

FDM Series

SKOPE Food Display Cabinet

Integral models: FDM900i, 1200i, 1500i



FDM1200i

FDM900i/1200i/1500i
SKOPE Food Display Cabinet
Service Manual

MAN2056S
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SKOPE INDUSTRIES LIMITED

Head Office
PO Box 1091, Christchurch
New Zealand
A.B.N. 73 374 418 306
AU: 1800 121 535
NZ: 0800 947 5673
E-mail: skope@skope.com
Website: www.skope.com

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1 Specifications

Table 1: Cabinet

Construction	FDM900i		FDM1200i		FDM1500i	
Insulation	50 mm polyurethane foam					
Dimensions	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>	<i>External</i>	<i>Internal</i>
Height	1305 mm	800 mm	1305 mm	800 mm	1305 mm	800 mm
Width	900 mm	600 mm	1200 mm	900 mm	1500 mm	1200 mm
Depth	662 mm	600 mm	662 mm	600 mm	662 mm	600 mm
Floor area	0.6 m ²		0.8 m ²		1.0 m ²	
Cabinet internal volume	288 litres		432 litres		576 litres	
Doors	2 double-glazed sliding doors with internal mirror finish		2 double-glazed sliding doors with internal mirror finish		2 double-glazed sliding doors with internal mirror finish	
Internal door opening size	2 rear door openings: 275 mm wide × 630 mm high		2 rear door openings: 390 mm wide × 630 mm high		2 rear door openings: 540 mm wide × 630 mm high	
Shelves	3 shelves (2 adjustable angle): 630 mm wide × 440 mm deep		3 shelves (2 adjustable angle): 930 mm wide × 440 mm deep		3 shelves (2 adjustable angle): 1230 mm wide × 440 mm deep	
Cabinet temperature range	1°C to +7°C in 32°C ambient, +10°C to +23°C in elevated mode					
Total weight	160 kg		190 kg		225 kg	

Table 2: Refrigeration cartridge

	FDM900i	FDM1200i	FDM1500i
Refrigeration system	Integral Food Display Refrigeration Cartridge		
Electronic controller	SKOPE customised CAREL ir33		
Cartridge model	UB70AAD-420ZX or UB70ABD-420ZX or UB70ALD-420ZE	UB71AAD-420ZX or UB71ABD-420ZX or UB71ALD- 420ZE	UB72AAD-420ZC or UB72ABD-420ZC
Drainage	No plumbing required		
Compressor	Electrolux GLY90RA or Embraco NEK6187Z	Electrolux GLY90RA or Embraco NEK6187Z	Danfoss SC12G
Nominal capacity	450 watts	540 watts	620 watts
Refrigerant	R134a		
Charge	480 g	480 g	950 g

Table 3: Electrical

	FDM900i	FDM1200i	FDM1500i
Supply	220-240 volts a.c. 50 Hz, single phase supply		
Lighting	3 × 14 W/830 T5 fluorescent tube (Ø16 mm × 550 mm)	3 × 21 W/830 T5 fluorescent tube (Ø16 mm × 850 mm)	3 × 28 W/830 T5 fluorescent tube (Ø16 mm × 1150 mm)
Total run amps	2.0 amps	2.4 amps	3.4 amps

Servicing Tools Tools required for servicing may consist of the following:

- Screwdriver with TORX T-10 and T-15 bit
- Screwdriver with Pozidriv PZ1 and PZ2 bit
- Small slotted screwdriver (for electrical connectors)

2 Controller

Overview

Introduction The SKOPE electronic controller controls and displays the cabinet temperature. The preset temperature setting controls the internal air temperature for chilled food between 1°C and 7°C, and room temperature food between 10°C and 23°C. The electronic controller also signals temperature alarms, and the CAREL ir33 records the minimum and maximum value reached at the time of the alarm.

The electronic controller is visible on the rear panel of the cabinet and is connected to the refrigeration cartridge junction box. The cabinet is fitted with either a SKOPE customised CAREL ir33 controller (ELZ3333) or a CAREL S4 EVO controller. Check the label on top of the controller to verify the controller type.

Customised SKOPE controllers cannot be replaced with standard CAREL controllers.

Variations Note: All SKOPE cabinets manufactured from January 2023 will use the CAREL S4 EVO controller. All necessary replacement components are supplied in a replacement kit when ordered as a spare part. See:

- Table 13, "Parts – FDM900i cabinet", on page 17
- Table 14, "Parts – FDM1200i cabinet", on page 19
- Table 15, "Parts – FDM1500i cabinet", on page 21

See "Control Box Assembly" on page 36 for replacement procedures.

While the controllers are similar, there are some visual and functional differences between them. This manual covers both.

CAREL ir33



Faceplate

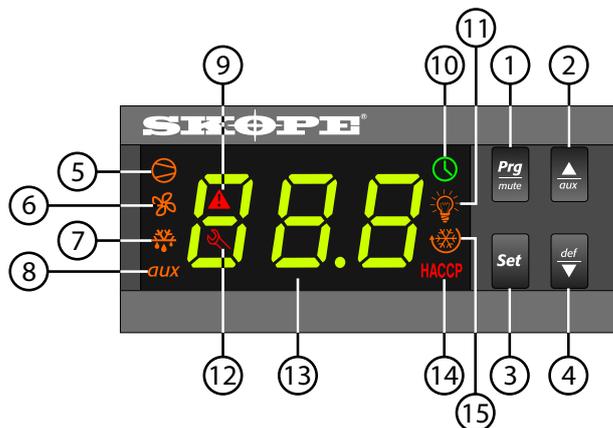


Table 4: ir33 controller faceplate

Item	Icon	Function
1		Mute/program: Button. Mutes the audible alarm (buzzer) and deactivates the alarm relay. To initiate program sets, press for 5 seconds.
2		Up: Button. To scroll settings up (in program mode).
3		Set point: Button. If pressed for more than 2 seconds displays and / or enables changing the temperature setpoint (see page 7).
4		Manual defrost / down: Button. Press for more than 5 seconds to initiate manual defrost. To scroll settings down (in program mode).
5		Compressor: Indicator. ON when the compressor and condenser fan starts. Flashes when activation of the compressor is temporarily delayed.
6		Fan: Indicator. Shows when the fan is operational.
7		Defrost: Indicator. ON when the defrost is activated. Flashes when the activation of the defrost is temporarily delayed due to procedures in progress.
8		Aux: Indicator. n.a.
9		Alarm: Indicator. Flashes in the event of some alarms (see page 10).
10		Clock: Indicator. n.a.
11		Light: Indicator. n.a.
12		Service: Indicator. Flashes in the event of malfunctions (see page 10).
13		DISPLAY: Indicator. Shows the cabinet temperature. Flashes when the door is open.
14		HACCP: Indicator. n.a.
15		CONTINUOUS CYCLE: Indicator. n.a.

Temperature Setpoint The temperature setpoint is set at the factory depending on the cabinet or program type. If necessary the standard setting for chilled food can be adjusted between 1.0°C and 5.0°C, and the standard setting for room temperature food can be adjusted between 10°C and 20°C.

SKOPE does not recommend changing the setpoint unless it is absolutely necessary, and then only by small increments at a time.

Procedure 1: To view and adjust the temperature setpoint on an ir33 controller

1. To view the setpoint: press and hold the **Set** button for 2 seconds, until the setpoint value flashes
2. To adjust the setpoint: press the  or  buttons to display the required setpoint value.
3. Press the **Set** button again to assign the new setpoint value. If you do not do this within 60 seconds, changes will be lost and you will need to repeat the procedure.

Controller Reset To delete program modifications and reset the controller to SKOPE default program, or when a replacement controller is being fitted, a Controller Reset must be performed. The electronic controller must never be left in program mode **bn0**, as failure will occur.

Procedure 2: To reset the ir33 controller

1. Disconnect the cabinet from the power supply.
2. Press and hold the **Prg** mute button while plugging the cabinet into the power supply (this may require two people). After a few seconds the controller is reset and program mode **bn0** is displayed. You must not leave the controller in program mode **bn0** as failure will occur.
3. Press the **▲** aux or **▼** def buttons to select the appropriate **bn** program mode.
4. Immediately press the **Set** button to confirm the preferred program. If not confirmed within 60 seconds the controller will remain in program mode **bn0** (and cause failure). If this occurs, repeat the procedure.

CAUTION
The electronic controller must never be left in program mode **bn0**, as failure will occur.

Hardware Setup Refer to the wiring diagrams on page 15. The controller has five separate inputs, three of which are used for temperature probes.

Table 5: ir33 inputs

Input	Used for	Description and location
1	Control probe	Determines cabinet temperature, temperature display and cabinet temperature alarms. Located in the return airflow on the bracket in front of the evaporator face.
2	Evaporator probe (red sleeve)	Determines defrost termination and evaporator fan activation. Located inside the evaporator coil between fins at the bottom of the coil.
3	Condenser probe (grey or blue sleeve)	Determine refrigeration shut down due to overheating of condensing temperature. Located and insulated on the outside middle tube of the condenser.
4	Unused	
5	Unused	

Table 6: ir33 relays

Relay	Used for
1	Compressor
2	Aux1 – Alarm
3	Unused
4	Unused

Programming “Cold Key”

A controller may be field-programmed via a CAREL Cold Key. The SKOPE factory pre-programmed cold key has the capability of instantly changing program configurations. A cold key may also be used to introduce a customised program to meet a specific customer requirement.

Field-adjustable Programming

Within each program are field-adjustable (Type C) parameters. Non-useful parameters are hidden. Changes to SKOPE factory default programs are not recommended.

ir33 Controller Parameters

Factory default configuration of the controller is set by SKOPE for a specific SKOPE product. The factory default cannot be altered in the field. A label on the controller box indicates the default parameter program (P420 bn1, bn2, bn3, or bn4).

Parameter programs

Table 7: ir33 parameter programs

Models	Parameter program
FDM900i/1200i/1500i (standard mode)	P-420 bn1
FDM900i/1200i/1500i (manual mode)	P-420 bn2
FDM900i/1200i/1500i (auto mode)	P-420 bn3
FDM900i/1200i/1500i (elevated mode)	P-420 bn4

Within each program are field adjustable (Type C) parameters. To help with navigation, the parameters can be displayed in groups listed in the table below. Non-useful parameters are hidden.

Table 8: ir33 parameter groups

Display	Group	Display	Group
Pro	 Probe	Fan	 Fan
Ctl	 Temperature	CnF	<i>aux</i> General
CMP	 Compressor	HcP	HACCP
dEF	 Defrost	rtc	 Real time clock
ALM	 Alarm		

Changes to SKOPE factory default programs are not recommended.

Procedure 3: To access ir33 Type C parameters

1. Press the **Prg** mute and **Set** buttons together for more than 5 seconds. The display will show either **00** or **-1**, representing the password prompt.
2. Press the  or  buttons until displaying the password number **66**.
3. Confirm by pressing the **Set** button. The display will show the code of the first modifiable Type C parameter.

Procedure 4: To modify CAREL ir33 Type C parameters

1. Access the relevant category using one of the two methods:
 - Press the  or  keys until you reach the parameter you want. When scrolling, an icon appears on the display representing the category the parameter belongs to.
 - Press the **Prg** mute key to display a menu that is used to quickly access the group of parameters to be modified (see Table 9, “ir33 controller alarms”, on page 10), then scroll through the menu with the  or  keys. The display shows the codes of the various categories of parameters.
2. When you have reached the desired category, press the **Set** key to move directly to the first parameter in the category.
3. At this stage, continue to scroll through the parameters or press the **Prg** mute key to return to the categories.
4. Press the **Set** key to display the value associated with the parameter.

