OD1100

SKOPE Open Deck Chiller

SKOPE®

Refrigeration

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SKOPE reserve the right to inspect any faulty part before being liable for any warranty claim. Do not discard faulty components, prior to account settlement.

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The SKOPE trade mark on this product is infringed if the owner, for the time being, does any of the following:

- Applies the trade mark to the product after their state, condition, get-up or packaging has been altered in any manner
- Alters, removes (including part removal) or obliterates (including part obliteration) the trade mark on the product
- Applies any other trade mark to the product
- Adds to the product any written material that is likely to damage the reputation of the trade mark

Notice of the above contractual obligations passes to:

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

Publication

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SKOPE Open Deck Chiller
Service Manual

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Figure 2: OD1100
(Optional - Low Sign)

1 SPECIFICATIONS

1.1 Cabinet and Refrigeration Unit

Cabinet Construction

Exterior:	Powdercoated galvanised steel and silver anodised aluminium
Interior:	Powdercoated galvanised steel
Insulation:	50mm thick, polyurethane foam Cyclo-iso Pentane blowing agent: C_5H_{10}/C_5H_{12}

Dimensions

Height:	2195mm (with high sign), 2015mm (with low sign)
Width:	1280mm
Depth:	820mm
Floor area:	$1.05m^2$
Internal opening:	1140mm wide x 1030mm high
Internal volume:	1020 litres

Refrigeration System

Bottom mounted SKOPE refrigeration unit with electronic control

Nominal capacity:	2500 Watts
Compressor:	Electrolux MS26TB_T
Controller:	CAREL (SKOPE custom version - IRSKFOHC01)
Refrigerant:	R404A / 1500 grams
Cab. temp. range:	0°C to 5°C

Electrical

230-240 Volts a.c. 50 Hz, single phase power supply

Run Amps:	7.5 Amps at 240 Volts

Interior Light

1 x 54 Watt T5 fluorescent tube (Ø16mm x 1150mm) Daylight 860/865

Sign

1 x 54 Watt T5 fluorescent tube (Ø16mm x 1150mm) Daylight 860/865

Shelves

4 adjustable height and angle top shelves + 1 fixed angle bottom shelf.

Table 1: Specifications

2 OPERATION

2.1 Safety Information

When using any electrical appliance, safety precautions should always be observed. Read these instructions carefully, and retain for future reference.

- When used by, or near, young children or infirm persons, close supervision is necessary. Young children should be supervised to ensure that they do not play with the appliance.

- Do **NOT** use this appliance for other than its intended use.

- Do **NOT** cover the grilles or block the entry or exhaust of airflow by placing objects up against the refrigeration unit.

- Do **NOT** probe any opening.

- Only use this appliance with voltage specified on the rating label.

- Ensure adequate ventilation of the SKOPE refrigeration system.

- Be careful not to touch moving parts and hot surfaces.

- Regulations require that all electrical work be carried out by authorised persons. For your own safety and that of others, ensure this is done.

- If the supply cord becomes damaged, it must be replaced by a SKOPE authorised service agent, or similarly qualified person.

Warning:

Do **NOT** overload the power supply (see the rating label inside the cabinet for maximum current draw).

Caution:

Disconnect the cabinet from the power supply before cleaning or servicing the cabinet.

Do **NOT** allow liquids or any other materials to drain into the bottom of the cabinet, as this could lead to refrigeration system failure.

2.2 Cabinet Installation

Power Supply

The power supply must be plugged directly into a dedicated wall socket. Extension cords or multi-boxes should **NOT** be used.

Air Movement

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

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

Ventilation

For efficient operation of the chiller, it is essential that adequate ventilation clearance be provided around the refrigeration unit. Normal operating conditions should not exceed 25°C at 60% RH (Climatic Class 3). It is critical that the hot refrigeration exhaust air is not restricted and that it can easily flow up, away from the cabinet.

Important:

The minimum clearance between the cabinet back and the rear wall must be at least 75mm (see Figure 3 on the following page). The minimum clearance above the cabinet must be at least 200mm. The cabinet should also have 60mm clearance on both sides.

2 OPERATION

Do not store cardboard cartons or other items on top of the cabinet, or in front or rear of the refrigeration unit. The ventilation slots in the front and rear of the cabinet must be kept clear at all times.
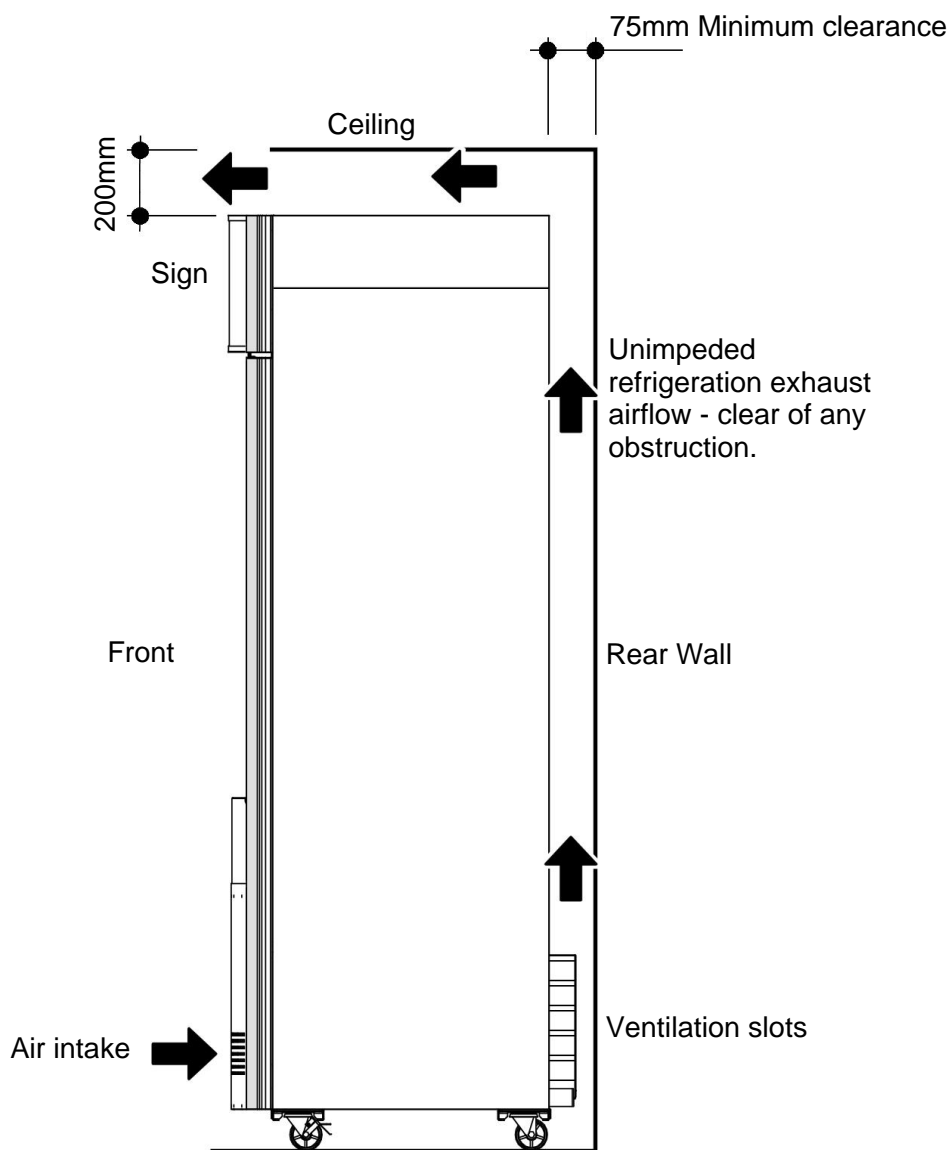
75mm Minimum clearance

Ceiling

200mm

Sign

Unimpeded refrigeration exhaust airflow - clear of any obstruction.

Front

Rear Wall

Ventilation slots

Air intake

Figure 3: Cabinet Ventilation

2 OPERATION

2.3 Cabinet Operation

Refrigeration Unit

The refrigeration unit evaporator and condenser fans should all operate continuously from the time the cabinet is plugged in. The internal cabinet air will continue to circulate at all times.

The compressor will start after approximately one minute. The compressor will switch off when the cabinet internal temperature reaches approximately +1.5°C, and on again at approximately +4°C. The compressor will quieten after it has stabilised.

Electronic Controller

At start-up, the electronic controller will display the cabinet temperature.

The 'Compressor' icon ⊖ will indicate when the compressor is operating.

The 'Light' icon 🔅 will indicate when the cabinet lighting is activated.

Cabinet Lighting

The illuminated sign and cabinet interior light will both light up when the cabinet is plugged in. The fluorescent lights will require a period of time to stabilise following initial start up. The cabinet lighting will stay on permanently while the night blind is up and will turn off when the night blind is pulled down (see 'Night Blind' on page 14).

The two cabinet lights both share the same electronic ballast, therefore if one fluorescent tube fails neither light will operate. Note: In an alarm situation the cabinet lighting is off.

3 CABINET

3.1 Mains Isolation

The cabinet mains isolation box houses an isolating switch and socket, providing mains connection to the refrigeration unit and cabinet (see Figure 4 below).

The mains isolation box can be used to isolate all cabinet and unit electrics without unplugging the cabinet from the wall. The mains isolation box is located on the roof of the refrigeration unit compartment.

To access the cabinet isolation box:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim.
2. The isolation switch can now be turned off and the refrigeration unit supply flex can be unplugged.

Caution:

The cabinet MUST be disconnected from the mains power supply before attempting to remove the isolation box.
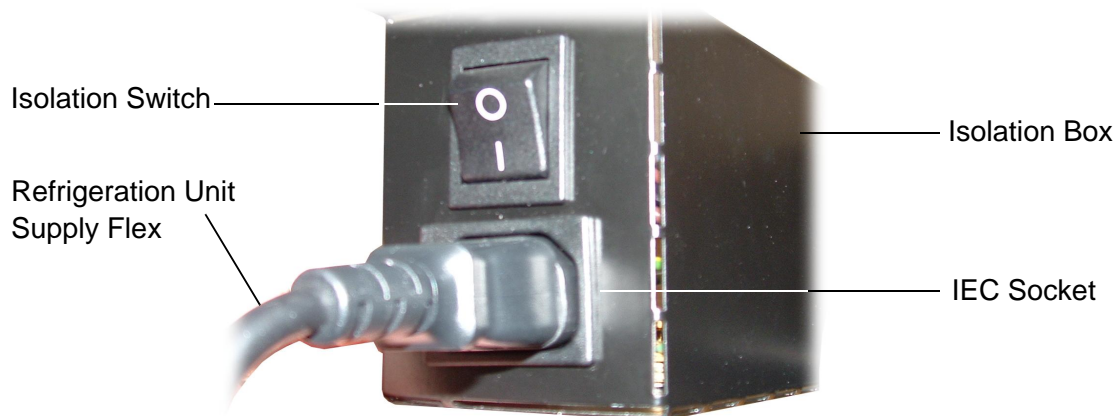

Figure 4: Mains Isolation Box

3.2 Fitting the Standard High Sign

For transit purposes the OD1100 Standard High Sign model has the high sign assembly packed separately inside the cabinet. The OD1100 Low Sign model has the sign assembly already fitted to the cabinet and requires no additional assembly.

