component.
Segment of modular component not working.	Faulty modular lighting component.	Replace faulty modular lighting component.

**Interior Lights** The interior lights are located on either side of the cabinet front opening. Follow the steps below to replace an interior light.

### To replace an interior light

1. Remove the front panel and isolate the chiller from the mains power supply (see page 27).
2. Remove the light diffuser by squeezing it until it is released from the housing.
3. Unclip and unplug the LED light module from the cabinet.
4. Fit the new LED light module.
5. Perform electrical safety Reassemble and reconnect the chiller to the power supply.

**LED Driver Power Supply** The 24V 25W LED driver power supply is located on the electrics plate assembly. Refer to page 29 for information on accessing the LED driver power supply.

## Cabinet Electrics

### Electrics Plate Assembly

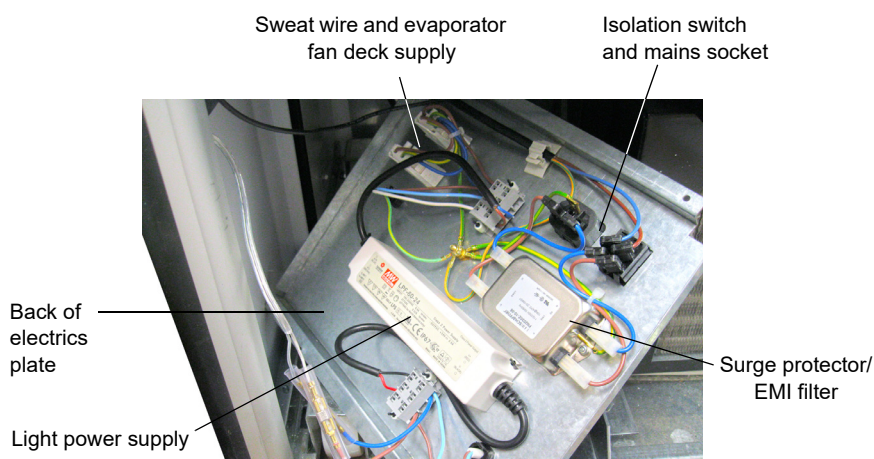
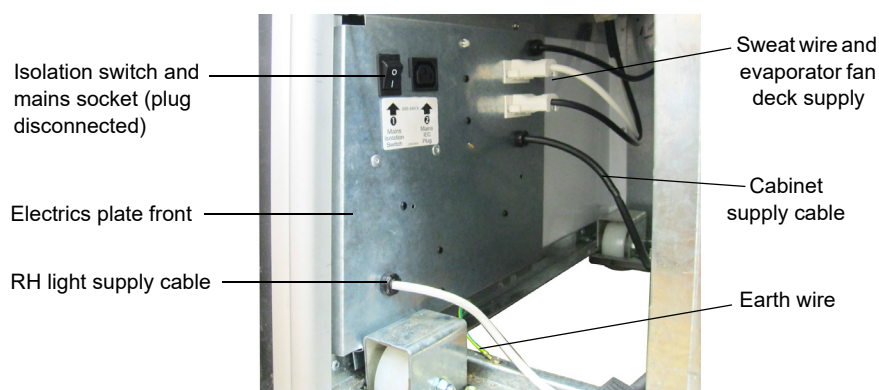
The cabinet is fitted with an electrics plate assembly, located on the LH side of the refrigeration unit compartment. The electrics plate assembly houses the cabinet electrical components including the lights power supply, the surge protector/EMI filter, isolation switch, and the mains IEC connector socket.

The surge protector/EMI filter protects the chiller from voltage spikes and eliminates possible electromagnetic interference, and regulates the supplied voltage before feeding it into the refrigeration cassette.

Before attempting any work within the electrics plate assembly, ensure the chiller is disconnected from the mains power supply.

#### To access components on the electrics plate assembly

1. Unplug the chiller from the power supply.
2. Remove the refrigeration unit (see page 33).
3. Undo the two fixing screws from the top of the electrics plate assembly, and withdraw the plate from the cabinet. Take care of cables when withdrawing the plate. Access can be made easier by unscrewing and lowering the LH unit lifting arm.
4. Components on the rear of the electrics plate can now be accessed.