Procedure 4: To modify CAREL ir33 Type C parameters (continued)

5. Increase or decrease the value using the $\frac{\blacktriangle}{aux}$ or $\frac{\blacktriangledown}{def}$ keys respectively.
6. Press the **Set** key to temporarily save the new value and return to the display of the parameter code.
7. Repeat step 1 on the previous page.
8. If the parameter has sub-parameters, press the **Set** key to display the first sub-parameter.
9. Press the $\frac{\blacktriangle}{aux}$ or $\frac{\blacktriangledown}{def}$ keys to scroll through all the sub-parameters.
10. Press the **Set** key to display an associated value.
11. Increase or decrease the value using the $\frac{\blacktriangle}{aux}$ or $\frac{\blacktriangledown}{def}$ keys respectively.
12. Press the **Set** key to temporarily save the new value and return to the display of the sub-parameter code.
13. Press the $\frac{Prg}{mute}$ key to return to the display of the parent parameter.
14. Press the $\frac{Prg}{mute}$ key for more than five seconds to store the new values of the modified parameters.

ir33 Controller Alarms

Table 9: ir33 controller alarms

Code	Display LCD	Buzzer	Alarm description	Initial action	Final action
	Flashing	On	Product HIGH temperature alarm (auto reset)	1. Check the cabinet product loading to ensure ventilation slots are not blocked and that product does not overhang the shelves. 2. Ensure the cabinet is installed with good refrigeration cartridge ventilation.	If the alarm persists, contact SKOPE (see page 2).
	Flashing	On	Product LOW temperature alarm (auto reset)	3. Check and clean the condenser coil. 4. Unplug cabinet from the power supply for 1 minute, then reconnect to power supply.	
	Flashing	Off	Refrigeration system high temperature pre-warning (auto reset)	1. Clean the condenser coil. 2. Check refrigeration ventilation. Ensure clear airpath at the top and front of the cabinet (to extract hot air). A minimum of 200 mm clear space is required above and in front of the refrigeration cartridge.	
	Flashing	On	Refrigeration system high temperature shutdown (manual reset)	3. Ensure the cabinet is installed in a suitable environment. 4. Unplug cabinet from the power supply for 1 minute, then reconnect to the power supply.	
	Flashing	Off	Ambient probe fault (also flashes 'rE')	Unplug cabinet from the power supply for 1 minute, then reconnect to power supply.	
	Flashing	Off	Evaporator probe fault		
	Flashing	Off	Condenser probe fault		
	None	Off	Defrost over-time limit		
	Flashing	Off	Controller E prom error		
	Flashing	Off	Controller E prom error		

Condenser Over-temperature Two Stage Alarm

To prevent damage to the refrigeration system, during periods of excess condensing temperature, the electronic controller will completely shut down the cabinet (and can only be reset by replugging the cabinet into the power supply).

This is a two stage alarm. Stage One is simply a warning code of **cht**, which ideally the customer should respond to. Cleaning the condenser may possibly fix the problem. If the condenser fan fails, the controller will quickly move to Stage Two alarm **CHT** and completely shut down the cabinet.

- Parameter "Ac" (SKOPE default) = 60 (Shutdown = 60°C)
- Parameter "AE" (SKOPE default) = 10 (Warning Initiation = Ac minus AE/2 = 55°C. Warning Reset = Ac minus AE = 50°C).

Note

In low ambient conditions the alarm may not activate due to a blocked condenser. In applications with a continuously low ambient, it may be worthwhile lowering the alarm threshold if condenser blockage notification is wanted.

SKOPE CAREL S4 EVO



Faceplate

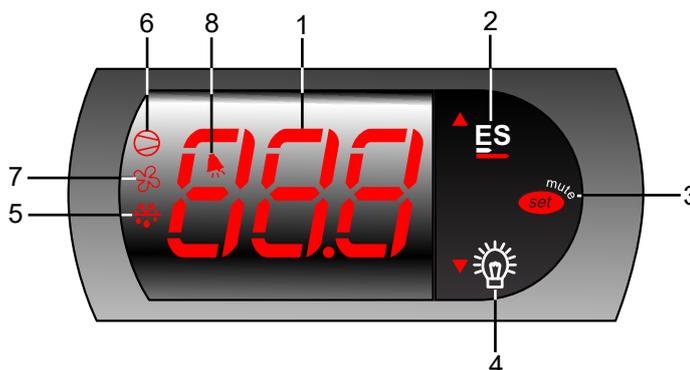


Table 10: CAREL S4 EVO controller faceplate

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 other 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.

Messages and Alarms

Controller Display The following tables explain the messages and alarms that the electronic controller displays.

Alarms signal unexpected operational changes in the cabinet and can be muted by pressing the Set (mute) button on the electronic controller faceplate (see page 12).

Table 11: CAREL S4 EVO messages

Display	Description
20	The cabinet is in Normal mode and the electronic controller displays the temperature.
--	The cabinet's internal temperature is above 13°C.
CCP	The cabinet is in Cold Climate Protection (CCP) mode. The cabinet enters CCP 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 below for more information).

Table 12: CAREL S4 EVO alarms

Display	Description
E0	Control probe error.
E1	Condenser probe error.
E2	Evaporator probe error.
L0	Low temperature alarm. An alarm sounds. The temperature inside the cabinet is too cold. The controller will automatically reset the alarm once the temperature inside the cabinet rises.
H1	High temperature alarm. An alarm sounds. The temperature inside the cabinet is too warm. The controller will automatically reset the alarm once the temperature inside the cabinet drops.
cht	Refrigeration system high temperature. Pre-warning (auto reset).
CHt	Refrigeration system high temperature. Shutdown (manual reset).
ELO	Low voltage alarm. An alarm sounds. The mains voltage is low. The controller switches off the compressor. The controller will automatically reset the alarm once the mains voltage rises.
EH1	High voltage alarm. An alarm sounds. The mains voltage is high. The controller switches off the compressor. The controller will automatically reset the alarm once the mains voltage drops.
EE	Electronic controller fault.
EF	

Running the Cabinet

Operating Modes The electronic controller runs the cabinet in constant “Normal” mode. There is no 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 cabinet in cold climate protection mode (CCP), or may shut down the lights and/or refrigeration system. Refer to "Cold Climate Protection (CCP)" on page 14, or "Messages and Alarms" on page 12 for more information.

Compressor and Fans The compressor and condenser fan will start shortly after the cabinet is turned on. The compressor stops when the setpoint (parameter **St**) is reached.

The evaporator fan starts approximately 3 seconds (parameter **F0**) after the compressor and condenser fan. To verify, check that the FAN light (item 7 in Table 10 on page 12) 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 cabinet's temperature, provides the temperature for the electronic controller to display, and notifies the electronic controller of any erratic or abnormal temperatures that could identify a problem within the refrigeration system. It is located in the return airflow on the bracket in front of the evaporator face.

The evaporator probe starts and stops the defrost cycle. It is located inside the evaporator coil, between the fins at the bottom of the coil.

The condenser probe monitors the refrigeration system condenser temperature, and notifies the electronic controller of any abnormally high temperatures that could identify a problem within the refrigeration system. It is located and insulated on the outside middle tube of the condenser.

To see the probe readings, go to parameters **d/1** and **d/2**.

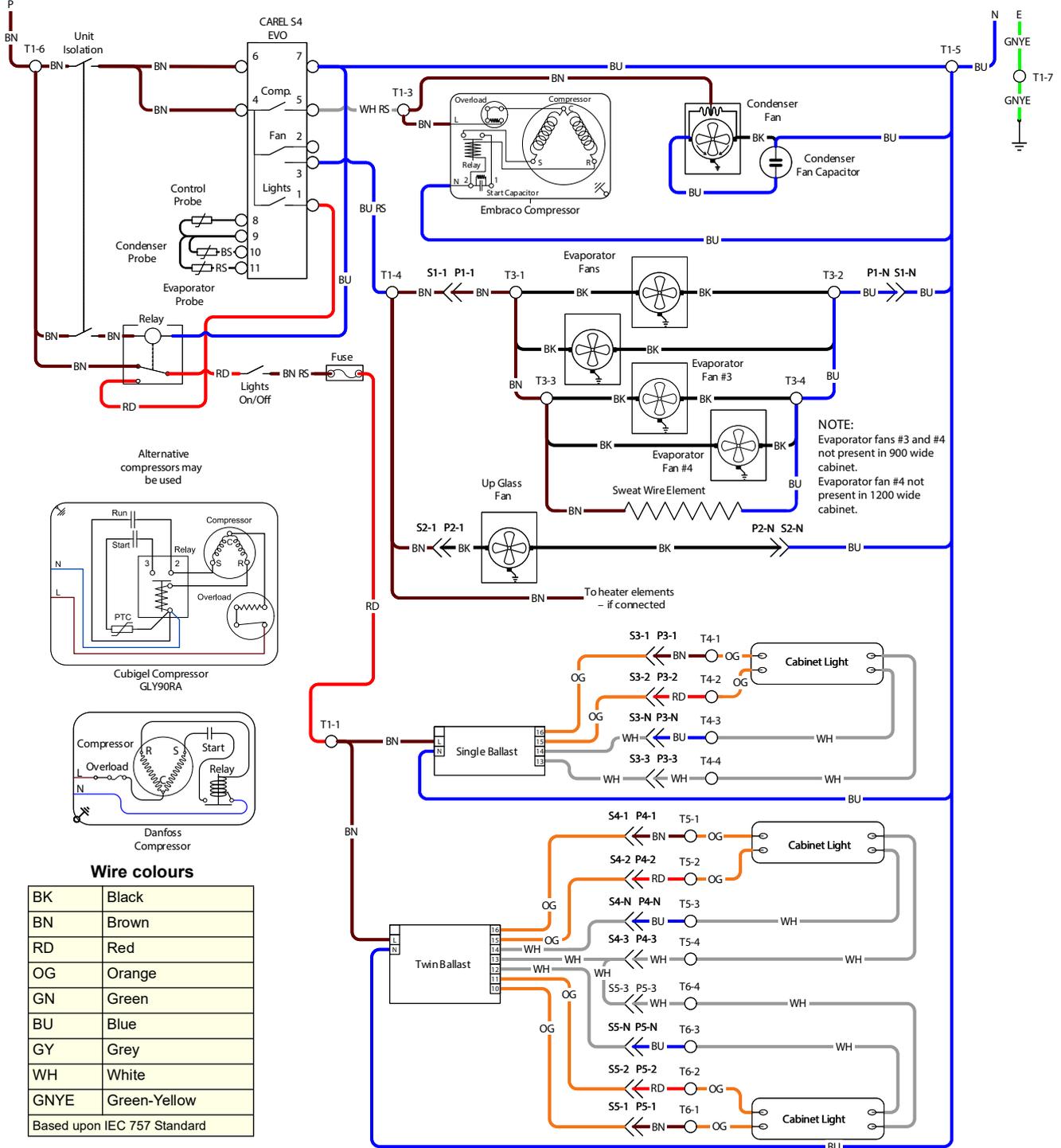
Defrost Cycle Defrosting is achieved via off-cycle defrosting. It is activated on elapse time (**dl**) and terminates on temperature (**dt**).

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

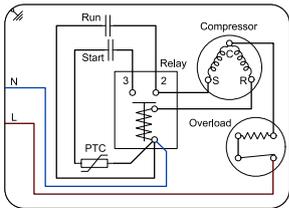
Cold Climate Protection (CCP) The cabinet will enter CCP mode if the ambient temperature becomes too cold. This happens if the control probe (at the evaporator air out) detects the interior temperature below 0°C (parameter **St - CCt**) for more than 30 minutes (parameter **CCd**). The lights will stay on and cannot be switched off while the cabinet is in CCP mode. The cabinet will return to Normal operation mode once the control probe reading rises to 2°C (parameter **St**) temperature.

3 Wiring

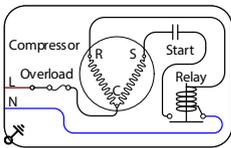
FDM Series - Integral



Alternative compressors may be used



Cubigel Compressor GLY90RA



Danfoss Compressor

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

BS	Blue sleeve	T2	Light ballast supply terminal block
RS	Red sleeve	T3	Cartridge evaporator fans terminal block
P1/S1	Evaporator fan ENSTO plug and socket	T4	Cabinet light 1 terminal block
P2/S2	Up glass fan ENSTO plug and socket	T5	Cabinet light 2 terminal block
P3/S3	Cabinet light 1 ENSTO plug and socket	T6	Cabinet light 3 terminal block
P4/S4	Cabinet light 2 ENSTO plug and socket		
P5/S5	Cabinet light 3 ENSTO plug and socket	O	Electrical connection/terminal
T1	Junction box main terminal block	>>	Plug and socket