To fit the high sign assembly to the cabinet:

1. Unpack the sign assembly. There should be four pieces - two identical side panels, one rear panel and the sign assembly.
2. Loosen the four retaining screws on the roof of the cabinet and fit each sign side panel over the screws. Slide the sign side panels forward, flush with the front of the cabinet and tighten all four retaining screws (see Figure 5 below).
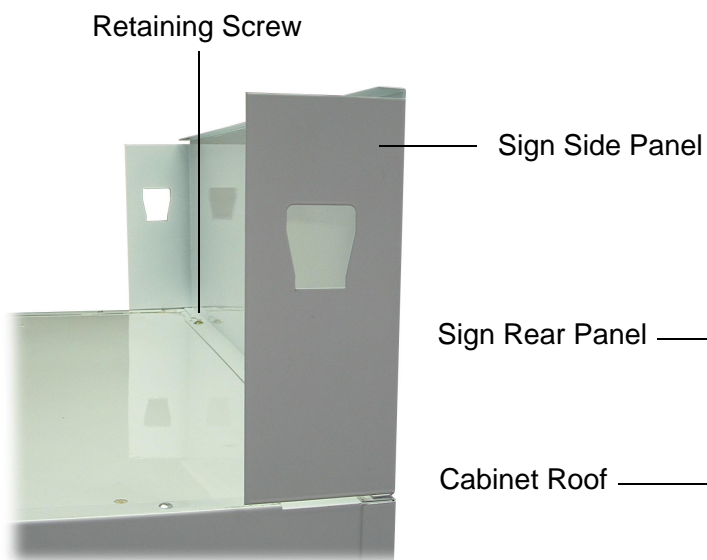
Retaining Screw

Retaining Slot

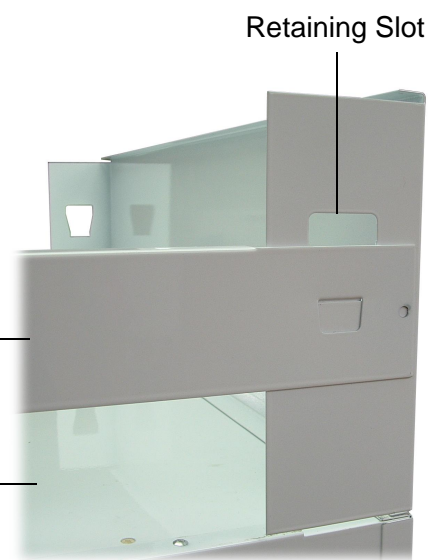Sign Side Panel

Sign Rear Panel

Cabinet Roof

Figure 5: Sign Side Panel

Figure 6: Sign Rear Panel

3. Fit the sign rear panel across the back of the sign side panels by clipping each end tag into the retaining slot in the side panels (see Figure 6 on the previous page).

4. Attach the high sign assembly onto the cabinet by clipping the top of the sign into the retaining slots at the top of both side panels and then locating the bottom of the sign over both the bottom keyhole screws (see Figure 7 below).

5. Pull the sign assembly down to ensure it is securely attached.

6. Turn the sign retaining clips, on top of each side panel, to hold the sign unit firmly in position.

7. To remove the sign assembly from the cabinet, lift the sign up to disengage from the top retaining slot and bottom keyhole screw on each side of the cabinet.
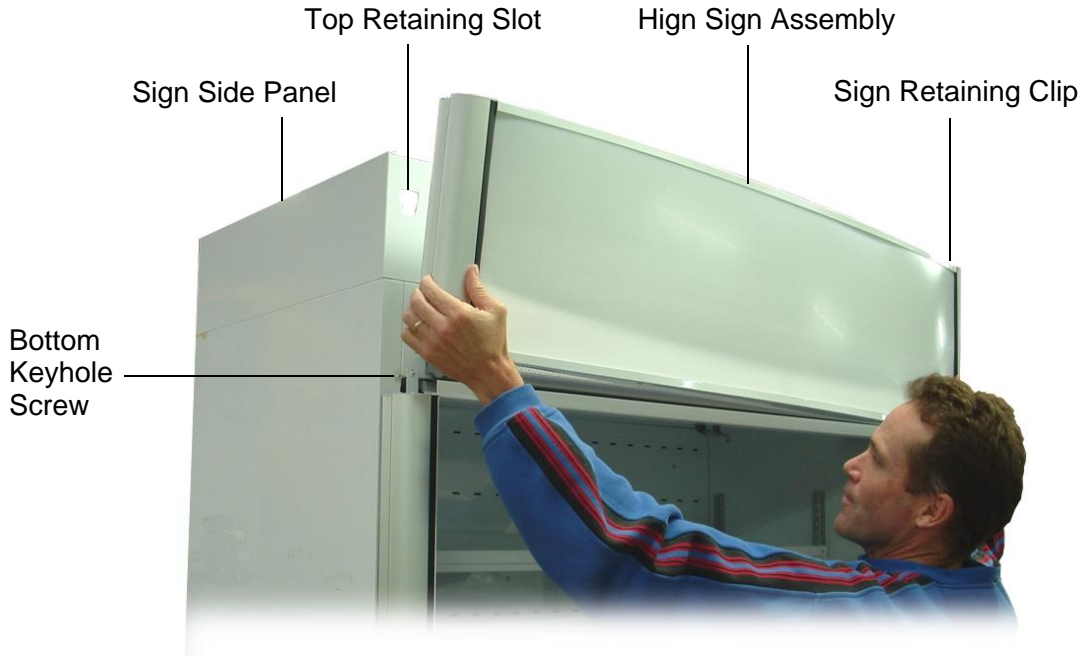
Figure 7: Attaching the High Sign Assembly

3.3 Night Blind

The SKOPE OD1100 Open Deck Chiller is fitted with an energy saving night blind. The blind, located behind the sign, may be pulled down outside of trading hours to save energy (see Figure 8 below).

Lowering the night blind operates the light switch - turning all the cabinet lighting OFF (including the sign), and at the same time turning ON the cabinet top fascia heater element. The cabinet lighting will turn ON again, and the cabinet heater element will turn OFF, when the night blind is fully raised.

When the night blind is down the temperature setting automatically alters to maintain an optimum temperature. The temperature display will lower by approximately 1°C but the product temperature will remain constant.

Night Blind
(up)

Night Blind
(down)

Figure 9: Centre Handle

Night Blind
Captive
Bracket

Figure 8: Night Blind (down)

Figure 10: Captive Bracket

3 CABINET

To remove the night blind:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Remove the sign assembly from the cabinet, by lifting the sign up to disengage from the top retaining slot and bottom keyhole screw on each side of the cabinet (see Figure 7 on page 13).
4. To disengage the blind, push the top section of both retaining clips and pull the night blind forward (see Figure 11 below).
5. The night blind can now be removed from the cabinet.
6. When refitting the blind, ensure that the light switch pressure plate is sitting on top of the blind and the blind is securely clipped into both retaining clips (see Figure 12 below).
7. Check that the blind works smoothly before refitting the sign. Check that the blind rolls up evenly and if not, pull the blind fully down and slowly feed evenly up.
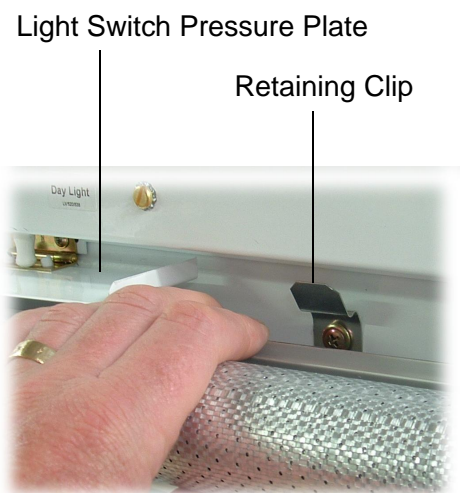
Light Switch Pressure Plate

Retaining Clip

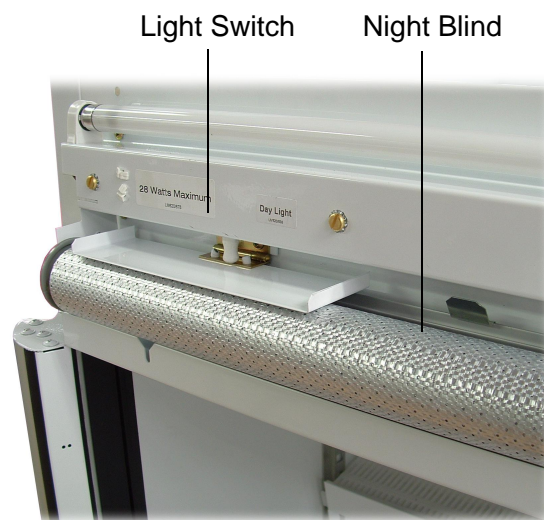Light Switch   Night Blind

Figure 11: Retaining Clip

Figure 12: Night Blind

3.4 Lighting

The cabinet interior light and sign light will both go on when the cabinet is plugged in. The cabinet lighting will stay on permanently while the night blind is up and will turn off when the night blind is pulled down (see 'Night Blind' on page 14).

The fluorescent lights will require a period of time to stabilise following initial start up.

Service Notes:

1. In an alarm situation the cabinet lighting is off.
2. The two cabinet lights both share the same electronic ballast, therefore if one fluorescent tube fails neither light will operate. An electronic control alarm automatically turns the lighting off.
3. When replacing a faulty fluorescent tube, ensure to use the correct wattage.
4. To replace a fluorescent tube, see the service instructions on pages 18-19.

3 CABINET

Cabinet Wiring

The night blind light switch, electronic ballast, lighting wiring and cabinet heater wiring are located behind the light channel assembly on the front of the cabinet (see Figure 13 below).

