

BackBar X

SKOPE Horizontal Chiller



BB380X-2SW

BackBar X
SKOPE Horizontal Chiller
Service Manual

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SKOPE INDUSTRIES LIMITED

Head Office
PO Box 1091, Christchurch
New Zealand
Freephone: 0800 947 5673
E-mail: skope@skope.com
Website: www.skope.com

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1 Specifications

Models

This service manual is applicable to the SKOPE BackBar X chillers detailed below. The model name is used to distinguish between different models.

Model name	Part No.	Type	Doors
BB380X-2SW	B2412	Integral chiller	2
BB580X-3SW	B2413	Integral chiller	3
BB780X-4SW	B2414	Integral chiller	4
BB380Xr-2SW	RB2412	Remote chiller	2
BB580Xr-3SW	RB2413	Remote chiller	3
BB780Xr-4SW	RB2414	Remote chiller	4
BB380XT-2SW	B2512	Integral tropical chiller	2
BB580XT-3SW	B2513	Integral tropical chiller	3
BB780XT-4SW	B2514	Integral tropical chiller	4
BB380XTr-2SW	RB2512	Remote tropical chiller	2
BB580XTr-3SW	RB2513	Remote tropical chiller	3
BB780XTr-4SW	RB2514	Remote tropical chiller	4

BackBar X Integral

	BB380X-2SW		BB580X-3SW		BB780X-4SW	
Dimensions	External	Internal	External	Internal	External	Internal
Height:	920mm*	758mm	920mm*	758mm	920mm*	758mm
Width:	1500mm	1020mm	2060mm	1580mm	2620mm	2140mm
Depth:	590mm	530mm	590mm	530mm	590mm	530mm
Floor area:	0.89m ²		1.22m ²		1.55m ²	
Internal volume:	380 litres		580 litres		780 litres	
Shelves:	2 × adjustable height, white plastic coated wire shelves per door					
Construction						
Insulation:	50mm polyurethane foam		50mm polyurethane foam		50mm polyurethane foam	
Doors:	Self-closing, double glazed, toughened, single Low-E, argon filled, safety glass doors. Optional door locks.					
Door number:	2		3		4	
Operating conditions						
Maximum operating temp:	40°C		40°C		40°C	
Product temp range (product mass average):	+2°C to +4°C		+2°C to +4°C		+2°C to +4°C	
Climate class:	5		5		5	
Electrical						
Current draw:	3.4A		3.6A		4.5A	
Internal lighting:	1 x 17W T8 Frosted LED Tube (Ø26 x 900mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched	
Refrigeration unit						
Description:	Electronically controlled, side mounted, integral refrigeration unit					
Unit model:	UE30ABF-100IC		UE30ABF-100IC		UE40ABF-100IC	
Nominal capacity:	480 Watts		480 Watts		750 Watts	
Refrigerant:	R134a / 425 g		R134a / 425 g		R134a / 455 g	
Electronic controller:	Carel S4 Evo		Carel S4 Evo		Carel S4 Evo	

*Height excludes castors, legs and optional worktop

BackBar X Remote

	BB380Xr-2SW		BB580Xr-3SW		BB780Xr-4SW	
Dimensions	External	Internal	External	Internal	External	Internal
Height:	920mm*	758mm	920mm*	758mm	920mm*	758mm
Width:	1355mm	1020mm	1915mm	1580mm	2475mm	2140mm
Depth:	590mm	530mm	590mm	530mm	590mm	530mm
Floor area:	0.8m ²		1.13m ²		1.46m ²	
Internal volume:	380 litres		580 litres		780 litres	
Shelves:	2 × adjustable height, white plastic coated wire shelves per door					
Construction						
Insulation:	50mm polyurethane foam		50mm polyurethane foam		50mm polyurethane foam	
Doors:	Self-closing, double glazed, toughened, single Low-E, argon filled. safety glass doors. Optional door locks.					
Door number:	2		3		4	
Operating conditions						
Maximum operating temp:	40°C		40°C		40°C	
Product temp range (product mass average):	+2°C to +4°C		+2°C to +4°C		+2°C to +4°C	
Climate class:	5		5		5	
Electrical						
Current draw:	0.7A		0.9A		1.4A	
Internal lighting:	1 x 17W T8 Frosted LED Tube (Ø26 x 900mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched	
Refrigeration unit						
Description:	Electronically controlled, side mounted, remote refrigeration unit					
Unit model:	UE30ABR-100IC		UE30ABR-100IC		UE40ABR-100IC	
Nominal capacity:	480 Watts		580 Watts		750 Watts	
Refrigerant:	Thermostatic expansion valve fitted as standard to suit R134a or R404A					
Electronic controller:	Carel S4 Evo		Carel S4 Evo		Carel S4 Evo	

*Height excludes castors, legs and optional worktop

BackBar X Integral Tropical

	BB380XT-2SW		BB580XT-3SW		BB780XT-4SW	
Dimensions	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>
Height:	920mm*	758mm	920mm*	758mm	920mm*	758mm
Width:	1500mm	1020mm	2060mm	1580mm	2620mm	2140mm
Depth:	590mm	530mm	590mm	530mm	590mm	530mm
Floor area:	0.89m ²		1.22m ²		1.55m ²	
Internal volume:	380 litres		580 litres		780 litres	
Shelves:	2 × adjustable height, white plastic coated wire shelves per door					
Construction						
Insulation:	50mm polyurethane foam		50mm polyurethane foam		50mm polyurethane foam	
Doors:	Self-closing, double glazed, toughened, single Low-E, argon filled, heated, safety glass doors. Optional door locks.					
Door number:	2		3		4	
Operating conditions						
Maximum operating temp:	40°C		40°C		40°C	
Product temp range (product mass average):	+2°C to +4°C		+2°C to +4°C		+2°C to +4°C	
Climate class:	5		5		5	
Electrical						
Current draw:	3.4A		3.6A		4.5A	
Internal lighting:	1 x 17W T8 Frosted LED Tube (Ø26 x 900mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched	
Refrigeration unit						
Description:	Electronically controlled, side mounted, integral refrigeration unit					
Unit model:	UE30ABF-100IC		UE30ABF-100IC		UE40ABF-100IC	
Remote refrigeration duty:	480 Watts		480 Watts		750 Watts	
Refrigerant:	R134a / 425 g		R134a / 425 g		R134a / 455 g	
Electronic controller:	Carel S4 Evo		Carel S4 Evo		Carel S4 Evo	

*Height excludes castors, legs and optional worktop

BackBar X Remote Tropical

	BB380Xr-2SW		BB580Xr-3SW		BB780Xr-4SW	
Dimensions	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>
Height:	920mm*	758mm	920mm*	758mm	920mm*	758mm
Width:	1355mm	1020mm	1915mm	1580mm	2475mm	2140mm
Depth:	590mm	530mm	590mm	530mm	590mm	530mm
Floor area:	0.8m ²		1.13m ²		1.46m ²	
Internal volume:	380 litres		580 litres		780 litres	
Shelves:	2 × adjustable height, white plastic coated wire shelves per door					
Construction						
Insulation:	50mm polyurethane foam		50mm polyurethane foam		50mm polyurethane foam	
Doors:	Self-closing, double glazed, toughened, single Low-E, argon filled, heated, safety glass doors. Optional door locks.					
Door number:	2		3		4	
Operating conditions						
Maximum operating temp:	40°C		40°C		40°C	
Product temp range (product mass average):	+2°C to +4°C		+2°C to +4°C		+2°C to +4°C	
Climate class:	5		5		5	
Electrical						
Current draw:	0.7A		0.9A		1.4A	
Internal lighting:	1 x 17W T8 Frosted LED Tube (Ø26 x 900mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched		1 x 24W T8 Frosted LED Tube (Ø26 x 1500mm, 5500K) - Switched	
Refrigeration unit						
Description:	Electronically controlled, side mounted, remote refrigeration unit					
Unit model:	UE30ABR-100IC		UE30ABF-100IC		UE40ABR-100IC	
Remote refrigeration duty:	480 Watts		480 Watts		750 Watts	
Refrigerant:	Thermostatic expansion valve fitted as standard to suit R134a or R404A					
Electronic controller:	Carel S4 Evo		Carel S4 Evo		Carel S4 Evo	

*Height excludes castors, legs and optional worktop

2 Electronic Controller

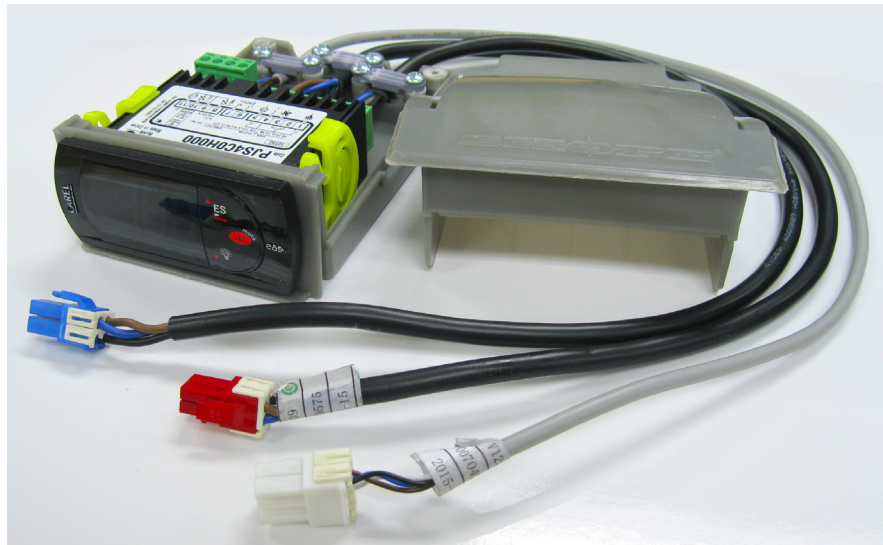
Electronic Controller Operations

Introduction The chiller is fitted with a CAREL S4 Evo electronic controller, which is visible on the unit cover and is housed inside the electronic controller box assembly in front of the refrigeration unit.

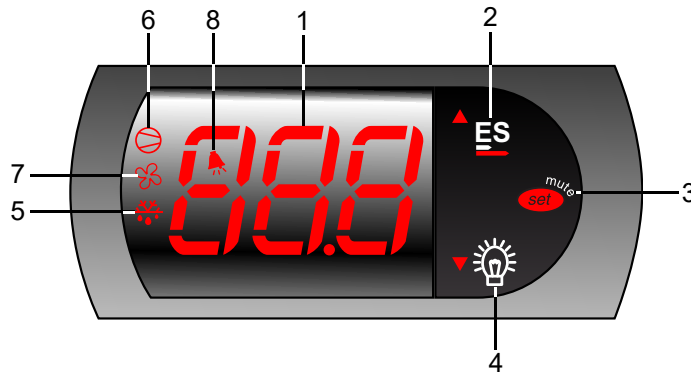
The electronic controller controls and displays the chiller temperature, and signals temperature alarms.









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

Running the Chiller




- Operating Modes** The electronic controller runs the chiller in constant 'Normal' mode. The BackBar X 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 14, or "Messages and Alarms" on page 13 for more information.
- Compressor and Fans** The compressor and condenser fan will start approximately just after the chiller is turned on. The compressor will stop and the condenser fan will run at low speed when the control probe temperature reading reaches 1°C (parameter St). The compressor will start and the condenser fan will run at full speed when the temperature reaches 3°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 6 hours (parameter dI) of real time. During the defrost cycle the compressor stops and the evaporator fan runs continuously. The defrost cycle will terminate when the evaporator probe reaches 4.5°C (parameter dt), or after the defrost cycle has been running for 45 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 11).

Messages

Display	Description
	The chiller is in Normal mode and the electronic controller displays the chiller temperature.
	The chiller internal temperature is above 13°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 parameter St - CCt temperature for more than CCd time. The lights remain on and cannot be switched off (see over page for more information).

Alarms

E0	Control probe error.	
E1	Condenser probe error.	
E2	Evaporator probe 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 35). 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 -1°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 parameter 1°C (parameter St) temperature.

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

The standard temperature settings for this chiller 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

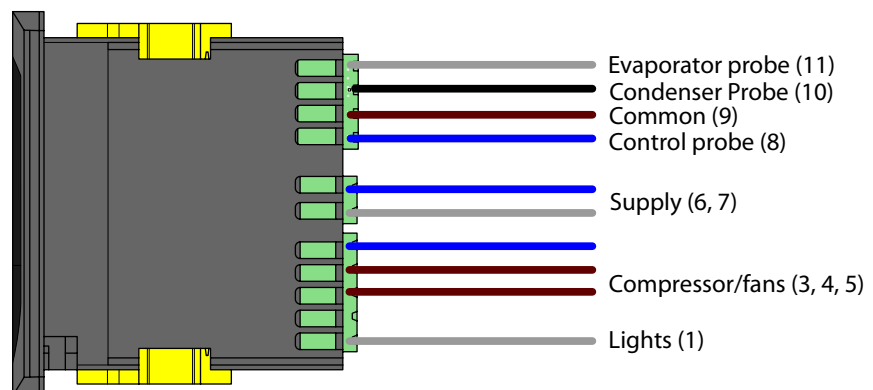
To view the condenser probe temperature reading, press the **ES (up)** and **Set (mute)** buttons simultaneously. The temperature reading will display on the controller faceplate.

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 BackBar X Series use program 100 (integral) and 103 (remote)).



