OD260

SKOPE Open Deck Chiller

Service Manual

MAN800056 Rev. 1.1 April 2020

SKOPE® Refrigeration

OD260
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Service Manual

MAN80056
Rev. 1.1 April 2020

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- Alters, removes (including part removal) or obliterates (including part obliteration) the trade mark on the product
- Applies any other trade mark to the product
- Adds to the product any written material that is likely to damage the reputation of the trade mark

Notice of the above contractual obligations passes to:

- Successors or assignees of the buyer
- Future owners of the product

CONTENTS

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
OD260	2 × interior lights	O26CY

OD260 Cabinet

Description	Open Deck Chiller	
Type	O26CY	
Construction		
Insulation	40mm thick, polyurethane foam. Cyclo-iso Pentane blowing agent: C_5H_{10}/C_5H_{12}	
Doors	n.a.	
Dimensions	*External*	*Internal*
Height	1400mm	850-910mm
Width	650mm	565mm
Depth	735mm (includes rear spacer)	495-595mm
Floor area	0.48m^2 (includes rear spacer)	
Internal volume	230 litres	
Shelves	2 × flat or angled (8°), adjustable height shelves, and 1 × fixed, angled bottom shelf. Top shelf: 545mm wide × 296mm deep. Middle shelf: 545mm wide × 371mm deep. Bottom shelf: 545mm wide × 442mm 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	3.2 Amps (includes unit 3.0 Amps)	
Sign lighting	n.a.	
Internal lighting	2 × 9 Watt LED strip side lights (18 Watts total)	

Refrigeration Unit

Description	Electronically controlled, bottom mounted SKOPE refrigeration unit
Unit model	UB89ABF-107IE
Compressor	Embraco NEK6210Z
Controller	Carel S4 Evo
Nominal capacity	815 Watts
Refrigerant	R134a / 420 gms

2 Electronic Controller

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 at the front of the refrigeration unit.

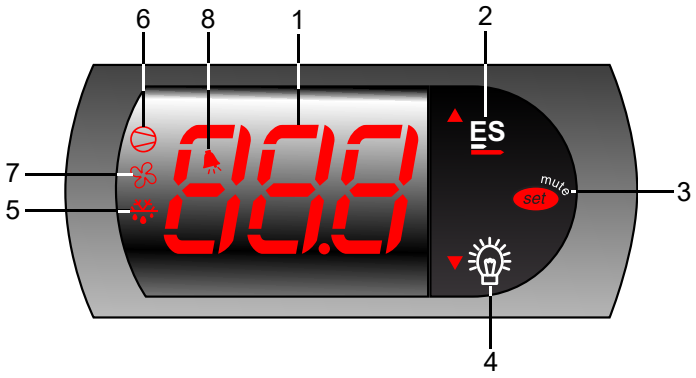
The electronic controller controls and displays the chiller temperature, and signals temperature alarms.

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		Digital display 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		**Up:** Button. Used for programming.
3		**Set (mute):** Button. Press to mute the alarm. Press and hold to access parameters. Also used for programming.
4		**Light (down):** Button. Press to switch the cabinet light on and off. Also used for programming.
5		**Defrost:** Indicator. ON when the defrost is activated. Flashes when the activation of the defrost is temporarily delayed due to procedures in progress.
6		**Compressor:** Indicator. ON when the compressor and condenser fan starts. Flashes when activation of the compressor is temporarily delayed.
7		**Fan:** Indicator. ON when the internal cabinet fans are activated. Flashes when activation of the fans is temporarily delayed.
8		**Alarm:** Indicator. ON when alarm is signalled.

Running the Chiller

Operating Modes

The electronic controller runs the chiller in constant ‘Normal’ mode. The OD260 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 2.0°C (parameter St), and on again when it reaches 4°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.

Refer to page 37 for service information.

Defrost Cycle

The defrost cycle will begin after 2 hours (parameter dI) 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

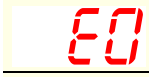
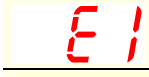
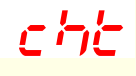
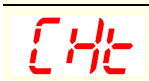
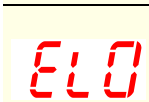
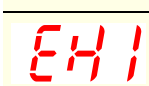
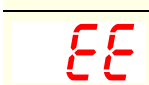
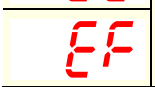
The following table explains messages and alarms that the electronic controller displays.

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 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

	Probe 1 error.	See parameters (page 12) for probe function.
	Probe 2 error.	
	Probe 3 error.	
	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.	
	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.	
	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.
	Refrigeration system high temperature Shutdown (manual reset)	
	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.	
	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.	
 	Electronic controller fault.	

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°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 2°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

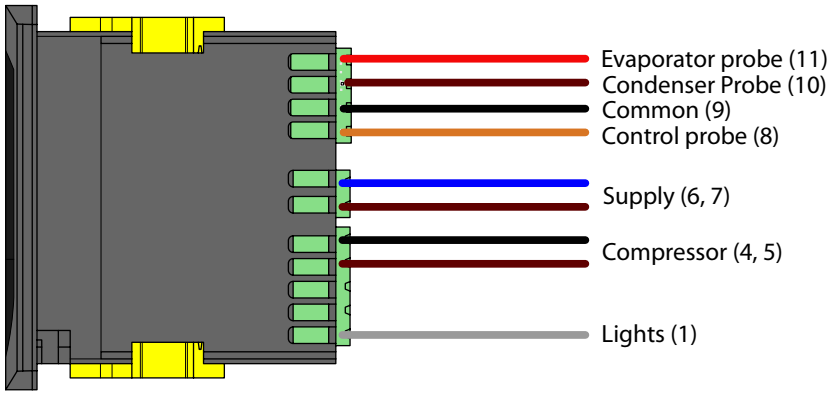
To view the condenser probe temperature reading, press the **ES (up)** and **Set (mute)** buttons simultaneously. The temperature reading will display on the controller faceplate.

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 OD260 uses program 107).

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 2°C for storage of perishable products (all shelves maintain temperatures below 5°C). The cabinet setpoint can be adjusted between 0°C and 4°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 decease 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 107 - OD260 (page 1 of 2)

SKOPE Refrigeration

Electronic Controller Parameter Sheet

107
Revision: 1.1

Full List
SET0

CPS1017-107-SET0
Last revised on
12-Feb-2018

Application **OD260**
Controller Type **SKOPE S4 EVO**
Controller Model & Revision PZSKC0H002K (Rev 1.414)
SKOPE Part Number ELZ11478-107

Parameter	Setting	Unit	Access Level	Range Min	Range Max	Description
Probe Parameters						
PS	**22**		F	0	200	Password (Read Only)
/2	**15**		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	**199**	°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	**1.5**	°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
Regulation Parameters						
St	**2.0**	°C	F	r1	r2	Set point
rd	**2.0**	°C	C	0.0	19.0	DAY differential
r1	**0.0**	°C	C	-50.0	r2	Minimum set point value
r2	**4.0**	°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	**2.0**	°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
Cold Climate Protection Parameters						
CCt	**2.0**	°C	C	0.1	20.0	Cold Climate Protection Temperature Delta
CCd	**30**	mins	C	0	199	Cold Climate Protection Delay
Pull Down Mode Parameters						
Pt	**127**	°C	C	0	127	Pull-down Mode - Activation Temperature
Pd	**250**	hrs	C	0	250	Pull-down Mode - Maximum Duration
Compressor Parameters						
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)
Defrost Parameters						
d0	**0**		C	0	1	Type of defrost (0 = Electric, 1 = Hot Gas)
dI	**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	**0**	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 107 - OD260 (page 2 of 2)