4 Spare Parts

Cabinet Assembly - FDM900i

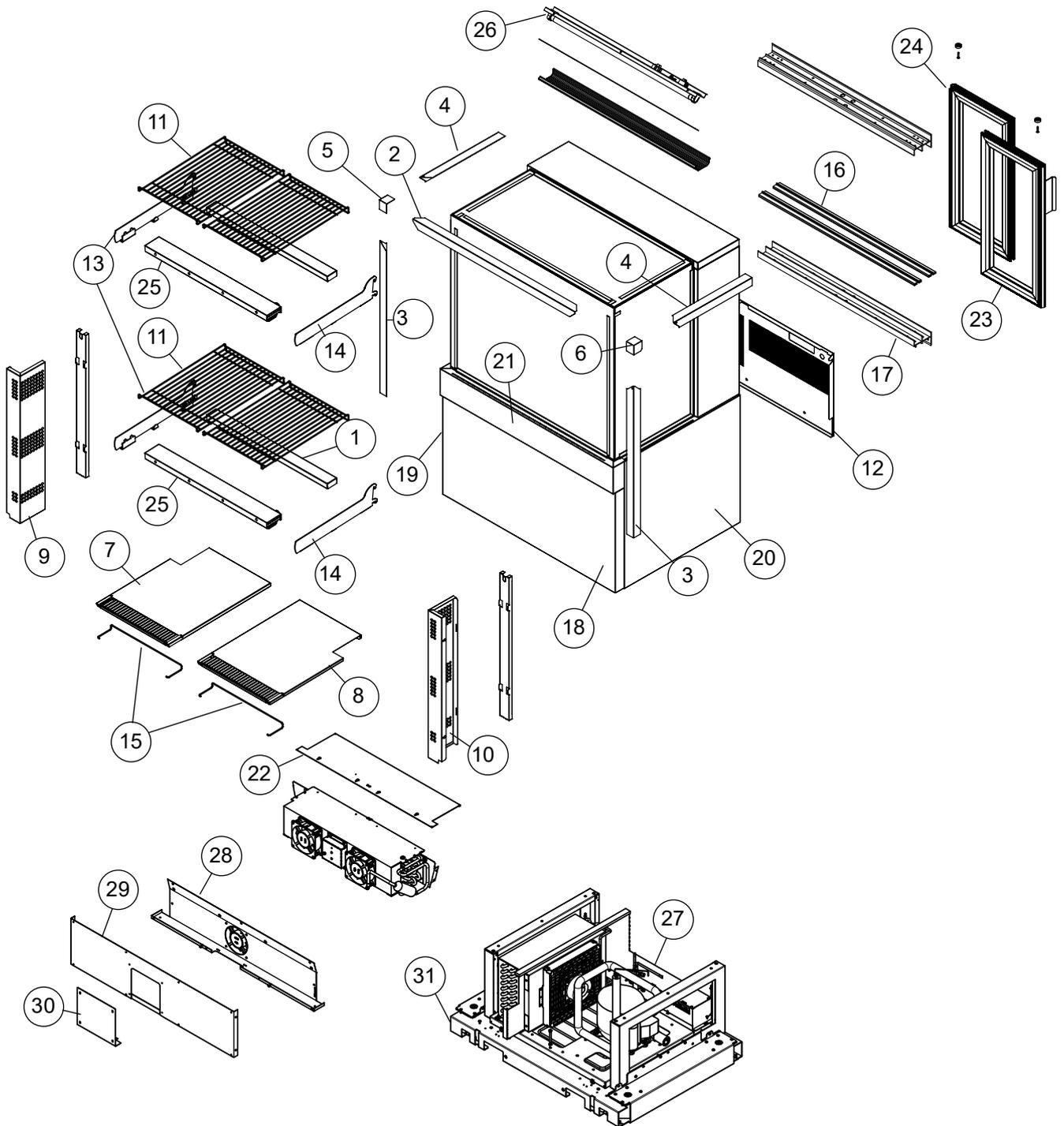


Table 13: Parts – FDM900i cabinet

Item	Description	SKOPE Part No.	Customer Part No.
1	Shelf Support	F0900/J22	
2	Capping Strip Middle	F0901/024	
3	Front Vertical Strip	F0901/025	
4	Horizontal Trim	F0901/025A	
5	Corner Cap – Left Hand	F0901/026L	
6	Corner Cap – Right Hand	F0901/026R	
7	Side Tray – Left Hand	F0901/585L	
8	Side Tray – Right Hand	F0901/585R	
	Bottom Shelf Support Bracket	F0900/353	
9	Air Guide – Left Hand	F0901/F88L	
10	Air Guide – Right Hand	F0901/F88R	
11	Wire Shelf	F0901/J77	
12	Rear Cover	F0901/N85	
13	Shelf Bracket – Left Hand	SSY2234	
14	Shelf Bracket – Right Hand	SSY2235	
15	Wire Upstand – Side	STW2978	
16	Door Track – 605 mm	F0900/N15	
17	Door Guide Extrusion	F0901/533	
18	Front Panel	F0901/A18	
19	Plinth Side – Left Hand	F0901/B87L	
20	Plinth Side – Right Hand	F0901/B87R	
21	Upper Front Panel	F0901/C61	
22	Evaporator Deflector	UB70AB/C93	
23	Sliding Door – Left Hand Back	F0901/N30LB	
24	Sliding Door – Right Hand Front	F0901/N30RF	
25	Tier Shelf Light Assembly	F0901/L83	
26	Top Light Assembly	F0900/L53	
27	CAREL S4 EVO Replacement Kit	ELZ11478-SP8	
28	Manifold Fan Assembly	F0901/U25A	
29	Front Manifold Cover	F0901/U28	
30	Manifold Fan Inspection Cover	F0901/U30	
31	Refrigeration Cartridge Assembly – Integral	UB70ALD-420ZE	

Cabinet Assembly - FDM1200i

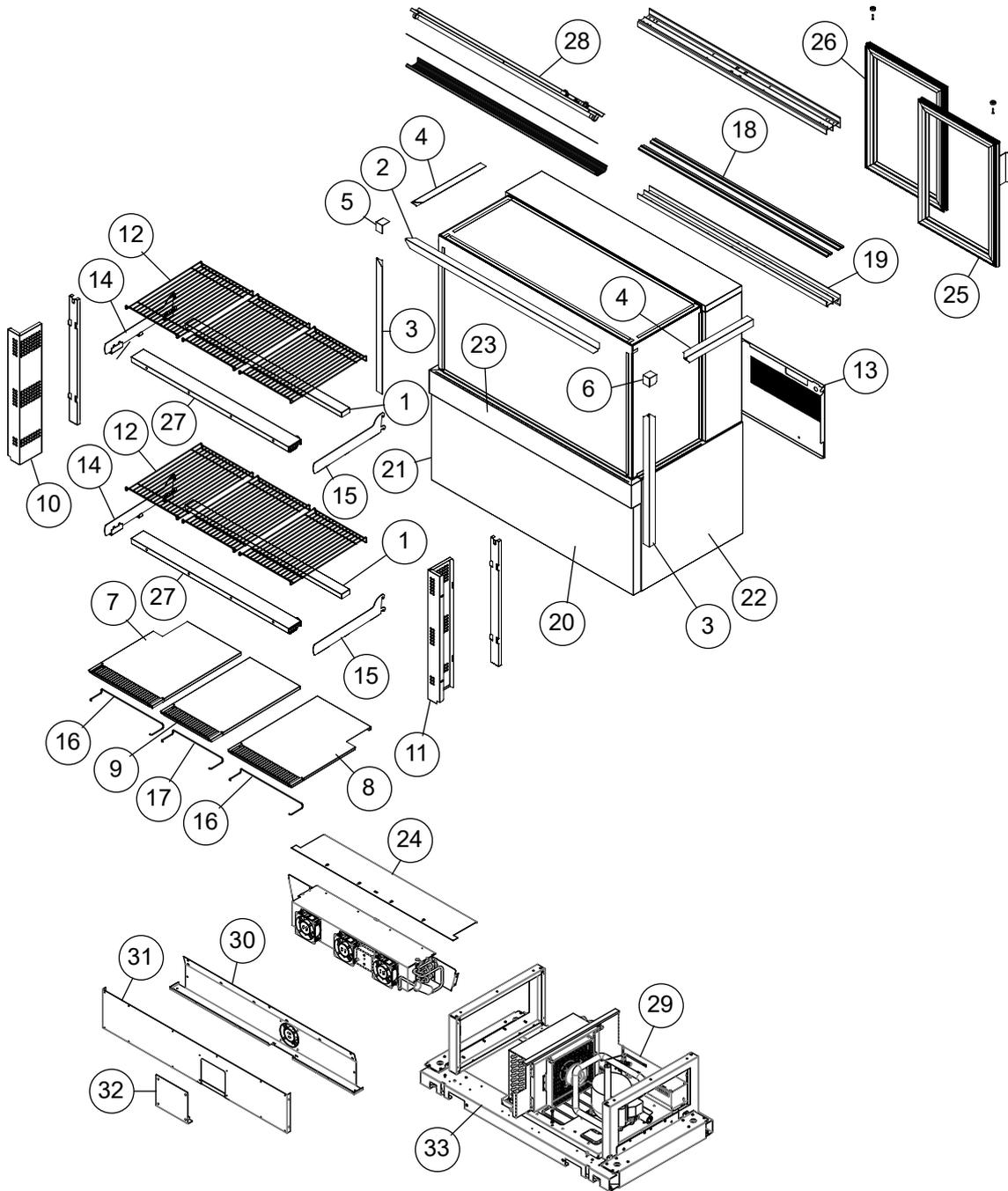


Table 14: Parts – FDM1200i cabinet

Item	Description	SKOPE Part No.	Customer Part No.
1	Shelf Support	F1200/J22	
2	Capping Strip Middle	F1201/024	
3	Front Vertical Strip	F0901/025	
4	Horizontal Trim	F0901/025A	
5	Corner Cap – Left Hand	F0901/026L	
6	Corner Cap – Right Hand	F0901/026R	
7	Side Tray – Left Hand	F0901/585L	
8	Side Tray – Right Hand	F0901/585R	
9	Tray – Middle	F1200/585M	
	Bottom Shelf Support Bracket	F1201/354	
10	Air Guide – Left Hand	F0901/F88L	
11	Air Guide – Right Hand	F0901/F88R	
12	Wire Shelf	F0901/J77	
13	Rear Cover	F1201/N85	
14	Shelf Bracket – Left Hand	SSY2234	
15	Shelf Bracket – Right Hand	SSY2235	
16	Wire Upstand – Side	STW2978	
17	Wire Upstand – Middle	STW2979	
18	Door Track – 905 mm	F1200/N15	
19	Door Guide Extrusion	F1201/533	
20	Front Panel	F1201/A18	
21	Plinth Side – Left Hand	F0901/B87L	
22	Plinth Side – Right Hand	F0901/B87R	
23	Upper Front Panel	F1201/C61	
24	Evaporator Deflector	UB71AB/C93	
25	Sliding Door – Left Hand Back	F1201/N30LB	
26	Sliding Door – Right Hand Front	F1201/N30RF	
27	Tier Shelf Light Assembly	F1201/L83	
28	Top Light Assembly	F1200/L53	
29	CAREL S4 EVO Replacement Kit	ELZ11478-SP8	
30	Manifold Fan Assembly	F1201/U25A	
31	Front Manifold Cover	F1201/U28	
32	Manifold Fan Inspection Cover	F0901/U30	
33	Refrigeration Cartridge Assembly – Integral	UB71ALD-420ZE	