The electronic controller parameters can be modified using the keypad. Frequent parameters can be access 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 1.0°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 100 - BackBar X Integral Series (page 1 of 2)



Electronic Controller Parameter Sheet

Application **BackBar - X (Integral)**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKC0H002K (Rev 1.314)**
 SKOPE Part Number **ELZ11478-100**

100Revision: **1.2**

Full List

SET0

CPS1017-100-SET0

Last revised on
12-Feb-2018

Parameter	Setting	Unit	Access Level	Range		Description
				Min	Max	
Probe Parameters						
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	°C	C	-99.00	99.0	Display Offset (Only if /E > 0)
/9	0	°C	C	-40.0	/A	Minimum Display value (Only if /E > 0)
/E	1		C	0	50	Display Dampening Coefficient
/C1	0.0	°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
Regulation Parameters						
St	1.0	°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	3.5	°C	C	r1	150	Maximum set point value
r3	0		C	0	1	Enable Auto Day/Night Mode Switching
r4	3.0	°C	C	-50.0	50.0	Night Mode set point delta (added to St)
r5	4.0	°C	C	0.0	19.0	Night differential
r6	4	hrs	C	0	90	Night Mode Start Delay (time period with no door openings)
r7	6	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	5	mins	C	0	100	Minimum compressor off time
c3	0	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)
dl	6	hrs	C	0	199	Defrost interval time (Time between defrosts)
d2	0		C	0	1	Run defrost interval timer only when compressor running
dt	4.5	°C	C	-50.0	127	Defrost Termination temperature
dP	45	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	1	mins	C	0	15	Dripping time (compressor and fans stopped after defrost)
d8	60	mins	C	0	199	Bypass high temperature alarm after defrost or door opening
d9	0		C	0	1	Defrost priority over compressor protectors
d/1	-	°C	F	-	-	Probe reading on 2nd Input (read only)

Parameter list - Program 100 - BackBar X Integral Series (page 2 of 2)



Electronic Controller Parameter Sheet

Application **BackBar - X (Integral)**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKCOH002K (Rev 1.314)**
 SKOPE Part Number **ELZ11478-100**

100

Revision: 1.2

Full List

SET0

CPS1017-100-SET0

Last revised on

12-Feb-2018

Parameter	Setting	Unit	Access Level	Range		Description
				Min	Max	
d/2	-	°C	F	-	-	Probe reading on 3rd Input (read only)
d10	-10.0	°C	C	-50.0	127	On demand defrost Start Temperature
d11	0	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	0	mins	C	0	200	No Downward Tendency Defrost - Start Delay (0 = function disabled)
d20	3	mins	C	1	< d19	No Downward Tendency Evaluation (Sample Time)
d21	1		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	-2.0	°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	180	mins	C	0	199	Temperature alarm delay (0 = AL and AH alarms disabled)
A10	5	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	66.0	°C	C	-50.0	250	High condenser temperature alarm set point
AE	11.0	°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	10	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	100		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.

Parameter list - Program 103 - BackBar X Remote Series (page 1 of 2)



Electronic Controller Parameter Sheet

Application **BackBar - X (Remote)**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKCOH002K (Rev 1.314)**
 SKOPE Part Number **ELZ11478-103**

103

Revision: 1.1

Full List

SET0

CPS1017-103-SET0

Last revised on

12-Feb-2018

Parameter	Setting	Unit	Access Level	Range		Description
				Min	Max	
Probe Parameters						
P5	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	°C	C	-99.00	99.0	Display Offset (Only if /E > 0)
/9	0	°C	C	-40.0	/A	Minimum Display value (Only if /E > 0)
/E	1		C	0	50	Display Dampening Coefficient
/C1	0.0	°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
Regulation Parameters						
St	1.0	°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	3.5	°C	C	r1	150	Maximum set point value
r3	0		C	0	1	Enable Auto Day/Night Mode Switching
r4	3.0	°C	C	-50.0	50.0	Night Mode set point delta (added to St)
r5	4.0	°C	C	0.0	19.0	Night differential
r6	4	hrs	C	0	90	Night Mode Start Delay (time period with no door openings)
r7	6	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	5	mins	C	0	100	Minimum compressor off time
c3	0	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)
dl	6	hrs	C	0	199	Defrost interval time (Time between defrosts)
d2	0		C	0	1	Run defrost interval timer only when compressor running
dt	4.5	°C	C	-50.0	127	Defrost Termination temperature
dP	45	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	1	mins	C	0	15	Dripping time (compressor and fans stopped after defrost)
d8	60	mins	C	0	199	Bypass high temperature alarm after defrost or door opening
d9	0		C	0	1	Defrost priority over compressor protectors
d/1	-	°C	F	-	-	Probe reading on 2nd Input (read only)

Parameter list - Program 103 - BackBar X Remote Series (page 2 of 2)



Electronic Controller Parameter Sheet

Application **BackBar - X (Remote)**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKCOH002K (Rev 1.314)**
 SKOPE Part Number **ELZ11478-103**

103

Revision: 1.1

Full List

SET0

CPS1017-103-SET0

Last revised on
12-Feb-2018

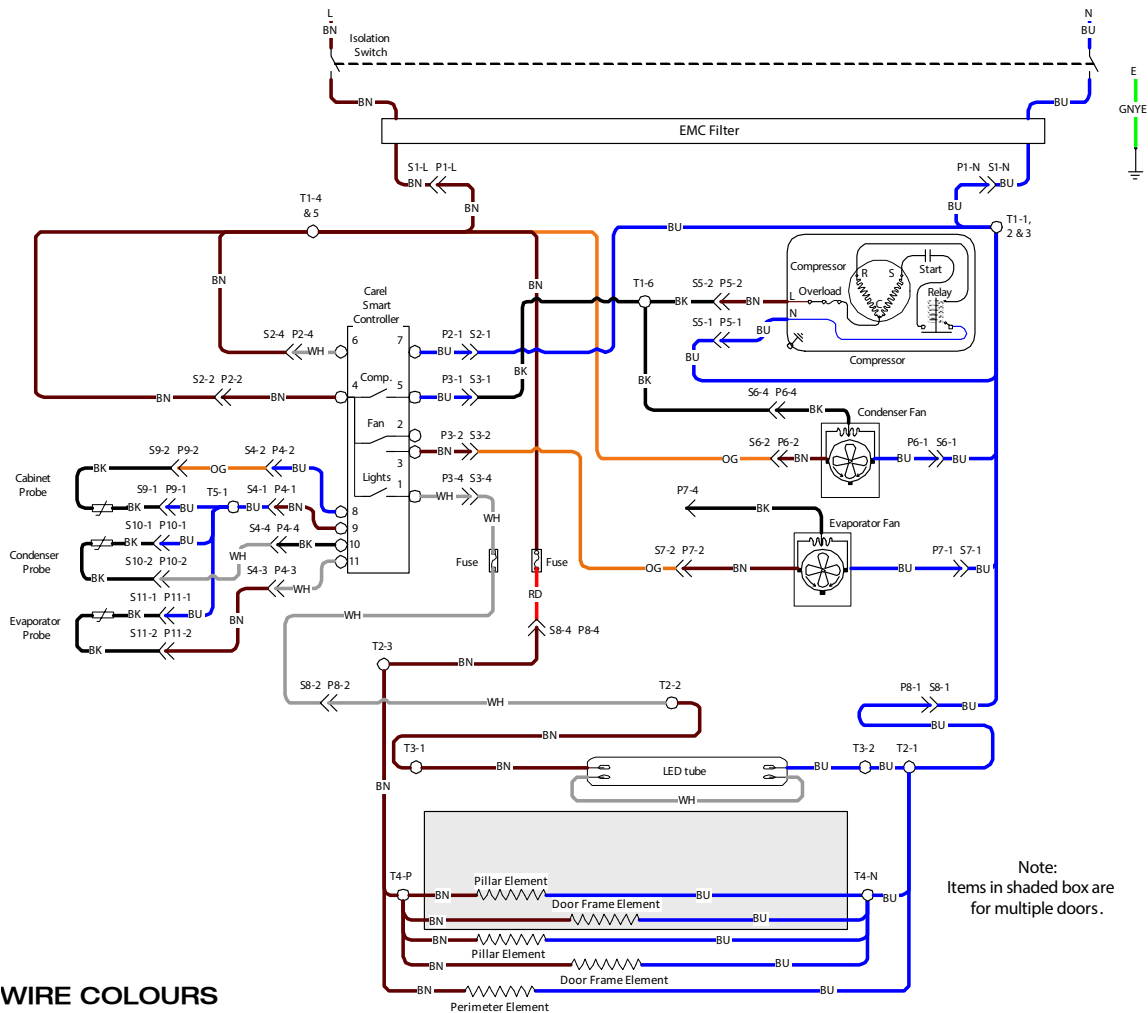
Parameter	Setting	Unit	Access Level	Range Min	Range Max	Description
d/2	-	°C	F	-	-	Probe reading on 3rd Input (read only)
d10	-10.0	°C	C	-50.0	127	On demand defrost Start Temperature
d11	0	mins	C	0	60	On demand defrost: start delay
d12	127	°C	C	-50.0	127	Enabling defrost condition: Control probe threshold
d13	1		C	0	1	Evaporator Fans During Defrost (0 = Off 1 = ON)
d19	0	mins	C	0	200	No Downward Tendency Defrost - Start Delay (0 = function disabled)
d20	3	mins	C	1	< d19	No Downward Tendency Evaluation (Sample Time)
d21	1		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	-2.0	°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	180	mins	C	0	199	Temperature alarm delay (0 = AL and AH alarms disabled)
A10	5	mins	C	0	10	Door Open Alarm delay (0 = door open alarm disabled)
A11	0		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	66.0	°C	C	-50.0	250	High condenser temperature alarm set point
AE	11.0	°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	10	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	103		F	0	199	ID code (read-only)

Warning

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3 Wiring

Model: BackBar X Integral Series



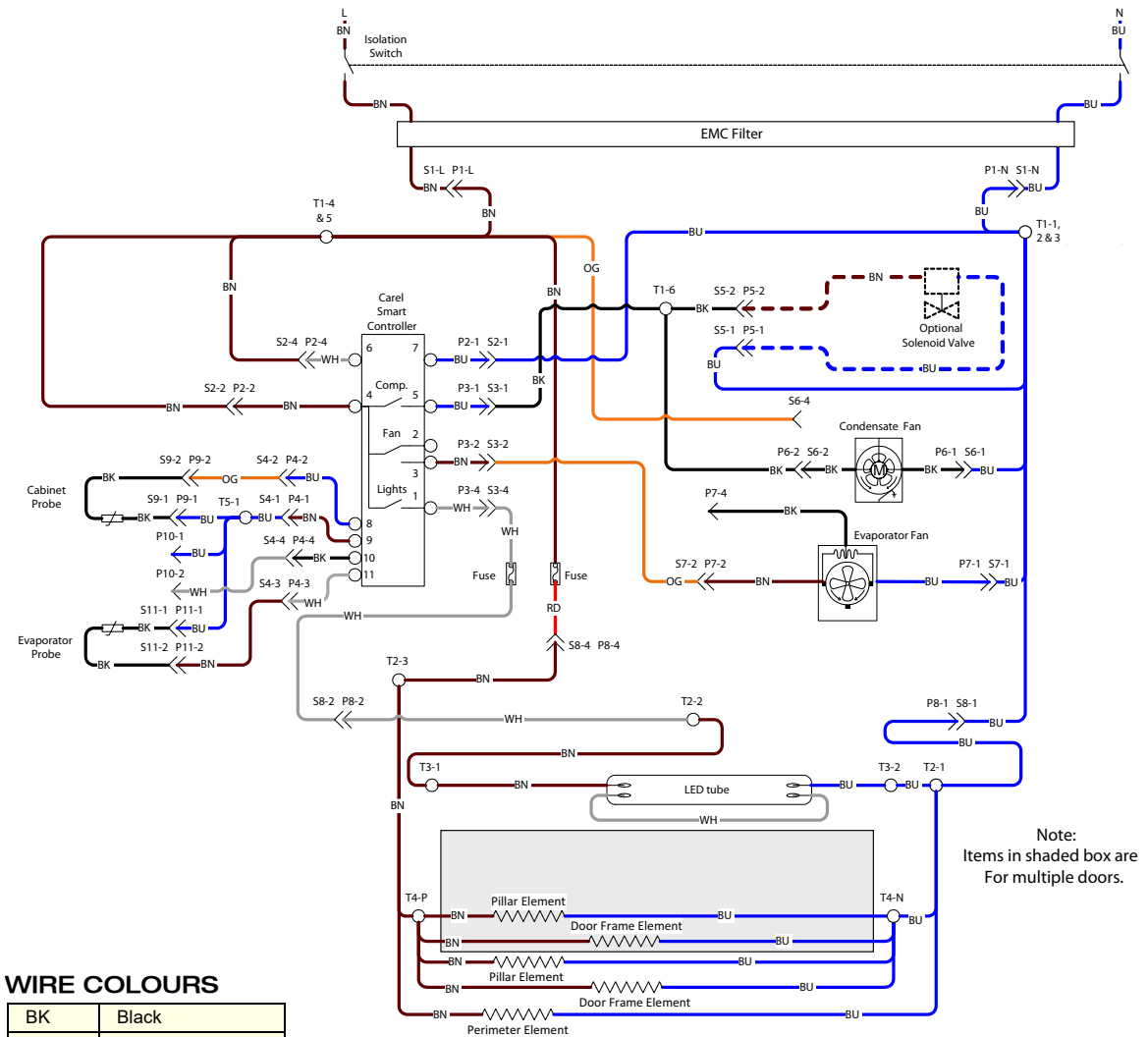
WIRE COLOURS

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

S1/P1	IEC cabinet socket/plug	S9/P9	Cabinet sensor socket/plug (blue 2-way)
S2/P2	Unit junction box to controller power socket/plug (red 4-way)	S10/P10	Condenser sensor socket/plug (red 2-way)
S3/P3	Unit junction box to controller power socket/plug (blue 4-way)	S11/P11	Evaporator sensor socket/plug (black 2-way)
S4/P4	Unit junction box to controller signal socket/plug (6-way)	T1	Unit terminals
S5/P5	Compressor unit socket/plug (blue 4-way)	T2	Cabinet terminals
S6/P6	Condenser motor unit socket/plug (red 4-way)	T3	LED light terminal
S7/P7	Evaporator motor unit socket/plug (white 4-way)	T4	Pillar/door terminals
S8/P8	Light unit socket/plug (yellow 4-way)	T5	Probe common terminal
<<	Plug and Socket	O	Terminal on Terminal Block