To access the cabinet wiring:

1. Disconnect the cabinet from the mains power supply.
2. Remove the sign assembly from the cabinet, by lifting the sign up to disengage from the top retaining slot and bottom keyhole screw on each side of the cabinet (see Figure 7 on page 13).
3. Undo the 6 screws holding the light channel assembly.
4. Turn the light channel around to expose the cabinet wiring.
5. When refitting the light channel assembly, ensure raising and lowering of the night cover correctly activates the light switch.
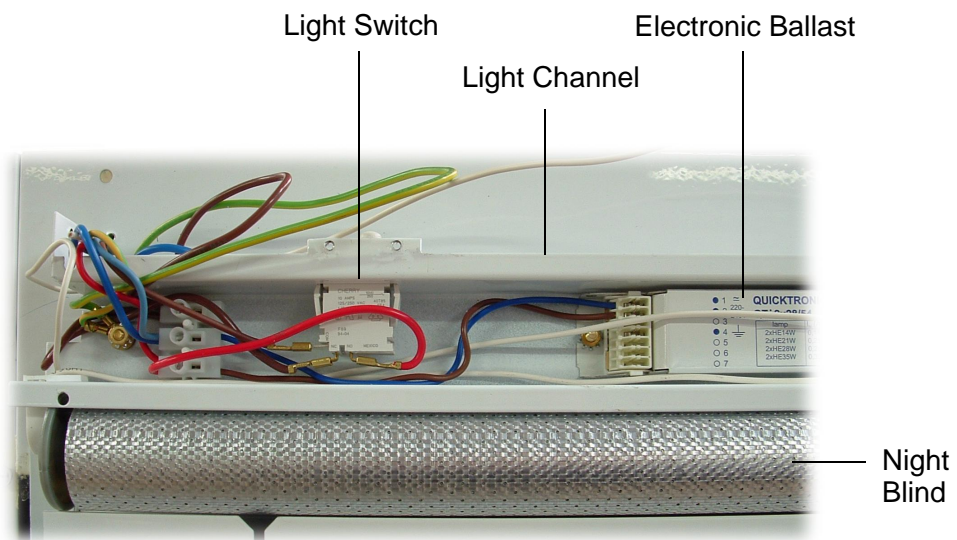

Figure 13: Cabinet Wiring

3 CABINET

Sign Light

The illuminated sign is fitted with one 54 Watt T5 fluorescent tube (Ø16mm x 1150mm, Daylight colour 860/865).

To replace the fluorescent tube:

1. Disconnect the cabinet from the mains power supply.
2. Remove the sign assembly from the cabinet, by lifting the sign up to disengage from the top retaining slot and bottom keyhole screw on each side of the cabinet (see Figure 7 on page 13).
3. Revolve the fluorescent tube until the pin position allows withdrawal and then lift the tube up to remove (see Figure 14 below).
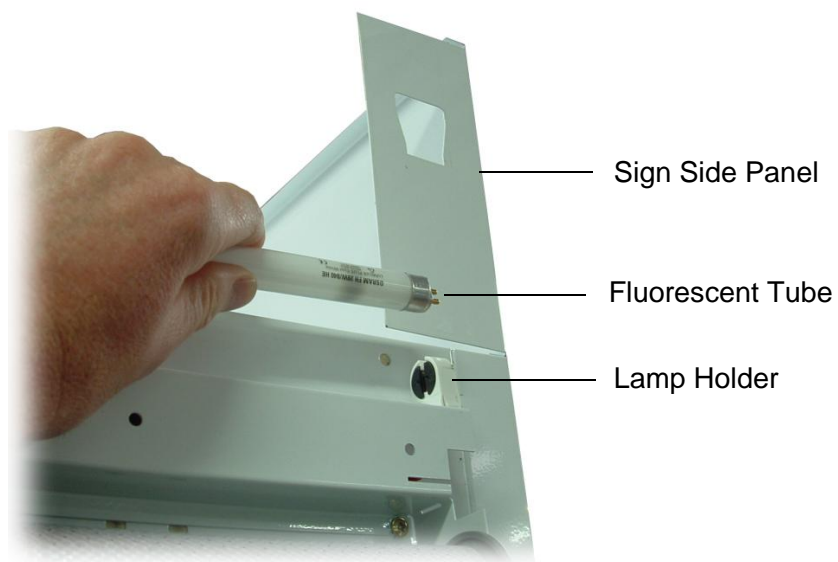4. Replace the fluorescent tube with SKOPE part no. ELL1296.

Sign Side Panel

Fluorescent Tube

Lamp Holder

Figure 14: Replacing the Sign Light

Cabinet Interior Light

The cabinet interior light is fitted with one 54 Watt T5 fluorescent tube (Ø16mm x 1150mm, Daylight colour 860/865).

To replace the fluorescent tube:

1. Disconnect the cabinet from the mains power supply.
2. Reach inside the cabinet and remove the light diffuser, from underneath the sign assembly, by compressing the front section of the diffuser until it disengages from the aluminium housing (see Figure 15 below).
3. Revolve the fluorescent tube until the pin position allows withdrawal and then pull the tube down to remove.
4. Replace the fluorescent tube with SKOPE part no. ELL1296.

Figure 15: Replacing the Cabinet Interior Light

3.5 Cabinet Airflow System

The OD1100 cabinet body itself uses no fans. The fans are solely located within the refrigeration unit. The airflow is channelled directly out of the evaporator box and into a plenum chamber (the area below the bottom shelf). A horizontal honeycomb section, fitted to the rear of the plenum, guides and straightens the airflow into the cabinet duct.

The cabinet uses a single duct system that forces a percentage of air into the cabinet via slots in the duct. The majority of air continues to the top front discharge air honeycomb grille. This top honeycomb grille creates the cold air curtain which blows directly downwards, into the return air grille. Due to cold air expansion it is normal for some cold air to spill out the front bottom of the cabinet.

The honeycomb grille uses a series of small (3.2mm) holes that may over time become blocked or restricted. If this occurs, the grille will need to be removed from the cabinet and washed or replaced. To remove the top airflow grille, loosen the 4 fixing screws holding the top duct and slide the duct back (see Figure 16 below). To remove the bottom airflow grille, remove the bottom shelf and undo the 4 bottom fixing screws (see Figure 17 below).
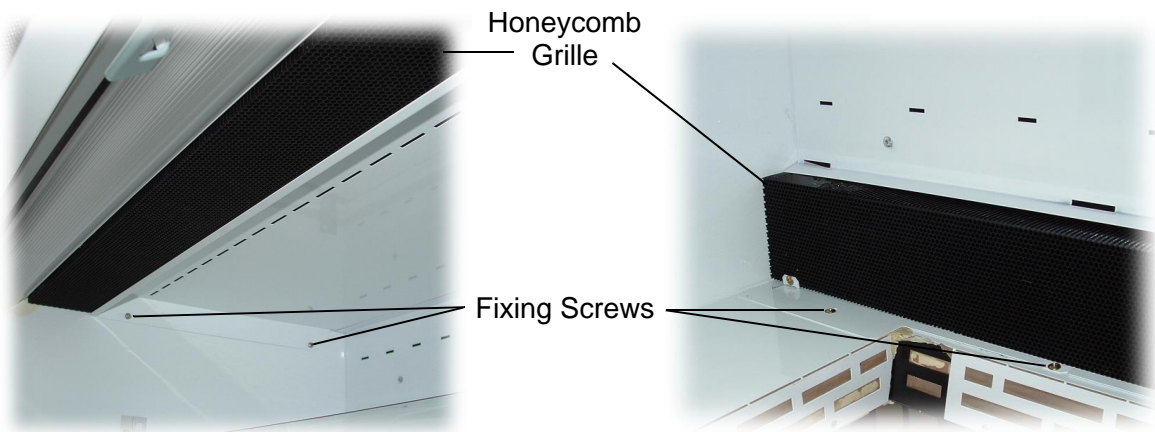
Honeycomb Grille

Fixing Screws

Figure 16: Top Airflow Grille

Figure 17: Bottom Airflow Grille

3.6 Shelving

The SKOPE OD1100 Open Deck Chiller is supplied with the following standard shelving items, packed inside the cabinet:

- 2 adjustable height top shelves (shallow depth)
- 2 adjustable height middle shelves (medium depth)
- 1 fixed bottom shelf (deep - supplied fitted)
- 5 merchandising ticket strips
- 16 shelf support clips

Adjustable Shelves

The four top shelves can be positioned at different heights to suit various products and are each held in place with four shelf support clips. The two top shelves are shallow depth and the two middle shelves are medium depth.

The four adjustable shelves are designed to be positioned either flat or angled down to accommodate the optional gravity feed shelf slides and dividers.

To fit the adjustable height shelves:

1. Unpack all the shelving items from inside the cabinet.
2. Establish the desired position for each of the shelves, based on the height of the product intended to go on each shelf.
3. Fit four shelf clips in each of the shelf support strips. To angle the shelves, fit the front clips two holes lower than the back clips (see Figure 18 on next page).
4. Fit the four shelves, beginning with the bottom shelf working up to the top shelf.

Note: When loading shelves with product, do not exceed a maximum of 195 kg/m^2.

Bottom Shelf

The bottom shelf is deeper than the adjustable shelves and is fixed at an angle to the floor of the cabinet.

Ticket Strips

The merchandising ticket strips, which go on the front of all the shelves, are intended for inserting advertising material.

Before fitting the shelves, fit the merchandising ticket strips to the front of each shelf, as required, by sliding the strips on to the metal strip riveted to the front of the shelf (see Figure 18 below).

To fit a ticket strip to the fixed bottom shelf, press the ticket strip on from the front ensuring it engages along the full length of the shelf.

Figure 18: Adjustable Top Shelf (angled down)

3.7 Security Grille

For security purposes an optional security grille is available for the SKOPE OD1100 Open Deck Chiller. The security grille fits in the front opening of the cabinet and is locked by means of two keyed security bolts. For convenience both locks use the same key.

To fit the optional security grille:

1. Position the security grille (with the tags at the top and locks on the sides) into the top of the cabinet opening.
2. Manoeuvre the security grille into position so as both the tags at the top of the grille locate into the rubber slots under the sign assembly (see Figure 19 below).
3. Position the sides of the grille to align both the security lock bolts with the holes in the sides of the cabinet.
4. Engage both the lock bolts and lock with the security key (see Figure 20 below).
5. Removing the security grille is a reversal of the fitting instructions.
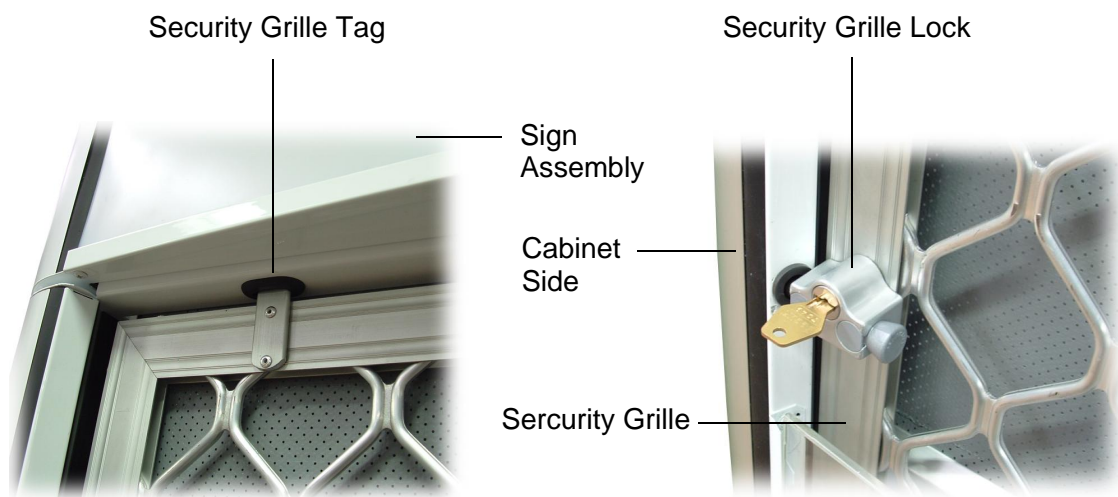

Figure 19: Security Grille Tag

Figure 20: Security Grille Lock

3.8 Cleaning

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

Warning:

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

The return air grille, inside the cabinet, can be opened to remove any foreign objects that may fall down the air slots into the unit compartment (see Figure 21 below). Care must be taken when the return air grille is open not to allow anything to drop into this area, as retrieval would be difficult.