Cabinet Assembly - FDM1500i

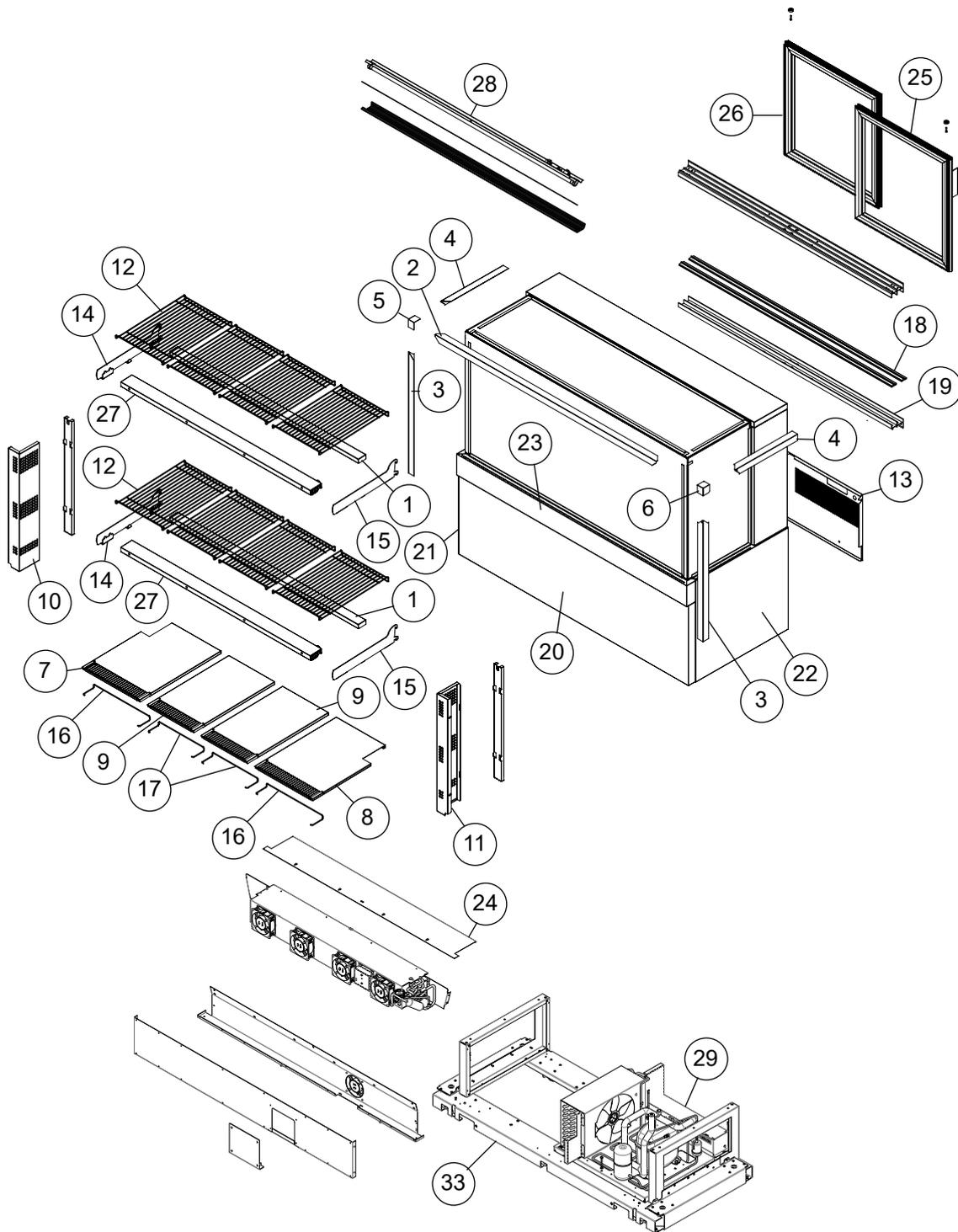
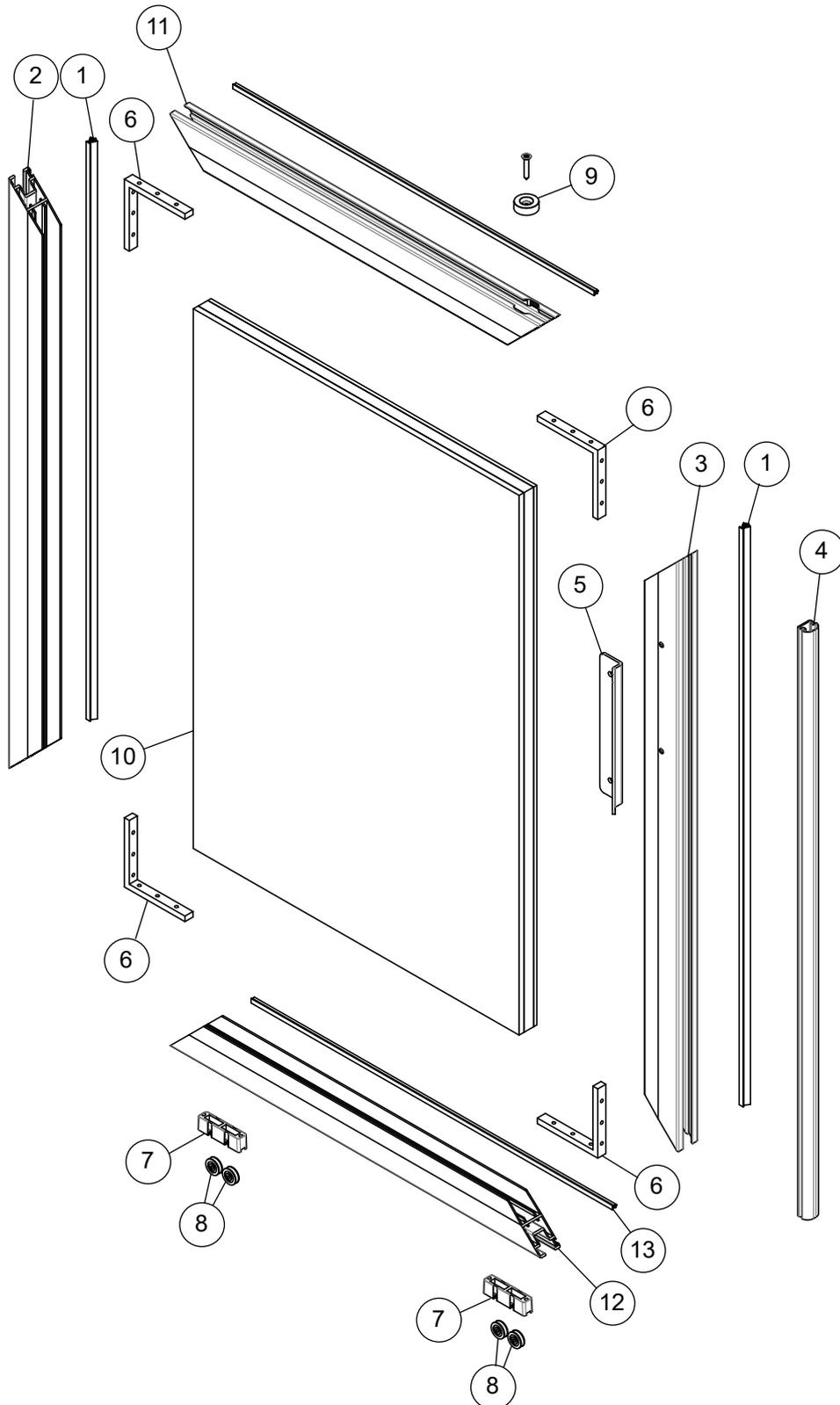


Table 15: Parts – FDM1500i cabinet

Item	Description	SKOPE Part No.	Customer Part No.
1	Shelf Support	F1500/J22	
2	Capping Strip Middle	F1501/024	
3	Front Vertical Strip	F0901/025	
4	Horizontal Trim	F0901/025A	
5	Corner Cap – Left Hand	F0901/026L	
6	Corner Cap – Right Hand	F0901/026R	
7	Side Tray – Left Hand	F0901/585L	
8	Side Tray – Right Hand	F0901/585R	
9	Tray – Middle	F1200/585M	
	Bottom Shelf Support Bracket	F1501/354	
10	Air Guide – Left Hand	F0901/F88L	
11	Air Guide – Right Hand	F0901/F88R	
12	Wire Shelf	F0901/J77	
13	Rear Cover	F1501/N85	
14	Shelf Bracket – Left Hand	SSY2234	
15	Shelf Bracket – Right Hand	SSY2235	
16	Wire Upstand – Side	STW2978	
17	Wire Upstand – Middle	STW2979	
18	Door Track – 1205 mm	F1500/N15	
19	Door Guide Extrusion	F1501/533	
20	Front Panel	F1201/A18	
21	Plinth Side – Left Hand	F0901/B87L	
22	Plinth Side – Right Hand	F0901/B87R	
23	Upper Front Panel	F1501/C61	
24	Evaporator Deflector	UB72AB/C93	
25	Sliding Door – Left Hand Back	F1501/N30LB	
26	Sliding Door – Right Hand Front	F1501/N30RF	
27	Tier Shelf Light Assembly	F1501/L83	
28	Top Side Light Assembly	F1500/L53	
29	CAREL S4 EVO Replacement Kit	ELZ11478-SP8	
30	Manifold Fan Assembly	F1501/U25A	
31	Front Manifold Cover	F1501/U28	
32	Manifold Fan Inspection Cover	F0901/U30	
33	Refrigeration Cartridge Assembly – Integral	UB72ACD-420ZC	

Sliding Door Assembly



Note: FDM1200i right hand door pictured (F1201/N30RF)

Table 16: Common parts – Sliding doors

Item	Description	SKOPE Part No.	Customer Part No.
1	Side Brush Sealing Strip	F0900/N36B	
2	Vertical Frame (non-handle side)	F0901/N32	
3	Right Hand Door Vertical Frame (handle side)	F0901/N32HR	
	Left Hand Door Vertical Frame (handle side)	F0901/N32HL	
4	Vertical Gasket	F0901/N35	
5	Right Hand Door Handle	HAN4998-49	
	Left Hand Door Handle	HAN4999-49	
6	Frame Corner Stake	JD2102/N34	
7	Roller Housing	PLM0323	
8	Roller	SXX7104	
9	Round Magnet	SXX10071	

Table 17: Parts – FDM900i sliding doors

Item	Description	SKOPE Part No.	Customer Part No.
1	Sliding Door – Right Hand Front	F0901N30RF	
2	Sliding Door – Left Hand Back	F0901/N30LB	
3	Glass Unit	GLA2261	
4	Right Hand Front Door Top Horizontal Frame	F0901/N33R	
	Left Hand Back Door Top Horizontal Frame	F0901/N33L	
5	Bottom Horizontal Frame	F0900/N33	
6	Bottom Brush Sealing Strip	F0900/N36C	

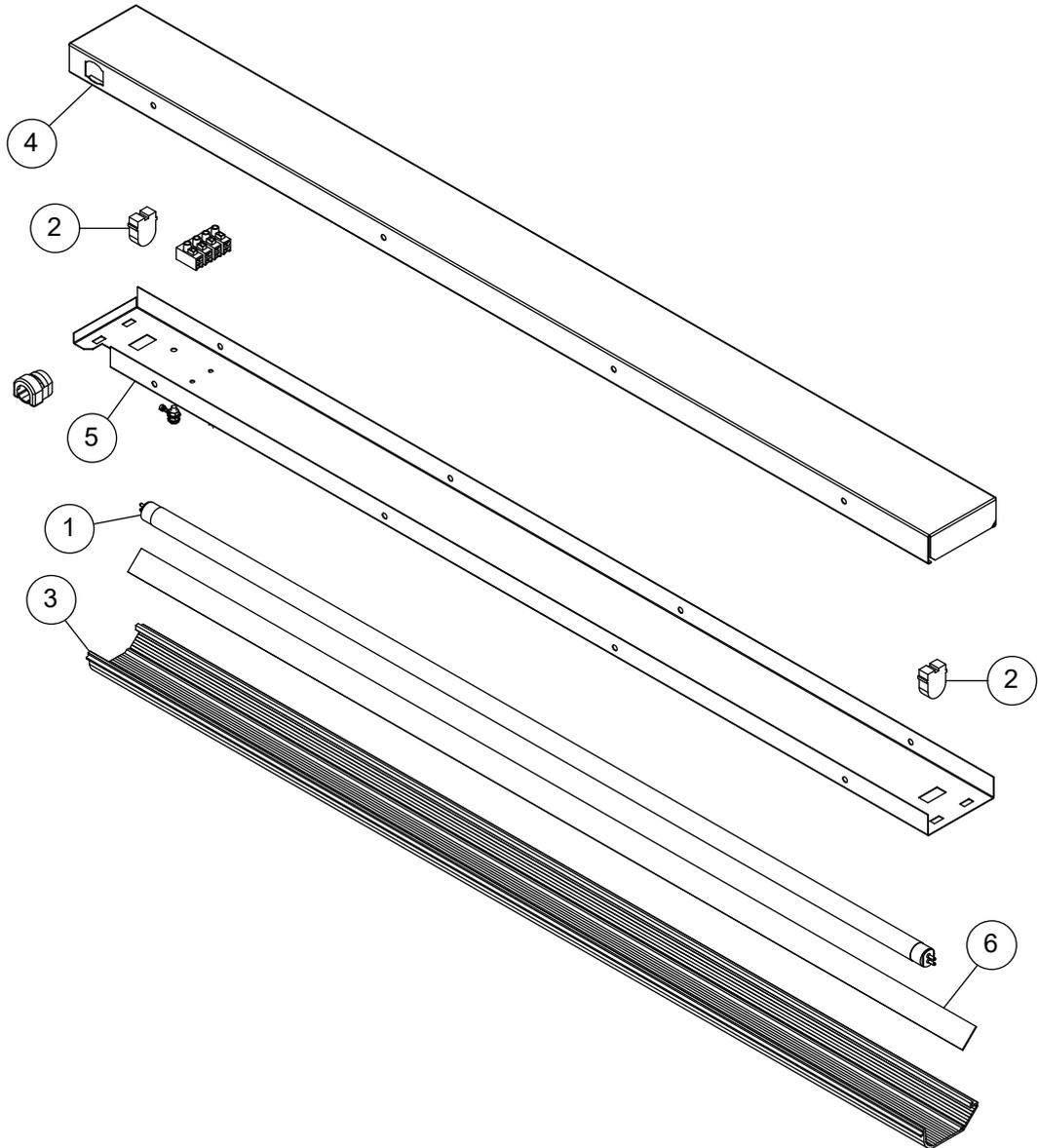
Table 18: Parts – FDM1200i sliding doors

Item	Description	SKOPE Part No.	Customer Part No.
1	Sliding Door – Right Hand Back	F1201/N30RF	
2	Sliding Door – Left Hand Front	F1201/N30LB	
3	Glass Unit	GLA2135	
4	Right Hand Front Door Top Horizontal Frame	F1201/N33R	
	Left Hand Back Door Top Horizontal Frame	F1201/N33L	
5	Bottom Horizontal Frame	F1200/N33	
6	Bottom Brush Sealing Strip	F1200/N36C	

Table 19: Parts – FDM1500i sliding doors

Item	Description	SKOPE Part No.	Customer Part No.
1	Sliding Door – Right Hand Back	F1501/N30RF	
2	Sliding Door – Left Hand Front	F1501/N30LB	
3	Glass Unit	GLA2263	
4	Right Hand Back Door Top Horizontal Frame	F1501/N33R	
	Left Hand Front Door Top Horizontal Frame	F1501/N33L	
5	Bottom Horizontal Frame	F1500/N33	
6	Bottom Brush Sealing Strip	F1500/N36C	

Tier Shelf Light Assembly



Note: FDM1200i tier shelf light assembly pictured (F1201/L83)