SKOPE Refrigeration

Electronic Controller Parameter Sheet

107
Revision: 1.1

Full List
SET0

Application **OD260**
Controller Type **SKOPE S4 EVO**
Controller Model & Revision PZSKC0H002K (Rev 1.414)
SKOPE Part Number ELZ11478-107

CPS1017-107-SET0
Last revised on
12-Feb-2018

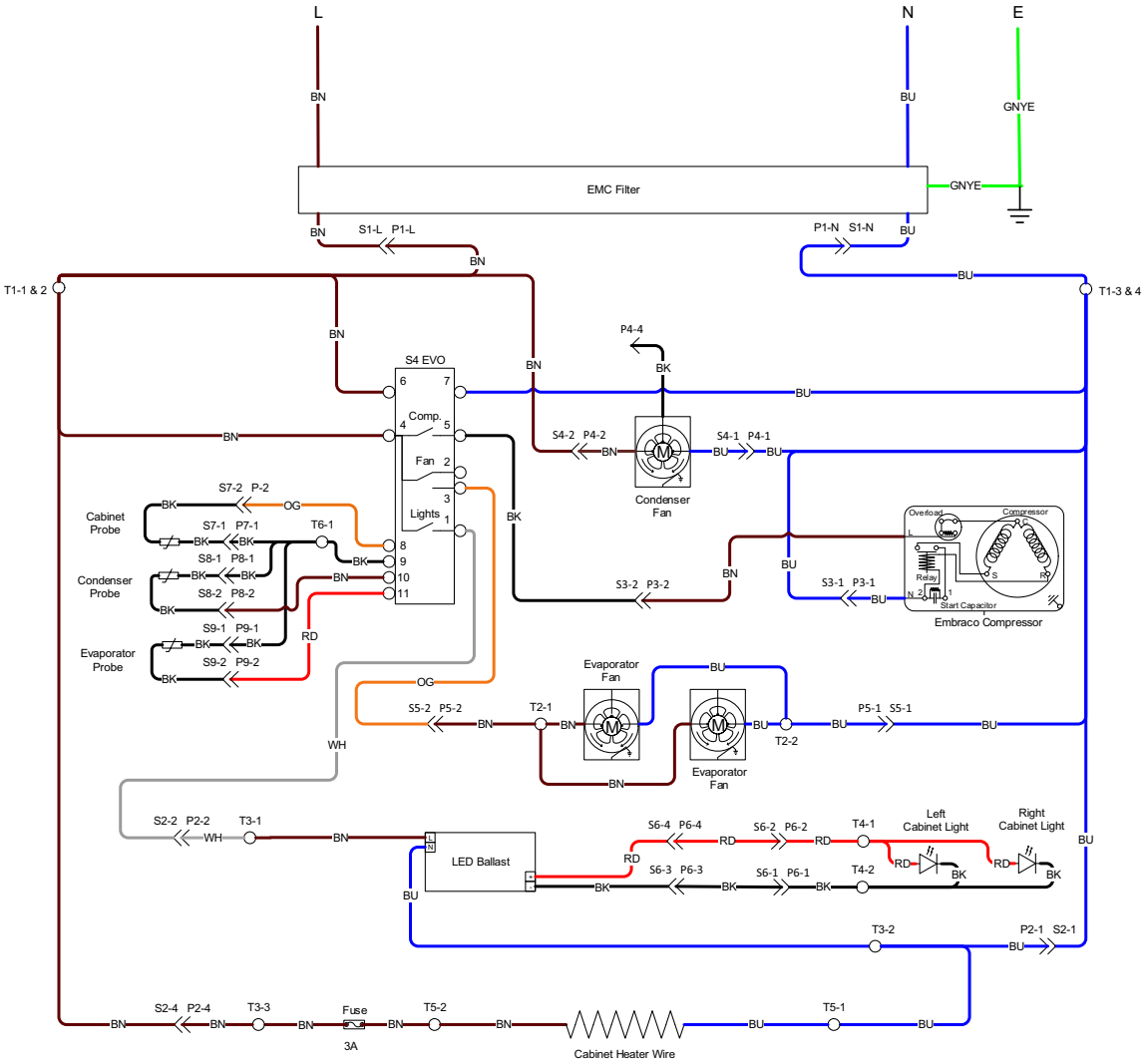
Parameter	Setting	Unit	Access Level	Range Min	Range Max	Description
d9	**0**		C	0	1	Defrost priority over compressor protectors
d/1	**-**	°C	F	-	-	Probe reading on 2nd Input (read only)
d/2	**-**	°C	F	-	-	Probe reading on 3rd Input (read only)
d10	**-9.0**	°C	C	-50.0	127	On demand defrost Start Temperature
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	**15**	mins	C	0	200	No Downward Tendency Defrost - Start Delay (0 = function disabled)
d20	**15**	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)
Alarm & Input Configuration Parameters						
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
Evaporator Fan Parameters						
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
Other Parameters						
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	**107**		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: OD260