### Sweat Wire

The chiller is fitted with a sweat wire which runs around the honeycomb air grille at the front of the cabinet interior ceiling. The wire is foamed into the cabinet and cannot be removed. The sweat wire operates continuously when the chiller is on.

## Front Upstand

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The front upstand is located at the bottom of the cabinet opening. The front upstand must be in place at all time as it directs the air curtain.

### To replace the front upstand

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1. Remove the front panel and isolate the chiller from the mains power supply (see page 27).
  2. Remove the existing front upstand by undo the six screws (three at each end) of the upstand.
  3. Fit the new front upstand.
  4. Reconnect the cabinet to the power supply and reassemble.
- 

## Vertical Bumpers

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A plastic bumper strip is fitted to the vertical extrusions on each side of the front of the cabinet. These bumpers provide general impact protection while the cabinet is in use. If necessary, the bumpers can be replaced.

### To replace the vertical bumpers

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1. Remove the front panel and isolate the chiller from the mains power supply (see page 27).
  2. Remove the lid from the top of the cabinet.
  3. Peel the existing vertical bumper from the aluminium extrusion.
  4. Slot the new vertical bumper into the extrusion.
  5. Trim the vertical bumper to the correct size.
  6. Reassemble the chiller and reconnect to the power supply.
- 

## Wheels

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The chiller is fitted with two front wheels, and two back wheels. The wheels are fixed in place and do not swivel or lock. The wheels can be removed and replaced.

## Honeycomb Air Grille

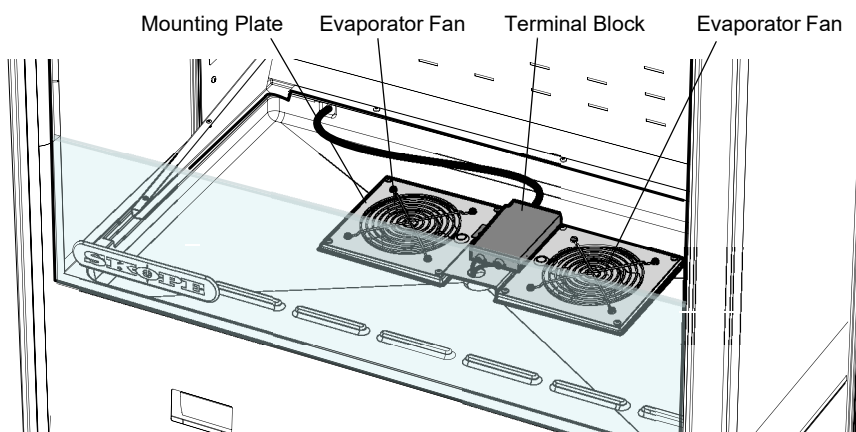
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The chiller is fitted with a honeycomb air grille at the front of the cabinet interior ceiling, which directs the air curtain down the front of the cabinet opening. The honeycomb can be removed for cleaning or replacing.

To remove the honeycomb, unscrew the cabinet interior ceiling top duct. When refitting, ensure the honeycomb site sits flat and cannot be easily removed. When pushed gently it should not move.

## Evaporator Fan Assembly

The evaporator fan assembly is located under the fixed bottom shelf, and is made up of two fans, two fan guards, a terminal block and a mounting plate. Each fan motor has a push in plug for easy removal and replacement.



Evaporator fan assembly (bottom shelf removed)

### To access and replace the evaporator fans

1. Remove the front panel and isolate the chiller from the mains power supply (see page 27).
2. Unload and remove the fixed bottom shelf by unscrewing the two fixing screws (one on each side) and lift from the cabinet. Place aside.  
**Note:** Depending on cabinet loading and shelf positioning, it may be necessary to unload the cabinet and remove the middle shelf.
3. Remove the evaporator fan assembly from the cabinet by unscrewing the eight fixing screws from the mounting plate, and flip the assembly over to gain access to the underside of the evaporator fans.
4. Unplug the fan to be replaced, and unscrew the fan fixing screws and earth screw to remove the fan motor from the mounting plate.
5. Replace the fan and fix in place.  
Ensure the fan orientation is correct. Air is pulled down from the cabinet to the refrigeration unit. The arrow on the fan must point down when the evaporator fan assembly is fixed into position.  
Ensure the earth screw is in place.
6. Reattach the plug.
7. Reassemble the chiller ensuring:
  - Both evaporator fan motors have been plugged in via the socket on the side of the fan motors.
  - The fan guards are in place.
  - All eight fixing screws are fitted in place on the evaporator fan assembly.
  - The fixed bottom shelf is fixed to the cabinet by the two fixing screws.
8. Test and check for correct operation.