Table 20: Parts – FDM900i tier shelf light

Item	Description	SKOPE Part No.	Customer Part No.
–	Tier Shelf Light Assembly	F0901/L83	
1	14W T5 Fluorescent Tube	ELL0594	
2	Lampholder	ELZ10777	
3	Shelf Light Diffuser	F0900/E71	
4	Shelf Light Cover	F0900/L84-SS2	
5	Shelf Light Channel	F0900/L86-32	
6	Opal Polycarb	PLY2885	

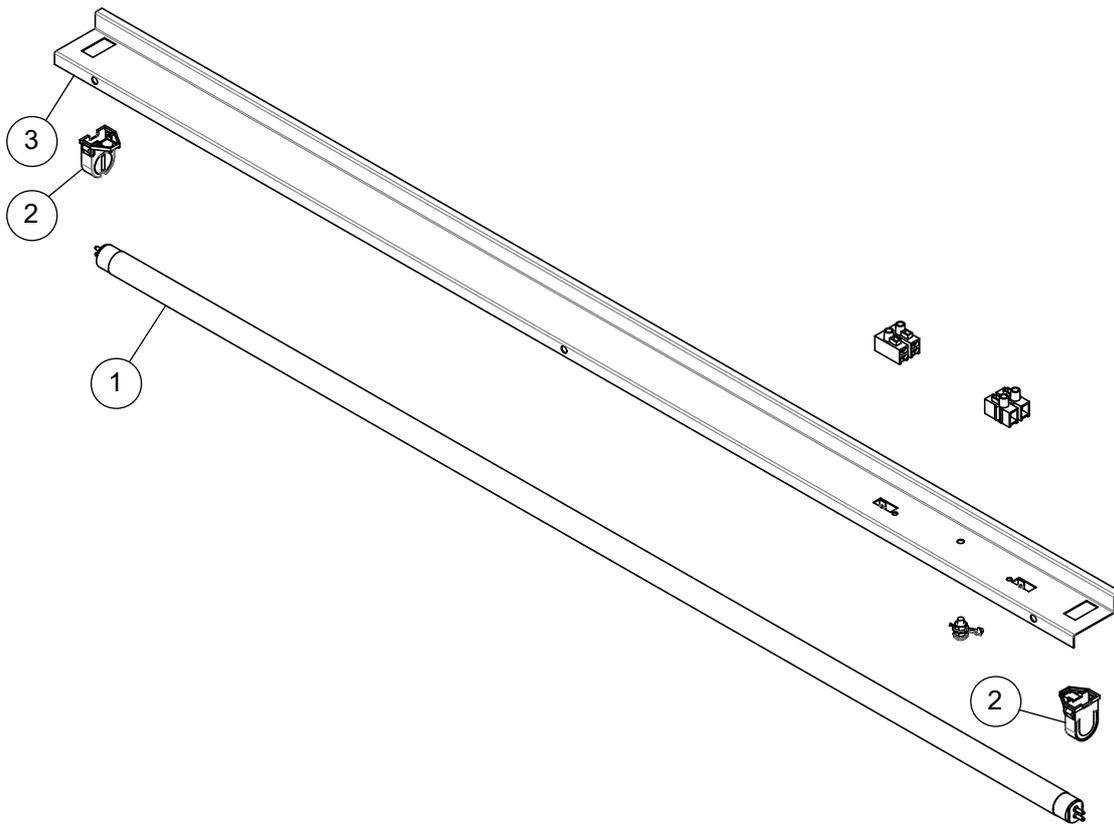
Table 21: Parts – FDM1200i tier shelf light

Item	Description	SKOPE Part No.	Customer Part No.
–	Tier Shelf Light Assembly	F1201/L83	
1	21W T5 Fluorescent Tube	ELL0595	
2	Lampholder	ELZ10777	
3	Shelf Light Diffuser	F1201/E71	
4	Shelf Light Cover	F1201/L84-SS2	
5	Shelf Light Channel	F1201/L86-32	
6	Opal Polycarb	PLY2886	

Table 22: Parts – FDM1500i tier shelf light

Item	Description	SKOPE Part No.	Customer Part No.
–	Tier Shelf Light Assembly	F1501/L83	
1	28W T5 Fluorescent Tube	ELL0595	
2	Lampholder	ELZ10777	
3	Shelf Light Diffuser	F1501/E71	
4	Shelf Light Cover	F1501/L84-SS2	
5	Shelf Light Channel	F1501/L86-32	
6	Opal Polycarb	PLY2887	

Top Light Assembly



Note: FDM1200i top light assembly pictured (F1200/L53-32)

Table 23: Parts – FDM900i top light

Item	Description	SKOPE Part No.	Customer Part No.
-	Top Light Assembly	F0900/L53-32	
1	14W T5 Fluorescent Tube	ELL0594	
2	T5 Lampholder	ELZ0600	
3	Top Light Channel	F0900/L54-32	

Table 24: Parts – FDM1200i top light

Item	Description	SKOPE Part No.	Customer Part No.
-	Top Light Assembly	F1200/L53-32	
1	21W T5 Fluorescent Tube	ELL0595	
2	T5 Lampholder	ELZ0600	
3	Top Light Channel	F1200/L54-32	

Table 25: Parts – FDM1500i top light

Item	Description	SKOPE Part No.	Customer Part No.
-	Top Light Assembly	F1500/L53-32	
1	28W T5 Fluorescent Tube	ELL0596	
2	T5 Lampholder	ELZ0600	
3	Top Light Channel	F1500/L54-32	

Control Box Assembly

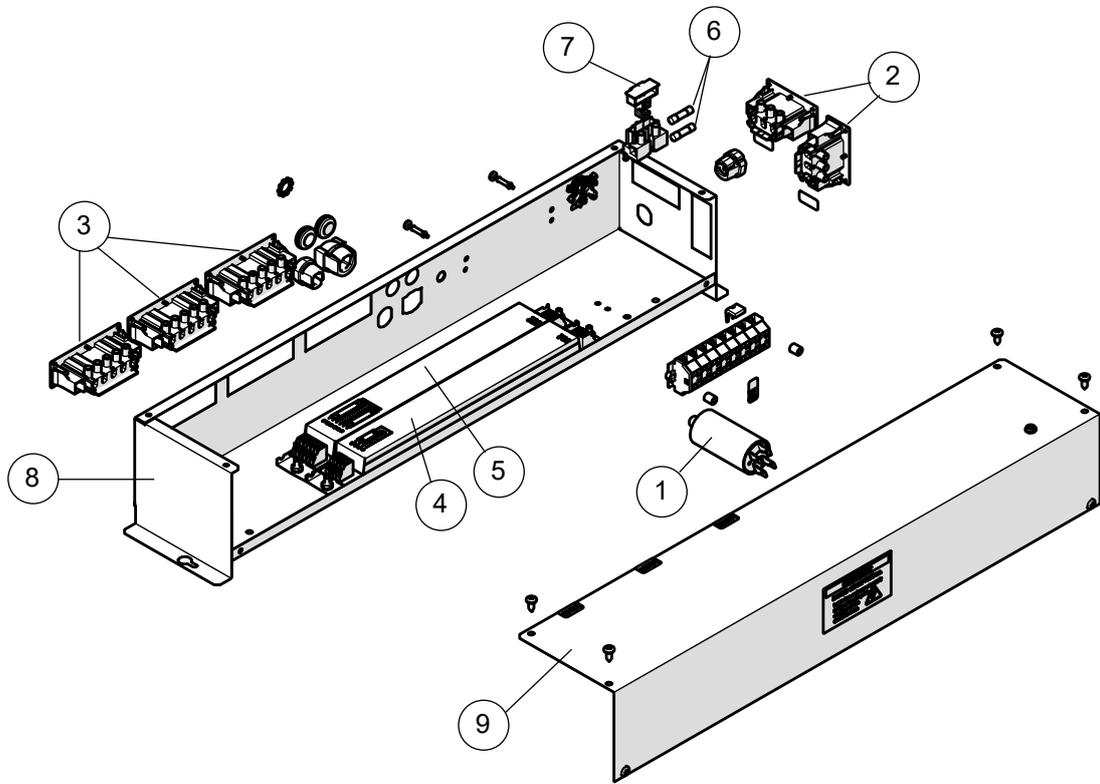


Table 26: Parts – Control box (CAREL ir33 and S4 EVO)

Item	Description	SKOPE Part No.	Customer Part No.
–	Control Box Assembly	F0900/G29-420	
1	Capacitor	ELC9142NC	
2	ENSTO 3-Pole Socket	ELZ0499-3	
3	ENSTO 5-Pole Socket	ELZ0499-5	
4	T5 Single Ballast	ELZ0605-2	
5	T5 Twin Ballast	ELZ0606-2	
6	3A Ceramic Fuse	ELZ9654	
7	Fused Terminal Block	ELZ9655	
8	Control Box Base	F0900/G30	
9	Control Box Cover	F0900/G31	
10	ENSTO 3-Pole Panel Adaptor (not shown)	PLM0497-3	
11	ENSTO 5-Pole Panel Adaptor (not shown)	PLM0497-5	

Controller Box Assembly

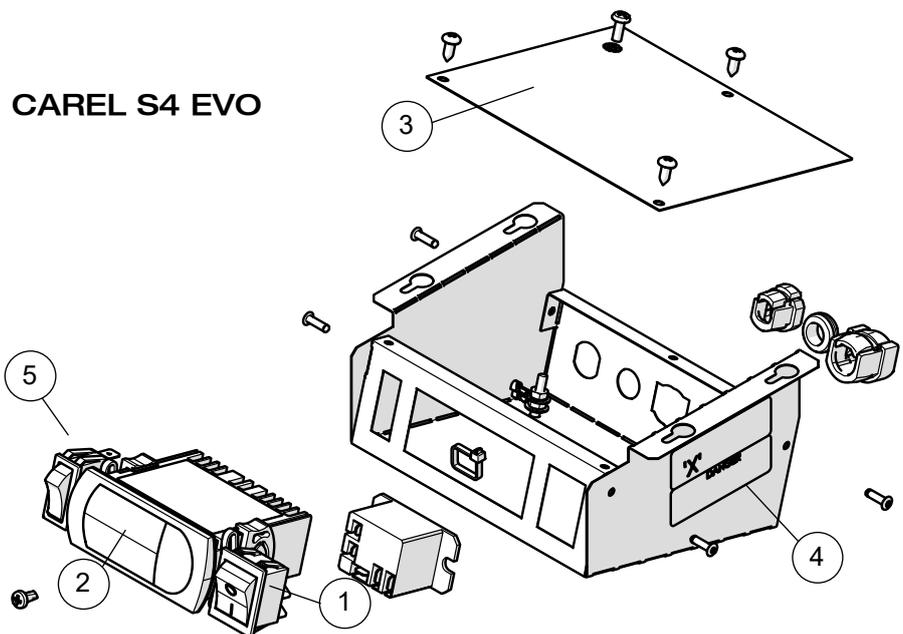
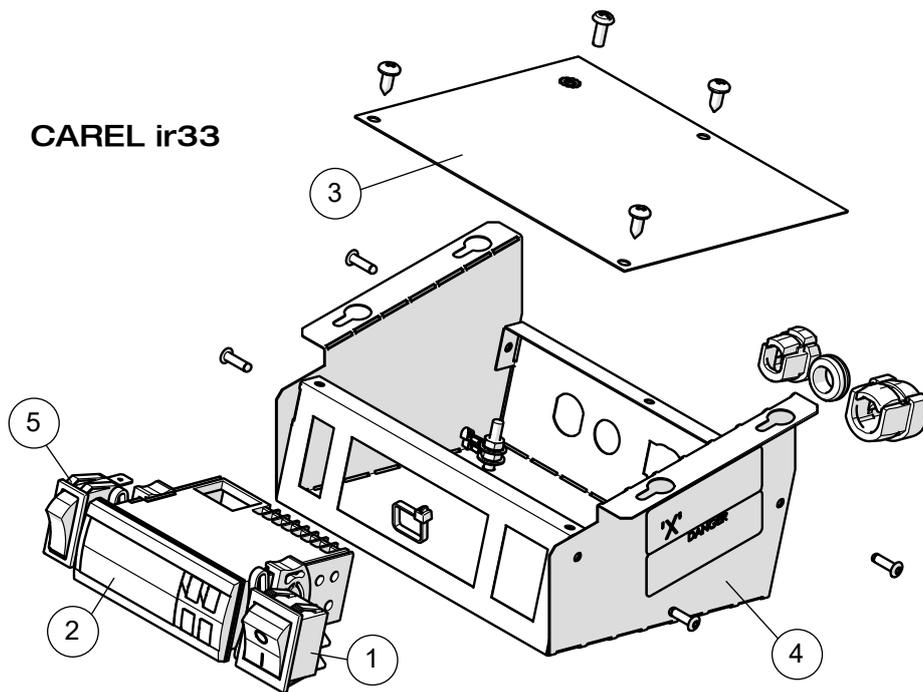