To open the return air grille:

1. Disconnect the cabinet from the mains power supply.
2. Undo the screw in the centre of the return air grille and hinge the grille up.

Figure 21: Opening the Return Air Grille

4ELECTRONIC CONTROLLER

Notes

4 ELECTRONIC CONTROLLER

4.1 Display
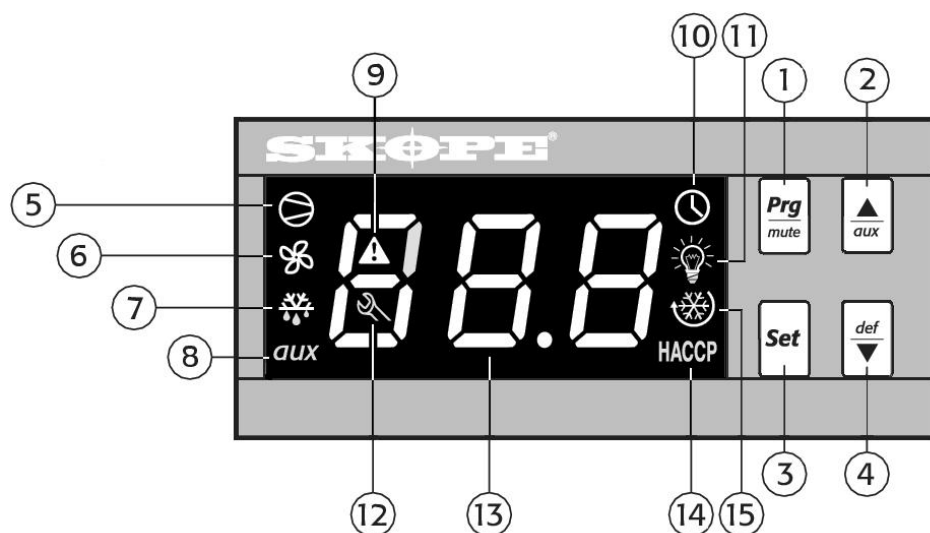
Figure 22: Controller Display

Keypad

Item	Key	Function
1	**Prg** / mute	**Prg / mute:** Mutes the audible alarm (buzzer) and deactivates the alarm relay.
2	**▲** / aux	**UP / aux:** To display the required temperature setting.
3	**Set**	**Set:** If pressed for more than 1 second, displays and / or enables changing the temperature setting.
4	def / **▼**	**DOWN / def:** To display the required temperature setting.

Table 2: Keypad Functions

4 ELECTRONIC CONTROLLER

Icons

Item	Icon	Function
5	⊖	**COMPRESSOR:** ON when the compressor starts. Flashes when the activation of the compressor is delayed (5 minutes compressor minimum off-time applies).
6	✺	**FAN:** n.a.
7	❆	**DEFROST:** ON when the defrost is activated. Flashes when the activation of the defrost is prevented due to procedures in progress.
8	*aux*	**AUX:** n.a.
9	⚠	**ALARM:** Flashes in the event of alarms.
10	🕐	**CLOCK:** At start-up, comes ON for a few seconds to indicate that the Real Time Clock is present.
11	💡	**LIGHT:** ON when the cabinet lighting is activated.
12	🔧	**SERVICE:** Flashes in the event of malfunctions.
13		**DISPLAY:** Shows the cabinet temperature.
14	HACCP	**HACCP:** See section 4.5 on page 35.
15	❄	**CONTINUOUS CYCLE:** n.a.

Table 3: Icon Functions

4 ELECTRONIC CONTROLLER

4.2 Operation

The SKOPE electronic controller controls and displays the cabinet temperature. The preset temperature setting controls the product temperature between 0°C and 5°C. The electronic controller also signals temperature alarms (see Table 5 on pages 46 & 47).

The electronic controller is located inside the controller box assembly, attached to the front of the refrigeration unit. For instructions on servicing the controller see pages 48-49).

Defrost

To ensure efficient operation, the electronic controller forces automatic defrosts either 6 hourly or more often when required. During the defrost cycle the compressor switches off. The controller is set to give a minimum compressor off-time of 5 minutes. There are no defrost elements.

Notes:

1. There is no link from the High Pressure Switch to the controller.
2. The SKOPE ir33 controller is a custom controller that cannot be interchanged with the standard CAREL ir33 controller.

Temperature Setting and Display

The controller temperature setting is factory set at 1.5°C. If necessary the setting can be altered between 0.5°C and 4.5°C. SKOPE do not recommend that the temperature setting be modified unless it is absolutely necessary, and then only by small increments at a time.

As standard, when the night blind is down the temperature setting automatically alters to maintain an optimum temperature. The temperature display will lower by approximately 1°C but the product temperature will remain constant.

4 ELECTRONIC CONTROLLER

To Display the Setpoint Temperature Setting:
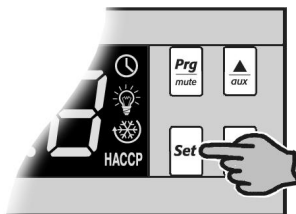
Press and hold the **SET** key for 2 seconds. The temperature setting value will be displayed.

The controller setpoint temperature setting may need to be altered to accommodate different ambient conditions or product loading. Ambient has direct impact on the operational air curtain temperature, effecting the relationship between controller setpoint and product temperature.

To Change the Setpoint Temperature Setting:
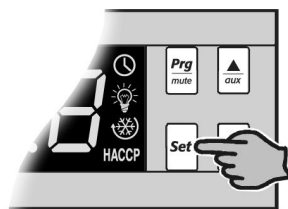
1. Press and hold the **SET** key for 2 seconds, until the temperature setting value flashes.
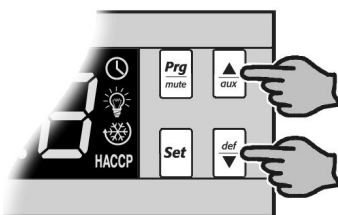
2. Press either the **UP** or **DOWN** keys to display required temperature setting value.
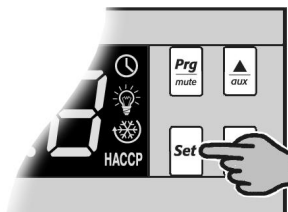
3. Press the **SET** key again to memorise the new temperature setting value.

4.3 Temperature Sensing Probes

The electronic controller has three temperature sensing probes; a control probe, a condenser probe and an evaporator probe (see Figure 25 on page 52, for probe locations).

1. Control Probe

For temperature control, temperature display and alarm temperatures, the temperature control probe is fitted to a bracket in the cabinet supply air. The control probe senses evaporator discharge airflow, therefore the set point is offset by parameter '/C1' at +4.6°C. The probe reading display speed is significantly dampened (slowed) to prevent erratic temperature display by parameter '/3'. To access the control probe, remove the refrigeration unit (see page 63).

2. Condenser Probe

For measurement of condenser over-temperature alarm 'Cht', the condenser probe is fitted onto the condenser coil. To access the condenser probe:

1. Remove the condensate tray (see page 54).
2. Remove the refrigeration unit (see page 63).
3. Elevate the left hand end of the refrigeration unit.

3. Evaporator Probe

For defrost initiation and termination, the evaporator probe is fitted onto the bottom of the evaporator coil at the distributor tube inlet. To access the evaporator probe:

1. Remove the refrigeration unit (see page 63).
2. Lift the evaporator coil out of the evaporator box, to expose the bottom left hand end of the coil. It will be necessary to free-up electrical cables and refrigeration tubing before lifting the coil.

4.4 Optional Programming Features

Program Sets

The SKOPE controller has the ability to store different program sets for different applications. Production from May 1st 2006 utilizes two stored SKOPE program sets within the controller ('**bn1**' and '**bn2**').

Program 'bn0' = CAREL default program not used by SKOPE.

Program 'bn1' = Perishable product storage (such as dairy and food products). Temperatures maintained constantly from 0 to 5°C.

Program 'bn2' = Non-perishable storage. The temperature is raised slightly during 'Night Mode' (when the night blind is down, to save energy consumption and power costs).

The controller leaves the SKOPE factory set on Program '**bn1**' (Perishable product storage). Therefore, if required, Program '**bn2**' can be implemented as follows:

To Change the Program Set:
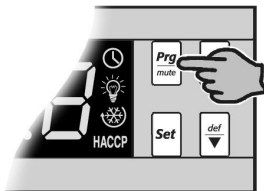
1. Press and hold the **PRG** key while plugging the cooler into the power supply. After a few seconds the current '**bn0**' is displayed as default.
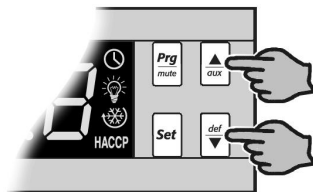
2. Press the **UP** or **DOWN** keys to change to program code '**bn1**' or '**bn2**'.
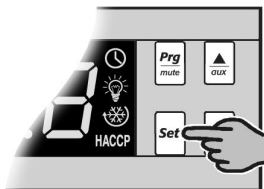
3. Confirm by pressing the **SET** key.

4 ELECTRONIC CONTROLLER

Configuration Parameters

The SKOPE electronic controller is a custom controller that cannot be interchanged with the standard CAREL ir33 controller.

The controller program should use the standard parameters as listed on pages 38-45. Specific situations may require the controller program to be changed. This should only be done if determined to be beneficial by an authorised SKOPE refrigeration service agent, after first obtaining authorisation directly from SKOPE.

Note: Unauthorised control parameter changes will void any warranty and SKOPE liability. SKOPE reserve the right, as part of on going product improvement, to modify the controller program without notice.

To Change the Parameters:
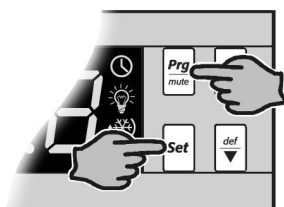
1. Press and hold both the **PRG** and **SET** keys simultaneously for 5 seconds. Zero (0) will be displayed.
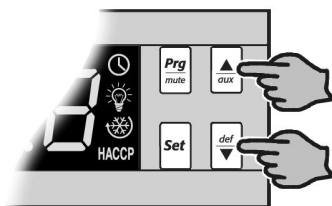
2. Press the **UP** or **DOWN** keys to enter the password. The password is '66'. Press the **SET** key to confirm the password entry.
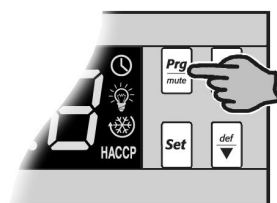
3. Press the **PRG** key for 1 second to access the block levels.