Model: BackBar X Remote Series



WIRE COLOURS

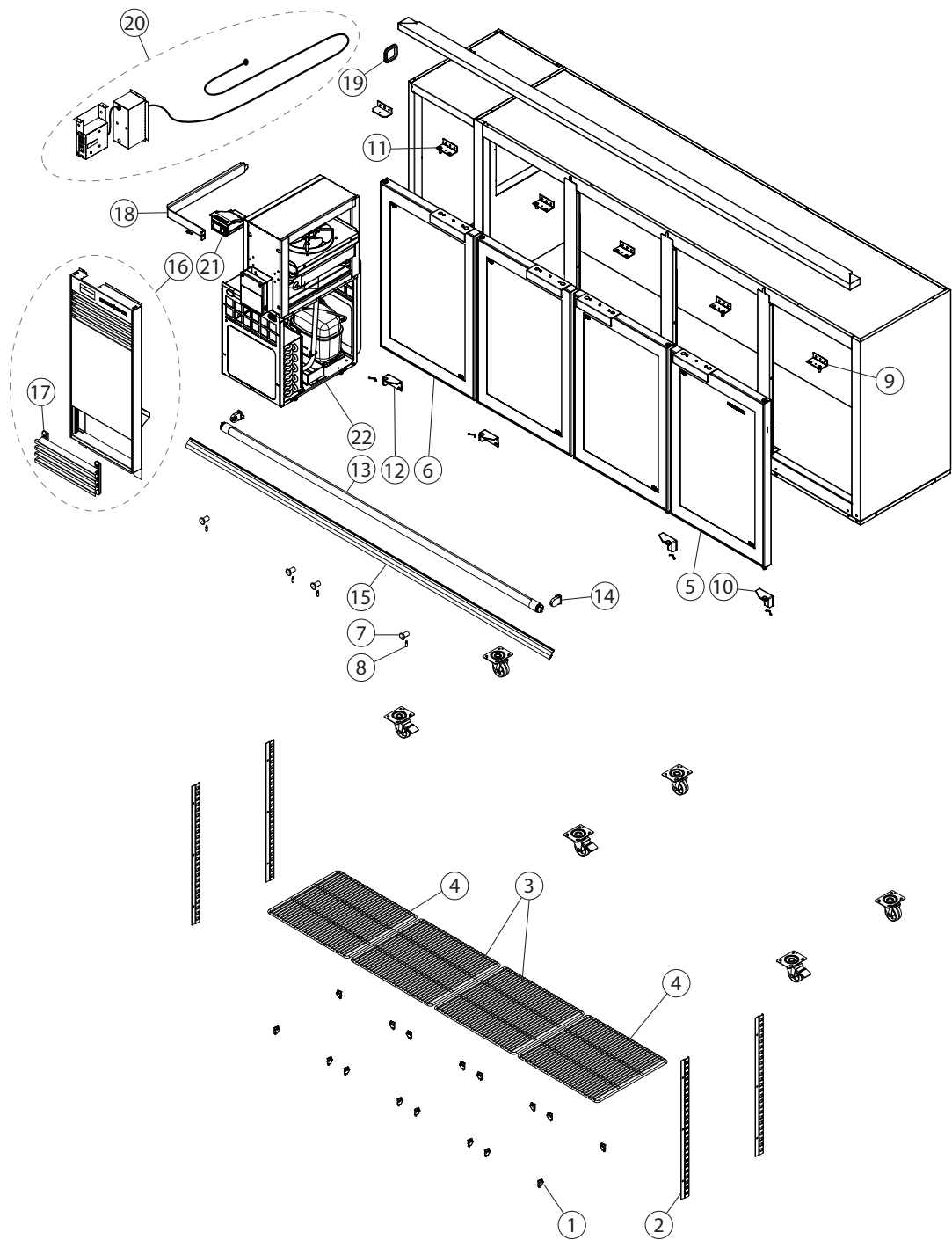
BK	Black
BN	Brown
RD	Red
OG	Orange
GN	Green
BU	Blue
GY	Grey
WH	White
GNYE	Green-Yellow
Based upon IEC 757 Standard	

LEGEND

S1/P1	IEC cabinet socket/plug	S9/P9	Cabinet sensor socket/plug (blue 2-way)
S2/P2	Unit junction box to controller power socket/plug (red 4-way)	S10/P10	Condenser sensor socket/plug (red 2-way)
S3/P3	Unit junction box to controller power socket/plug (blue 4-way)	S11/P11	Evaporator sensor socket/plug (black 2-way)
S4/P4	Unit junction box to controller signal socket/plug (6-way)	T1	Unit terminals
S5/P5	Compressor unit socket/plug (blue 4-way)	T2	Cabinet terminals
S6/P6	Condensate motor unit socket/plug (red 4-way)	T3	LED light terminal
S7/P7	Evaporator motor unit socket/plug (white 4-way)	T4	Pillar/door terminals
S8/P8	Light unit socket/plug (yellow 4-way)	T5	Probe common terminal
<<	Plug and Socket	O	Terminal on Terminal Block

4 Spare Parts

Cabinet Assembly - BB-X Integral Series

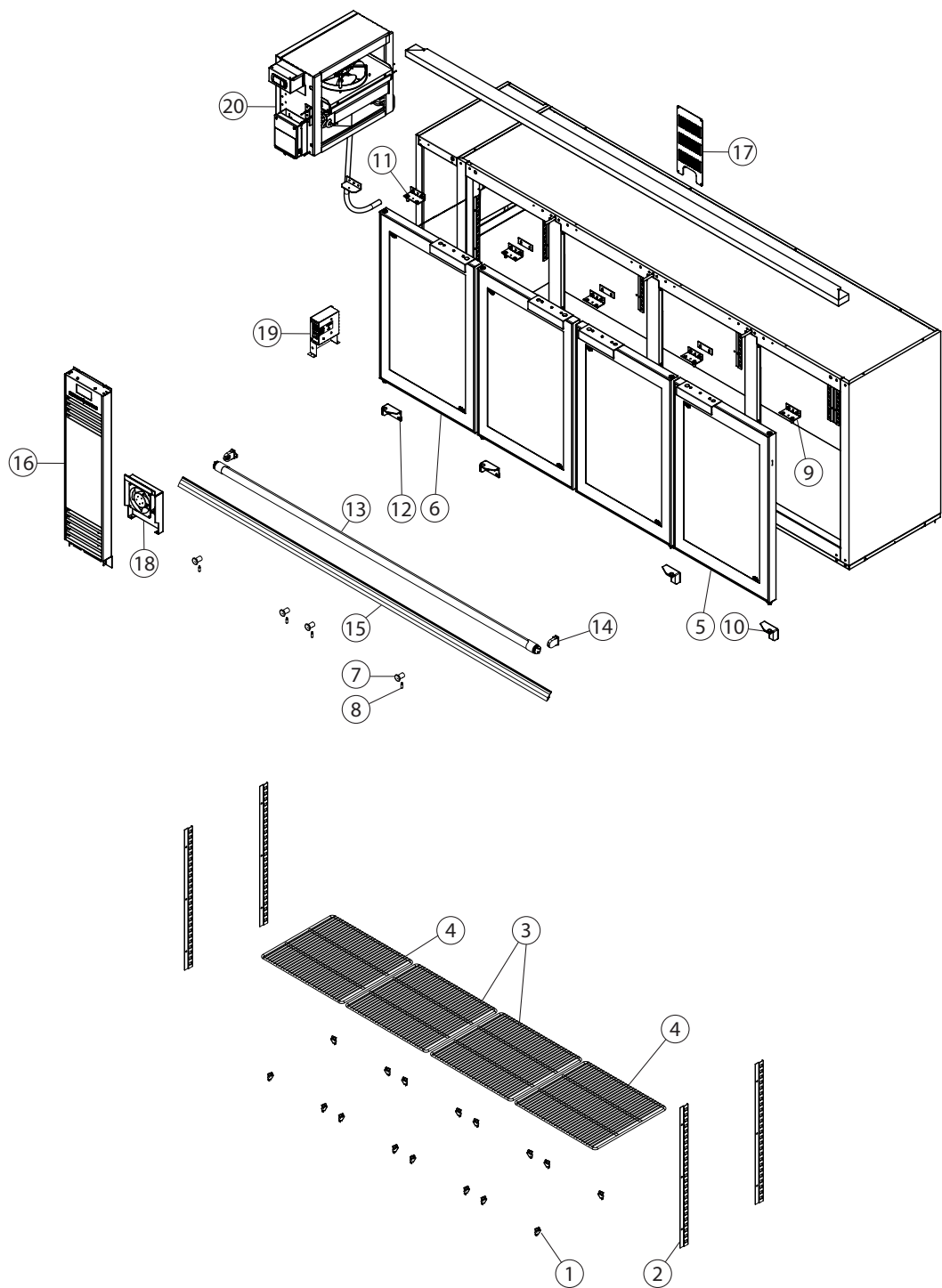


BB780X-4SW left hand cabinet/unit pictured

Parts i Cabinet Assembly - BB-X Integral Series

No.	Description	SKOPE Part No.		
		BB380X-2SW	BB580X-3SW	BB780X-4SW
1	Shelf clip	V0973	V0973	V0973
2	Shelf support strip	B9702/151AB	B9702/151AB	B9702/151AB
3	Wire shelf - middle	n.a.	B2003/160	B2003/160
4	Wire shelf - outside	B2002/160	B2002/160	B2002/160
5	Door assembly - RH standard	GLD11431R	GLD11431R	GLD11431R
	Door assembly - RH tropical	GLD11432R	GLD11432R	GLD11432R
6	Door assembly - LH standard	GLD11431L	GLD11431L	GLD11431L
	Door assembly - LH tropical	GLD11432L	GLD11432L	GLD11432L
7	Door lock (excluding pin)	SXX6816	SXX6816	SXX6816
8	Door lock pin	TUR11447	TUR11447	TUR11447
9	Top hinge - RH	B2412/388	B2412/388	B2412/388
10	Bottom hinge - RH	B2412/393	B2412/393	B2412/393
11	Top hinge - LH	B2412/389	B2412/389	B2412/389
12	Bottom hinge - LH	B2412/394	B2412/394	B2412/394
13	LED light tube	ELL10742	ELL10743	ELL10743
14	Light tube holder	ELZ6270	ELZ6270	ELZ6270
15	Light tube cover/diffuser	B2002/E71	B2003/E71	B2003/E71
16	Refrigeration unit cover (including louvre) - RH	B2412/130R	B2412/130R	B2412/130R
	Refrigeration unit cover (including louvre) - LH	B2412/130L	B2412/130L	B2412/130L
17	Refrigeration unit cover louvre	B2412/133A	B2412/133A	B2412/133A
18	Refrigeration unit fixing bracket	B2002/989	B2002/989	B2002/989
19	Mains flex enclosure grommet	RUM1273	RUM1273	RUM1273
20	Mains isolation box and flex assembly - RH	B2412/E80R	B2412/E80R	B2412/E80R
	Mains isolation box and flex assembly - LH	B2412/E80L	B2412/E80L	B2412/E80L
21	Electronic controller assembly	UE40ABF/K01-100	UE40ABF/K01-100	UE40ABF/K01-100
22	Refrigeration unit assembly - RH	UE30ABF-100ICR	UE30ABF-100ICR	UE40ABF-100ICR
	Refrigeration unit assembly - RH (tropical cabinet)	UE30ABF-100ICR	UE40ABF-100ICR	UE40ABF-100ICR
	Refrigeration unit assembly - LH	UE30ABF-100IC	UE30ABF-100IC	UE40ABF-100IC
	Refrigeration unit assembly - LH (tropical cabinet)	UE30ABF-100IC	UE40ABF-100IC	UE40ABF-100IC
-	Adjustable height leg (not pictured)	SXX5893	SXX5893	SXX5893
	Rear swivel castor (not pictured)	SXX6181	SXX6181	SXX6181
	Front swivel castor - lockable (not pictured)	SXX6182	SXX6182	SXX6182

Cabinet Assembly - BB-X Remote Series

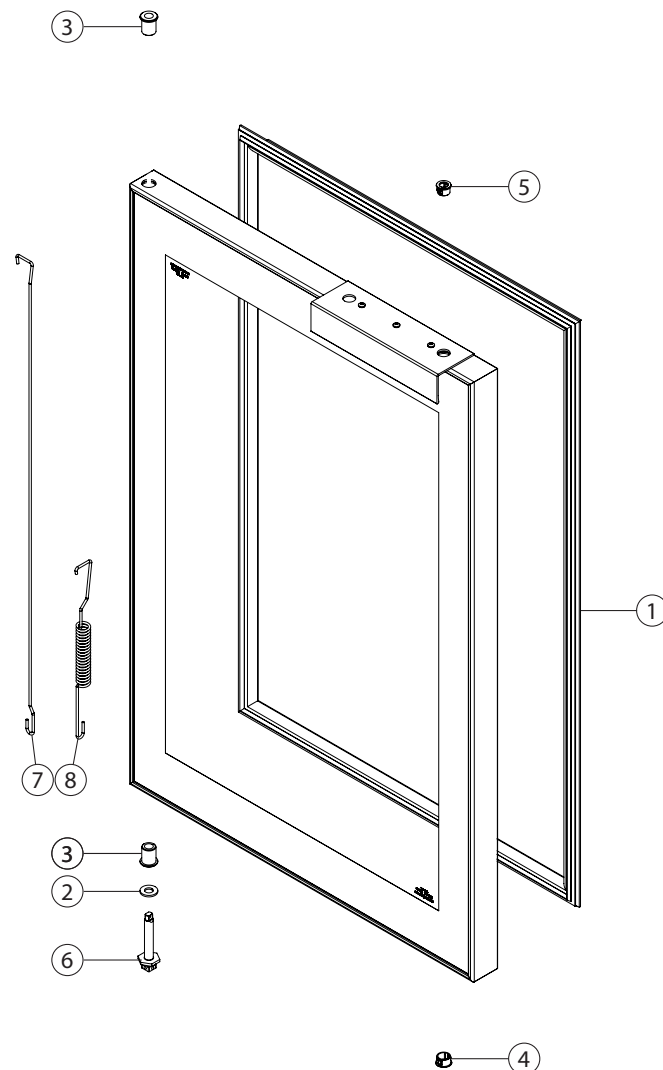


BB780Xr-4SW left hand cabinet/unit pictured

Parts i Cabinet Assembly - BB-X Remote Series

No.	Description	SKOPE Part No.		
		BB380Xr-2SW	BB580Xr-3SW	BB780Xr-4SW
1	Shelf clip	V0973	V0973	V0973
2	Shelf support strip	B9702/151AB	B9702/151AB	B9702/151AB
3	Wire shelf - middle	n.a.	B2003/160	B2003/160
4	Wire shelf - outside	B2002/160	B2002/160	B2002/160
5	Door assembly - RH standard	GLD11431R	GLD11431R	GLD11431R
	Door assembly - RH tropical	GLD11432R	GLD11432R	GLD11432R
6	Door assembly - LH standard	GLD11431L	GLD11431L	GLD11431L
	Door assembly - LH tropical	GLD11432L	GLD11432L	GLD11432L
7	Door lock (excluding pin)	SXX6816	SXX6816	SXX6816
8	Door lock pin	TUR11447	TUR11447	TUR11447
9	Top hinge - RH	B2412/388	B2412/388	B2412/388
10	Bottom hinge - RH	B2412/393	B2412/393	B2412/393
11	Top hinge - LH	B2412/389	B2412/389	B2412/389
12	Bottom hinge - LH	B2412/394	B2412/394	B2412/394
13	LED light tube	ELL10742	ELL10743	ELL10743
14	Light tube holder	ELZ6270	ELZ6270	ELZ6270
15	Light tube cover/diffuser	B2002/E71	B2003/E71	B2003/E71
16	Refrigeration unit front cover - RH & LH	RB2412/130	RB2412/130	RB2412/130
17	Refrigeration unit back cover	RB2002/F19	RB2002/F19	RB2002/F19
18	Ventilation fan assembly	RB2412/G51AL	RB2412/G51AL	RB2412/G51AL
19	Mains isolation box and flex assembly - RH & LH	RB2412/E80	RB2412/E80	RB2412/E80
20	Refrigeration unit assembly - RH	UE30ABR-100IDR	UE30ABR-100IDR	UE40ABR-100IDR
	Refrigeration unit assembly - RH (tropical cabinet)	UE30ABR-100IDR	UE40ABR-100IDR	UE40ABR-100IDR
	Refrigeration unit assembly - LH	UE30ABR-100ID	UE30ABR-100ID	UE40ABR-100ID
	Refrigeration unit assembly - LH (tropical cabinet)	UE30ABR-100ID	UE40ABR-100ID	UE40ABR-100ID
-	Adjustable height leg (not pictured)	SXX5893	SXX5893	SXX5893
	Rear swivel castor (not pictured)	SXX6181	SXX6181	SXX6181
	Front swivel castor - lockable (not pictured)	SXX6182	SXX6182	SXX6182