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	

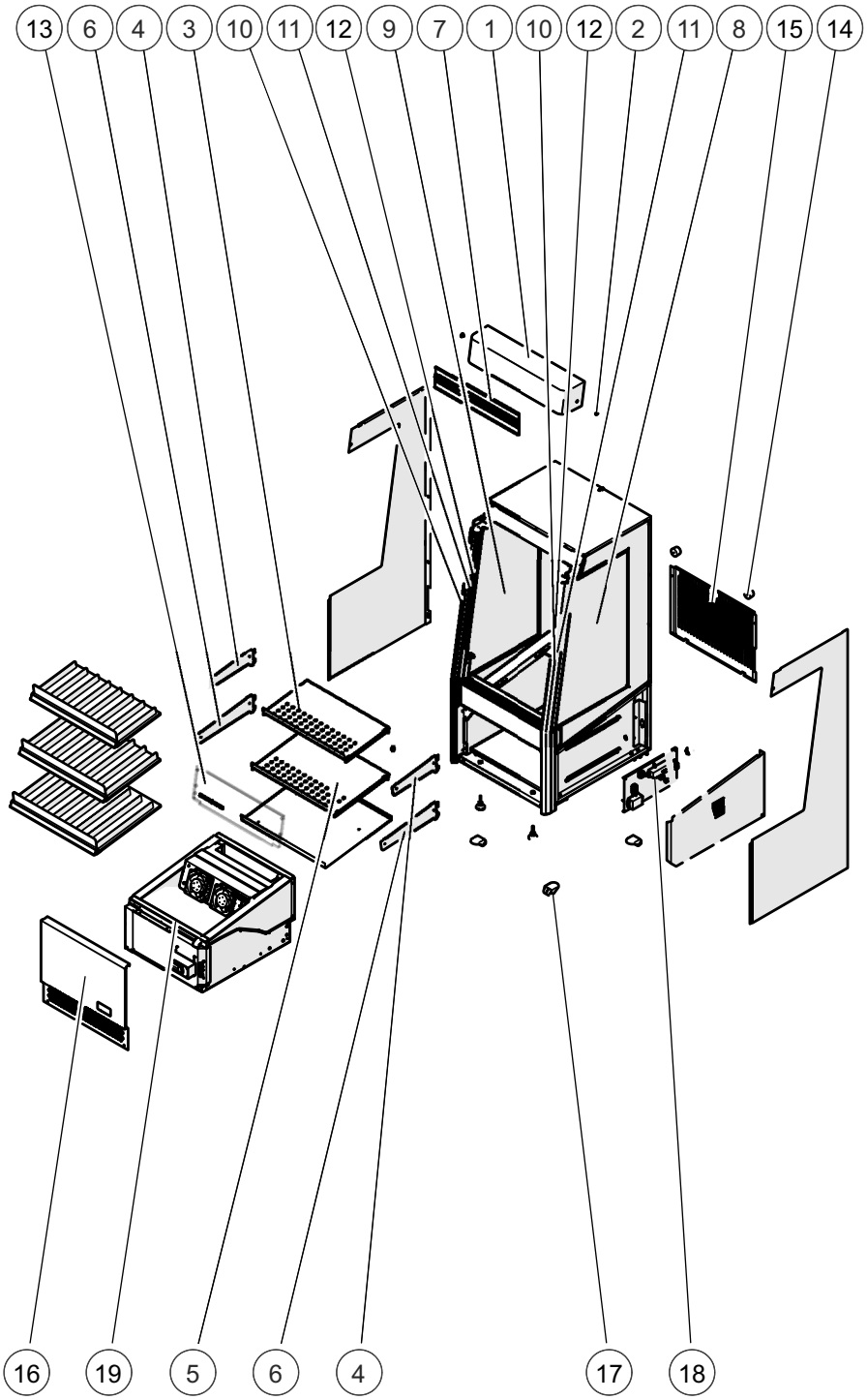
LEGEND

T1	Unit terminal	S3 & P3	Compressor socket and plug (blue 4-way)
T2	Evaporator fan junction box terminal	S4 & P4	Condenser fan socket and plug (red 4-way)
T3	Cabinet terminal	S5 & P5	Evaporator fan socket and plug (white 4-way)
T4	Cabinet light and terminal	S6 & P6	LED power supply output socket and plug (white 4-way)
T5	Heater wire terminal	S7 & P7	Control probe socket and plug (blue 2-way)
S1 & P1	IEC mains isolation socket and plug	S8 & P8	Condenser probe socket and plug (red 2-way)
S2 & P2	Unit to cabinet socket and plug	S9 & P9	Evaporator probe socket and plug (black 2-way)

Notes

4 Spare Parts

Cabinet Assembly - OD260

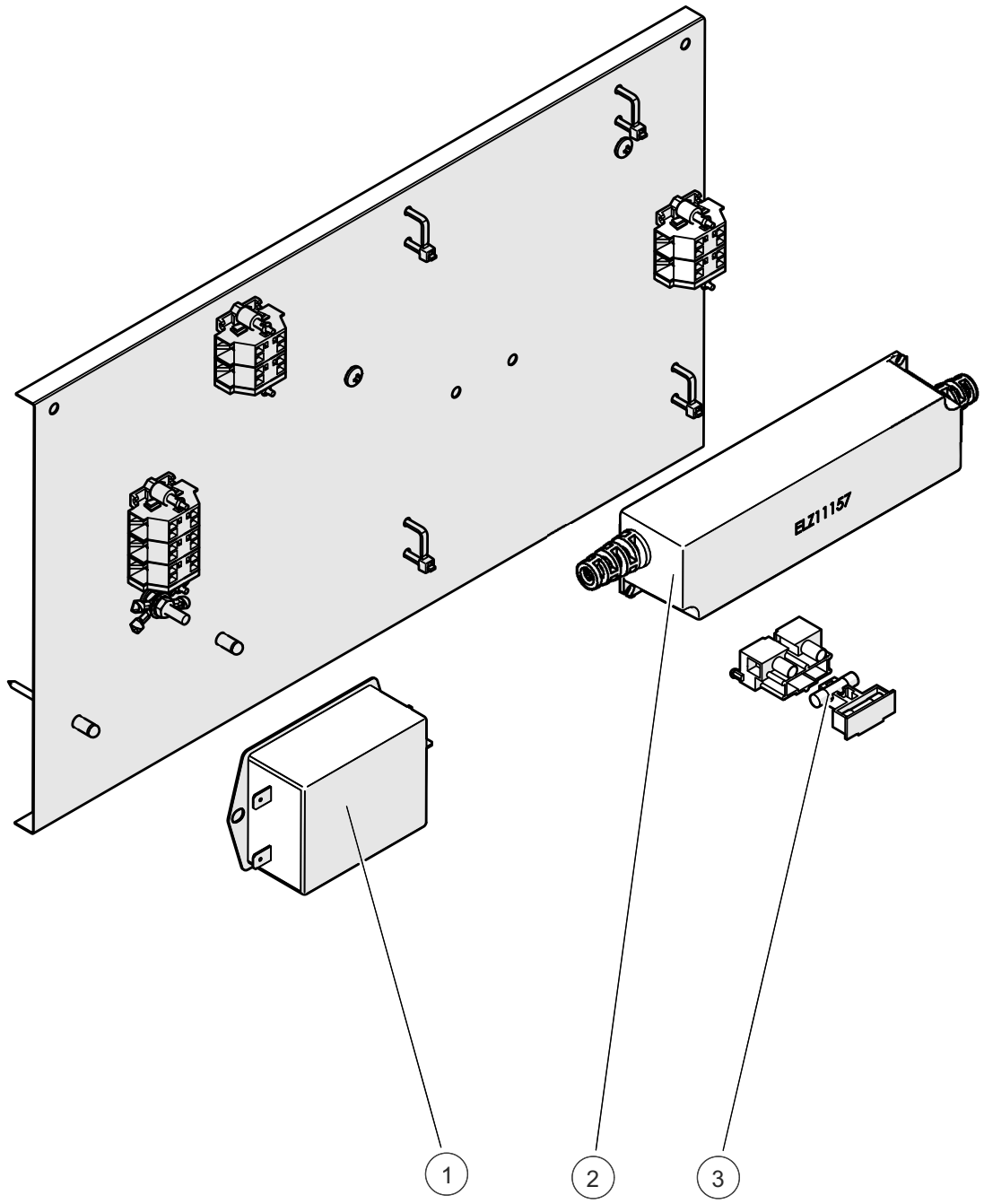


Parts ì Cabinet OD260

Item	Description	SKOPE Part No.		
		Standard	*White*	*Black*
1	Plastic lid	-	PLM1662A-WH	PLM1662A-BK
2	Plastic lid screw	-	PLM10437WH	PLM10437BK
3	Top shelf	-	O260/591C-32	O260/591C-49
4	Top shelf bracket - one part version*	-	STY11671-32	STY11671-49
	Top shelf bracket LH - two part version*	-	STY10956L-32	STY10956L-49
	Top shelf bracket RH - two part version*	-	STY10956R-32	STY10956R-49
	Top shelf height adjustment piece LH - two part version*	-	O230C/598CL-32	O230C/598CL-49
	Top shelf height adjustment piece RH - two part version*	-	O230C/598CR-32	O230C/598CR-49
5	Middle shelf*	-	O260/591B-32	O260/591B-49
6	Middle shelf bracket*	-	STY11670-32	STY11670-49
	Middle shelf bracket LH - two part version*	-	STY10955L-32	STY10955L-49
	Middle shelf bracket RH - two part version*	-	STY10955R-32	STY10955R-49
	Middle shelf height adjustment piece LH - two part version*	-	O230C/598BL-32	O230C/598BL-49
	Middle shelf height adjustment piece RH - two part version*	-	O230C/598BR-32	O230C/598BR-49
7	Point of sale header	-	-	PLE11610-0550
8	Side window RH	GLA11663R	-	-
9	Side window LH	GLA11663L	-	-
10	Vertical bumper strip	-	-	PLE4077BK-260L
11	Light module	ELL11123	-	-
12	Light cover	O260/E71	-	-
13	Acrylic upstand	PLY11672	-	-
14	Rear spacer	RUM4105	-	-
15	Rear panel	-	O260/N86-32	O260/N86-49
16	Front panel	-	O260/131-32	O260/131-49
17	Castor	SXX10289	-	-
18	Electrics plate assembly	O260/G29	-	-
19	Refrigeration unit assembly	UB89ABF-107IE	-	-