(continued on next page)
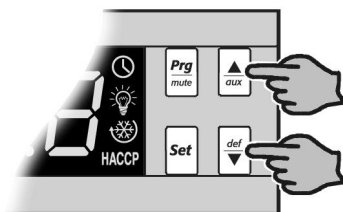
4. Press the **UP** or **DOWN** keys to display the correct block code. Press the **SET** key to enter specific parameters.
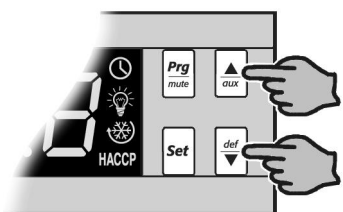
5. Press the **UP** or **DOWN** keys until the required parameter is displayed. Press the **SET** key to display the code for the parameter.
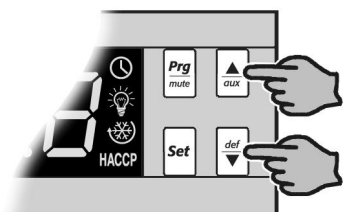
6. Press the **UP** or **DOWN** keys to alter the parameter setting / code.
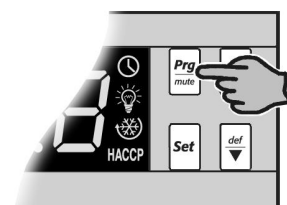
7. Press and hold the **PRG** key for 5 seconds to confirm the parameter changes. Repeat this process for any further changes.

NOTE: If no keys are pressed for 60 seconds, the controller reverts to the original program and any changes will be lost.

4 ELECTRONIC CONTROLLER

Real-Time Clock *(not configured by SKOPE)*

The SKOPE electronic controller features a real-time clock. If required, the Real-Time cock must be set up by a qualified SKOPE refrigeration service agent. The Real-Time Clock offers the benefits of real-time defrost (controlled defrosting for off-peak times) and, if the controller is set up, offers real-time temperature alarm and power failure monitoring (HACCP compliant).

Warning:

This programming should only be performed by experienced people. Non SKOPE authorised modification of the operational parameters could cause refrigeration failure and loss of stored product.

At commissioning of the machine the Electronic Controllers time clock should be checked to confirm it is set to the correct time. The electronic controller features a battery back-up for maintaining time when the cooler is unplugged.

Confirmation of the real-time clock settings is done by entering the configuration parameters mode (see page 17) and entering parameter 'tc'.

Real-Time Defrost *(not configured by SKOPE)*

Controlled real-time defrosting for the SKOPE OD1100 can be programmed. However, SKOPE recommend this should only be done by experienced refrigeration service engineers.

Correct defrosting is fundamental to reliable efficient operation. In normal circumstances this requires 4 spaced defrost events per 24 hours. By default the cooler defrosts every 6 hours, or more frequently by demand (if the evaporator coil remains below -9°C for 10 minutes).

4 ELECTRONIC CONTROLLER

4.5 HACCP *(not configured by SKOPE)*

The SKOPE electronic controller has HACCP (Hazard Analysis Critical Control Points) functionality. HACCP is designed to help the owner monitor food storage temperature in order to comply with the checking and recording phases required by the HACCP standards on correct food storage.

The electronic controller is HACCP compliant, due to its ability to record alarm situations when the maximum temperature thresholds for significant periods has been exceeded. This may derive from operating anomalies with the refrigeration system or due to power failure.

As SKOPE standard, the HACCP function is deactivated so the electronic controller will operate as follows:

- All standard system and temperature alarms are active. When an alarm event occurs the associated unit with the fault will turn off cabinet lighting and trim heaters; the electronic controller indicates alarm status with an audible and visual alarm.

- If the alarm status ends (e.g. the refrigeration system recovers to 'normal' temperature) the alarm status is overidden and any record of the alarm event is lost.

To Enable HACCP:

1. Ensure the Real-Time clock is to the correct time.
2. Enter configuration parameters mode (see pages 16-17).
3. Enter parameter 'Htd' (HACCP time delay) and enter desired HACCP delay time in minutes. If 'Htd' = 0, then HACCP is off. If 'Htd' = greater than 0, then = HACCP delay time.
4. Ensure the temperature high temp alarm threshold is correct in parameter 'AH' (factory set to 13°C).

4 ELECTRONIC CONTROLLER

HACCP Alarm

If the HACCP function is enabled (see previous page) it will maintain alarm status, with the day and time of the alarm event retrievable from the electronic controller memory. In addition to the normal alarms, the HACCP function adds the following features:

• The 'HA' HACCP alarm signal is activated if the cabinet temperature is warmer than the programmed high temperature alarm (see relevant program sheet parameter 'AH') for an extended period of time.
 Note: to be active 'Htd' must be at a value of 1 or greater.

• 'HF' HACCP alarm signal is activated if the cabinet has a power failure of over one minute duration combined with (at power resumption) temperature warmer than the programmed high temperature alarm (as per program parameter 'AH').

To read HACCP alarm activation

At HACCP alarm activation, the operater should determine whether there is spoilt product and how to deal with this. The time of the alarm event should be checked and the HACCP alarm reset (see the following page).

4 ELECTRONIC CONTROLLER

To View the HACCP Alarm Details:
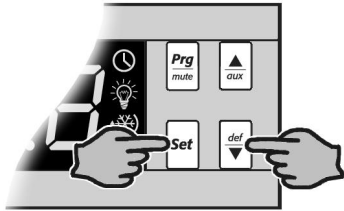
1. Press the **SET** or **DOWN** keys until the relevant HACCP time parameters are displayed.
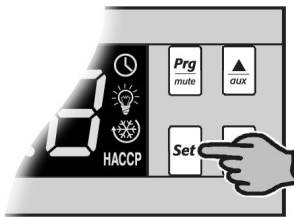
2. Press the **SET** key to display alarm day (range 1 to 7 = Monday to Sunday), hour (24 hour clock) and minute.

To Reset the HACCP Alarm:
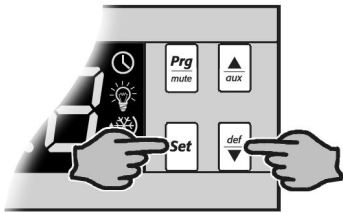
After viewing the HACCP details (as above):

1. Press and hold both the **SET** and **DOWN** keys simultaneously for 5 seconds.

2. 'rES' will be displayed, indicating that the HACCP alarm has been reset.

4.6 Parameters

Program '401: bn1' - for perishable products

The following chart contains the full list of SKOPE electronic controller '401: bn1' program parameters (for perishable products). Some of these parameters will be hidden for field service (only the parameters deemed necessary for the specific application will be visible).

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
PROBE PARAMETERS					
/2	4	-	1	15	Measurement stability
/3	4	-	0	15	Probe display speed
/4	0	-	0	100	Virtual probe
/5	0	flag	0	1	Select °C or °F (0 = °C)
/6	0	flag	0	1	Decimal point (0 = decimal point)
/tI	2	-	1	7	Sensor shown on controller display (2 = control sen)
/tE	0	-	0	6	Sensor shown on remote display
/P	0	-	0	2	Type of probe (0 = standard Carel NTC)
/A2	2	-	0	4	Probe 2 configuration (e.g. 2 = evap, 3 = cond)
/A3	3	-	0	4	Probe 3 configuration (e.g. 2 = evap, 3 = cond)
/A4	0	-	0	4	Probe 4 configuration (e.g. 0=absent, 2=evap, 3=cond)
/c1	4.6	°C / °F	-20°C	20°C	Calibration of probe 1
/c2-4	0	°C / °F	-20°C	20°C	Calibration of probe 2-3-4 /c2=probe 2, /c3=probe 3
CONTROL PARAMETERS					
St	1.5	°C / °F	r1	r2	Temperature set point
rd	6	°C / °F	0.1°C	20°C	Controller differential
rn	4	°C / °F	0°C	60°C	Dead Zone (when used 1 Heat 1 Cool)
rr	2	°C / °F	0.1°C	20°C	Reverse (heat) diff in dead zone control
r1	0.5	°C / °F	-50°C	r2	Minimum Set Point allowed
r2	4.5	°C / °F	r1	200°C	Maximum Set Point allowed
r3	0	flag	0	2	Mode 0 = cool with defrost, 1 = cool only, 2 = heating
r4	-1.0	°C / °F	-20°C	20°C	Value to alter Set point by from digital input
r5	1	flag	0	1	Enable temperature monitoring (Not related to HACCP)
rt	-	Hours	0	999	Temperature monitoring interval
rH	-	°C / °F	-	-	Maximum temperature recorded during period 'rt'
rL	-	°C / °F	-	-	Minimum temperature recorded during period 'rt'

Table 4: Controller Parameters '**401: bn1**' - or perishable products
(continued on next page - page 1 of 4)

4 ELECTRONIC CONTROLLER

Program 401: bn1 - for perishable products

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
COMPRESSOR PARAMETERS					
c0	1	Mins	0	15	Compressor and fan start delay at power up
c1	0	Mins	0	15	Minimum time between two compressor starts
c2	5	Mins	0	15	Minimum compressor OFF time
c3	1	Mins	0	15	Minimum compressor ON time
c4	10	Mins	0	100	Duty setting
cc	2	Hours	0	15	Duration of continuous cycle
c6	2	Hours	0	15	Alarm by-pass after continuous cycle
c7	0	Secs	0	900	Maximum Pump-Down (PD) time
c8	5	Secs	0	60	Compressor start delay after opening PD valve
c9	0	flag	0	1	Enable autostart with Pump-Down operation
c10	0	flag	0	1	Select Pump-Down by time or pressure switch
c11	4	Secs	0	250	Second compressor start delay
DEFROST PARAMETERS					
d0	0	flag	0	4	Defrost type (0=elec/temp, 1 = hot gas / temp, 2 = elec /time, 3 = hot gas / time...)
dl	6	Hours	0	250	Interval between defrosts (if not using real-time)
dt1	6.5	°C / °F	-50	200	End defrost temperature (if d0 = 0 or 1)
dt2	4	°C / °F	-50	200	End defrost temperature, aux evap. (if selected)
dP1	60	Mins	1	250	Maximum defrost duration
dP2	30	Mins	1	250	Maximum defrost duration, aux evap.
d3	0	Mins	0	250	Defost - delay starting defrost after stopping comp.
d4	0	flag	0	1	Defost at power up (0 = no, 1 = yes)
d5	0	Mins	0	250	Defrost delay at power up (if d4 = 1)
d6	1	-	0	2	Display during def (0=dF (flash), 1=locked, 2=dEF)
dd	1	Mins	0	15	Dripping time after defrost
d8	0	Hours	0	15	Bypass alarms after defrost
d8d	0	Hours	0	15	Delay for door open
d9	0	flag	0	1	Defrost priority over compressor protection
d/1/d/2	-	°C / °F	-	-	Display defrost probe temp d/1=def P1, d/2=def P2
dC	0	flag	0	1	Time basis for defrost (0=hr/min, 1=min/sec)
d10	10	Mins	0	250	Compressor run time for demand defrost
d11	-9	°C / °F	-20°C	20°C	Compressor temperature set for demand defrost
d12	0	-	0	3	Advanced defrost enable
dn	65	-	1	100	Nominal defrost duration (smart defrost)
dh	50	-	0	100	Proportional factor for variation in 'dl' (smart DF)