# Refrigeration Unit

**Introduction** The refrigeration unit is a bottom mounted, electronically controlled, removable cassette.

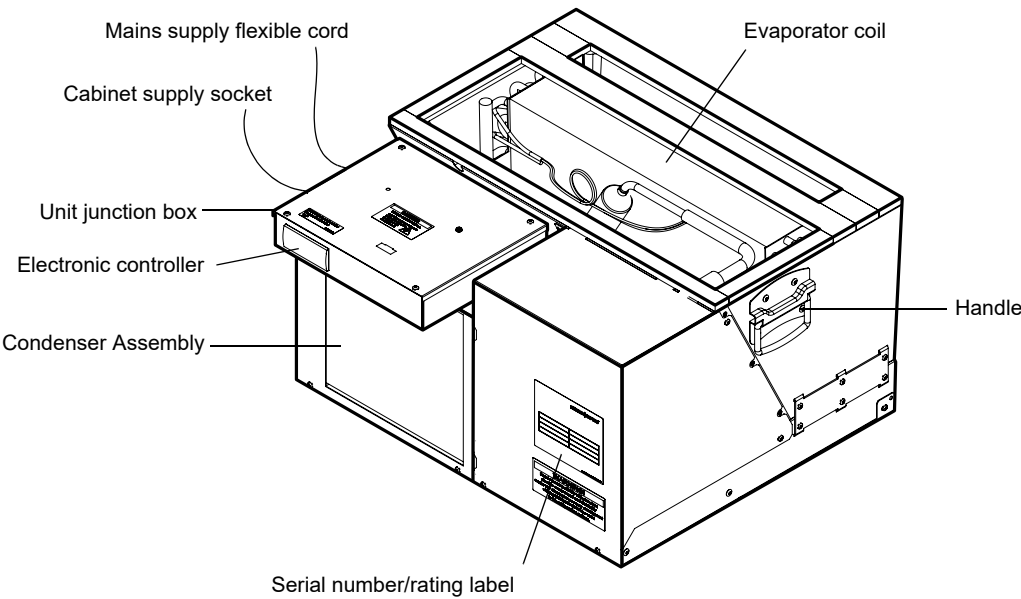
For major servicing the refrigeration unit unplugs and pulls out from the cabinet (see page 33). Minor servicing can be performed without removing the refrigeration unit from the cabinet.

Specifications for the model are in the following table. Verify model and basic requirements before servicing.

**Unit specifications**

Unit Model:	UB84ANF-106IE
Compressor:	Embraco NEK6212Z
Compressor capacity:	885 Watts
Refrigerant:	R134a
Charge:	380 g

The model and serial numbers are printed on the serial number/rating label attached to the front of the refrigeration unit. Take note of these numbers before ordering spare parts.





## Removing the Refrigeration Unit

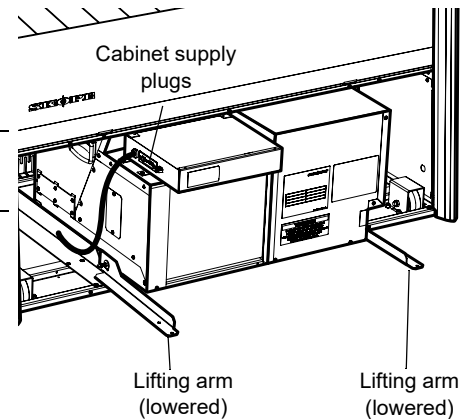
### To remove the refrigeration unit

1. Remove the front panel and isolate the chiller from the power supply (see page 27).

2. Remove the top screw from each lifting arm and pull both arms down. This action drops the entire refrigeration unit down.

3. Carefully pull the unit out approximately 150mm.

4. Unplug the Cabinet supply plug from the LH side of the refrigeration unit.



5. Using the side handles, carefully slide the unit straight out from the cabinet and place on the ground.

## Unit Junction Box

The refrigeration unit connectors, fuses and electronic controller are located inside the unit junction box.