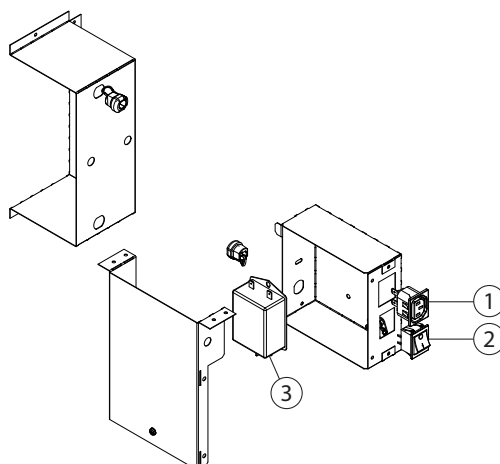
Door Assembly



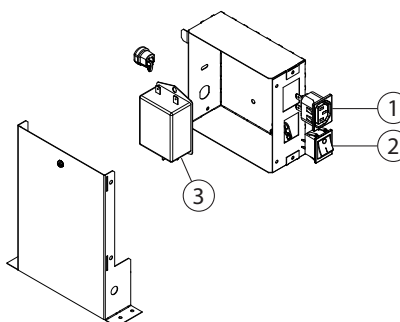
Parts i Door Assembly

No.	Description	SKOPE Part No.
0	Door assembly - RH standard	GLD11431R
	Door assembly - RH tropical	GLD11432R
	Door assembly - LH standard	GLD11431L
	Door assembly - LH tropical	GLD11432L
1	Gasket	GKT11546
2	Bush spacer	PLM11298
3	Bush	PLM5075
4	Plug Ø16mm	PLM11448
5	Plug Ø14mm - door with no door lock	PLM11449
	Plug Ø14mm - door with door lock	PLM11446
6	Capstan	TUR11299
7	Torsion bar - standard door	REF11473
8	Torsion bar - tropical door	REF11457

Mains Isolation Box Assembly



Mains Isolation Box Assembly - BB-X Integral



Mains Isolation Box Assembly - BB-Xr Remote

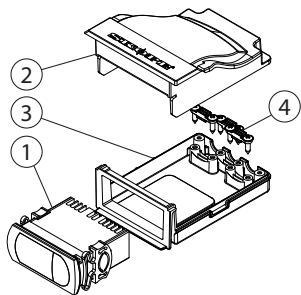
Parts ì Mains Isolation Box Assembly - BB-X Integral

No.	Description	SKOPE Part No.
0	Mains isolation box and flex assembly - RH (including mains flexible power cord)	B2412/E80R
	Mains isolation box and flex assembly - LH (including mains flexible power cord)	B2412/E80L
1	IEC socket outlet	ELK8880
2	2 Pole rocker switch	ELS0495
3	EMI filter	ELZ10136
-	Mains flexible power cord (not pictured)	C9011/E53

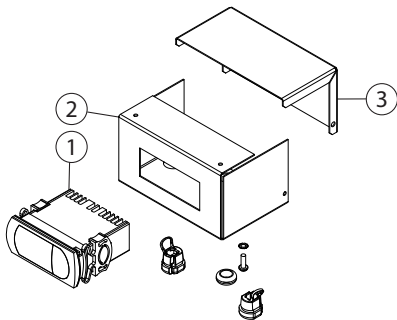
Parts ì Mains Isolation Box Assembly - BB-Xr Remote

No.	Description	SKOPE Part No.
0	Mains isolation box and flex assembly - RH (including mains flexible power cord)	RB2412/E80R
1	IEC socket outlet	ELK8880
2	2 Pole rocker switch	ELS0495
3	EMI filter	ELZ10136
-	Mains flexible power cord (not pictured)	C9011/E53

Electronic Controller Assembly



Electronic Controller Assembly - BB-X Integral



Electronic Controller Assembly - BB-Xr Remote

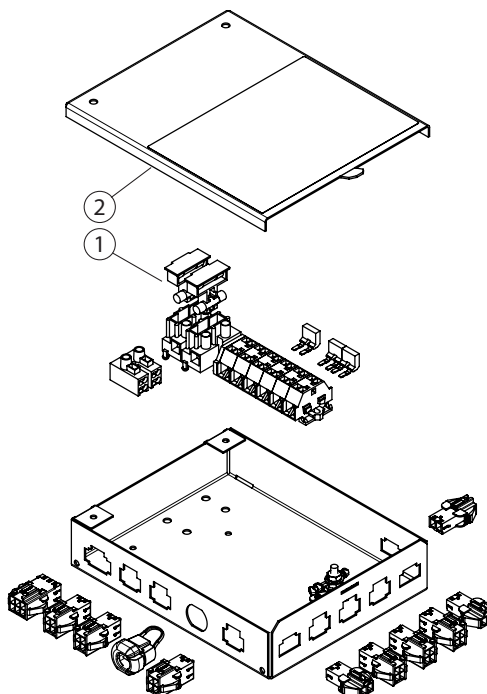
Parts ì Electronic Controller Assembly - BB-X Integral

No.	Description	SKOPE Part No.
0	Electronic controller assembly	UE40ABF/K01-100
1	CAREL S4 Evo electronic controller	ELZ11478-100
2	Electronic controller housing lid	HB0070206126
3	Electronic controller housing base	HB0070206125
4	Cable clamp	HB0070206127

Parts ì Electronic Controller Assembly - BB-Xr Remote

No.	Description	SKOPE Part No.
0	Electronic controller assembly	UE40ABR/K01-103
1	CAREL S4 Evo electronic controller	ELZ11478-103
2	Electronic controller housing lid	UE40ABR/K03-49
3	Electronic controller housing base	UE40ABR/K02-49

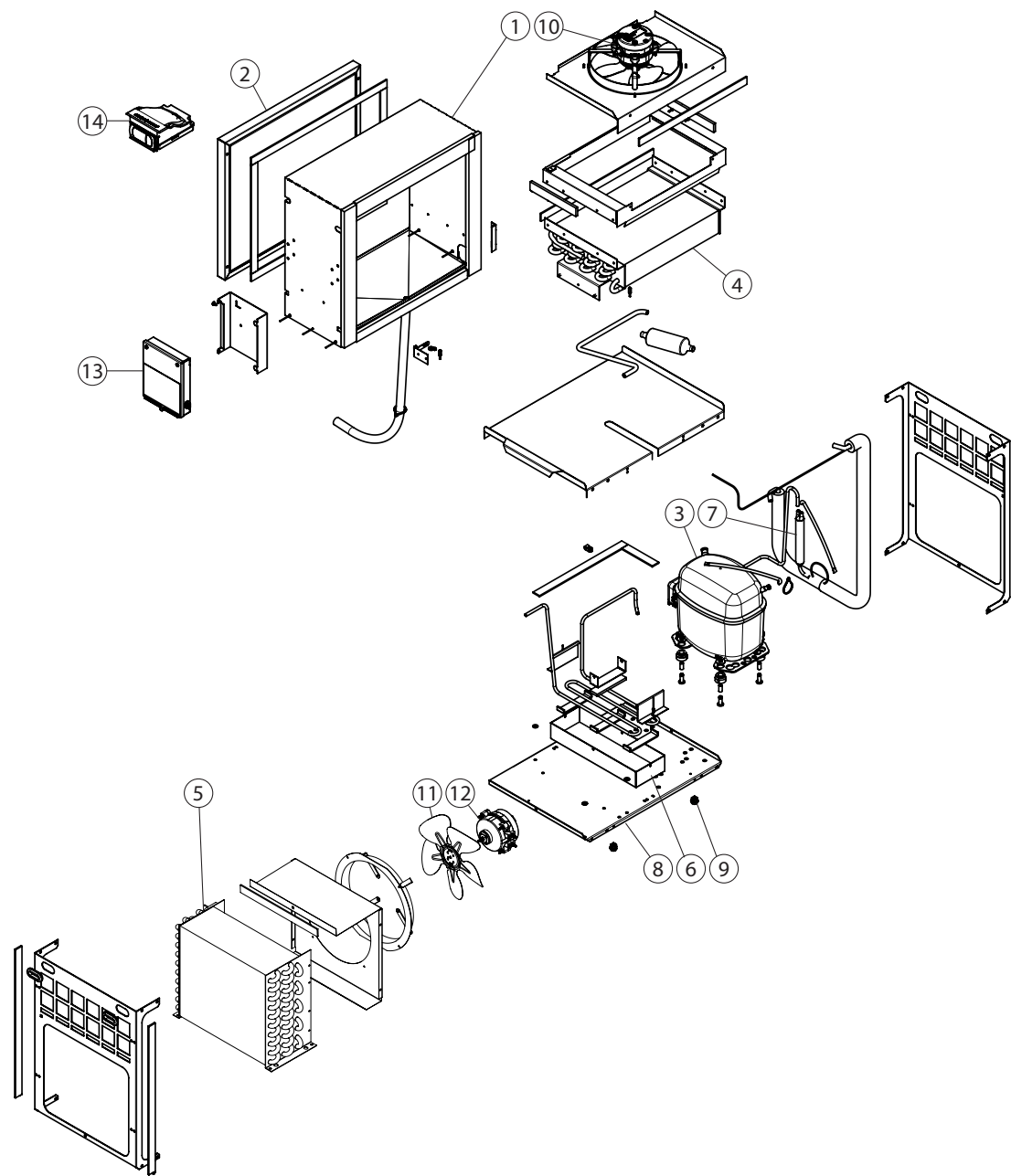
Unit Electrics Box Assembly



Parts ì Unit Electrics Box Assembly

No.	Description	SKOPE Part No.
0	Unit electrics box assembly (RH unit)	UE40ABF/R86R
	Unit electrics box assembly (LH unit)	UE40ABF/R86L
1	Fuse (5A)	ELZ9640
	Fuse holder	ELZ9655
2	Unit electrics box lid	UE40ABF/R88
-	Unit IEC supply flexible cord (not pictured)	UE40ABF/E53
-	Condenser temperature probe (including red plug) (not pictured)	UE40ABF/E49C
-	Control temperature probe (including blue plug) (not pictured)	UE40ABF/E49A
-	Evaporator temperature probe (including black plug) (not pictured)	UE40ABF/E49B

Refrigeration Unit Assembly - BB-X Integral

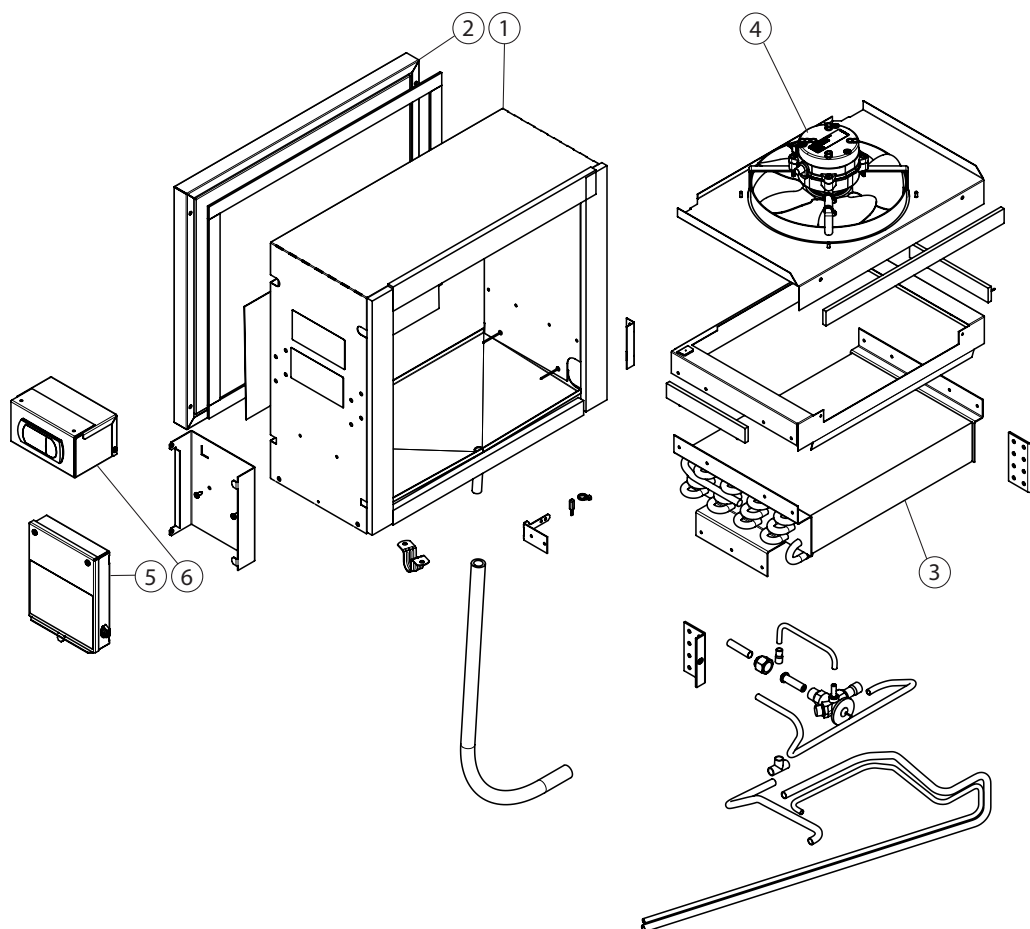


UE30ABF LH unit pictured

Parts ì Refrigeration Unit Assembly - BB-X Integral

No.	Description	SKOPE Part No.	
0	Refrigeration unit assembly - RH	UE30ABF-100ICR (used in BB380X/580X and BB380XT)	UE40ABF-100ICR (used in BB780X and BB580XT/780XT)
	Refrigeration unit assembly - LH	UE30ABF-100IC (used in BB380X/580X and BB380XT)	UE40ABF-100IC (used in BB780X and BB580XT/780XT)
1	Evaporator box - foamed	UE40ABF/970	UE40ABF/970
2	Evaporator lid - foamed	B2002/980	B2002/980
3	Compressor	CPR6108	CPR7344P
	Compressor relay	ELR2729NC	ELR2729NC
	Start capacitor	ELC2369NC	ELC2369NC
4	Evaporator coil	CLS9902R	CLS9902R
5	Condenser coil	CLS9317	CLS9317
6	Condensate tray	UE11AA/992	UE11AA/992
7	Drier	DRY8783	DRY8783
8	Unit base	UE40AA/994	UE40AA/994
9	Unit base foot	PLM6108	PLM6108
10	Evaporator fan blade	FAN3809	FAN3809
	Evaporator fan motor	UE40ABF/404P1	UE40ABF/404P1
11	Condenser fan blade	FAN3809	FAN3809
12	Condenser fan motor	UE40ABF/404CP1	UE40ABF/404CP1
13	Unit electrics box assembly - RH unit	UE40ABF/R86R	UE40ABF/R86R
	Unit electrics box assembly - LH unit	UE40ABF/R86	UE40ABF/R86
14	Electronic controller assembly	UE40ABF/K01-100	UE40ABF/K01-100