Table 4: Controller Parameters '**401: bn1**' - for perishable products
(continued on next page - page 2 of 4)

Program 401: bn1 - for perishable products

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
ALARM PARAMETERS					
A0	2	°C / °F	0°C	20°C	Alarm and fan differential
A1	1		0	1	Type of alarm for AL and AH (0=relative, 1=absolute)
AL	-5	°C / °F	-50°C	200°C	Low alarm temp (see A1 for absolute or relative)
AH	13	°C / °F	-50°C	200°C	High alarm temp (see A1 for absolute or relative)
Ad	120	Mins	0	250	Low and high temperature alarm delay
A4	0	-	0	15	Configuration of digital input 1
A5	7	-	0	15	Configuration of digital input 2
A6	0	Mins	0	100	Duty setting for compressor from digital in alarm
A7	0	Mins	0	250	External alarm delay if using digital input
A8	1	flag	0	1	Enable alarms 'Ed1' and 'Ed2' (defrost end on time)
Ac	60	°C / °F	0.0°C	200°C	Condenser alarm shut-down set point
AE	10	°C / °F	0.1°C	20°C	Cond'r warning (divided by 2, i.e. 10=5K diff from Ac)
Acd	0	Mins	0	250	High condenser temperature alarm delay
AF	0	Secs	0	250	Light sensor off time
ALF	-50	°C / °F	-50°C	200°C	Anti-freeze alarm set point
AdF	1	Mins	0	15	Anti-freeze alarm delay
FANS PARAMETERS					
F0	2	flag	0	2	Fan management (0=according to F2, F3, Fd1 = amb - evap, 2 = evaporator temperature (St + F1))
F1	-50	°C / °F	-50°C	200°C	Fan start temperature
F2	1	flag	0	1°C	Fans cycle with compressor (0 = no, 1 = yes)
F3	1	flag	0	1°C	Fans in defrost (0 = on, 1 = off)
F4	40	°C / °F	-50°C	200°C	Condenser fan off temperature
F5	5	°C / °F	0°C	20°C	Condenser fan differential
Fd	1	Mins	0	15	Fans delay after dripping
CONFIGURATION PARAMETERS					
H0	1	-	0	207	Serial address
H1	3	flag	0	11	Function of relay 2 (3 = light)
H2	1	flag	1	6	Keypad and IR locking
H3	0	-	0	255	Remote control enabling code
H4	0	flag	0	1	Disable buzzer (0 = enabled, 1 = disabled)
H6	0	-	0	255	Buttons to lock when keypad locked
H8	0	flag	0	1	Select output to activate with time band
HPr	0	-	0	15	Print profile
H9	0	flag	0	1	Enable set point change with time
Hdn	0	flag	0	6	Number of default parameter sets
Hdh	0	°C / °F	-50°C	200°C	Anti-sweat heater control offset

Table 4: Controller Parameters '**401: bn1**' - for perishable products
(continued on next page - page 3 of 4)

4 ELECTRONIC CONTROLLER

Program 401: bn1 - for perishable products

Display	SKOPE Setting '401'	Range Min.	Max.	Description of Parameter
HACCP PARAMETERS				
HAn/HF	-	-	0	15	Number of events HA/HF occurred
HA/HF	-	-	-	-	Date / time of most recent HA/HF
y_	-	Years	0	99	Year
M_	-	Months	1	12	Month
d_	-	Days	1	7	Day
h_	-	Hours	0	23	Hour
n_	-	Mins	0	59	Minute
t_	-	Hours	0	99	Duration
Htd	0	Mins	0	250	HACCP activation (0 = off, >0 = on and delay
REAL-TIME CLOCK PARAMETERS				
td1	-	-	-	-	Defrost time band 1~8
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
ton	-	-	-	-	Light / aux ON time setting
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
tof	-	-	-	-	Light / aux OFF time setting
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
tc	-	-	-	-	RTC date / time setting
y_	00	Years	0	99	Years
M_	1	Months	1	12	Month
d_	1	Days	1	31	Day of the month
u_	6	Days	1	7	Day of the week
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute

Table 4: Controller Parameters '**401: bn1**' - for perishable products
(continued on next page - page 4 of 4)

4 ELECTRONIC CONTROLLER

Program '401: bn2' - for non-perishable product

The following chart contains the full list of SKOPE electronic controller '401: bn2' program parameters. Some of these parameters will be hidden for field service (only the parameters deemed necessary for the specific application will be visible).

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
PROBE PARAMETERS					
/2	4	-	1	15	Measurement stability
/3	4	-	0	15	Probe display speed
/4	0	-	0	100	Virtual probe
/5	0	flag	0	1	Select °C or °F (0 = °C)
/6	0	flag	0	1	Decimal point (0 = decimal point)
/tl	2	-	1	7	Sensor shown on controller display (2 = control sen)
/tE	0	-	0	6	Sensor shown on remote display
/P	0	-	0	2	Type of probe (0 = standard Carel NTC)
/A2	2	-	0	4	Probe 2 configuration (e.g. 2 = evap, 3 = cond)
/A3	3	-	0	4	Probe 3 configuration (e.g. 2 = evap, 3 = cond)
/A4	0	-	0	4	Probe 4 configuration (e.g. 0=absent, 2=evap, 3=cond)
/c1	4.6	°C / °F	-20°C	20°C	Calibration of probe 1
/c2-4	0	°C / °F	-20°C	20°C	Calibration of probe 2-3-4 /c2=probe 2, /c3=probe 3
CONTROL PARAMETERS					
St	1.5	°C / °F	r1	r2	Temperature set point
rd	6	°C / °F	0.1°C	20°C	Controller differential
rn	4	°C / °F	0°C	60°C	Dead Zone (when used 1 Heat 1 Cool)
rr	2	°C / °F	0.1°C	20°C	Reverse (heat) diff in dead zone control
r1	0.5	°C / °F	-50°C	r2	Minimum Set Point allowed
r2	4.5	°C / °F	r1	200°C	Maximum Set Point allowed
r3	0	flag	0	2	Mode 0 = cool with defrost, 1 = cool only, 2 = heating
r4	2.0	°C / °F	-20°C	20°C	Value to alter Set point by from digital input
r5	1	flag	0	1	Enable temperature monitoring (Not related to HACCP)
rt	-	Hours	0	999	Temperature monitoring interval
rH	-	°C / °F	-	-	Maximum temperature recorded during period 'rt'
rL	-	°C / °F	-	-	Minimum temperature recorded during period 'rt'

Table 5: Controller Parameters '**401: bn2**' - for non-perishable product
(continued on next page - page 1 of 4)

4 ELECTRONIC CONTROLLER

Program 401: bn2 - for non-perishable product

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
COMPRESSOR PARAMETERS					
c0	1	Mins	0	15	Compressor and fan start delay at power up
c1	0	Mins	0	15	Minimum time between two compressor starts
c2	5	Mins	0	15	Minimum compressor OFF time
c3	1	Mins	0	15	Minimum compressor ON time
c4	10	Mins	0	100	Duty setting
cc	2	Hours	0	15	Duration of continuous cycle
c6	2	Hours	0	15	Alarm by-pass after continuous cycle
c7	0	Secs	0	900	Maximum Pump-Down (PD) time
c8	5	Secs	0	60	Compressor start delay after opening PD valve
c9	0	flag	0	1	Enable autostart with Pump-Down operation
c10	0	flag	0	1	Select Pump-Down by time or pressure switch
c11	4	Secs	0	250	Second compressor start delay
DEFROST PARAMETERS					
d0	0	flag	0	4	Defrost type (0=elec/temp, 1 = hot gas / temp, 2 = elec /time, 3 = hot gas / time...)
dl	6	Hours	0	250	Interval between defrosts (if not using real-time)
dt1	6.5	°C / °F	-50	200	End defrost temperature (if d0 = 0 or 1)
dt2	4	°C / °F	-50	200	End defrost temperature, aux evap. (if selected)
dP1	60	Mins	1	250	Maximum defrost duration
dP2	30	Mins	1	250	Maximum defrost duration, aux evap.
d3	0	Mins	0	250	Defost - delay starting defrost after stopping comp.
d4	0	flag	0	1	Defost at power up (0 = no, 1 = yes)
d5	0	Mins	0	250	Defrost delay at power up (if d4 = 1)
d6	1	-	0	2	Display during def (0=dF (flash), 1=locked, 2=dEF)
dd	1	Mins	0	15	Dripping time after defrost
d8	0	Hours	0	15	Bypass alarms after defrost
d8d	0	Hours	0	15	Delay for door open
d9	0	flag	0	1	Defrost priority over compressor protection
d/1/d/2	-	°C / °F	-	-	Display defrost probe temp d/1=def P1, d/2=def P2
dC	0	flag	0	1	Time basis for defrost (0=hr/min, 1=min/sec)
d10	10	Mins	0	250	Compressor run time for demand defrost
d11	-9	°C / °F	-20°C	20°C	Compressor temperature set for demand defrost
d12	0	-	0	3	Advanced defrost enable
dn	65	-	1	100	Nominal defrost duration (smart defrost)
dh	50	-	0	100	Proportional factor for variation in 'dl' (smart DF)

Table 5: Controller Parameters '**401: bn2**' - for non-perishable product
(continued on next page - page 2 of 4)