The box is mounted above the condenser assembly and can be removed by unscrewing the four fixing screws from the perimeter of the box. It may be necessary to free up or disconnect wires and cables to move the box easily.

### To open the unit junction box

1. Remove the front panel and isolate the chiller from the power supply (see page 27).

2. Remove the refrigeration unit from the cabinet to gain access to the unit junction box (see above).

3. Remove the cover of the unit junction box by unscrewing the four fixing screws from each corner of the lid. Leave the earth wire attached.

4. Service as necessary, then refit the lid ensuring the earth wire is still attached.

**Condenser Fan** The condenser fan assembly is made up of a fan blade, a motor and a bracket. The motor is attached to the bracket fixed onto the condenser coil shroud. When viewed from the inside of the refrigeration unit (motor end), the motor and blade should rotate in a clockwise direction and pull air through the front of the refrigeration unit.

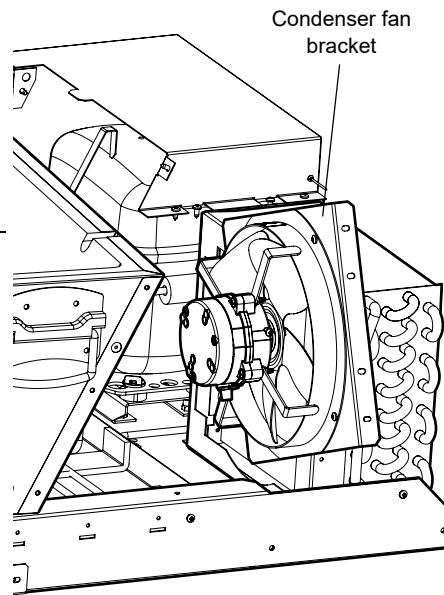
#### To replace the condenser fan motor

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Remove the lid from the unit junction box and trace the condenser fan flexible cable to the terminal within the unit junction box. Detach the condenser fan motor flexible cord terminals from the terminal block.

4. Detach the condenser cover (side and top including unit junction box) by removing the fixing screws and swivel the cover to the side. It may be necessary to free up wires and capillaries inside the unit junction box to allow movement.

5. Remove the fan bracket (with fan motor and blade attached) by undoing the two fixing screws on the outside of the bracket and unslotting the inside of the bracket.

**Note:** Access can be made easier by undoing the evaporator box fixing plates and moving the evaporator box up and out of the way.



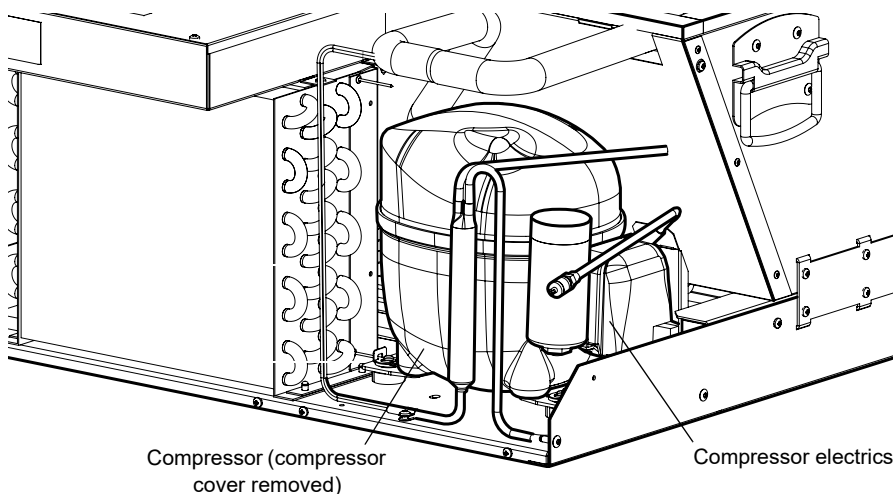
6. Detach the condenser fan motor from the motor mount and fit the replacement motor.
7. Reassemble the refrigeration unit and test. When reassembling the refrigeration unit ensure:
  - ▣ The fan blade is reattached the correct way around.
  - ▣ All wires are attached to the correct terminals within the unit junction box.
  - ▣ The condenser fan guard is reattached.
  - ▣ The evaporator box is reattached.