Table 27: Parts – Control box

Item	Description	SKOPE Part No.	Customer Part No.
–	Controller Box Assembly	F0902/K01-SP8	
1	2 Pole Rocker Switch (refrigeration system isolation switch)	ELS0495	
2	CAREL S4 EVO Replacement Kit	ELZ11478-SP8	
3	Controller Box Cover	F0900/K03	
4	Controller Box Base	F0900/K02	
5	Switch (lights)	ELS6560	

Refrigeration Cartridge Assembly – FDM900i

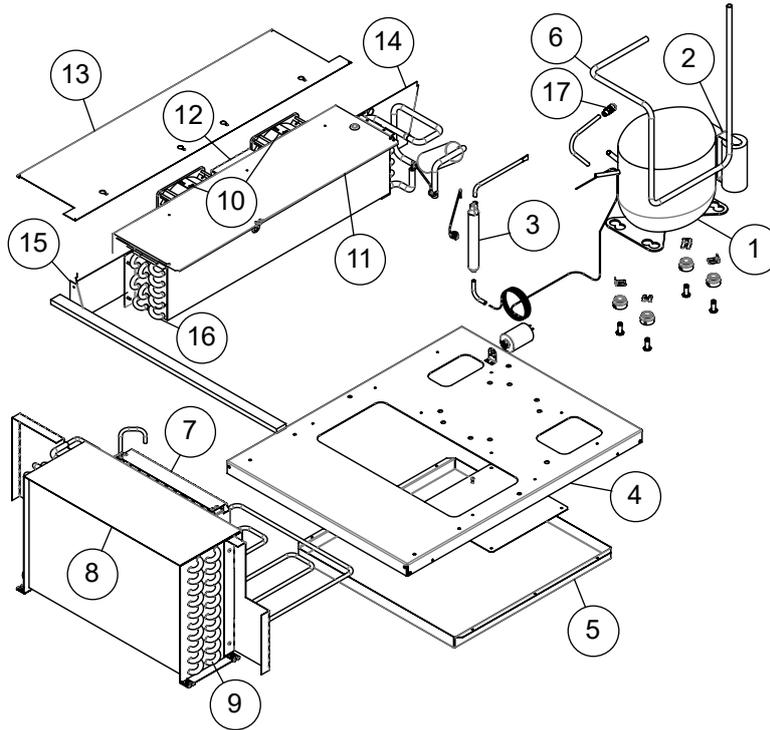


Table 28: Parts – FDM900i refrigeration cartridge

Item	Description	SKOPE Part No.	Customer Part No.
–	Refrigeration Cartridge Assembly	UB70ALD-420ZX	
1	Compressor – Embraco NEK6187Z	CPR10646	
2	Compressor Run Capacitor	ELC9914NC	
	Compressor Start Capacitor	ELC9942NC	
	Compressor Relay	ELR9943NC	
3	Drier	DRY8783	
4	Cartridge Base	UB70AA/210-49	
5	Condensate Tray	UB70AA/258W-SS3	
6	Suction Line Assembly	UB70AA/378	
7	Condenser Fan Guard/Motor Mount	UB70AA/R21/1-49	
	Condenser Fan Motor	ELM9917	
	Condenser Fan Blade	FAN5500	
8	Condenser Fan Shroud	UB70AA/232-49	
9	Condenser Coil	CLS6797	
	Discharge Line	UB70AA/255	
10	Evaporator Fan Motor/Blade	ELM7230	
11	Evaporator Fan Mount Bracket	UB70AA/B19-S1	
12	Evaporator Fan Junction Box	UB70AB/229	
13	Evaporator Deflector – Top	UB70AB/C93	
14	Evaporator Deflector – Right Hand (UB70ACD-420ZX & UB70ALD-420ZE only)	UB70AB/227L-SS3	
15	Evaporator Deflector – Left Hand (UB70ACD-420ZX & UB70ALD-420ZE only)	UB70AB/227L-SS3	
16	Evaporator Coil	CLS10066	
17	Schrader Recharging Valve	VAL2816	

Refrigeration Cartridge Assembly – FDM1200i

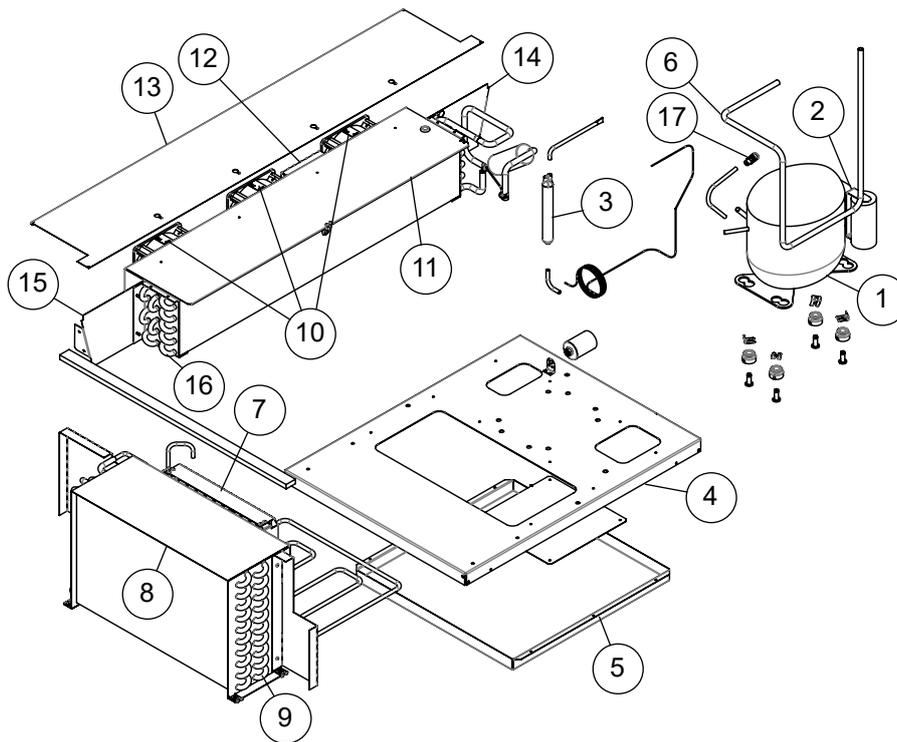


Table 29: Parts – FDM1200i refrigeration cartridge

Item	Description	SKOPE Part No.	Customer Part No.
–	Refrigeration Cartridge Assembly	UB71ALD-420ZE	
1	Compressor – Embraco NEK6187Z	CPR10646	
2	Compressor Run Capacitor	ELC9914NC	
	Compressor Start Capacitor	ELC9942NC	
	Compressor Relay	ELR9943NC	
3	Drier	DRY8783	
4	Cartridge Base	UB70AA/210-49	
5	Condensate Tray	UB70AA/258W-SS3	
6	Suction Line Assembly	UB70AA/378	
7	Condenser Fan Guard/Motor Mount	UB70AA/R21/1-49	
	Condenser Fan Motor	ELM9917	
	Condenser Fan Blade	FAN5500	
8	Condenser Fan Shroud	UB70AA/232-49	
9	Condenser Coil	CLS6797	
	Discharge Line	UB70AA/255	
10	Evaporator Fan Motor/Blade	ELM7230	
11	Evaporator Fan Mount Bracket	UB70AA/B19-S1	
12	Evaporator Fan Junction Box	UB71AB/229	
13	Evaporator Deflector – Top	UB71AB/C93	
14	Evaporator Deflector – Right Hand (UB71ACD-420ZX and UB71ALD-420ZE only)	UB71AB/227L-SS3	
15	Evaporator Deflector – Left Hand (UB71ACD-420ZX and UB71ALD-420ZE only)	UB71AB/227L-SS3	
16	Evaporator Coil	CLS10067	
17	Schrader Recharging Valve	VAL2816	

Refrigeration Cartridge Assembly – FDM1500i

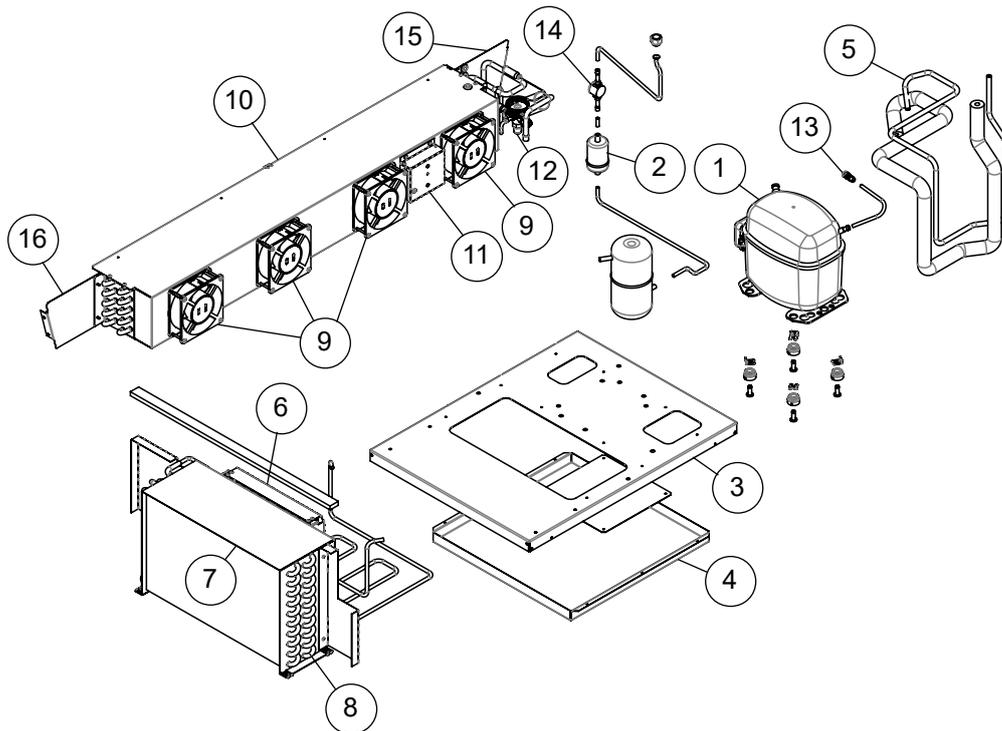


Table 30: Parts – FDM1500i refrigeration cartridge

Item	Description	SKOPE Part No.	Customer Part No.
–	Refrigeration Cartridge Assembly	UB72ACD-420ZX	
1	Compressor – Danfoss SC12G	CPR6108PH	
	Compressor Mounting Kit	SXX3654NC	
	Compressor Start Capacitor	ELC2369NC	
	Compressor Relay	ELR2729NC	
2	Drier	DRY6110	
3	Cartridge Base	UB70AA/210-49	
4	Condensate Tray	UB70AA/258W-SS3	
5	Suction Line Assembly	UB72AA/378	
6	Condenser Fan Guard/Motor Mount	UB70AA/R21/1-49	
	Condenser Fan Motor	ELM9917	
	Condenser Fan Blade	FAN1047	
7	Condenser Fan Shroud	UB72AA/232-49	
8	Condenser Coil	CLS6797	
	Discharge Line	UB72AA/255	
9	Evaporator Fan Motor/Blade	ELM7230	
10	Evaporator Fan Mount Bracket	UB70AA/B19-S1	
11	Evaporator Fan Junction Box	UB72AB/229	
12	TX Valve	UB72AA/524	
13	Schrader Recharging Valve	VAL2816	
14	Sight Glass	REF7622	
15	Evaporator Deflector – Right Hand (UB72ACD-420ZX only)	UB72AB/227L-SS3	
16	Evaporator Deflector – Left Hand (UB72ACD-420ZX only)	UB72AB/227L-SS3	
17	Evaporator Deflector (not shown)	UB72AB/C93	

5 Replacement Procedures

Refrigeration System

Introduction Integral SKOPE Food Display Cabinets are fitted with a bottom-mounted, electronically controlled refrigeration system. The refrigeration system can be isolated from the mains power supply via the refrigeration cartridge isolation switch (see Figure 3 below). To verify whether the cabinet is fitted with a refrigeration system, check the serial number/rating label above the electronic controller at the rear of the cabinet (see Figure 3 below). Integral versions are denoted by an “i” at the end of the model number (i.e. FDM1200i). Remote versions are denoted with an “r” and ambient versions with an “a”. Verify model and basic specifications before servicing (see page 5).