Program 401: bn2 - for non-perishable product

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
ALARM PARAMETERS					
A0	2	°C / °F	0°C	20°C	Alarm and fan differential
A1	1		0	1	Type of alarm for AL and AH (0=relative, 1=absolute)
AL	-5	°C / °F	-50°C	200°C	Low alarm temp (see A1 for absolute or relative)
AH	13	°C / °F	-50°C	200°C	High alarm temp (see A1 for absolute or relative)
Ad	120	Mins	0	250	Low and high temperature alarm delay
A4	0	-	0	15	Configuration of digital input 1
A5	7	-	0	15	Configuration of digital input 2
A6	0	Mins	0	100	Duty setting for compressor from digital in alarm
A7	0	Mins	0	250	External alarm delay if using digital input
A8	1	flag	0	1	Enable alarms 'Ed1' and 'Ed2' (defrost end on time)
Ac	60	°C / °F	0.0°C	200°C	Condenser alarm shut-down set point
AE	10	°C / °F	0.1°C	20°C	Cond'r warning (divided by 2, i.e. 10=5K diff from Ac)
Acd	0	Mins	0	250	High condenser temperature alarm delay
AF	0	Secs	0	250	Light sensor off time
ALF	-50	°C / °F	-50°C	200°C	Anti-freeze alarm set point
AdF	1	Mins	0	15	Anti-freeze alarm delay
FANS PARAMETERS					
F0	2	flag	0	2	Fan management (0=according to F2, F3, Fd1 = amb - evap, 2 = evaporator temperature (St + F1))
F1	-50	°C / °F	-50°C	200°C	Fan start temperature
F2	1	flag	0	1°C	Fans cycle with compressor (0 = no, 1 = yes)
F3	1	flag	0	1°C	Fans in defrost (0 = on, 1 = off)
F4	40	°C / °F	-50°C	200°C	Condenser fan off temperature
F5	5	°C / °F	0°C	20°C	Condenser fan differential
Fd	1	Mins	0	15	Fans delay after dripping
CONFIGURATION PARAMETERS					
H0	1	-	0	207	Serial address
H1	3	flag	0	11	Function of relay 2 (3 = light)
H2	1	flag	1	6	Keypad and IR locking
H3	0	-	0	255	Remote control enabling code
H4	0	flag	0	1	Disable buzzer (0 = enabled, 1 = disabled)
H6	0	-	0	255	Buttons to lock when keypad locked
H8	0	flag	0	1	Select output to activate with time band
HPr	0	-	0	15	Print profile
H9	0	flag	0	1	Enable set point change with time
Hdn	0	flag	0	6	Number of default parameter sets
Hdh	0	°C / °F	-50°C	200°C	Anti-sweat heater control offset

Table 5: Controller Parameters '**401: bn2**' - for non-perishable product
(continued on next page - page 3 of 4)

Program 401: bn2 - for non-perishable product

Display	SKOPE Setting '401'		Range Min.	Max.	Description of Parameter
HACCP PARAMETERS					
HAn/HF	-	-	0	15	Number of events HA/HF occurred
HA/HF	-	-	-	-	Date / time of most recent HA/HF
y_	-	Years	0	99	Year
M_	-	Months	1	12	Month
d_	-	Days	1	7	Day
h_	-	Hours	0	23	Hour
n_	-	Mins	0	59	Minute
t_	-	Hours	0	99	Duration
Htd	0	Mins	0	250	HACCP activation (0 = off, >0 = on and delay
REAL-TIME CLOCK PARAMETERS					
td1	-	-	-	-	Defrost time band 1~8
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
ton	-	-	-	-	Light / aux ON time setting
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
tof	-	-	-	-	Light / aux OFF time setting
d_	0	Days	0	11	Day
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute
tc	-	-	-	-	RTC date / time setting
y_	00	Years	0	99	Years
M_	1	Months	1	12	Month
d_	1	Days	1	31	Day of the month
u_	6	Days	1	7	Day of the week
h_	0	Hours	0	23	Hour
n_	0	Mins	0	59	Minute

Table 5: Controller Parameters '**401: bn2**' - for non-perishable product
(continued on next page - page 4 of 4)

4.7 Alarms (see 'Troubleshooting' p70-72)

Code	Display Icon	Alarm Description
HI	⚠ Flashing	Product HIGH temperature alarm ▶
LO	⚠ Flashing	Product LOW temperature alarm
cht	🔧 Flashing	Refrigeration system high temperature pre-warning ▶
CHt	🔧 Flashing	Refrigeration system high temperature shutdown
E0	🔧 Flashing	Control probe fault
E1	🔧 Flashing	Defrost probe fault
E2	🔧 Flashing	Condenser probe fault ▶
Ed1	None	Defrost over-time limit
Etc	🕐 Flashing	Real-time clock fault
EE	🔧 Flashing	Controller E prom error
EF	🔧 Flashing	Controller E prom error
dFb	None	Start defrost request ▶
dFE	None	End defrost request

Table 6: Controller Alarm and Signals *(continued on next page)*

4 ELECTRONIC CONTROLLER

Initial Actions	Final Action
1. Check cabinet product loading to ensure ventilation slots are not blocked and that product does not overhang the shelves. 2. Ensure cabinet is installed in an environment suitable for open front refrigerators. 3. Unplug cabinet from power supply for 1 minute, then reconnect to power supply.	
1. Check refrigeration ventilation. Ensure clear airpath at the bottom front and rear of cabinet (to extract hot air). 2. Ensure cabinet is installed in an environment suitable for open front refrigerators. 3. Unplug cabinet from power supply for 1 minute, then reconnect to power supply.	
Unplug cabinet from power supply for 1 minute, then reconnect to power supply.	If alarm persists, contact SKOPE.
None	None

Table 6: Controller Alarm and Signals *(continued)*

4.8 Servicing

If the electronic controller has a suspected fault, care must be taken to ensure accurate diagnosis, as the controller has various programmable parameters that can effect operation such as time delay and defrost modes (see Tables 4 and 5 on pages 38-45).

To access the electronic controller for servicing:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Remove the front cover from the controller box by undoing the 2 front and 2 side screws. Leave the Earth wire attached.
4. Remove both yellow clamps from the sides of the controller.
5. Disconnect the wiring from rear of the controller. Take care to maintain the red and grey sleeves on the evaporator and condenser temperature probes.
6. The controller can now be removed (see Figure 23 below).
7. Check the probe resistance is correct (see Table 7).
8. Confirm all wiring and terminations are correct (see Figure 24).

Figure 23: Removing the Electronic Controller

Controller NTC Probe Resistance

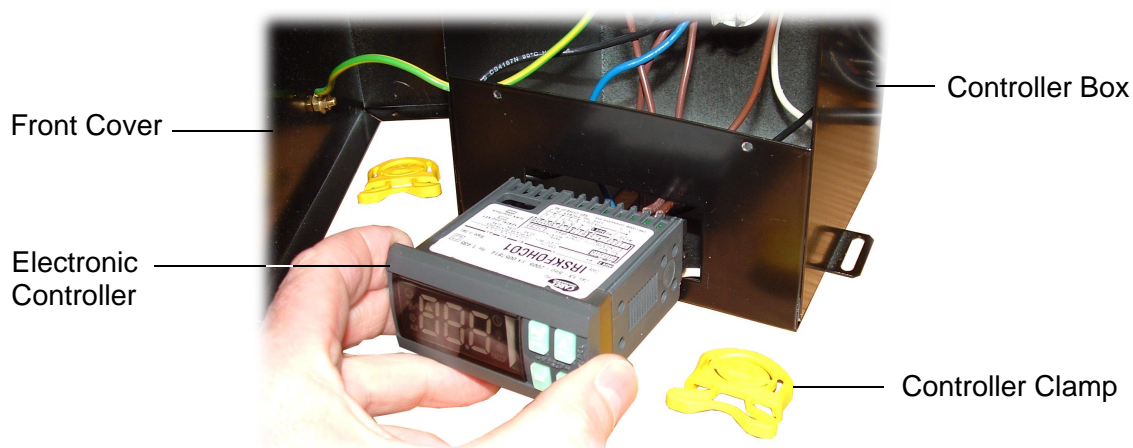| Temperature	Resistance (Tol. ± 2.4%)
-10°C	42.5 K Ohms
-5°C	34.0 K Ohms
0°C	27.3 K Ohms
5°C	22.1 K Ohms
10°C	18.0 K Ohms
20°C	12.1 K Ohms
30°C	8.3 K Ohms
40°C	5.8 K Ohms
50°C	4.2 K Ohms

Table 7: NTC Probe Resistance

Figure 24: Electronic Controller Wiring

5 REFRIGERATION UNIT

5.1 Introduction

The SKOPE OD1100 refrigeration unit is a bottom mounted, electronically controlled, removable cassette.

For **Major Servicing** (see page 62), the refrigeration unit unplugs and pulls out from the cabinet (see pages 63-64). **Minor Servicing** (see page 53) can be performed without having to remove the refrigeration unit from the cabinet.

Air Movement

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

Ventilation

For efficient operation of the chiller, it is essential that adequate ventilation be provided around the refrigeration unit. Normal operating conditions should not exceed 25°C at 60% RH (Climatic Class 3). See pages 8-9 for ventilation requirements.

Never store cardboard cartons or other items in front or rear of the refrigeration unit. The ventilation slots in the front and rear of the cabinet must be kept clear at all times.

Controller Setpoint

The electronic controller setpoint may need to be altered to accommodate different ambient conditions or product loading. Ambient has direct impact on the operational air curtain temperature, effecting the relationship between controller setpoint and product temperature.

5 REFRIGERATION UNIT

Defrost

The electronic control initiates a compressor timed-off defrost, either by demand (evaporator temperature) or every six hours. Defrost termination is primarily by temperature with time as a back up. If any ice build-up occurs on the evaporator coil, ensure:

- the drain tube is clear and water is free to drain.
- the chiller is operating within ambient specifications.
- the refrigerant charge is correct.
- the expansion valve is operating correctly (4K superheat).
- the electronic controller is programmed and operating correctly.

Maintenance Free Condenser

The SKOPE OD1100 refrigeration unit features a wide finned condenser coil, sitting in a condensate tray, that is both air and water cooled. The condenser coil is coated in a special corrosion resistant coating.

The coil should not require regular cleaning, as the wide fins should not get blocked with dust. However, due to spillages or general sludge build-up, it may be necessary to remove the condensate tray for cleaning.

5 REFRIGERATION UNIT

Air Flow and Sensor Probe Locations

The cross-section diagram below shows the refrigeration unit air flow and temperature sensor probe locations (see Figure 25 below).

| Location	Sensor Probe	Fitting
A	Control Probe	Fitted to a bracket at the cabinet supply air.
B	Evaporator Probe (red sleeve)	Fitted onto the bottom of the evaporator coil at the distributor tube inlet. Cable tied directly, and then insulated, onto the copper elbow.
C	Condenser Probe (grey sleeve)	Fitted onto the condenser coil. Cable tied directly, and then insulated, onto the copper elbow.
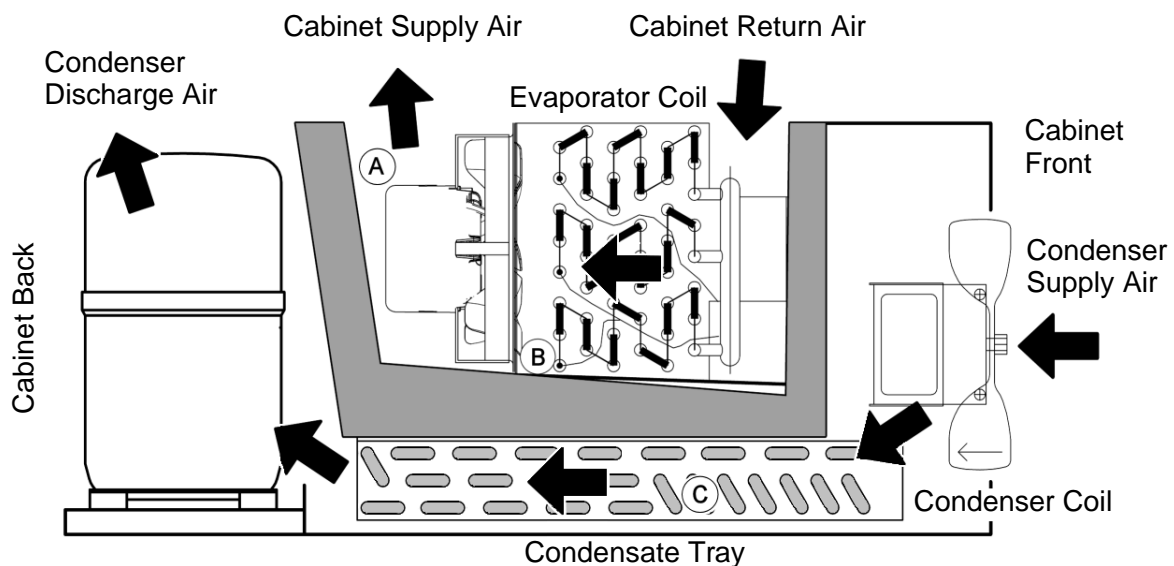
Figure 25: Refrigeration Unit Air Flow

5 REFRIGERATION UNIT

5.2 Minor Servicing

For minor servicing, most refrigeration components can be accessed from the front of the cabinet, without having to remove the refrigeration unit from the cabinet.