**Compressor** The compressor is located at the front of the refrigeration unit behind the compressor cover.

Before replacing the compressor, ensure the compressor electrics are operating correctly and that the compressor is being supplied with consistent voltage over 220 Volts. Ensure the voltage does not drop at start-up. If the voltage does drop, ensure the unit has a direct power supply (not from a multi-box or extension cord).

#### To access the compressor

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Remove the condenser cover (see step 3 on page 34).
4. Remove the compressor cover from the refrigeration unit by unscrewing the fixing screws and lifting the cover off.



**Compressor Electrics** The compressor electrics box is fixed onto the side of the compressor.

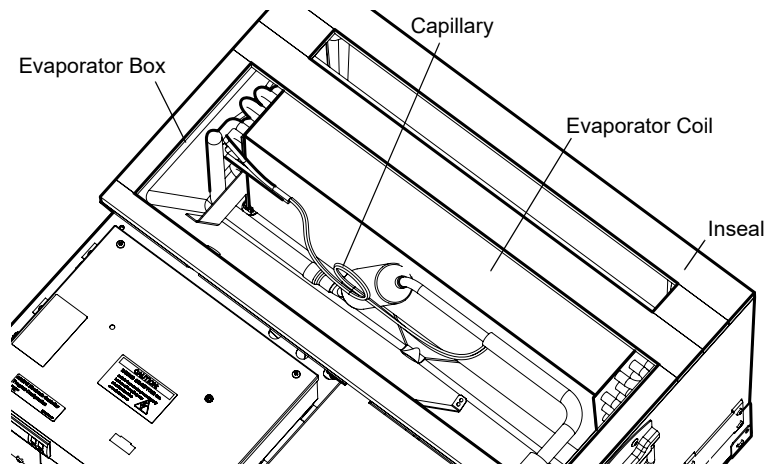
#### To access the compressor electrics

1. Gain access to the compressor (see steps above).
2. Use a flat head screwdriver to ease the electrics cover from the electrics box.

**Evaporator Coil** The evaporator coil is located inside the evaporator box and can be lifted up for servicing.

**To lift up the evaporator coil**

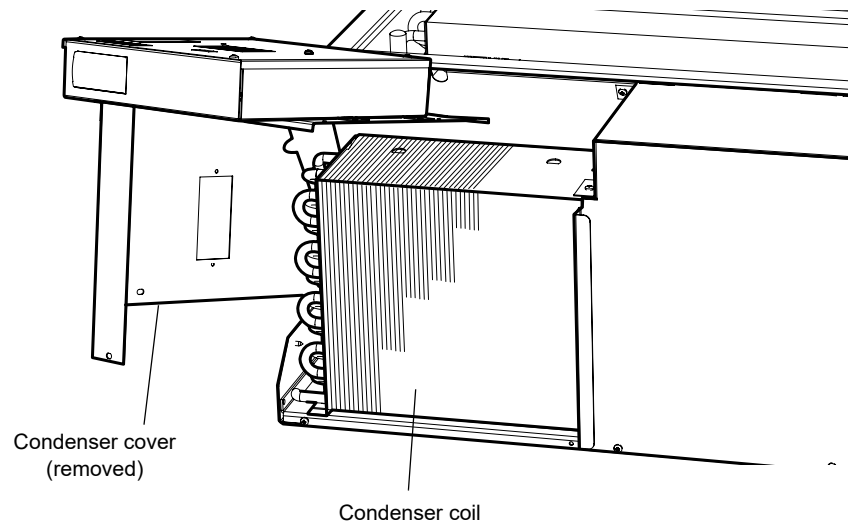
1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Lift the evaporator coil vertically to expose the capillary, coil and electronic controller sensor probe. If the evaporator coil needs to be substantially lifted, it will be necessary to free up pipes and cables from the edge of the evaporator box.
4. Remove the compressor cover from the refrigeration unit by unscrewing the seven fixing screws and lifting the cover off.
5. Lift the inseat and free all pipes and cables from the putty on the edge of the evaporator box.
6. The evaporator coil can now be lifted from the evaporator box. After refitting the evaporator coil, ensure all gaps around the pipes and cables are filled with putty and the inseat is refitted to the edge of the evaporator box.