*See page 27 for information on shelf bracket variations

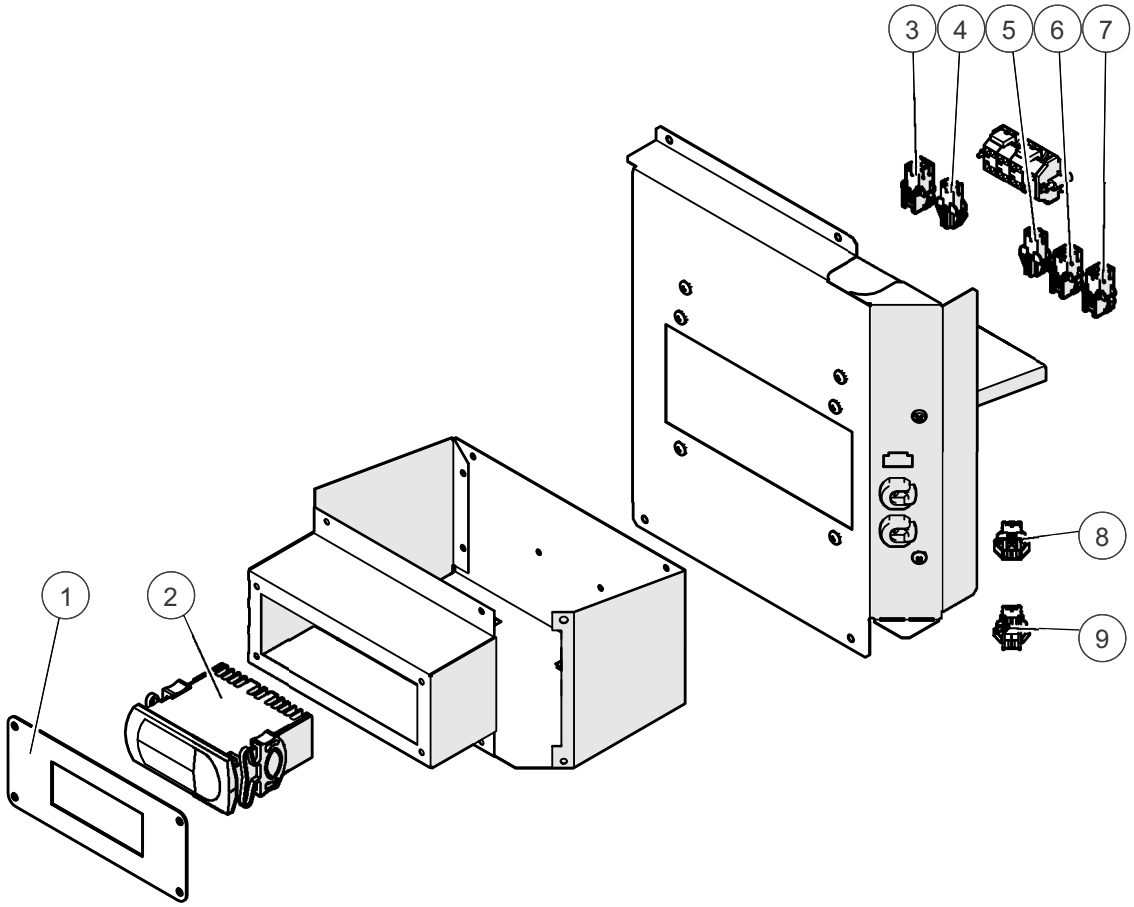
Electrics Plate Assembly



Parts ì Electrics Plate Assembly

Item	Description	SKOPE Part No.
0	Electrics plate assembly	O260/G29
1	EMI filter	ELZ10136
2	Light power supply	O260/K08
3	3A fuse	ELZ9654
	Fuse holder	ELZ9655

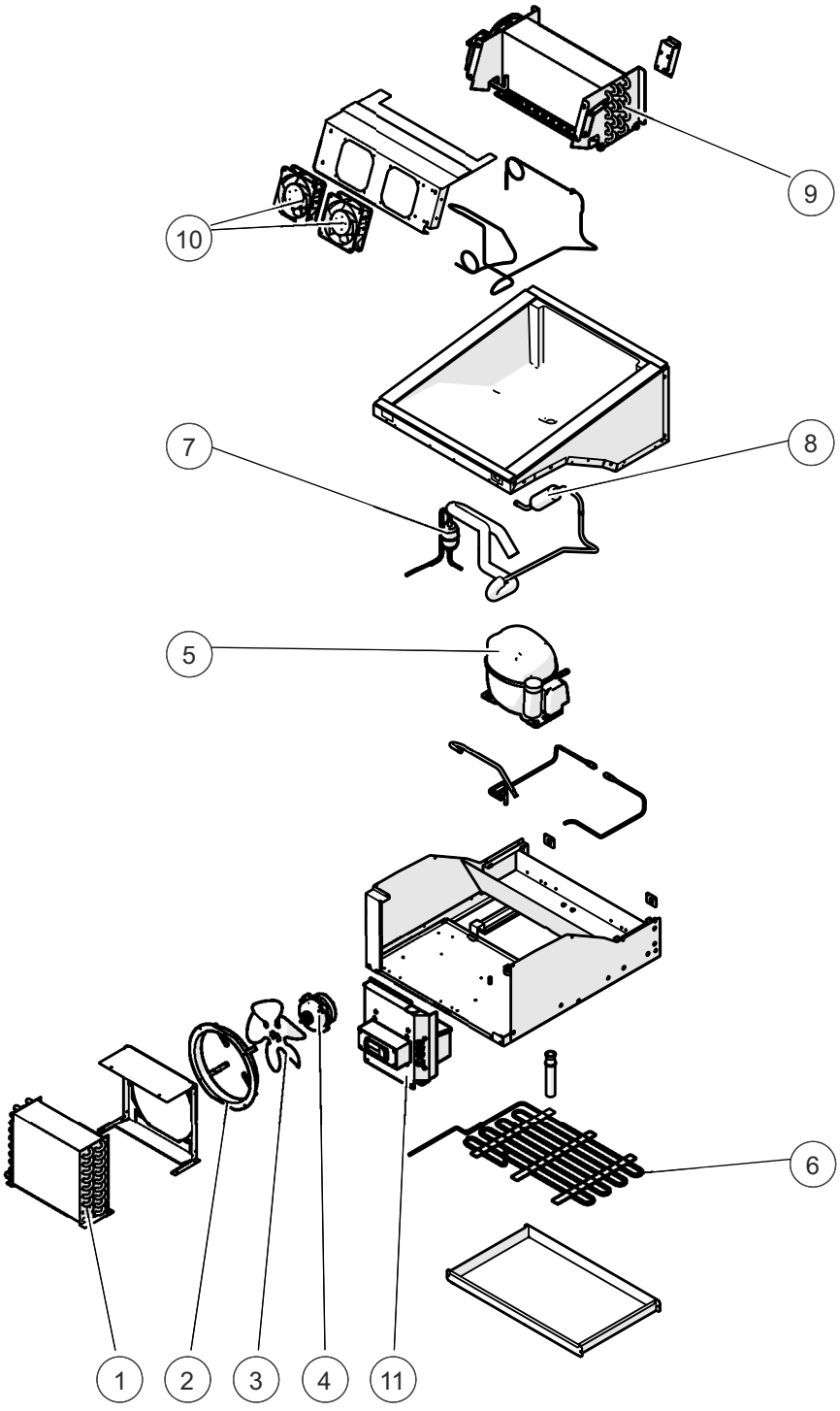
Unit Electrics Box Assembly



Parts ì Unit Junction Box

Item	Description	SKOPE Part No.
0	Unit junction box assembly	UB89ABF/R86-107
1	Controller faceplate	UB89ABF/K03/1-49
2	CAREL S4 Evo electronic controller (program 107)	ELZ11478-107
3	TYCO 4-Pole socket red	ELZ11345-RD
4	TYCO 2-Pole socket red	ELZ11341-RD
5	TYCO 2-Pole socket black	ELZ11341-BK
6	TYCO 4-Pole socket white	ELZ11345-WH
7	TYCO 4-Pole socket blue	ELZ11345-BU
8	TYCO 2-Pole socket blue	ELZ11341-BU
9	TYCO 4-Pole socket yellow	ELZ11345-YE