Refrigeration Unit Assembly - BB-Xr Remote



UE30ABR LH unit pictured

Parts i Refrigeration Unit Assembly - BB-Xr Remote

No.	Description	SKOPE Part No.	
0	Refrigeration unit assembly - RH	UE30ABR-103IDR (used in BB380Xr/580Xr and BB380XTr)	UE40ABR-103IDR (used in BB780Xr and BB580XTr/780XTr)
	Refrigeration unit assembly - LH	UE30ABR-103ID (used in BB380Xr/580Xr and BB380XTr)	UE40ABR-103ID (used in BB780Xr and BB580XTr/780XTr)
1	Evaporator box - foamed	UE40ABF/970	UE40ABF/970
2	Evaporator lid - foamed	B2002/980	B2002/980
3	Evaporator coil	CLS9902R	CLS9902R
4	Evaporator fan blade	FAN3809	FAN3809
	Evaporator fan motor	UE40ABF/404P1	UE40ABF/404P1
5	Unit electrics box assembly - RH unit	UE40ABF/R86R	UE40ABF/R86R
	Unit electrics box assembly - LH unit	UE40ABF/R86	UE40ABF/R86
6	Electronic controller assembly	UE40ABR/K01-103	UE40ABR/K01-103

5 Installation

Locating the Cabinet

Climate Class The chiller is designed to operate within a climate class 5 environment (40°C @ 40% RH). We recommend that you put the chiller in the coolest place possible because it will use less power and last longer.

Location When positioning the cabinet, avoid direct sunlight and warm draughts etc. The cabinet must NOT be situated where it is affected by warm or hot air from adjacent equipment, as this will compromise the airflow and performance of the cabinet.

The cabinet must be positioned on a level surface for the doors to shut and seal correctly, and to prevent the condensate tray from overflowing. Adequate allowance should be made for door opening.

Always ensure that the top of the cabinet is shielded from impact and moisture, with either a SKOPE provided bench top, or with a custom or existing bench top.

When installing the cabinet

- Avoid direct sunlight and warm draughts etc.
- Allow adequate space for the doors to open fully.
- Ensure the cabinet is positioned on a level surface so the doors shut and seal correctly and to prevent the condensate tray from overflowing.

Ventilation The chiller pulls air in and blows air out of from the front panel. It is essential that adequate ventilation be provided around the front of the refrigeration unit. Normal operating conditions should not exceed the rated climate class (see climate class above).

It is critical that the hot refrigeration exhaust air is not restricted and that it can easily flow out and away from the front of the cabinet. Never store cardboard cartons or other items in front of the refrigeration unit. The ventilation slots on the unit front cover must be kept clear at all times.

Power Cord The chiller is supplied with a flexible power cord and plug, which is located at the rear of the cabinet.

Before final positioning of the cabinet, pull the power cord out from the cabinet and connect to the power supply.

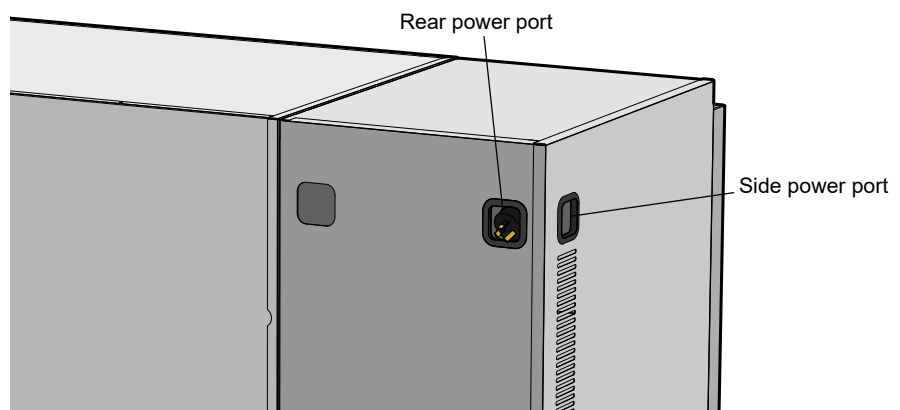
WARNING:

Do **NOT** overload the power supply. See the rating label inside the cabinet for power supply and current draw.

If the chiller does not power up when the cabinet is connected to the power supply, check that the isolation switch is switched on (see page 40).

Integral cabinets

The power cord can be retrieved from either the rear or side power port. Any surplus cord length can be left inside the compartment.



Remote cabinets

The power cord is located behind the unit pipework cover on the back of the cabinet, and should be connected or hardwired to the power supply by a qualified person during installation of the remote refrigeration system.

Positioning the Cabinet

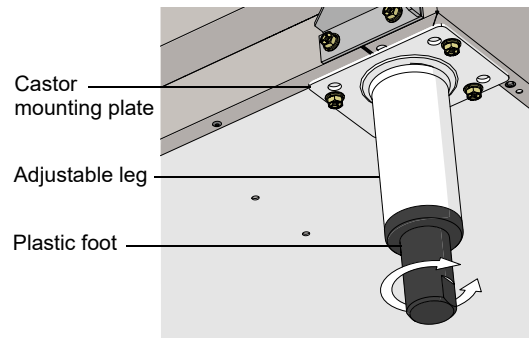
Legs and Castors

The chiller is packed with a set of adjustable height legs and a set of adjustable height castors. The legs can adjust the cabinet height up to 30mm, and the castors can adjust the cabinet height up to 15mm. Depending on specific height and manoeuvrability requirements, either of these sets can be screwed into the mounting plates on the bottom of the cabinet.

Note: If fitting the castors, the lockable castors should be fitted to the front of the cabinet, and the non-locking castors fitted to the rear.

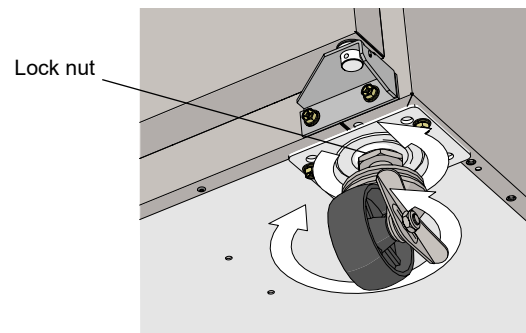
To adjust leg height

1. Turn the black plastic foot at the bottom of the leg counter-clockwise to raise the height or clockwise to lower.



To adjust castor height

1. Rotate the lock nut anti-clockwise to free-up the castor for height adjustment.
2. Turn the castor counter-clockwise to raise the height or clockwise to lower (see image below). Re-tighten each lock nut after final adjustment has been made.



3. After final adjustment has been made, rotate the lock nut clockwise to lock the castor height.

Shelves

The chiller is fitted with wire shelves, which may be positioned at different heights to suit various products.

Fitting the Shelves Remove all packaging material from the shelves. Clip the shelf support brackets into the shelf support strips, at the desired heights, and fit the shelves. The shelves may be positioned at different heights to suit various products. Always ensure that the shelf clips are securely engaged in each of the shelf support strips. The shelf support strips are marked '+' for easy location of shelf clips and can be lifted up and removed for cleaning purposes.

Remote Cabinet Installation

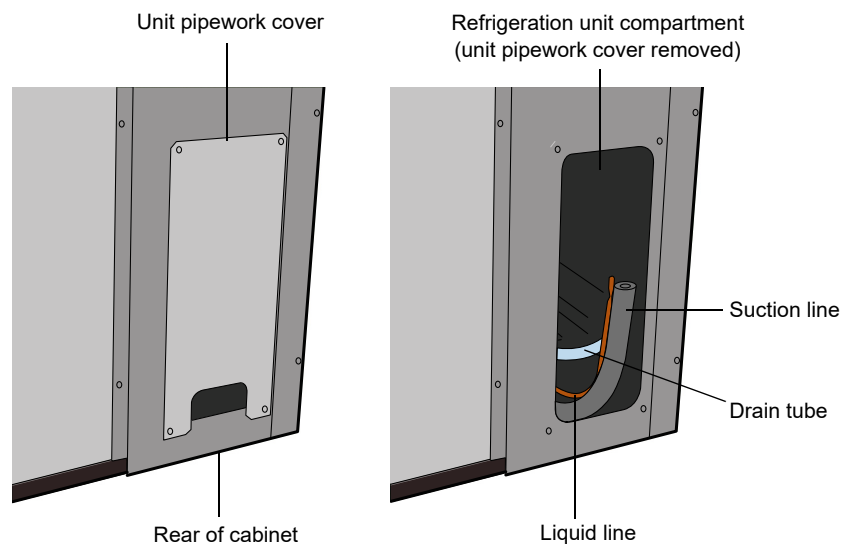
Only applicable for cabinets with remote refrigeration systems.

SKOPE horizontal remote cabinets are supplied with a separate instruction sheet: *Guidelines for SKOPE remote Refrigeration* (PRN2362). Refer to this sheet for SKOPE remote refrigeration installation guidelines and specifications.

Power Supply The power cord and isolation switch is located in the evaporator unit compartment. The power supply should be connected or hardwired by a qualified person during installation of the remote refrigeration system. If the chiller does not power up when the cabinet is connected to the power supply, check that the isolation switch in the evaporator unit compartment is switched on (see page 40).

Electronic Controller When the cabinet is connected to the power supply, the electronic controller will display the current cabinet temperature. On the controller display, the \ominus symbol will indicate the compressor output signal has been initiated and the \otimes symbol will indicate the evaporator fan is on.

Pipe Locations Refer to the images below for component locations and unit access points.



6 Replacement Procedures

Isolating Electrics

To isolate the chiller from the power supply, either unplug the cabinet from the wall, or use the isolation switch to turn off electrics to the cabinet and refrigeration unit. The isolation switch is located behind the unit cover, inside the refrigeration unit compartment.

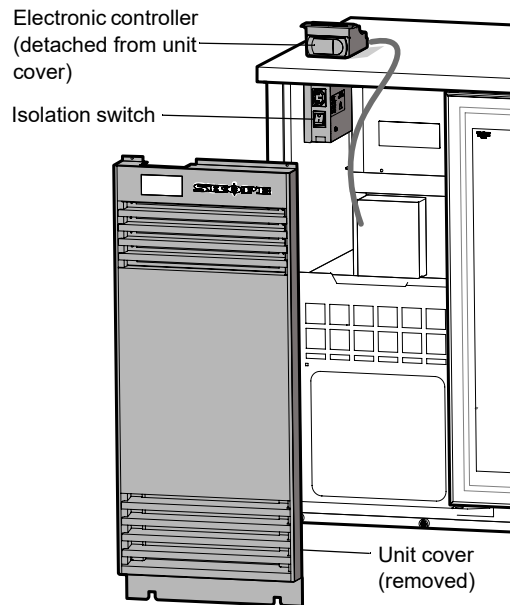
To isolate the electrics (integral cabinet pictured)

1. Unscrew the two screws at the top of the unit cover, and lift the unit cover off the cabinet to remove.

Note: The electronic controller is attached to the unit cover. Take care of cables when removing the unit cover, and if necessary, detach the electronic controller.

2. Switch off (O) the power at the isolation switch, and unplug the IEC plug.

Note: On remote cabinets, the isolation switch and IEC plug is located towards the bottom of the compartment.



3. Once the maintenance work has been completed, reconnect the plug and turn the isolation switch back on (I) before refitting the unit cover.
-

Lighting

This chiller is designed for use with LED tube lights and is not compatible with fluorescent tubes.

IMPORTANT

DO NOT use fluorescent tubes.

The chiller is fitted with one T8 LED tube light, which can be replaced without moving shelves or product. See the table below for light tube specifications.

Model	Light description	SKOPE Part No.
BB380X	1 x 20W T8 frosted LED tube (Ø26 × 900mm, 5500K)	ELL10742
BB580X	1 x 24W T8 frosted LED tube (Ø26 × 1500mm, 5500K)	ELL10743
BB780X	1 x 24W T8 frosted LED tube (Ø26 × 1500mm, 5500K)	ELL10743

Note: LED light tubes may be fitted with rotating end caps at each end of the tube. Ensure both end caps are positioned at the '8' setting and that the light faces in the correct direction.

To replace the interior LED light tube

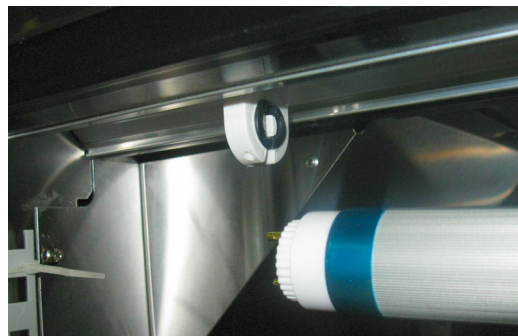
1. Disconnect the cabinet from the power supply.