Table 31: Model specifications

Cabinet model	FDM900i	FDM1200i	FDM1500i
Refrigeration system model	UB70	UB71	UB72
Compressor	Electrolux GLY90RA or Embraco NEK61872	Electrolux GLY90RA or Embraco NEK61872	Danfoss SC12G
Refrigerant	R134a	R134a	R134a
Charge	480g	980g	980g

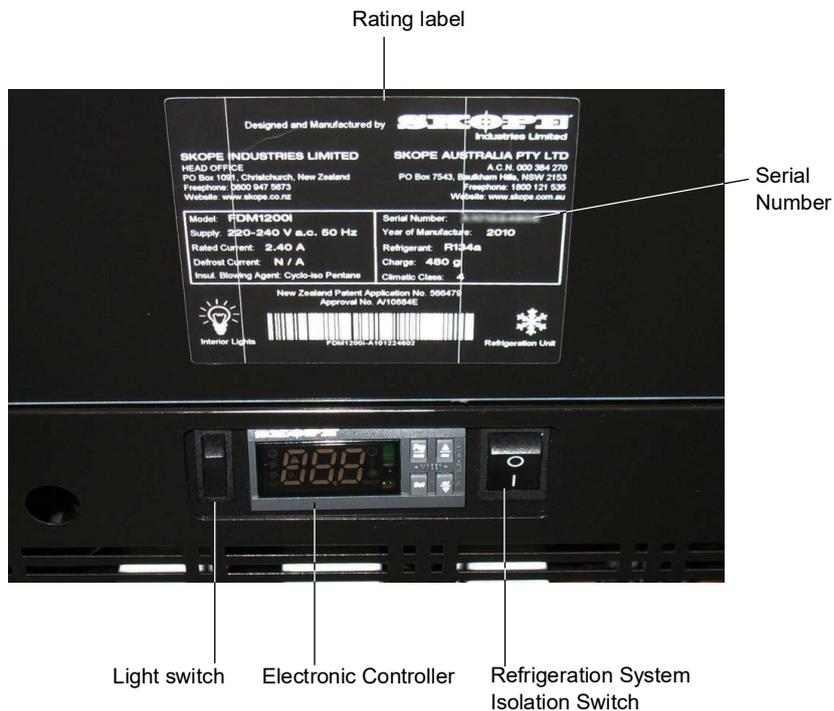


Figure 3: Serial Number Label and Isolation Switch

Refrigeration System Assembly

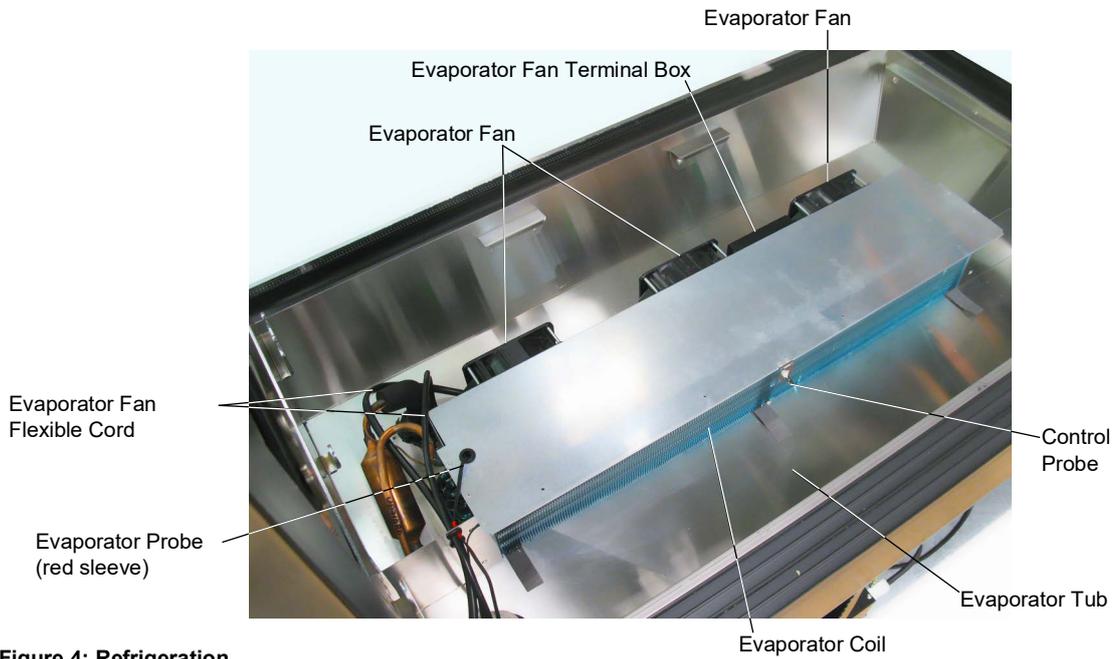


Figure 4: Refrigeration System – Evaporator (UB71 Pictured)

Note: Sliding doors and evaporator deflector have been removed.

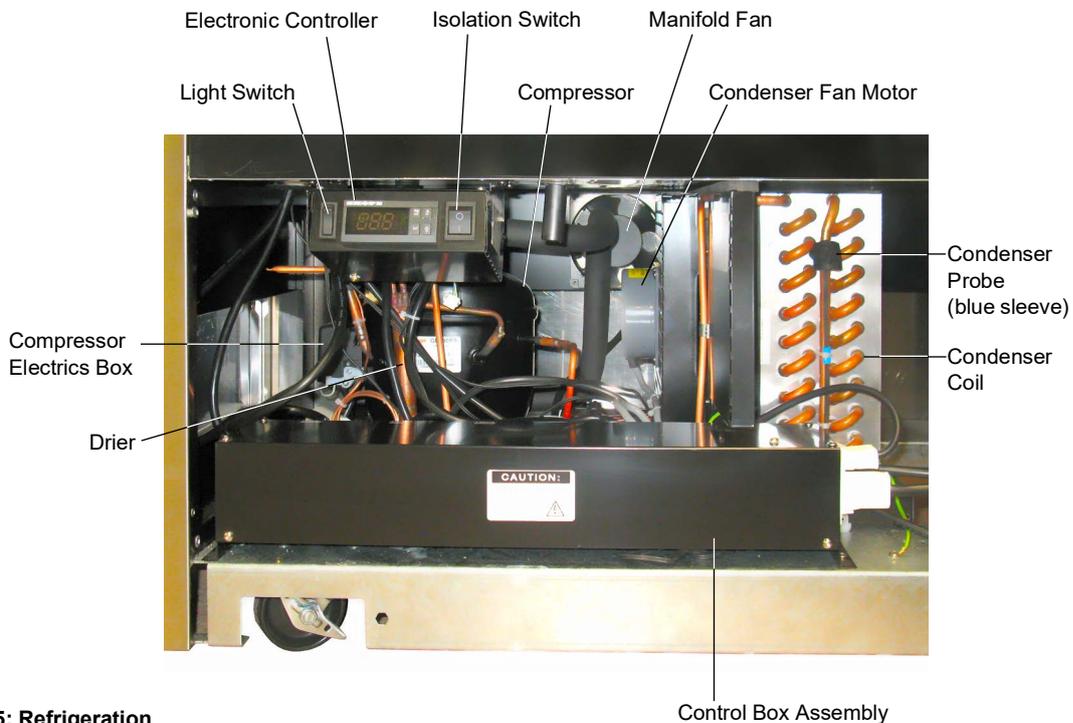


Figure 5: Refrigeration System – Condenser and Electrics (UB71 Pictured)

Note: Rear cover has been removed.

Gaining Access There are three different access points available for servicing the refrigeration system. Before carrying out any work ensure the cabinet is isolated from the mains power supply.

Access via the front panel

The front panel is attached to the cabinet by a hinge at the bottom and secured in place with two fixing screws along the top of the panel. Remove the front panel to access the manifold fan and parts of the condenser assembly.



Figure 6: Front Panel
(FDM1200i pictured)

Access via the rear cover

The rear panel can be unscrewed and lifted from the rear of the cabinet. From here the condenser assembly, electronic controller assembly and control box can be serviced.



Figure 7: Rear Panel
(FDM1200i pictured)

Access via the cabinet interior floor

The evaporator assembly can be accessed from inside the cabinet. Remove the sliding doors and shelves to free up space, and unscrew the evaporator deflector to gain access to the evaporator coil.



Figure 8: Cabinet Interior Floor
(FDM1200i pictured)

Control Box Assembly The control box assembly is located behind the rear cover, below the electronic controller. It contains electrical connections, ballasts and fuses for the refrigeration system and cabinet lighting.

Procedure 5: To access the ir33 and S4 EVO control box

1. Isolate the cabinet from the mains power supply (see page 33).
2. Remove the rear cover from the cabinet (see "Gaining Access" on page 35).
3. Disconnect the five ENSTO plugs from the control box.
4. Loosen the two keyhole screws (one at each end) from the control box base and lift the control box from the base of the cabinet.
5. Undo the six fixing screws from around the control box cover perimeter and remove the cover (leave the earth wire attached).
6. All electrical connections can now be accessed. Ensure the cover is replaced and the box is fixed to the base of the cabinet after servicing.

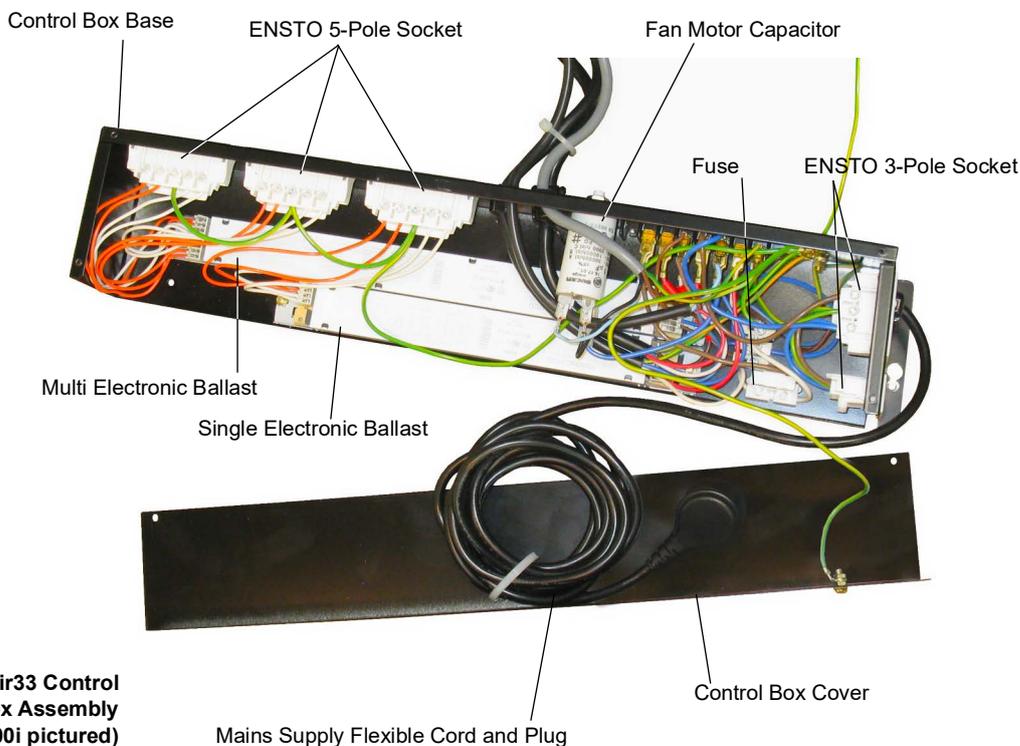


Figure 9: ir33 Control Box Assembly (FDM1200i pictured)

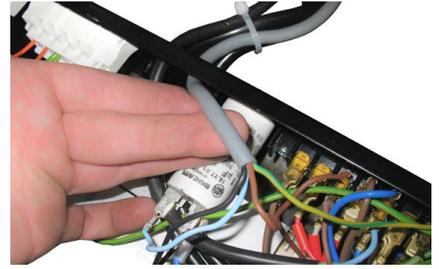
Condenser Fan The condenser fan assembly is made up of a fan motor, fan blade and a motor mount bracket. The motor mount bracket slots into the condenser coil shroud and is fixed into place with two fixing screws. Access is easiest from the rear cover (see "Gaining Access" on page 35).

Procedure 6: To remove and replace the condenser fan motor

1. Isolate the cabinet from the mains power supply (see page 33).
2. Remove the rear cover (see "Gaining Access" on page 35).
3. Remove and open the control box assembly (see "Control Box Assembly" on page 36).

Procedure 6: To remove and replace the condenser fan motor (continued)

- Trace the condenser fan motor flexible cord to the push-on connections inside the control box and disconnect the terminals. Withdraw the condenser fan motor flexible cord from the control box.



- Unscrew the two fixing screws from the motor mount bracket and remove the fan assembly from the cabinet.



- Service as necessary. When refitting ensure all wires are reconnected correctly.

Evaporator Fans

Depending on the model, the cabinet will be fitted with two, three or four evaporator fans. The fans are located underneath the bottom trays on the floor of the cabinet interior.

The fans can be replaced individually. Each fan has a push-in plug for easy removal and replacement.

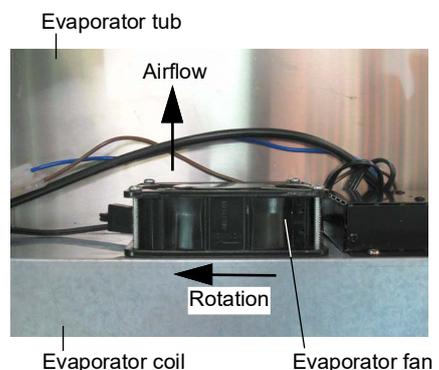
Procedure 7: To access and remove an evaporator fan motor

- Isolate the cabinet from the mains power supply (see page 33).
- Remove the rear sliding doors, all interior shelving, lights and the bottom trays (see Procedure 8 on page 39).