**Condenser Coil** The condenser coil is located at the front of the refrigeration unit beside the compressor.

**To access the condenser coil**

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Detach the condenser cover by removing the fixing screws and swivel the cover to the side. It may be necessary to free up wires and capillaries inside the unit junction box to allow movement.



## Electronic Controller

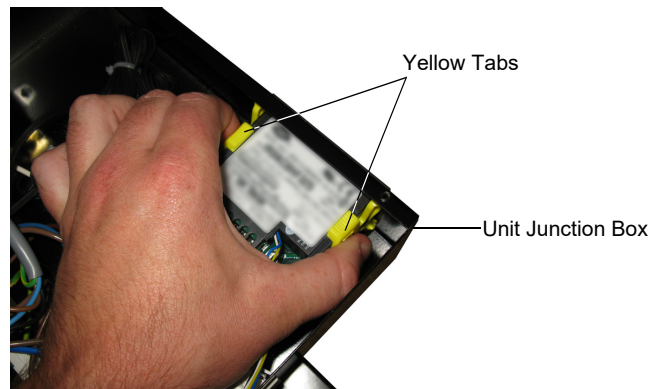
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**Introduction** The electronic controller is located inside the unit junction box (see page 33). For information on operating and programming the controller, see page 6.

### Removal To access and remove the electronic controller

---

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
  2. Remove the unit junction box lid (see page 33).
  3. Press the two yellow tabs on either side of the electronic controller and push it through the front of the unit junction box (see image below).
  4. The electronic controller can now be detached and replaced.
- 



**Replacement** If the controller has a suspected fault, care must be taken to ensure accurate diagnostics (often controller faults are mis-diagnosed). The controller has various programmable parameters that affect operation. Any suspected failure must be double checked. Confirm all wiring and terminations are correct. If operation appears erratic, perform a controller reset.

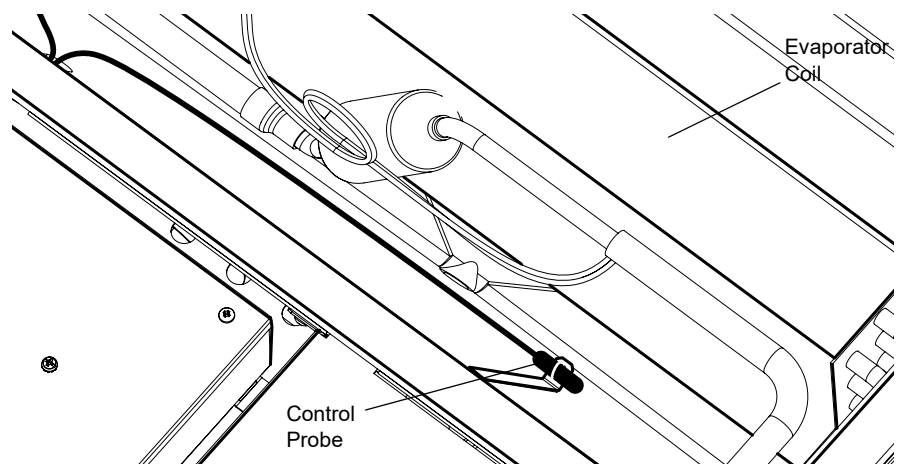
**Temperature Probes** The electronic controller uses three temperature probes to gather data from the refrigeration unit: the control, evaporator and condenser probes. The probes connect into the rear of the electronic controller and exit from the rear of the unit junction box to their locations.

### Control Probe

For temperature control, temperature display and alarm temperatures, the temperature control probe is fitted to a bracket in the cabinet supply air, inside the evaporator tub.

### To access the control probe

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. The control probe is now accessible within the evaporator box.



### Evaporator Probe

For defrost initiation and termination, the evaporator probe is fitted onto the bottom of the evaporator coil at the distributor tube inlet. The probe must be cable tied in place onto the evaporator inlet pipe and insulated.

#### To access the evaporator probe

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Lift the evaporator coil out of the evaporator box to expose the bottom LH end of the coil (see page 36). It will be necessary to free-up electrical cables and refrigeration tubing before lifting the coil.