Refrigeration Unit Assembly



Parts ì Refrigeration Unit

Item	Description	SKOPE Part No.
0	Refrigeration unit assembly	UB84ABF-107IE
1	Condenser coil	CLS10627
2	Condenser fan shroud	UB89AA/232-49
3	Condenser fan blade	FAN3809
4	Condenser fan motor	UB89ABF/404CP1
5	Compressor Embraco NEK6210Z	CPR10608
6	Condensate line assembly	UB89ABF/255T-99
7	Drier	DRY6110
8	Accumulator	V8100/496
9	Evaporator coil	CLS10628
10	Evaporator fan motor	ELM1522
11	Unit electrics box assembly	UB89ABF/R86-107

5 Installation

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, or draughts from doorways, 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 is supplied with a flexible power cord fitted with a three pin plug, which is packed separately inside the cabinet. Connect the power cord to the IEC socket on the back of the cabinet before moving into position.

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 kick 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.

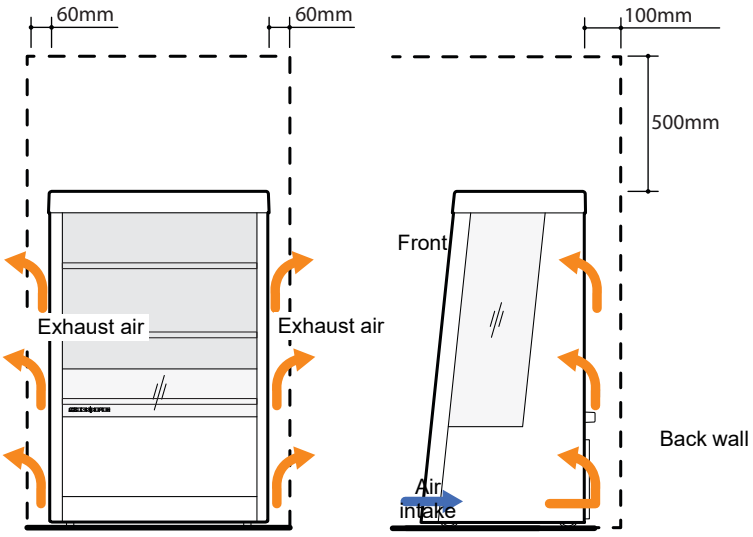
Determine if the installation is free-standing or enclosed, and ensure the installation meets the ventilation requirements detailed below.

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.



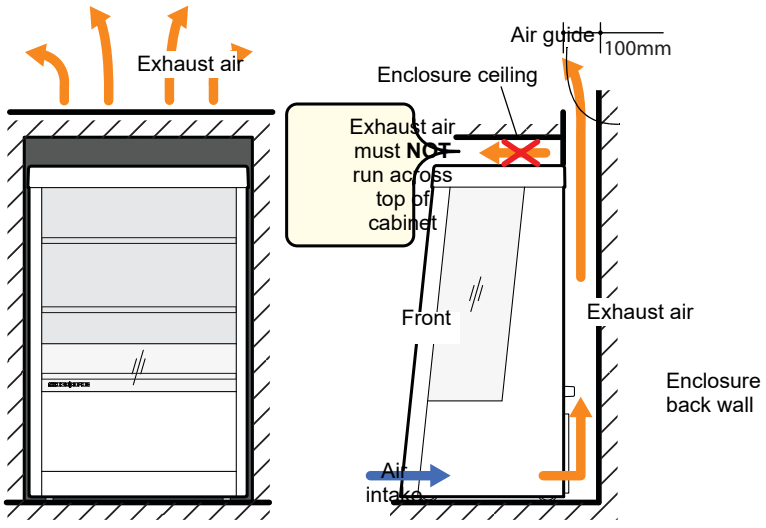
Free-standing installation ventilation requirements

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.

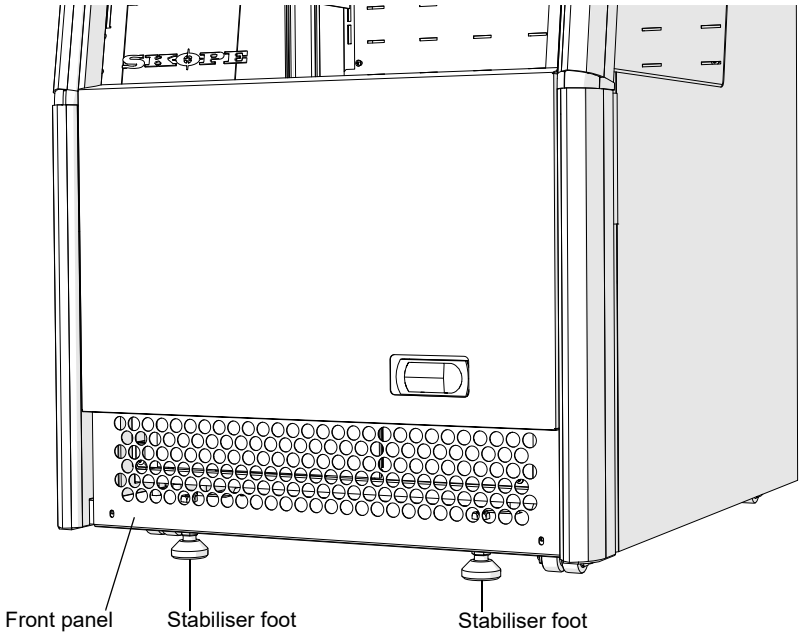
Refrigeration exhaust air must **NOT** be allowed to run horizontally across the top of the cabinet, as it may be pulled down into the cabinet interior.



Enclosed installation ventilation requirements

Stabiliser Feet

Ensure the stabiliser feet are wound all the way up when moving the chiller around. Once the chiller is in position, wind down the two front stabiliser feet to firmly contact the ground.

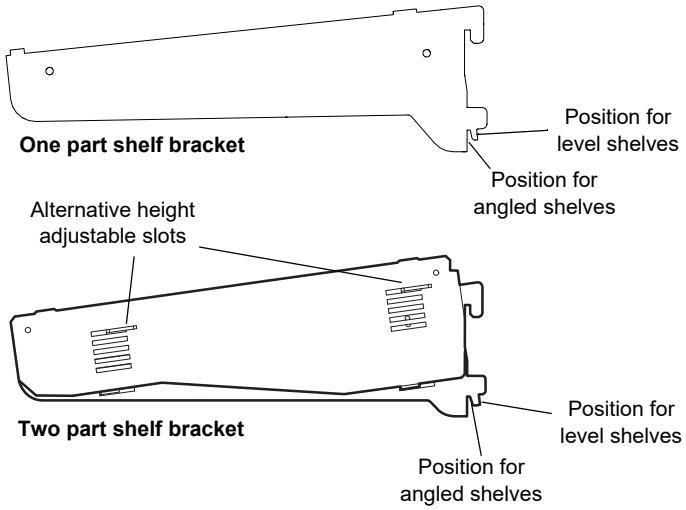


Shelves

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.

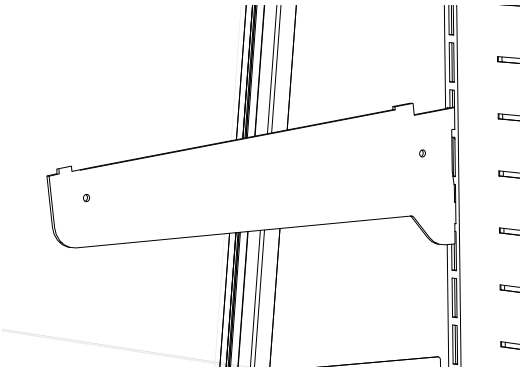
The two top shelves are each held in place by cantilevered shelf brackets which clip into cut-outs in the cabinet back duct. These brackets may be in one part or two parts. The two part version allows for additional 6mm interval height adjustments by separating the shelf bracket into two and re-slotting together using the alternative slots.