2. Remove the top light diffuser by squeezing it until it is released from the housing.



3. Rotate the LED tube until the pins on the ends of the tube align with the slots, then slide it out.

4. Fit a new LED tube and clip the diffuser back into place. When fitting vertically mounted LED tubes, ensure the tube is fitted with the 'Power' end at the top.



Doors

Alignment Door alignment can be achieved by releasing the bottom hinge fixing bracket. The bracket is provided with slots allowing alignment adjustment.

Gasket The door gasket clips into the door gasket retainer extrusion on the inside of the door and may be removed for repair or replacement by peeling from the frame, starting at a corner.

New gaskets, when fitted, can be lightly lubricated with a clear silicone grease or similar compound to lessen the possibility of the gasket rolling. Should the gasket be out of shape when in place, use hot air (i.e. from hair drier) to realign.

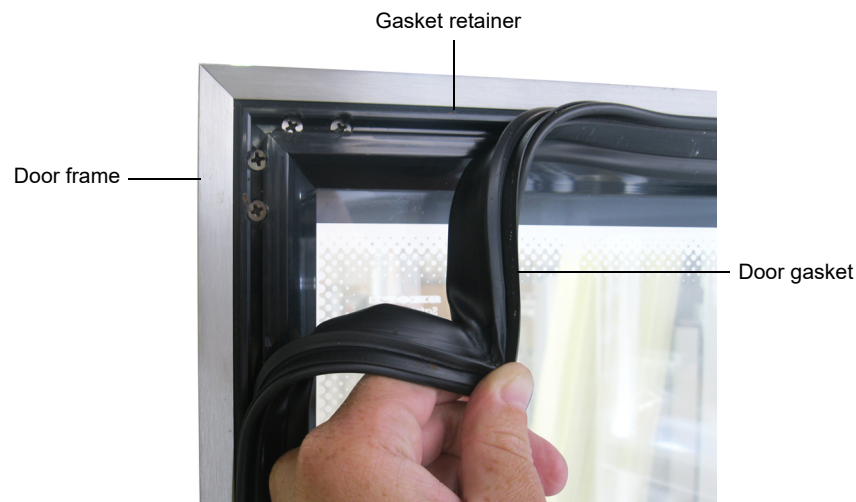


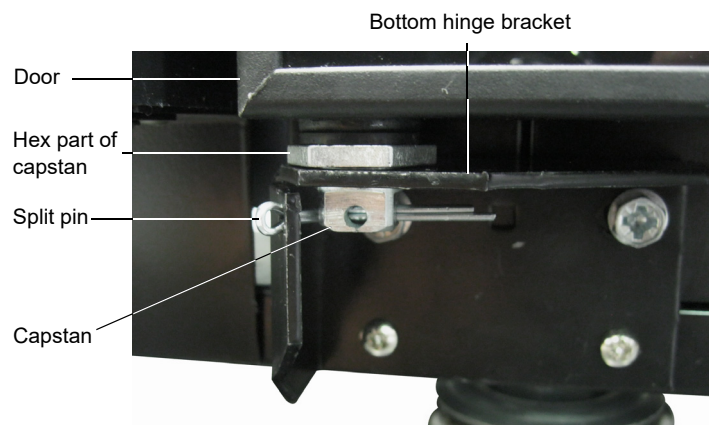
Figure 5: Door Gasket

Tension Adjustment The door has an internal torsion bar, pretensioned at the factory, which enables the door to self-close. If necessary, door tension can be adjusted by rotating the capstan mounted in the bottom hinge bracket.

In the event the door tension can no longer be adjusted, the torsion bar may need replacing (see “Torsion Bar Replacement” on page 43).

To adjust door tension

1. Slowly release tension on the capstan by turning the hex part of the capstan with a spanner, and remove the split pin.
2. Increase the tension by turning the capstan in the direction the door closes.



Continued over page

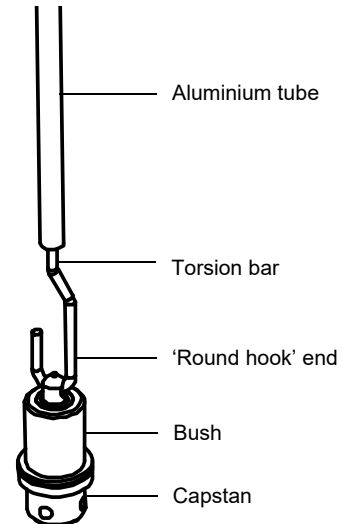
3. Once adequate tension has been achieved, re-insert the split pin through the hole in the hinge bracket to lock in position.
4. To check door tension, hold the door open approximately 100mm and let go of the door. The door should gently close, with the door gasket forming an air tight seal with the cabinet.

Torsion Bar Replacement

The torsion bar assembly is located inside the door frame, and can be replaced if necessary.

To replace the door torsion bar assembly

1. Disconnect the cabinet from the mains power supply.
2. Remove the door (see "Removal" on page 43).
3. Carefully lever out the bottom bush from the door frame, and pull the old torsion bar out from the door frame. The end of the torsion bar will need manoeuvring to allow the 'flat hook' end to clear the hinge hole.
Note: If the torsion bar cannot be removed, cut the torsion bar as far down as possible and leave the remainder in the door.
4. Remove the existing capstan, bush spacer and bush from the old torsion bar.
5. Thread the capstan, complete with bush and bush spacer, over the 'round hook' end of the new torsion bar. If present, ensure the aluminium tube moves freely up and down the torsion bar.
6. Fit the new torsion bar assembly into the door frame. When the torsion bar is correctly installed, the capstan should not turn.
7. Lightly tap bottom of capstan into hinge hole, until the bush is flush with door frame.
8. Refit the door to cabinet, and adjust tension ("Tension Adjustment" on page 42).



Removal For ease of replacement, the door can be removed from the cabinet. **Note:** Glass replacement is not considered economical, as the glass is fixed to the frame for integral strength. Door replacement is recommended.

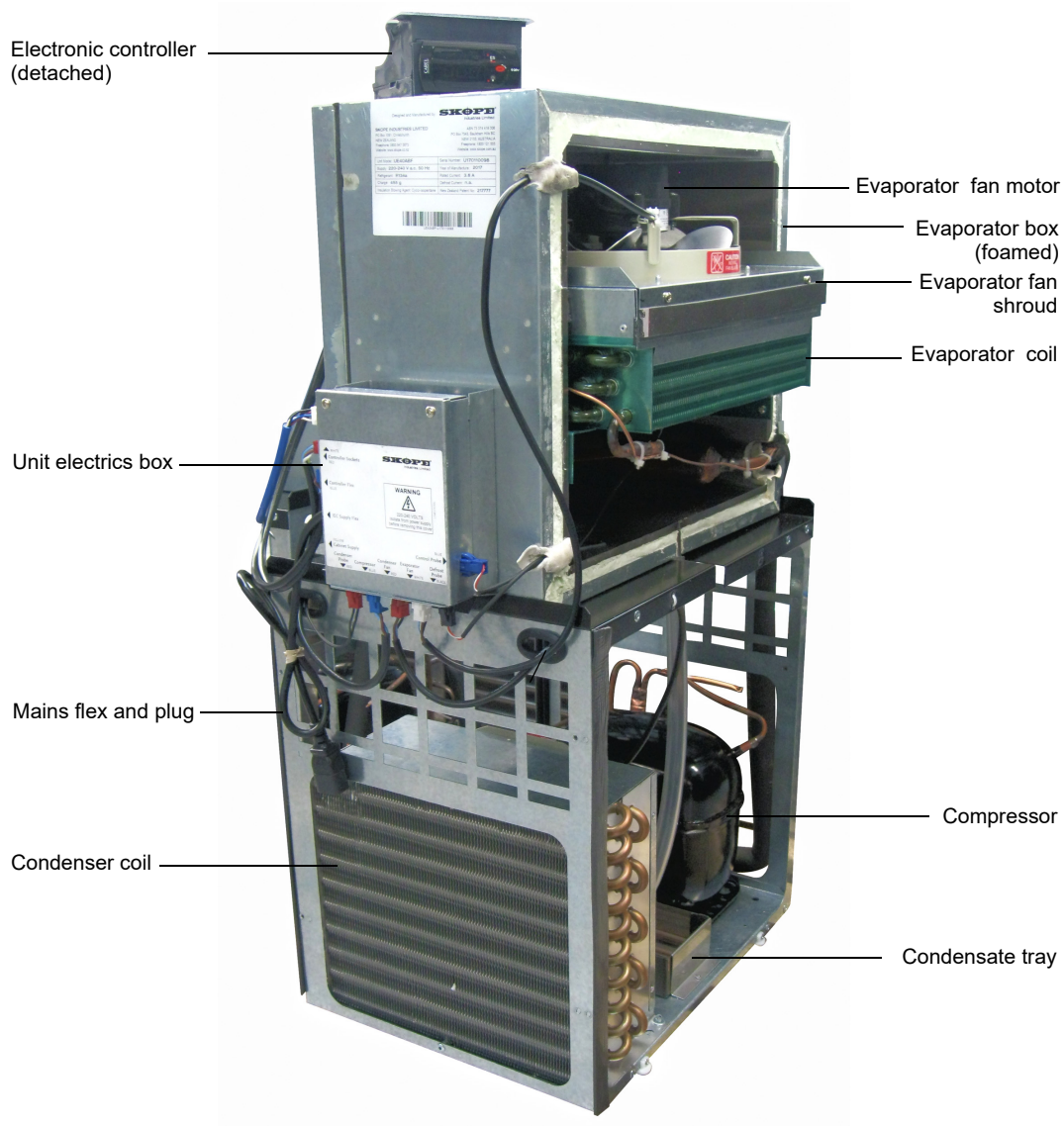
To remove the door

1. Disconnect the cabinet from the mains power supply.
2. Slowly release tension on the door capstan by turning the capstan with a spanner, and remove the split pin from the bottom hinge bracket (see step 1 in "Tension Adjustment" on page 42).
3. Remove the cabinet control panel.
4. Unscrew top hinge and lift the door clear of bottom pivot.
5. The door and hinge can now be removed from the cabinet.

Integral Refrigeration Unit

Refrigeration Unit Assembly

The SKOPE BackBar X integral refrigeration unit is an end mounted, removable refrigeration unit. Depending on the cabinet specification, the refrigeration unit is LH end mounted or RH end mounted. The unit is end specific and cannot be reversed (LH unit pictured).



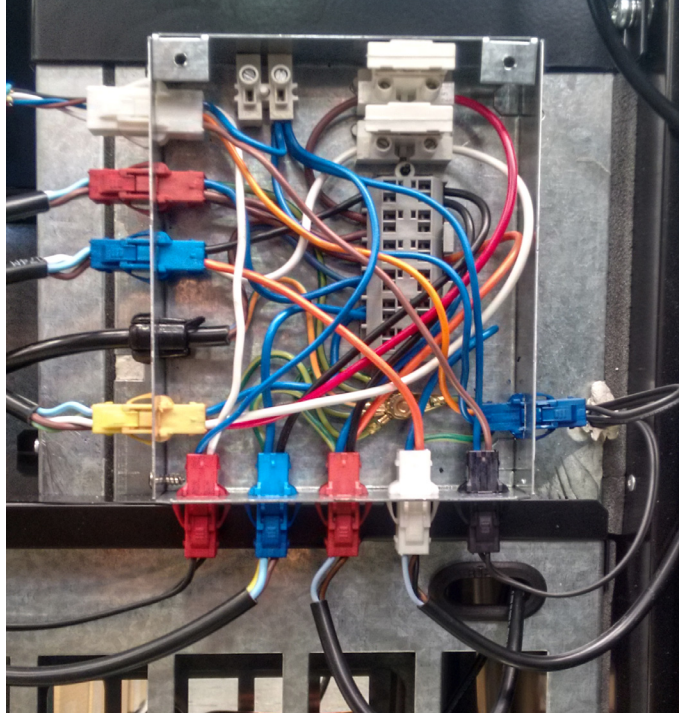
Unit Front Cover

To remove the unit front cover: undo the two fixing screws at the top of the cover, then lift the cover up and off the cabinet.

To refit the unit front cover: lift the cover up onto the two lugs and fix in place with the two fixing screws at the top of the cover.

Unit Electrics Box The unit electrics box houses fuses, refrigeration unit electrics, and refrigeration unit and cabinet connectors. The unit electrics box is fixed onto the front of the refrigeration unit, and can be accessed by removing the unit front cover. Refer to the label on the unit electrics box cover for connector identification.

Note: The unit electrics box is either LH or RH to match the refrigeration unit.



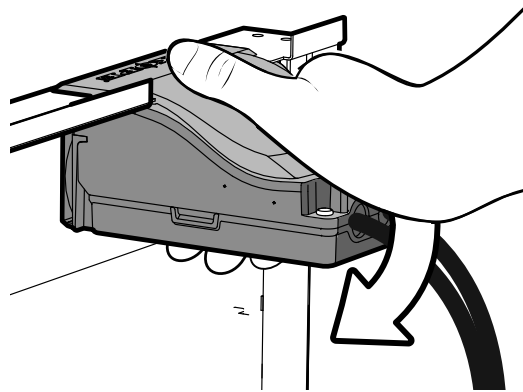
Refrigeration Unit Removal

Follow the steps below to remove the refrigeration unit from the cabinet.