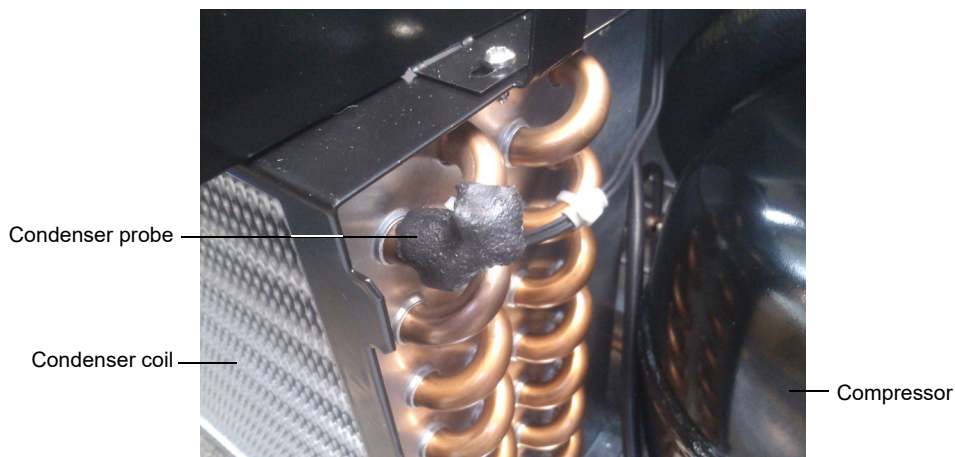


### Condenser Probe

The condenser probe determines refrigeration shutdown due to overheating of condensing temperature. The condenser probe is located on the side of the condenser coil.

#### To access the condenser probe

1. Remove the front panel and isolate the chiller from the power supply (see page 27).
2. Remove the refrigeration unit (see page 33).
3. Remove the compressor cover.
4. The condenser probe is now accessible. The condenser probe is fitted to the side of the condenser coil.





## Cleaning

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Ensure the cabinet is disconnected from the mains power supply before cleaning the cabinet.

**Cabinet** When necessary, wipe both the interior and exterior of the cabinet with a damp cloth.

The bottom shelf can be removed to assist with cleaning by undoing the two side fixing screws. Ensure the bottom shelf is refitted before reconnecting the chiller to the power supply.

### CAUTION

Do **NOT** wash any liquid down into the refrigeration system, as this could lead to refrigeration failure.

**Condenser Coil** To ensure trouble-free performance, the condenser coil must be kept clean. We strongly urge monthly cleaning with a soft brush to remove dust and fluff. A thorough cleaning is required by qualified service personnel every six months. The condenser coil **must** be kept clean for efficient and reliable operation.

### WARNING

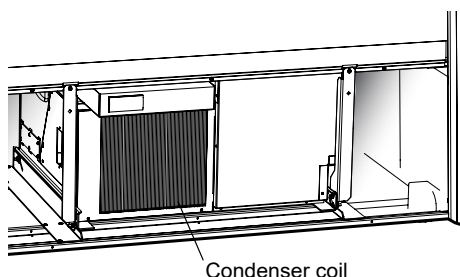
Disconnect the chiller from the power supply before cleaning the condenser coil.

### To clean the condenser coil

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1. Remove the front panel and isolate the chiller from the power supply (see page 27).
- 

2. Brush the condenser coil with a soft brush



3. Refit the front panel and reconnect to the power supply.
-

## 7 Troubleshooting

### Cabinet

The following 'Troubleshooting' guide should be used as a supplement to standard refrigeration fault finding principles.