To fit the shelves

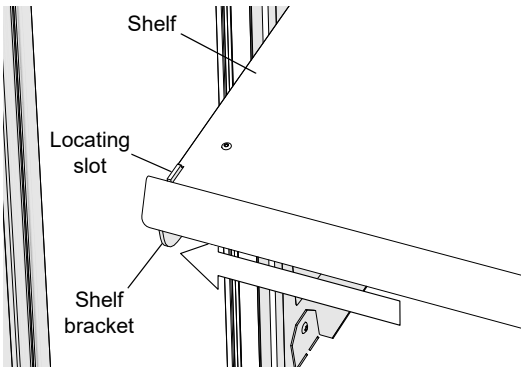
1. Clip the cantilevered shelf brackets into the slots in the cabinet back duct.

   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.



6 Replacement Procedures

Isolating Electrics

The chiller should be isolated from the power supply before attempting **any** maintenance. Unplug the cabinet from the power supply to isolate.

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 can be switched on and off with the light switch on the electronic controller faceplate.

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.
	Test plug not fitted.	Fit test plug.
	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. Isolate the chiller from the mains power supply.
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 test, 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 30 for information on accessing the LED driver power supply.

Cabinet Electrics

Electrics Plate Assembly

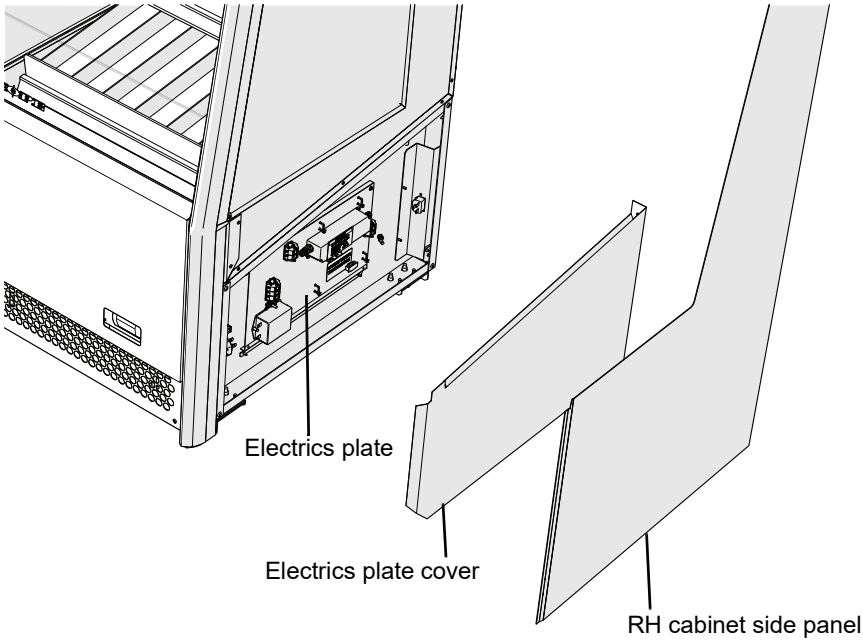
The cabinet is fitted with an electrics plate assembly, located on the RH side of the cabinet. The electrics plate assembly houses cabinet electrical components including the lights power supply, the surge protector/EMI filter, and the mains IEC connector socket.

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. Isolate the chiller from the power supply.
2. Remove the lid from the top of the cabinet.
3. Remove the RH cabinet side panel and the electrics plate cover.
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

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

1. Isolate the chiller from the mains power supply.
2. Remove the existing front upstand by undoing the 4 screws (2 at each end) of the upstand.
3. Fit the new front upstand.
4. Reconnect the cabinet to the power supply and reassemble.

Vertical Bumpers

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

1. Isolate the chiller from the mains power supply.
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

The chiller is fitted with 4 castors which can be removed and replaced if necessary. The wheels swivel but do not lock. Use the stabiliser feet to lock the chiller in position (see page 26).

The wheels can be removed and replaced.

Honeycomb Air Grille

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.

Refrigeration Unit

Introduction

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

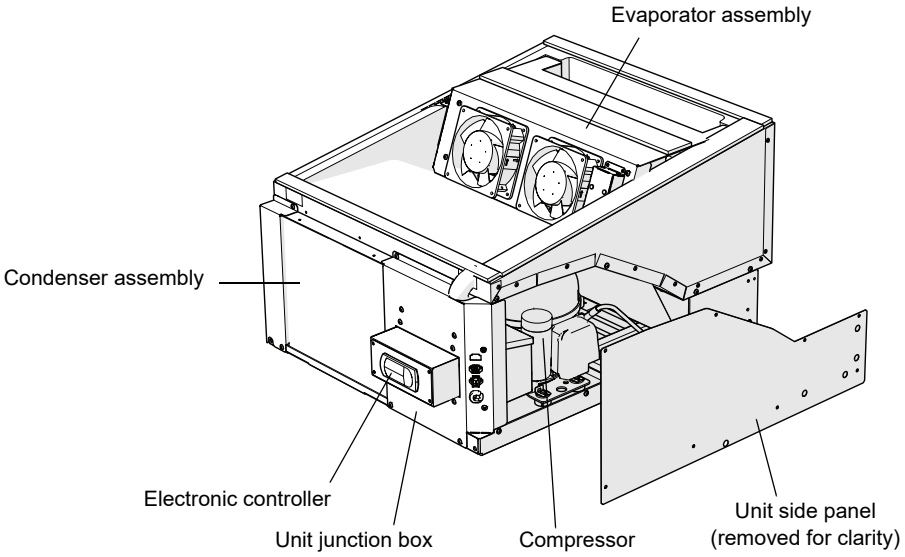
For major servicing the refrigeration unit unplugs and pulls out from the cabinet (see page 33). Minor servicing can be performed without removing the refrigeration unit from the cabinet.

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

Unit specifications

Unit Model:	UB89ABF-107IE
Compressor:	Embraco NEK6210Z
Compressor capacity:	815 Watts
Refrigerant:	R134a
Charge:	420 g

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



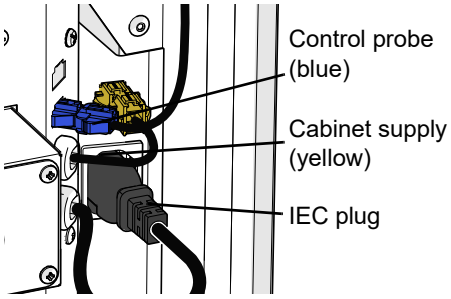
Removing the Refrigeration Unit

To remove the refrigeration unit

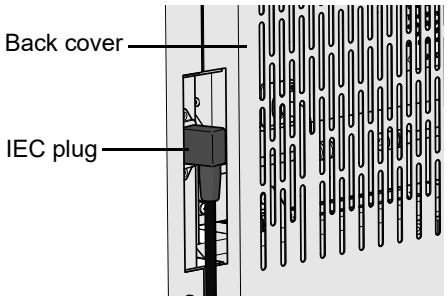
1. Disconnect the cabinet from the power supply.