- Unplug the faulty fan and undo the fixing screws to remove the fan from the evaporator assembly.



- Fit the replacement fan. Ensure fan rotation and airflow are as shown.



- Reassemble the cabinet.

Compressor Depending on the model, the cabinet will be fitted with either an Electrolux, Embraco or Danfoss compressor. The compressor is located at the bottom of the cabinet and is accessible through both the front and rear cover (see page 35).

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 terminal 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 refrigeration cartridge has a direct power supply (not from a multi-box or extension cord).

Compressor Electrics The compressor electrics box is attached to the side of the compressor. It houses the compressor relay and start capacitor.

To access the compressor relay, remove the rear cover from the cabinet to access the compressor and remove the cover from the electrics box. To access the start capacitor, fold the cabinet front cover down.

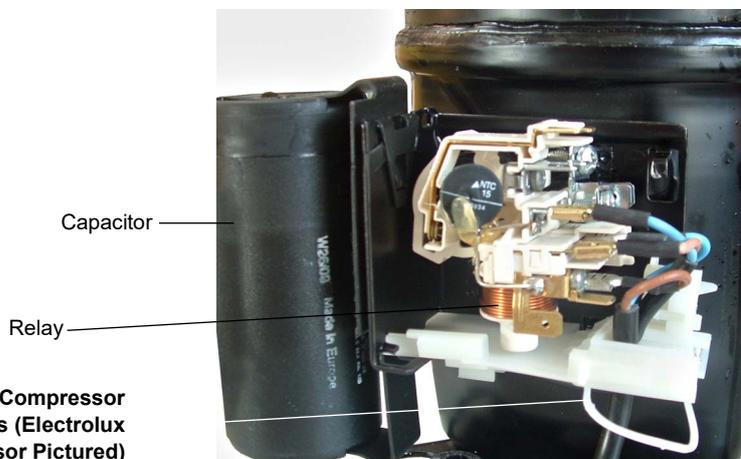


Figure 10: Compressor Electrics (Electrolux Compressor Pictured)

Glass Fan The cabinet is fitted with a fan to blow air up and across the glass to eliminate condensation. The glass fan is part of the fan manifold assembly located behind the front cover. Air is blown up through vents around the bottom edge of the glass.

To inspect the glass fan, fold down the front cover and remove the manifold fan inspection cover. If replacing the glass fan, remove the complete fan manifold assembly and service as necessary.

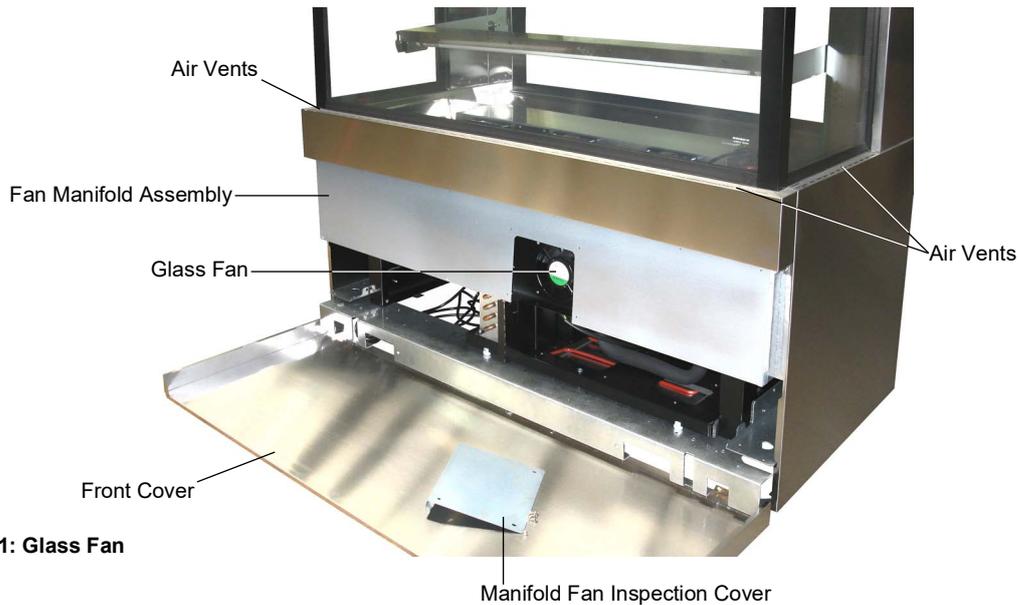


Figure 11: Glass Fan

Cabinet

Introduction The Food Display Cabinet is fitted with shelving and lighting. The shelving consists of two levels of angled adjustable shelves and one bottom level of stainless steel trays. The adjustable shelves can be positioned either horizontally or angled down 5°. The shelving is designed to be easily removed from the cabinet for ease of cleaning and servicing.

The two sliding doors are located at the rear of the cabinet and can be lifted out to provide easier access inside the cabinet.

Procedure 8: To remove the doors, shelves and lights from the cabinet

1. Isolate the cabinet from the mains power supply.

2. The sliding doors can be removed from the cabinet by lifting each door up and pulling out at the bottom. To refit the doors, lift each door up into the top track and place onto the bottom track.



3. The wire shelves can be lifted out of the cabinet. When refitting the wire shelves ensure the bottom rail on each wire shelf sits against the rear support.



Procedure 8: To remove the doors, shelves and lights from the cabinet (continued)

4. The shelf rear support panels and shelf lighting can be removed from the cabinet by lifting up and off the shelf brackets. The power supply cable will remain attached to the lighting panels.



5. Remove the shelf brackets by lifting up at the front and pulling out from the cabinet.

6. The floor panels can be removed from the cabinet by lifting each panel up. The floor of the cabinet can now be accessed for cleaning.



Lighting The Food Display Cabinet is fitted with three fluorescent tube interior lights. One light is located in the ceiling of the cabinet. The other lights are located underneath the front of each shelf. The lights can be turned on and off via the light switch on the left hand side of the electronic controller. See Table 32 below for fluorescent tube specifications.

Table 32: Fluorescent tube specifications

Model	Description
FDM900i	14 Watt T5 fluorescent tube (Ø16 mm × 550 mm) Warm White 830
FDM1200i	21 Watt T5 fluorescent tube (Ø16 mm × 850 mm) Warm White 830
FDM1500i	28 Watt T5 fluorescent tube (Ø16 mm × 1150 mm) Warm White 830

Procedure 9: To replace the ceiling fluorescent tube

1. Disconnect the cabinet from the mains power supply.
2. Remove the light diffuser, by compressing one end of the diffuser until it disengages from the housing.

3. The fluorescent tube can now be removed. Revolve the tube until the pin position allows withdrawal.



4. When refitting the diffuser, engage the back section into the housing and then compress and snap the front section of diffuser back into place working along the full length of the light.

Procedure 10: To replace a shelf light

1. Remove both sliding rear doors (see page 39).
2. Remove the wire shelves (see page 39).

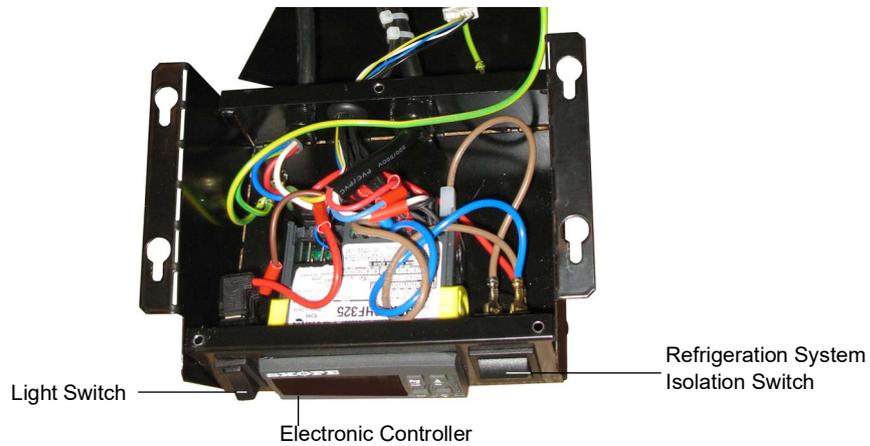
3. Lift the light assembly panel up off both shelf end supports and remove from the cabinet. The power supply cable will remain attached.



4. Remove the light diffuser by compressing one end of the diffuser until it disengages from the housing. The fluorescent tube can now be removed. Revolve the tube until the pin position allows withdrawal.



Controller Box The controller box houses the electronic controller, light switch and refrigeration system isolation switch. To remove and access the controller box, remove the rear cover from the cabinet and unscrew the assembly from the top of the refrigeration system compartment.



Sliding Doors

Gasket Each sliding door is fitted with a vertical gasket that clips into the outside edge of the frame. The gasket can be removed by peeling it from the frame starting at one end.

If the gasket is out of shape after refitting, use a hair drier to heat and reshape it.



Figure 13: Door Gasket

Wheels and Track The sliding door rolls on two wheels across a track at the base of the cabinet door opening. Both the wheels and the track can be replaced if necessary.

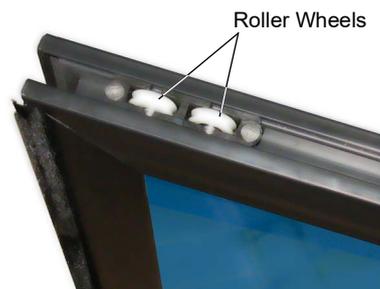


Figure 14: Roller Wheels



Figure 15: Door Track

6 Maintenance

Cleaning

When necessary, the interior and exterior of the cabinet can be wiped with a damp cloth. The sliding doors, wire shelves, shelf support panels, shelf lighting and floor panels can all be removed from the cabinet for ease of cleaning.

CAUTION

Isolate the cabinet from the mains power supply before attempting any cleaning or maintenance.

Cabinet

Procedure 11: To clean the cabinet

1. Isolate the cabinet from the mains power supply (see page 33).

2. The sliding doors can be removed from the cabinet by lifting each door up and pulling out at the bottom. To refit the doors, lift each door up into the top track and place onto the bottom track.



3. The wire shelves can be lifted out of the cabinet for cleaning. When refitting the wire shelves ensure the bottom rail on each wire shelf sits against the rear support. This prevents the shelves sliding backwards.



4. The shelf rear support panels and shelf lighting can be removed from the cabinet by lifting up, off the shelf brackets. The power supply cable will remain attached to the lighting panels.



5. Remove the shelf brackets by lifting up at the front and pulling out from the cabinet.



Procedure 11: To clean the cabinet (continued)

6. The floor panels can be removed from the cabinet by lifting each panel up. The floor of the cabinet can now be accessed for cleaning.

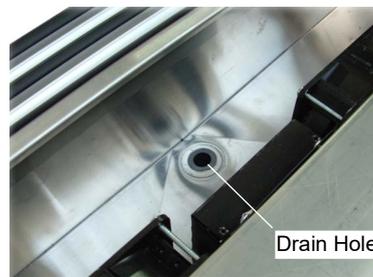
Warning: Be careful not to touch the exposed evaporator coil fins as they are very sharp and damage easily.



7. Both door guide bottom runners can be lifted out for cleaning.



8. The evaporator drain should be regularly checked and cleaned to prevent blockage. To access the drain hole, remove the rear floor panel from inside the cabinet (see step 6). If using water to clear the drain, take care not to overflow the condensate tray.



9. The evaporator drain tube should also be checked for blockage. To access the drain tube, remove the ventilation panel from the rear of the cabinet by undoing the two bottom screws and unhooking from the cabinet. To clear the drain tube, pull the drain tube out from the cabinet and drain the water into a bucket.



Condenser Coil The condenser coil **MUST** be kept clean for reliable operation and to minimise power consumption (a blocked condenser can double power consumption).

To ensure trouble-free performance, the condenser coil should be brushed clean once a month. If the electronic controller display flashes **cht** the condenser coil must be cleaned immediately.

Over time, dust may accumulate within the condenser that cannot be removed with a brush. If this occurs, contact SKOPE to arrange for a SKOPE Authorised Service Agent to clean the condenser with compressed air.

Important

If the electronic controller flashes **cht**, clean the condenser coil immediately.

The condenser coil is located in the refrigeration cartridge compartment at the bottom of the cabinet.

Procedure 12: To clean the condenser coil

1. Isolate the cabinet from the mains power supply (see page 33).
2. Remove the ventilation panel from the rear of the cabinet by undoing the two bottom screws.

3. Clean the fins of the condenser coil with a soft brush. Be careful when cleaning the coil fins as they are very sharp.



4. Refit the ventilation panel.

SKOPE Contacts

SKOPE Industries Limited

ABN: 73 374 418 306

AU: 1800 121 535

NZ: 0800 947 5673

skope@skope.com

www.skope.com