Complaint	Possible Cause	Repair
1. Cabinet warm, product warm, possible 'HI' alarm activation	<ul style="list-style-type: none"> <li>• External drafts, possibly from air-conditioning, door ways or ventilation fans. External drafts must be less than 0.2 m/s. Note: 0.2 m/s is not noticeable by touch. Generally, any noticeable draft is too much. Some drafts may be intermittent, such as when air-conditioning cycles on and off.</li> <li>• Cabinet loaded with very little stock or unusual shelf position.</li> <li>• Blocked or restricted condenser coil.</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm visually any potential airflow draft outlets. It may be necessary to redirect ventilation fans or relocate the cabinet.</li> <li>• Controller setpoint may require change. Note: that an unloaded cabinet generally operates warmer.</li> <li>• Clean condenser coil (see page 41).</li> <li>• Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.</li> </ul>
2. Cabinet not operating	<ul style="list-style-type: none"> <li>• Loss of power supply.</li> </ul>	<ul style="list-style-type: none"> <li>• Check mains power supply and cabinet isolation switch.</li> </ul>
3. Compressor not operating - controller displays 'HI' alarm	<ul style="list-style-type: none"> <li>• Faulty component.</li> <li>• Blocked or restricted condenser coil.</li> </ul>	<ul style="list-style-type: none"> <li>• Repair or replace control.</li> <li>• Clean condenser coil (see page 41).</li> <li>• Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.</li> </ul>
4. Cabinet lights not operating	<ul style="list-style-type: none"> <li>• Blown fuse.</li> <li>• Loose electrical connections.</li> <li>• ENSTO plug not plugged into controller box socket.</li> <li>• Controller alarm</li> <li>• Failed light power supply</li> </ul>	<ul style="list-style-type: none"> <li>• Replace blown fuse.</li> <li>• Check all light connections.</li> <li>• Check plug.</li> <li>• Determine cause and eliminate (see page 9).</li> <li>• Replace light power supply.</li> </ul>
5. Unit defrosting excessively	<ul style="list-style-type: none"> <li>• Unit will demand defrost regularly if the evaporator temperature is over cold due to being short of refrigerant or starved evaporator.</li> </ul>	<ul style="list-style-type: none"> <li>• Check evaporator refrigerant flow and make suitable repairs.</li> </ul>
6. Product warm - no alarm	<ul style="list-style-type: none"> <li>• Blocked or restricted honeycomb air grille.</li> <li>• One evaporator fan not operating or incorrect rotation.</li> <li>• Unit defrosting excessively.</li> <li>• Restricted return air grille.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove and clean, or replace honeycomb.</li> <li>• Check power supply plug is fully engaged into motor. Repair or replace evaporator fan motor.</li> <li>• See number 5 above.</li> <li>• Remove restriction.</li> </ul>

*Continued over page*

7. Controller displays 'cht' and 'CHT' alarms	<ul style="list-style-type: none"> <li>• Restricted ventilation.</li> <li>• Excessive heatload into cabinet.</li> <li>• Blocked or restricted condenser coil.</li> <li>• Condenser fan motor failure or intermittent overload trip.</li> <li>• Condenser fan incorrect rotation</li> <li>• Over-charged with refrigerant (critical measured charge required).</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure no restriction to cabinet airflow at front and rear of cabinet. If possible, space the cabinet slightly out from the wall.</li> <li>• Ensure ambient has not risen above 25°.</li> <li>• Clean condenser coil (see page 41).</li> <li>• Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.</li> <li>• Check motor and replace if at all dubious.</li> <li>• Check rotation and change as necessary.</li> <li>• If over-charge is apparent, evacuate and recharge to rating label.</li> </ul>
8. Water on floor	<ul style="list-style-type: none"> <li>• Condensate tray overflow.</li> <li>• Excess humidity.</li> <li>• Cabinet not level.</li> <li>• Sludge build-up in condensate tray.</li> </ul>	<ul style="list-style-type: none"> <li>• Check condensate tray.</li> <li>• Keep humidity below 60%.</li> <li>• Ensure the cabinet is positioned on a level surface.</li> <li>• Remove condensate tray and clean.</li> </ul>
9. Water / ice within evaporator box	<ul style="list-style-type: none"> <li>• Blocked drain tube, causing the box to fill with water.</li> <li>• Inadequate defrost time due to loose or faulty evaporator probe.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove the unit and clean out the bottom of the evaporator box and drain entry.</li> <li>• Secure or replace probe.</li> </ul>
10. Moisture or condensation on product	<ul style="list-style-type: none"> <li>• When humidity is above 65% RH, this may begin to occur.</li> </ul>	<ul style="list-style-type: none"> <li>• Keep humidity below 60%.</li> </ul>
11. Product is deteriorating at an excessive rate (e.g. milk going 'off').	<ul style="list-style-type: none"> <li>• Incorrect controller program.</li> <li>• Cabinet overloaded and / or restricted internal or external ventilation.</li> <li>• External drafts.</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm correct program is used. Possibly alter setpoint colder.</li> <li>• Ensure the maximum operating ambient condition is 25°C/60% RH.</li> <li>• Ensure there is NO noticeable draft and that the cabinet is situated well clear of doorways and other points of ventilation and air-conditioning.</li> </ul>

# SKOPE Contacts

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