2. Remove the front panel. Take care not to scratch the front upstand when removing.

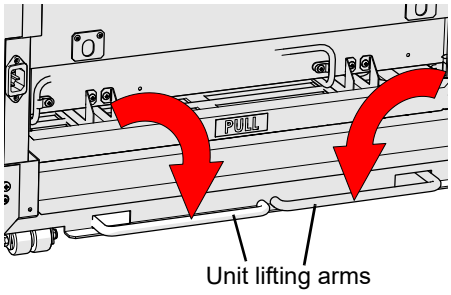
3. Unplug the IEC plug from the cabinet, and the control probe (blue) and cabinet supply (yellow) from the unit.



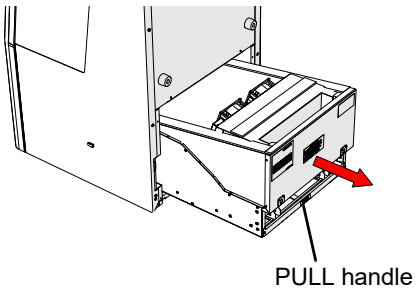
4. Move to the back of the cabinet. Unplug the IEC plug and remove the back cover.



5. Pull the two unit lifting arms out from the cabinet to unlock, and rotate in to lower the refrigeration unit.



6. Use the PULL handle to carefully slide the unit out from the cabinet.



When refitting the refrigeration unit ensure:

- The gasket on top of the unit is in good condition.
- Wires and cables are clear of the unit when moving it.
- The unit is pushed fully in the cabinet, the unit lifting arms are rotated fully upwards and locked into place.
- All plugs are re-connected.
- The front panel and back cover are refitted.

Unit Junction Box

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

The box is mounted to the front of the refrigeration unit. The interior can be accessed without removing the refrigeration unit, however this will only offer restricted access to components. If you need to access other components or wiring, remove the refrigeration unit prior to accessing the refrigeration unit junction box.

To open the unit junction box

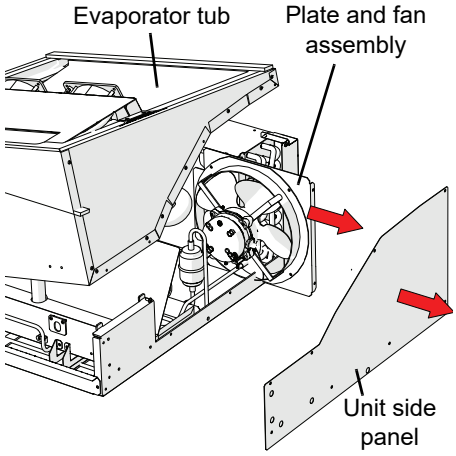
1. Isolate the chiller from the power supply.
2. Remove the cabinet front kick panel. Take care not to scratch the front upstand when removing.
3. Undo the four fixing screws (two at the top and two at the bottom) from the front of the unit junction box, and pull the box out from the unit.
4. Undo the four fixing screws (two at the front and two at the back) from the unit junction box cover and remove the cover.
5. Service as necessary and refit.

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. Isolate the chiller from the power supply and remove the refrigeration unit from the cabinet (see page 33).
2. Remove the LH and RH unit side panels.
3. Carefully raise and support the evaporator tub to gain access to the condenser fan fixing screws.
4. Gain access to 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.
5. Undo the two condenser fan mounting plate screws and remove the plate and fan as one assembly.



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 evaporator box is reattached.

Evaporator Fans

The refrigeration unit is fitted with two evaporator fans, attached to the evaporator fan shroud on top of the unit. The fans can be replaced individually and each fan has a push in plug for easy removal.

To replace an evaporator fan

1. Isolate the chiller from the power supply and remove the refrigeration unit from the cabinet (see page 33).
2. Unplug the push-in plug from the fan motor.
3. The fan can now be removed from the unit assembly. When fitting the replacement fan, ensure the push-in plug is securely plugged in, the orientation is correct and that the fan assembly is fixed onto the evaporator assembly with the four perimeter fixing screws.

Compressor

The compressor is located behind the RH unit side panel on the refrigeration unit.

If the compressor is causing excessive noise check the mountings to ensure there is no damage to the rubber or washers, nuts and screws.

Before replacing the compressor, check all plug connections and ensure the compressor electrics are operating correctly (see below). The compressor must be 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).

If replacing the compressor, ensure the system is clear and not contaminated. If there is a burn-out, a suction burn-out filter drier should be used until all contamination is removed (use only as specified by the filter drier manufacturer).

To access the compressor

1. Isolate the chiller from the power supply and remove the refrigeration unit from the cabinet (see page 33).
2. Remove the RH unit side panel.
3. The compressor can now be accessed for servicing. Access can be improved by removing the LH unit side panel, and carefully raising and supporting the evaporator tub.

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.

Electronic Controller

Introduction

The electronic controller is located inside the unit junction box (see page 34). For information on operating and programming the controller, see page 6.

Removal

To access and remove the electronic controller

1. Isolate the chiller from the power supply.
2. Undo the four screws from the controller faceplate, and withdraw the faceplate and controller from the unit junction box.
3. Press the two yellow tabs on either side of the electronic controller and push it through the faceplate.
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

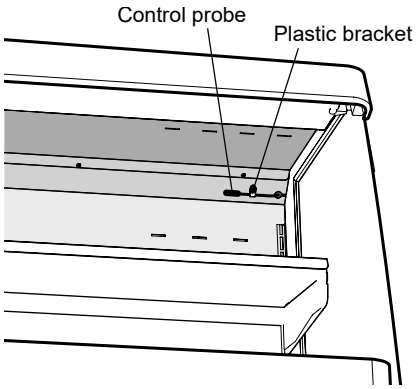
The electronic controller uses three temperature probes to gather data from the refrigeration unit: the control, evaporator and condenser probes. The probes connect into the rear of the electronic controller and exit from the rear of the unit junction box to their locations.

Control Probe

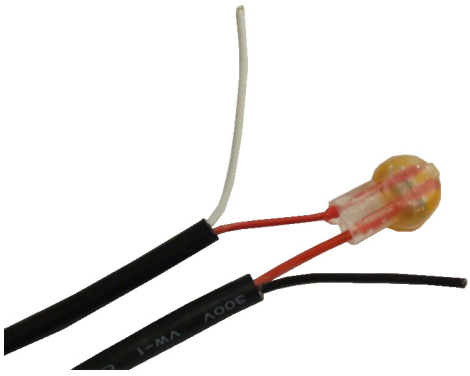
For temperature control, temperature display and alarm temperatures, the control probe is fitted to a bracket at the top of the cabinet interior ducting. It plugs into the blue socket at the front RH side of the refrigeration unit.

To replace the control probe

1. Isolate the chiller from the power supply.
2. Remove the control probe from the plastic bracket.



3. Cut the failed probe from the probe cable.
4. Use wire cutters to remove the insulation from the probe cable wires and from the replacement probe wires.
5. Insert the red wires of each cable into a crimp. Using a crimping tool, crimp together.
6. Insert the other wires into another crimp. Using a crimping tool, crimp together.



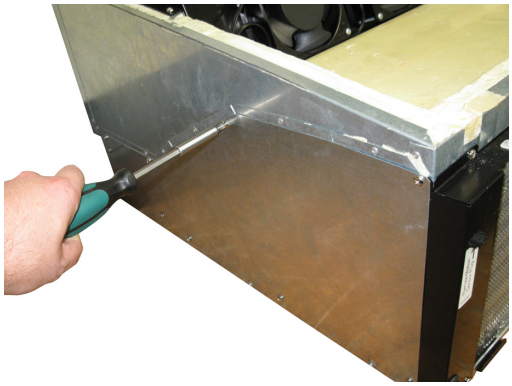
7. Refit the probe into the plastic bracket and reassemble.

Condenser Probe

The condenser probe is attached to the side of the condenser coil and wrapped with insulating cork tape. The condenser probe cable runs along the floor of the refrigeration unit behind the condenser coil.