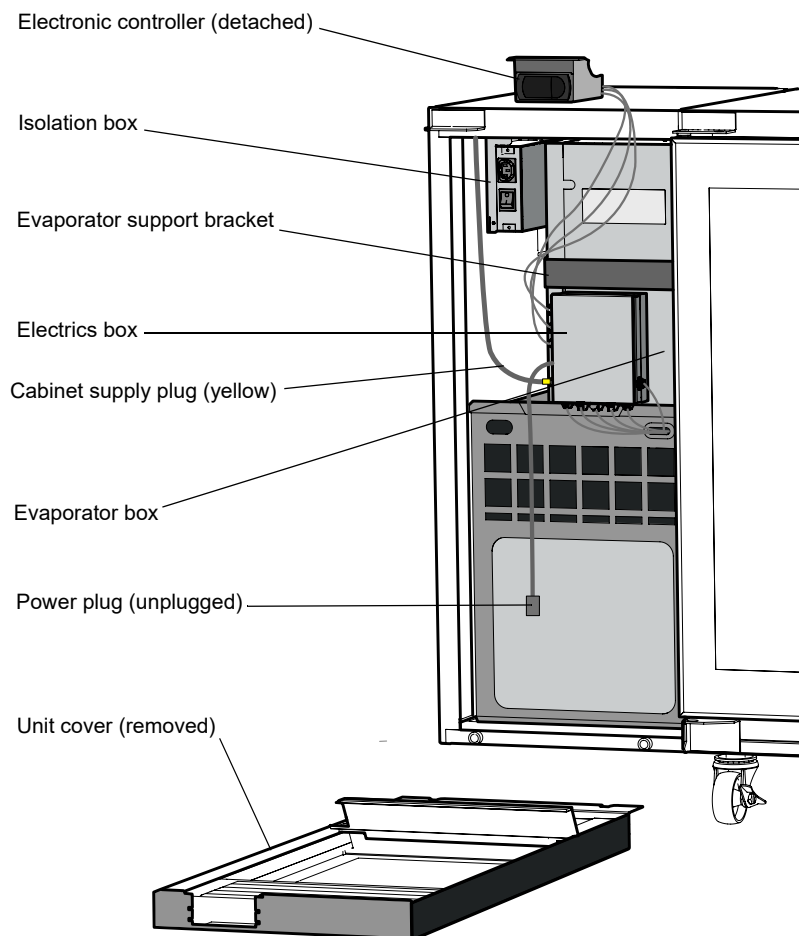
To remove the refrigeration unit from cabinet

1. Remove the unit cover, switch off (O) the isolation switch and unplug the power plug from the isolation box.
2. Unplug the yellow cabinet supply plug from the electrics box.

3. Detach the electronic controller from the unit cover. To do this, grasp with your thumb over the top and fingers wrapped around, and push the back of the assembly down firmly to unclip.



4. Unscrew and withdraw the evaporator support bracket, and slide the evaporator box out from the cabinet port hole.
5. Slide the unit out from the cabinet.



Evaporator Fan Assembly

The evaporator fan assembly is made up of a fan motor, fan blade and a mounting bracket which can be replaced if necessary.

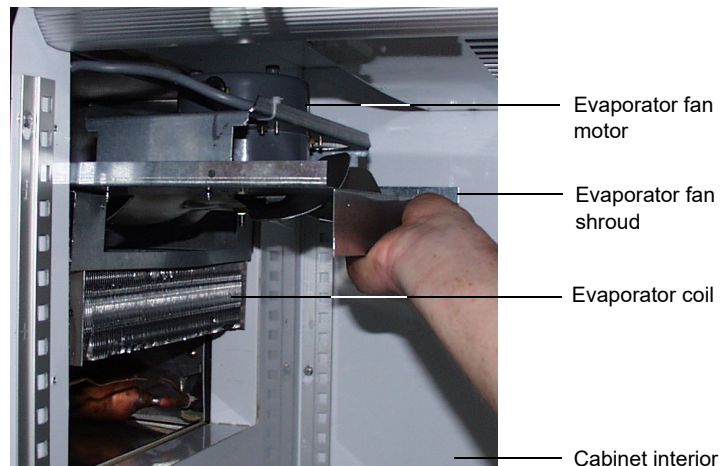
If the fan stops for any reason, check all connections to ensure no plugs have come loose. Refer to the label on the unit electrics box cover to identify the condenser fan plug and socket on the unit electrics box.

It is important that the fan blade and/or fan motor is replaced with the same part to ensure correct alignment and refrigeration performance. Fan blades should be tightened to 2.1Nm.

The evaporator fan assembly can be accessed from inside the cabinet, or by removing the refrigeration unit.

To remove the evaporator fan assembly

1. Remove the unit front cover and isolate the chiller from the power supply (see page 40).
2. Disconnect evaporator motor flex from unit electrics box.
3. To remove the assembly via the cabinet interior (when cabinet is unloaded): Gain access to the assembly by removing the duct transition from inside the cabinet.
To remove the assembly from outside the cabinet (when cabinet is loaded with product): Remove the refrigeration unit (see page 46).
4. Undo the screws holding evaporator fan shroud in place, pull the fan shroud out from the unit and pull the flex through the evaporator box.



Removal via cabinet interior pictured

To replace the evaporator fan blade

1. Remove the unit front cover and isolate the chiller from the power supply (see page 40).
2. Remove the evaporator fan assembly (see steps above).
3. Detach and replace the fan blade (take note of blade orientation when removing).
4. Refit the evaporator assembly, reconnect to the power supply and check for correct operation.

To replace the evaporator fan blade

1. Remove the unit front cover and isolate the chiller from the power supply (see page 40).
2. Remove the evaporator fan assembly (see page 47).
3. Detach the evaporator fan blade from the fan motor.
4. Unscrew and replace the fan motor.
5. Refit the evaporator fan blade.
6. Run the evaporator fan motor flex through the hole in the evaporator box, refit the evaporator assembly, reconnect the evaporator motor flex to the unit electrics box, reconnect the cabinet to the power supply and check for correct operation.

Condenser Fan Assembly

The condenser fan assembly is made up of a fan motor, fan blade and a mounting bracket which can be replaced if necessary.

If the fan stops for any reason, check all connections to ensure no plugs have come loose. Refer to the label on the unit electrics box cover to identify the condenser fan plug and socket on the unit electrics box.

It is important that the fan blade and/or fan motor is replaced with the same part to ensure correct alignment and refrigeration performance. Fan blades should be tightened to 2.1Nm.

The condenser fan assembly can be accessed after removing the refrigeration unit.

To remove the condenser fan assembly

1. Remove the unit front cover and isolate the chiller from the power supply (see page 40).
2. Remove the refrigeration unit (see page 46).
3. Disconnect condenser motor flex from unit electrics box.
4. Detach the drain pipe from the fan mounting bracket by cutting the cable tie.
5. Unscrew the fan mounting bracket and withdraw the condenser fan assembly from the unit.
Note: A short handled screw driver may be required to unscrew the fan mounting bracket.
6. When refitting, direct the drain pipe to the condensate tray and cable tie to the fan mounting bracket.

Compressor

The compressor is located at the back of the refrigeration unit, behind the condensate tray. If the compressor is causing excessive noise, check the mountings to ensure there is no damage to the rubber or the washers, nuts and screws.

Before replacing the compressor, check all plug connections and ensure the compressor electrics are operating correctly. 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).

Recommended Service Procedures

SKOPE recommend the SKOPE Cyclone® demountability and exchangeability philosophy, which in essence means:

The customer must not be inconvenienced during system maintenance.

In the unlikely event of Refrigeration failure, an exchange unit is simply swapped in a matter of minutes. There is no cabinet down time or unloading product. In one short visit, the customer's inconvenience ends. The faulty Cyclone® is then removed to the workshop for repair as time allows.

For a suspected refrigerant problem

Disconnect the evaporator fan motor and with the system running, a 'frost line' will become obvious (after approximately 5 minutes): Entire evaporator, accumulator, and suction line right up to compressor must be frosting. Compressor at suction inlet will sweat.

If these conditions are not met, the system is faulty, either short of refrigerant, compressor not pumping efficiently, or capillary restriction. The system must then be opened (see Refrigerant R134a Handling Precautions section) and gauges temporarily fitted (i.e. either temporarily fit line piercing valves, or braze in service lines).

Short of refrigerant

Where the frosting effect is shorter than required (unless all refrigerant is lost, where there is no frosting effect). Only a small amount of refrigerant will exit the system. A leak test (refrigerant / dry nitrogen mix, up to 250 psig) should be performed to locate the leak. If no leak is found, a pressure test should be performed (dry nitrogen only, up to 250 psig) if there is no pressure drop over 24 hours, the fault should be treated as a capillary restriction.

Compressor not pumping efficiently

Where the frosting effect is not as cold as it should be. Symptoms include: compressor body hotter than normal, condenser cooler than normal, and the compressor may make an unusual hissing sound. All of these symptoms depend on the severity of the problem.

The only way to prove a pumping problem is to perform a compressor pump-down test: braze closed compressor suction line, open discharge line; then run the compressor to pull a vacuum on a vacuum gauge.

The compressor should pull down to approximately 30" Hg (inches of mercury) or 101 kPa vacuum, then turn the compressor off and this vacuum must be held without any loss for 5 minutes. If the Compressor does not pass these tests; it is not pumping efficiently and must be replaced.

There are different methods to proving pumping efficiency. If the test is performed with a system charged with refrigerant, a deep vacuum will not be achieved.

Capillary restriction

With a totally blocked capillary, there will be no refrigeration effect. A partially blocked capillary may have similar symptoms to a system being short of refrigerant. Flush a restricted capillary with dry nitrogen. If the capillary will not clear, it must be replaced.

After the repair, the drier must be replaced. The Cyclone® must be fully evacuated and charged to the volume of refrigerant indicated on the Cyclone® serial/rating label. All service lines must be purged.

Finally, pinch-off the gauge process lines (or remove line piercing valves) and braze the system closed. SKOPE recommend against leaving service valves in the system as these are prone to leak (and are open to abuse). Perform a final system leak test.

Refrigerant R134a handling precautions

It is important to maintain dedicated HFC service equipment and parts

- ▣ Refrigeration gauges
- ▣ Service lines / Fittings
- ▣ Vacuum Pump
- ▣ Charging equipment
- ▣ Driers
- ▣ Compressors
- ▣ Temperature / Pressure chart

HFC (R134a) refrigeration systems require special service procedures because of the highly hygroscopic (moisture sensitive) polyolester (POE) compressor oil:

- ▣ The system (especially compressor) must only be open for the very minimum time (to prevent moisture ingress). All parts required for servicing must be at hand - before the system is opened, and there should be no interruption until the system is on the vacuum pump (or hermetically sealed).
- ▣ The system must not be open for longer than 20 minutes maximum.
- ▣ The drier must be replaced every time the system is opened.
- ▣ Clean work practices are essential.
- ▣ SKOPE recommend brazing the system closed after service, as valves are prone to leak due to the nature of R134a.

Electronic Controller

Electronic Controller Location

The electronic controller is located within the electronic controller box assembly.

To access the controller

1. Remove the unit cover and isolate the chiller from the power supply (see page 40).
 2. Open the electronic controller box assembly by undoing the two fixing screws at the rear of the assembly.
-

Diagnostics

If the electronic controller has a suspected fault, care must be taken to ensure accurate diagnosis. The controller has various programmable parameters that effect operation such as time delay and defrost modes. Any suspected failure must be double checked. Confirm all wiring and terminations are correct. Check that the probe resistance is correct and replace any faulty components. If operation appears erratic, check the controller programming.

Probe Resistance

**Table of temperature-resistance values for
NTC sensor 10K@25°C β 3435**

Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
-50	344,60	329,50	314,90
-49	325,00	310,90	297,30
-48	306,60	293,50	280,90
-47	289,40	277,20	265,40
-46	273,40	262,00	251,00
-45	258,30	247,70	237,40
-44	244,20	234,30	224,70
-43	231,00	221,70	212,80
-42	218,60	209,90	201,60
-41	207,00	198,90	191,00
-40	196,00	188,50	181,10
-39	185,50	178,50	171,60
-38	175,60	169,00	162,60
-37	166,30	160,20	154,20
-36	157,60	151,90	146,30
-35	149,40	144,10	138,80
-34	141,70	136,70	131,80
-33	134,50	129,80	125,20
-32	127,70	123,30	119,00
-31	121,20	117,10	113,10
-30	115,20	111,30	107,50
-29	109,40	105,70	102,20
-28	103,90	100,50	97,20
-27	98,68	95,52	92,45
-26	93,80	90,84	87,97
-25	89,20	86,43	83,73
-24	84,85	82,26	79,74
-23	80,76	78,33	75,96
-22	76,89	74,61	72,39
-21	73,23	71,10	69,01
-20	69,77	67,77	65,82
-19	66,44	64,57	62,74
-18	63,30	61,54	59,83
-17	60,32	58,68	57,07
-16	57,51	55,97	54,46
-15	54,85	53,41	51,99
-14	52,33	50,98	49,65
-13	49,95	48,68	47,43
-12	47,69	46,50	45,32
-11	45,55	44,43	43,33
-10	43,52	42,47	41,43
-9	41,55	40,57	39,60
-8	39,69	38,77	37,86
-7	37,92	37,06	36,21
-6	36,25	35,44	34,64
-5	34,66	33,90	33,15
-4	33,15	32,44	31,73
-3	31,72	31,05	30,39
-2	30,36	29,73	29,11
-1	29,06	28,48	27,89
0	27,83	27,28	26,74

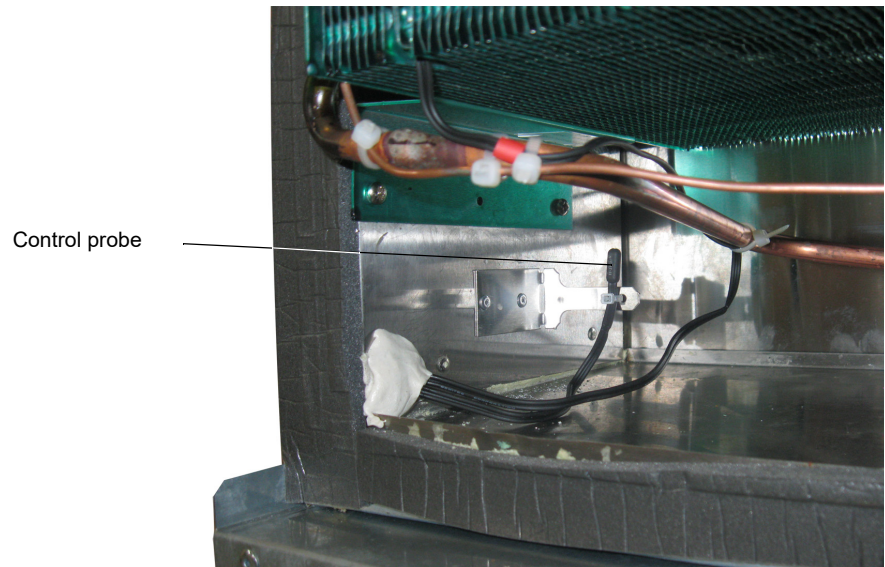
Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
1	26,65	26,13	25,62
2	25,52	25,03	24,55
3	24,44	23,99	23,54
4	23,42	23,00	22,57
5	22,45	22,05	21,66
6	21,53	21,15	20,78
7	20,64	20,30	19,95
8	19,81	19,48	19,15
9	19,01	18,70	18,39
10	18,25	17,96	17,67
11	17,51	17,24	16,97
12	16,81	16,56	16,30
13	16,14	15,90	15,67
14	15,50	15,28	15,06
15	14,89	14,69	14,48
16	14,31	14,12	13,92
17	13,75	13,58	13,39
18	13,22	13,06	12,89
19	12,72	12,56	12,40
20	12,24	12,09	11,94
21	11,77	11,63	11,50
22	11,32	11,20	11,07
23	10,90	10,78	10,66
24	10,49	10,38	10,27
25	10,10	10,00	9,90
26	9,73	9,63	9,53
27	9,38	9,28	9,18
28	9,04	8,94	8,84
29	8,72	8,62	8,52
30	8,41	8,31	8,21
31	8,11	8,01	7,92
32	7,83	7,73	7,63
33	7,55	7,45	7,36
34	7,29	7,19	7,10
35	7,04	6,94	6,85
36	6,79	6,70	6,61
37	6,56	6,47	6,37
38	6,34	6,25	6,15
39	6,12	6,03	5,94
40	5,92	5,83	5,74
41	5,72	5,63	5,54
42	5,53	5,44	5,35
43	5,34	5,26	5,17
44	5,17	5,08	4,99
45	5,00	4,91	4,83
46	4,83	4,75	4,67
47	4,68	4,59	4,51
48	4,52	4,44	4,36
49	4,38	4,30	4,22
50	4,24	4,16	4,08
51	4,10	4,03	3,95
52	3,97	3,90	3,82
53	3,85	3,77	3,70
54	3,73	3,65	3,58
55	3,61	3,54	3,46

Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
56	3,50	3,43	3,35
57	3,39	3,32	3,25
58	3,28	3,22	3,15
59	3,18	3,12	3,05
60	3,09	3,02	2,95
61	2,99	2,93	2,86
62	2,90	2,84	2,77
63	2,82	2,75	2,69
64	2,73	2,67	2,61
65	2,65	2,59	2,53
66	2,57	2,51	2,45
67	2,50	2,44	2,38
68	2,42	2,36	2,31
69	2,35	2,30	2,24
70	2,28	2,23	2,17
71	2,22	2,16	2,11
72	2,15	2,10	2,05
73	2,09	2,04	1,99
74	2,03	1,98	1,93
75	1,98	1,92	1,87
76	1,92	1,87	1,82
77	1,87	1,82	1,77
78	1,81	1,77	1,72
79	1,76	1,72	1,67
80	1,72	1,67	1,62
81	1,67	1,62	1,58
82	1,62	1,58	1,53
83	1,58	1,53	1,49
84	1,54	1,49	1,45
85	1,49	1,45	1,41
86	1,45	1,41	1,37
87	1,42	1,37	1,33
88	1,38	1,34	1,30
89	1,34	1,30	1,26
90	1,31	1,27	1,23
91	1,27	1,23	1,19
92	1,24	1,20	1,16
93	1,21	1,17	1,13
94	1,17	1,14	1,10
95	1,14	1,11	1,07
96	1,12	1,08	1,04
97	1,09	1,05	1,02
98	1,06	1,02	0,99
99	1,03	1,00	0,97
100	1,01	0,97	0,94
101	0,98	0,95	0,92
102	0,96	0,92	0,89
103	0,93	0,90	0,87
104	0,91	0,88	0,85
105	0,89	0,86	0,83
106	0,87	0,84	0,81
107	0,84	0,82	0,79
108	0,82	0,80	0,77
109	0,80	0,78	0,75
110	0,79	0,76	0,73

Control Probe The control probe is located in the evaporator box, cable tied to a bracket under the evaporator coil (see image below).

To replace the control probe

1. Remove the unit cover and isolate the chiller from the power supply (see page 40).
2. Remove the refrigeration unit (page 46).
3. Unplug the probe from the unit electrics box.
4. Detach the probe from the bracket, and withdraw from the evaporator box.
5. Plug the new probe into the unit electrics box.
6. Following the same path as the original probe, run the new probe into the evaporator box (use cable ties to hold the probe cable in place) and cable tie to the probe bracket.
7. Use putty to seal up any gaps around the evaporator box entry point.
8. Reassemble the cabinet, reconnect to the power supply and check for correct operation.



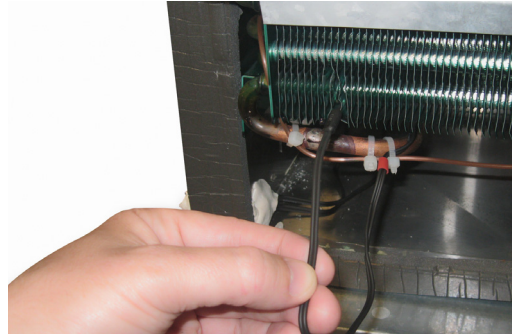
Evaporator Probe The evaporator probe is located within the evaporator coil.

To replace the evaporator probe

1. Remove the unit cover and isolate the chiller from the power supply (see page 40).
2. Remove the refrigeration unit (page 46).
3. Unplug the probe from the unit electrics box.
4. Remove the probe from the evaporator coil, and withdraw from the evaporator box.
5. Plug the new probe into the unit electrics box.

Continued over page

6. Following the same path as the original probe, run the new probe into the evaporator box (use cable ties to hold the probe cable in place). Feed the probe into the 8th fin on the evaporator coil, and push 200mm into the coil. Crimp the fins to secure the probe in place.



7. Use putty to seal up any gaps around the evaporator box entry point.
8. Reassemble the cabinet, reconnect to the power supply and check for correct operation.

Condenser Probe

The condenser probe is protected with insulating cork tape and attached to the side of the condenser coil. It can be identified by its blue colour sleeve.

To replace the condenser probe

1. Remove the unit cover and isolate the chiller from the power supply (see page 40).
2. Remove the refrigeration unit (page 46).
3. Unplug the probe from the unit electrics box.
4. Detach the probe from the side of the condenser coil.
5. Plug the new probe into the unit electrics box.
6. Following the same path as the original probe, fit the new probe with cable ties and cork tape as necessary.
7. Reassemble the cabinet, reconnect to the power supply and check for correct operation.



Condenser probe

7 Maintenance

Cleaning

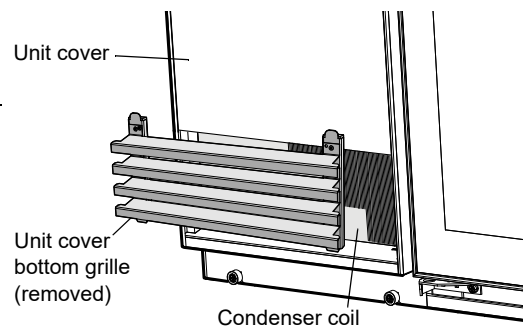
Condenser Coil To ensure trouble-free performance, we strongly urge monthly cleaning with a soft brush to remove dust and fluff. A more thorough cleaning is required by qualified service personnel every six months. The condenser coil **must** be kept clean for efficient and reliable operation.

The condenser coil is located at the front of the refrigeration unit, behind the bottom grille on the unit cover. Take care of the condenser coil fins when cleaning.

To clean the condenser coil

1. Lift the grille up and out of the unit cover to gain access to the coil.

2. Brush the condenser coil with a soft brush to remove any dust and fluff.



3. Refit the grille to the closed position.

Cabinet When necessary, wipe both the interior and exterior of the cabinet with a damp cloth. Ensure the cabinet is unplugged from the mains power supply before cleaning the cabinet.

CAUTION

Unplug the cabinet from the mains power supply before cleaning the cabinet.

8 Troubleshooting

Diagnostic Table

For questions about the electronic controller, see page 10. For problems with the cabinet and refrigeration unit, use the following table.

Cabinet

Problem	Possible Cause	Suggestions
Cabinet not operating No controller display	<ul style="list-style-type: none"> Isolation switch off Loss of power supply 	<ul style="list-style-type: none"> Turn the isolation switch on (I) (see page 40) Check mains power supply.
Interior light not on	<ul style="list-style-type: none"> Light switched off Failed light tube Blown cabinet fuse 	<ul style="list-style-type: none"> Switch on at controller faceplate (see page 11). Replace light tube (see page 41). Replace fuse.
Power consumption is higher than expected	<ul style="list-style-type: none"> Unit operating too hot Cabinet doors are opened excessively Unit and/or door seals compromised 	<ul style="list-style-type: none"> Clean the condenser coil (see page 55). Ensure the cabinet has good ventilation around the front of the refrigeration unit (see page 35). Ensure the cabinet is in a suitable location (see page 35). Ensure doors are closed more often. Check unit and door seals and service as necessary.
Product is too warm	<ul style="list-style-type: none"> Restricted airflow to cabinet 	<ul style="list-style-type: none"> Ensure product is not blocking airflow slots. Ensure there is space around individual product pieces.
Warm cabinet temperatures Compressor operating for long periods (more than 1 hour)	<ul style="list-style-type: none"> Blocked condenser Poor ventilation around refrigeration unit Unit and/or door seals compromised 	<ul style="list-style-type: none"> Clean the condenser coil (see page 55). Ensure the cabinet has good ventilation around the front of the refrigeration unit (see page 35). Check unit and door seals and service as necessary.

Refrigeration unit

Problem	Possible Cause	Suggestions
Compressor will not start: no hum.	<ul style="list-style-type: none"> Loss of power supply Overload protector tripped. Wiring improper, or loose. 	<ul style="list-style-type: none"> Replace fuse. Check reason. Repair or replace control. Check wiring against diagram (see page 22).
	<ul style="list-style-type: none"> Faulty contactor 	<ul style="list-style-type: none"> Check and if necessary replace contactor.

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Problem	Possible Cause	Suggestions
Compressor will not start: hums but trips on overload protector.	<ul style="list-style-type: none"> • Improperly wired. • Low voltage to unit. • Start capacitor defective on CSIR or CSR motor. • Run capacitor defective on PSC motor. • Relay failing to close. • Compressor motor has a winding open or shorted. • Internal mechanical trouble in compressor. 	<ul style="list-style-type: none"> • Check wiring against diagram (see page 22). • Determine reason and correct. • Determine reason and replace. • Determine reason and replace. • Determine reason and correct. Replace if necessary. • Check resistance values. Replace compressor if necessary. • Replace compressor.
Compressor starts, but does not switch off.	<ul style="list-style-type: none"> • Improperly wired. • Low voltage to unit. • Relay failing to open, due to welded contacts or relay incorrectly mounted. • Run capacitor defective on CSR motor. • Excessively high discharge pressure. • Compressor motor has winding open or shorted. Check continuity and resistance. • Internal mechanical trouble in compressor (tight). May be lubrication. 	<ul style="list-style-type: none"> • Check wiring against diagram (see page 22). • Determine reason and correct. • Determine reason and correct. Replace if necessary. • Determine reason and replace. • Clean condenser. Check power input Watts. Possible overcharge, insufficient condenser cooling, or non-condensable gasses. • Replace compressor if faulty. • Replace compressor.
Compressor starts and runs, but short cycles on overload protector (relay may chatter on RSIR, CSIR and CSR motors).	<ul style="list-style-type: none"> • Additional current passing through overload protector. • Low voltage to unit. • Overload protector defective. • Run capacitor defective on CSR motor. • Excessive discharge pressure. • Suction pressure too high. • Compressor too hot - insufficient suction gas cooling. • Compressor motor has a winding shorted. 	<ul style="list-style-type: none"> • Check wiring diagram. Check for added fan motors etc., connected to wrong side of protector. • Determine reason and correct. • Check current, replace protector. • Determine reason and replace. • Check condenser, check ventilation, check for restrictions in refrigeration system. • Check for possibility of misapplication. • Check refrigerant charge (fix leak), add if necessary. Check return vapour temperature and suction superheat. • Replace compressor.
Unit runs OK, but short cycles.	<ul style="list-style-type: none"> • Overload protector. • Electronic controller not operating correctly • Incorrect refrigerant charge. 	<ul style="list-style-type: none"> • See section above. • Diagnose fault with controller and service as necessary (see page 10). • Adjust refrigerant charge.

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Problem	Possible Cause	Suggestions
Unit operates long or continuously. Unsatisfactory cabinet temperature.	• Short of refrigerant.	• Fix leak, and add charge.
	• Overcharge of refrigerant.	• Remove refrigerant to correct charge.
	• Chiller has excessive load.	• Establish load within limits.
	• Evaporator coil iced.	• Defrost evaporator. Check evaporator probe. Check refrigeration, Check thermostat. Check elements. Check door closing, seals etc.
	• Electronic controller not operating correctly	• Diagnose fault with controller and service as necessary (see page 10).
	• Restriction in refrigeration system	• Determine location and clear restriction. Flush with dry nitrogen. Replace component if blockage will not clear.
	• Dirty condenser	• Clean condenser. Advise client how to regularly clean condenser.
	• Inadequate air circulation	• Internal: Improve air movement, allow airflow around stock. External: Remove any restrictions to condensing ventilation.
	• Compressor not pumping efficiently	• Replace compressor.
	• Filter dirty (if applicable)	• Clean or replace.
	• Faulty fan motor	• Check rotation. Replace if necessary.
	• Electronic controller not operating correctly	• Diagnose fault with controller and service as necessary (see page 10).
Start capacitor open, shorted or blown.	• Relay contact not opening properly.	• Clean contacts, or replace relay if necessary.
	• Prolonged operation on start cycle due to: (a) Low voltage to unit. (b) Improper relay.	• (a) Determine reason and correct. (b) Replace relay.
	• Excessive short cycling.	• Determine reason for short cycling, and correct.
	• Improper capacitor.	• Determine correct size and replace.
Relay defective or burned out.	• Incorrect relay.	• Check and replace.
	• Line voltage too high or too low.	• Determine reason and correct.
	• Excessive short cycling.	• Determine reason, and correct.
	• Relay being influenced by loose vibrating mount.	• Remount rigidly.
Suction line frosted.	• Evaporator fan not running	• Determine reason and correct
	• Overcharge of refrigerant capillary systems	• Correct charge
Unit noisy.	• Loose parts or mountings	• Find and tighten
	• Tubing rattle	• Reform to be free of contact
	• Bent fan blade causing vibration	• Replace fan
	• Fan motor bearing worn	• Replace fan

SKOPE Contacts

SKOPE Industries Limited

A.B.N. 73 374 418 306

AU: 1800 121 535

NZ: 0800 947 5673

skope@skope.com

www.skope.com