To replace the condenser probe

1. Remove the front panel, isolate the chiller from the mains power supply and remove the refrigeration unit (see page 33).
2. Remove the unit LH side panel.

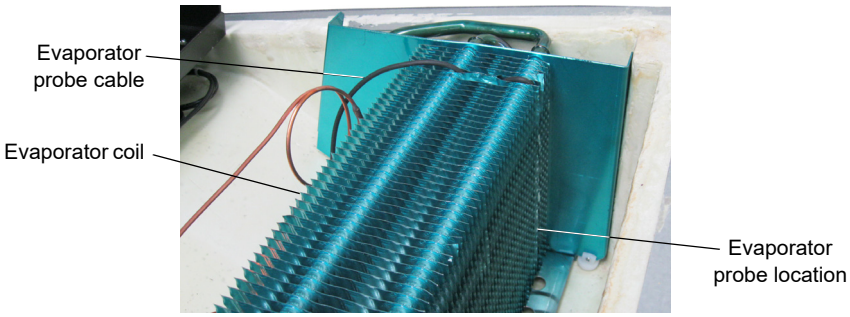


3. Detach the probe from the side of the condenser coil.

4. Remove the electronic controller (see page 36).
5. Detach the condenser probe cable from the rear of the electronic controller and withdraw the cable (and probe) from the refrigeration unit.
6. Feed the new probe cable (and probe) through the trunking behind the condenser coil.
7. Reattach the probe and fix to the condenser coil with a cable tie and bundle any excess cable with another cable tie. Insulate the probe with cork tape.

Evaporator Probe

The evaporator probe is located within the evaporator coil, in-between the fifth and sixth fins and between the first and second pipes. The evaporator probe cable runs across the evaporator tub.



To replace the evaporator probe

1. Remove the front panel, isolate the chiller from the mains power supply and remove the refrigeration unit (see page 33).
2. Detach the evaporator fan assembly from the evaporator coil by undoing the four fixing screws (two at each end), and place the evaporator fan assembly out of the way.
3. Withdraw the probe from the evaporator coil and detach the probe cable from the refrigeration unit.
4. Remove the electronic controller (see page 36).
5. Detach the evaporator probe cable from the rear of the electronic controller and withdraw the cable (and probe) from the refrigeration unit.
6. Fit the new probe cable following the same path as the original cable.
7. Feed the probe up inbetween the fifth and sixth fins and the first and second pipes in the evaporator coil. Crimp the fins to hold the probe in place.

8. Ensure the probe cable is securely attached to the unit and reassemble.

Service Probe

A service probe is required when testing/running the refrigeration unit outside of the cabinet and should be used for bench testing when the cabinet control probe cannot be plugged into the unit. Refer to part details below:

Description	Part No.
Service probe	FLX10106-99

The service probe plugs into the control probe socket on the RH side of the refrigeration unit.

To use the service probe

1. Connect the probe to the control probe plug on the RH side of the refrigeration unit. The probe end can be placed in areas of varying temperature depending on the type of testing being completed.

Cleaning

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 warm soapy water and a soft cloth. Do **not** use chemical cleaners.

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.

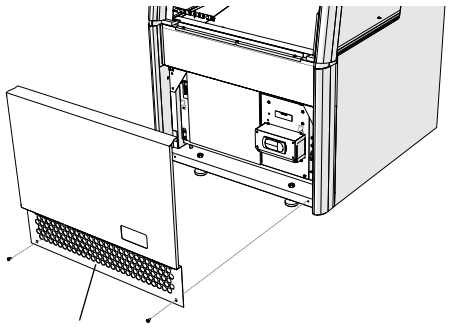
WARNING

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

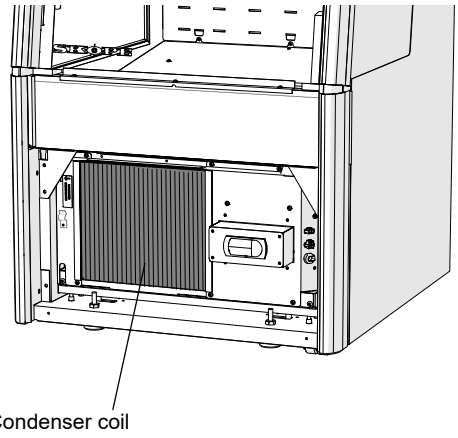
To clean the condenser coil

1. Disconnect the cabinet from the power supply.

2. 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.



3. Brush the condenser coil with a soft brush



4. Refit the front panel and reconnect to the power supply.

7 Troubleshooting

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	• 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.	• Confirm visually any potential airflow draft outlets. It may be necessary to redirect ventilation fans or relocate the cabinet.
	• Cabinet loaded with very little stock or unusual shelf position.	• Controller setpoint may require change. Note: that an unloaded cabinet generally operates warmer.
	• Blocked or restricted condenser coil.	• Clean condenser coil (see page 40). • Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.
2. Cabinet not operating	• Loss of power supply.	• Check mains power supply and cabinet isolation switch.
3. Compressor not operating - controller displays 'HI' alarm	• Faulty component.	• Repair or replace control.
	• Blocked or restricted condenser coil.	• Clean condenser coil (see page 40). • Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.
4. Cabinet lights not operating	• Blown fuse.	• Replace blown fuse.
	• Loose electrical connections.	• Check all light connections.
	• Tyco plug not plugged into controller box socket.	• Check plug.
	• Controller alarm	• Determine cause and eliminate (see page 9).
	• Failed light power supply	• Replace light power supply.
5. Unit defrosting excessively	• Unit will demand defrost regularly if the evaporator temperature is over cold due to being short of refrigerant or starved evaporator.	• Check evaporator refrigerant flow and make suitable repairs.
6. Product warm - no alarm	• Blocked or restricted honeycomb air grille.	• Remove and clean, or replace honeycomb.
	• One evaporator fan not operating or incorrect rotation.	• Check power supply plug is fully engaged into motor. Repair or replace evaporator fan motor.
	• Unit defrosting excessively.	• See number 5 above.
	• Restricted return air grille.	• Remove restriction.

Continued over page

7. Controller displays 'cht' and 'CHT' alarms	• Restricted ventilation.	• Ensure no restriction to cabinet airflow at front and rear of cabinet. If possible, space the cabinet slightly out from the wall.
	• Excessive heatload into cabinet.	• Ensure ambient has not risen above 25°.
	• Blocked or restricted condenser coil.	• Clean condenser coil (see page 40). • Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.
	• Condenser fan motor failure or intermittent overload trip.	• Check motor and replace if at all dubious.
	• Condenser fan incorrect rotation	• Check rotation and change as necessary.
	• Over-charged with refrigerant (critical measured charge required).	• If over-charge is apparent, evacuate and recharge to rating label.
8. Water on floor	• Condensate tray overflow.	• Check condensate tray.
	• Excess humidity.	• Keep humidity below 60%.
	• Cabinet not level.	• Ensure the cabinet is positioned on a level surface.
	• Sludge build-up in condensate tray.	• Remove condensate tray and clean.
9. Water / ice within evaporator box	• Blocked drain tube, causing the box to fill with water.	• Remove the unit and clean out the bottom of the evaporator box and drain entry.
	• Inadequate defrost time due to loose or faulty evaporator probe.	• Secure or replace probe.
10. Moisture or condensation on product	• When humidity is above 65% RH, this may begin to occur.	• Keep humidity below 60%.
11. Product is deteriorating at an excessive rate (e.g. milk going 'off').	• Incorrect controller program.	• Confirm correct program is used. Possibly alter setpoint colder.
	• Cabinet overloaded and / or restricted internal or external ventilation.	• Ensure the maximum operating ambient condition is 25°C/60% RH.
	• External drafts.	• Ensure there is NO noticeable draft and that the cabinet is situated well clear of doorways and other points of ventilation and air-conditioning.

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