Minor servicing includes:

- Isolating the cabinet and unit electrics (page 11)
- Cleaning the condensate tray (page 54)
- Checking the refrigerant charge (page 55)
- Accessing the electrics in the controller box (page 56)
- Replacing the cabinet fuse (page 56)
- Resetting the high pressure switch (page 59)
- Servicing the condenser fan motors (page 60)
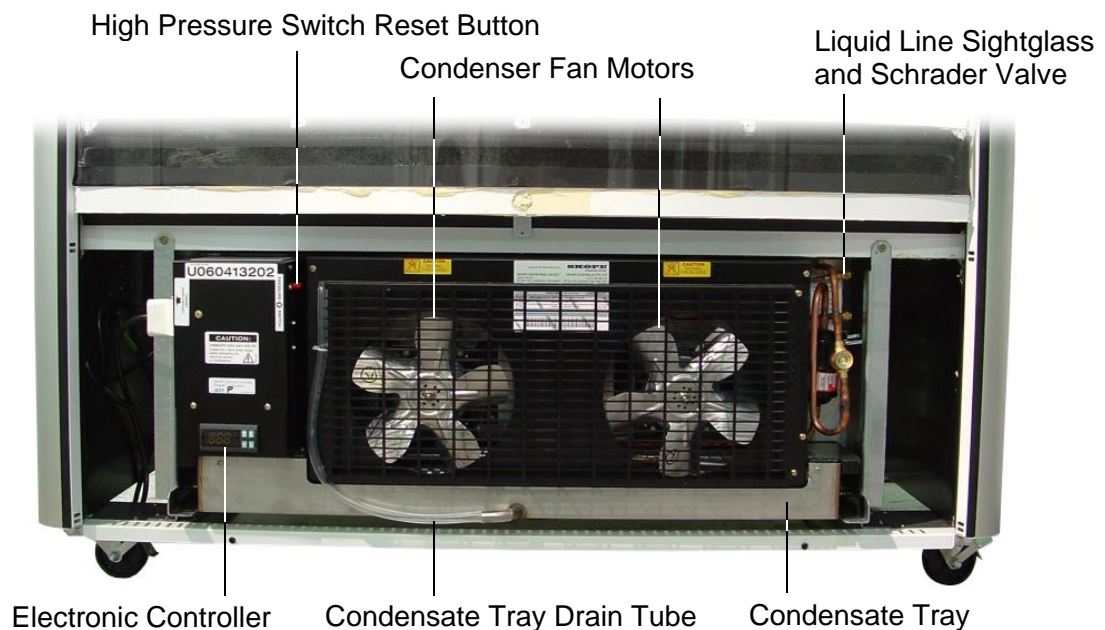- Servicing the electronic controller (page 48)

Figure 26: Refrigeration Unit (with front kick panel removed)

5 REFRIGERATION UNIT

Cleaning the Condensate Tray

The refrigeration unit incorporates a removable condensate tray, which collects water build up from the refrigerator cabinet. To ensure reliable operation of the chiller, it is recommended that the condensate tray is periodically removed from the unit and cleaned. To remove the condensate tray:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.

2. Isolate the cabinet from the mains power supply by switching off the mains isolating switch and unplugging the IEC flex (see page 11).

3. Pull the drain tube out from the grille and drain out any water from inside the condensate tray.

4. Undo the 2 fixing screws from the front of the condensate tray.

5. Carefully pull the condensate tray forward, out from the refrigeration unit. Allow the tray to drop down a small amount at the rear before pulling all the way out (see Figure 27 below).

6. Clean the inside of the tray with a brush and hot soapy water. Take care not to damage the inseal strips attached to the inside of the tray. Rinse all soapy water out prior to refitting.
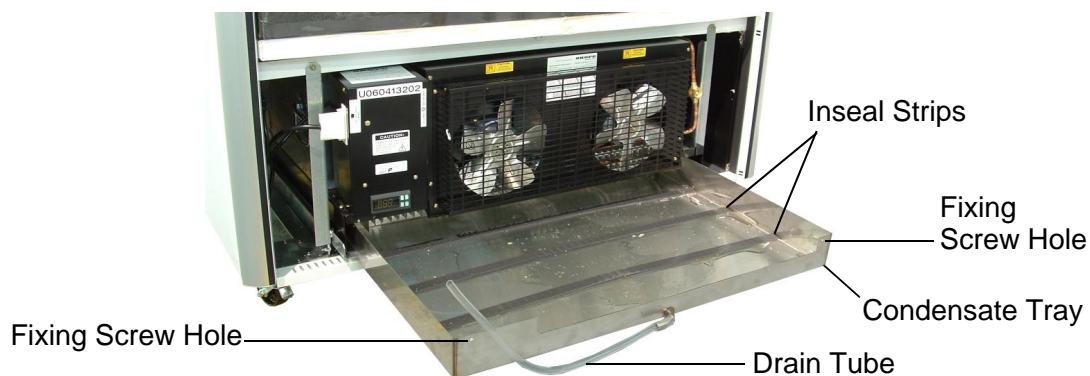

Figure 27: Removing the Condensate Tray

5 REFRIGERATION UNIT

Checking the Refrigerant Charge

The liquid line sightglass and suction Schrader valve are located on the right hand side of the condenser shroud (see Figure 28 below). These can be accessed by removing the cabinet front kick panel.

NOTE: R404A refrigerant is present at the suction valve. The valve should only be used by qualified refrigeration technicians. No discharge pressure valve is fitted, as they are considered too prone to leaking.

The sightglass may be used to check for correct refrigerant charge. This is done by looking at the sightglass during a stabilised compressor run cycle. The sightglass must be clear during this period. If there are bubbles visible in the sightglass it may indicate a system short on refrigerant. For a system to be short of refrigerant, a leak may have occured which must be located and repaired.

The sightglass will also indicate sytem moisture content. The sightglass must always indicate dry refrigerant, shown by the indicator being green in colour. If the sightglass indicator is not green then the drier must be replaced.

Figure 28:
Liquid Line Sightglass

Stabilised suction pressure range is from 380-450 kPa (55-65 psig). If necessary to connect a high pressure line, a temporary valve must be fitted (which is later removed and sealed off).

NOTE: This refrigeration system has a critical gas charge, as no receiver is used.

5 REFRIGERATION UNIT

Controller Box Assembly

The controller box assembly houses the electronic controller, the refrigeration high pressure switch, cabinet fuse, fan motor terminations, condenser fan motor capacitors and electrical supply wiring for the cabinet. The controller box is located behind the cabinet kick panel, on the left hand side of the refrigeration unit.

To access the controller box:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Remove the front cover from the controller box by undoing the 2 front and 2 side fixing screws. Leave the front cover Earth wire attached (see Figure 31 on the following page).
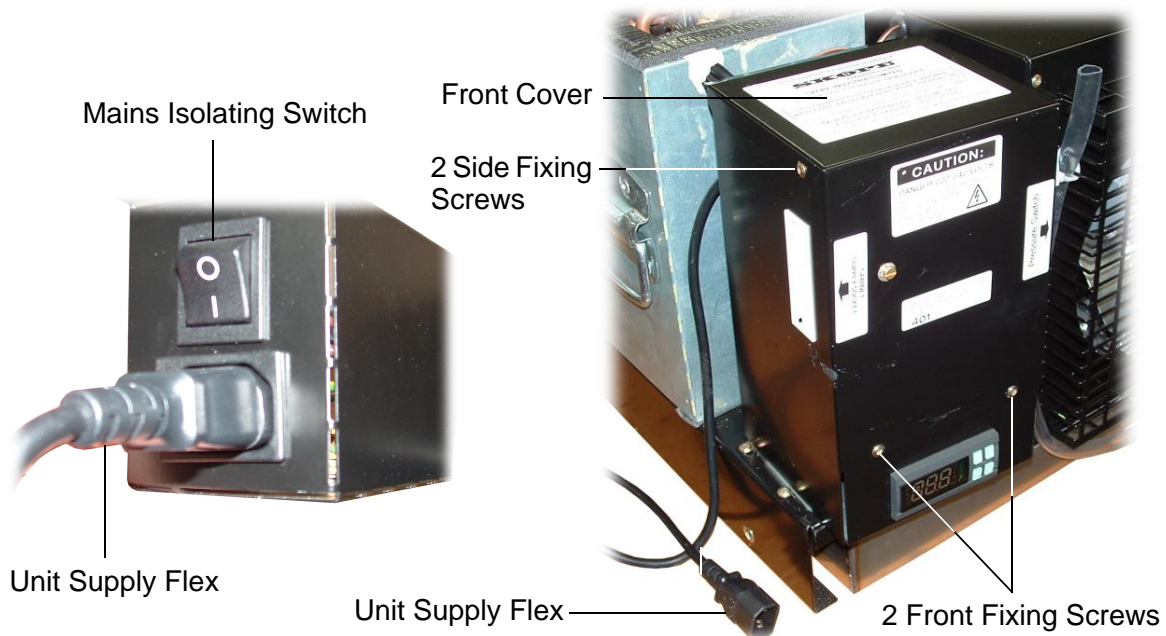
Figure 29: Isolation Switch

Figure 30: Controller Box (closed)

4. The controller box electrics can now be accessed (see Figure 31 below).
5. Before refitting the contoller box cover ensure all the wires are clear of any sharp edges and that the Earth wire is not caught between the controller box and front cover.
6. Reconect the unit supply flex to the isolation box and switch on the mains islolating switch.

Front Cover

Front Cover
Earth Wire

High Pressure Switch

Cabinet Supply
Socket

Cabinet Fuse

Fan Motor
Capacitors

Electronic Controller

Unit Supply Flex

Figure 31: Controller Box (open)

High Pressure Switch

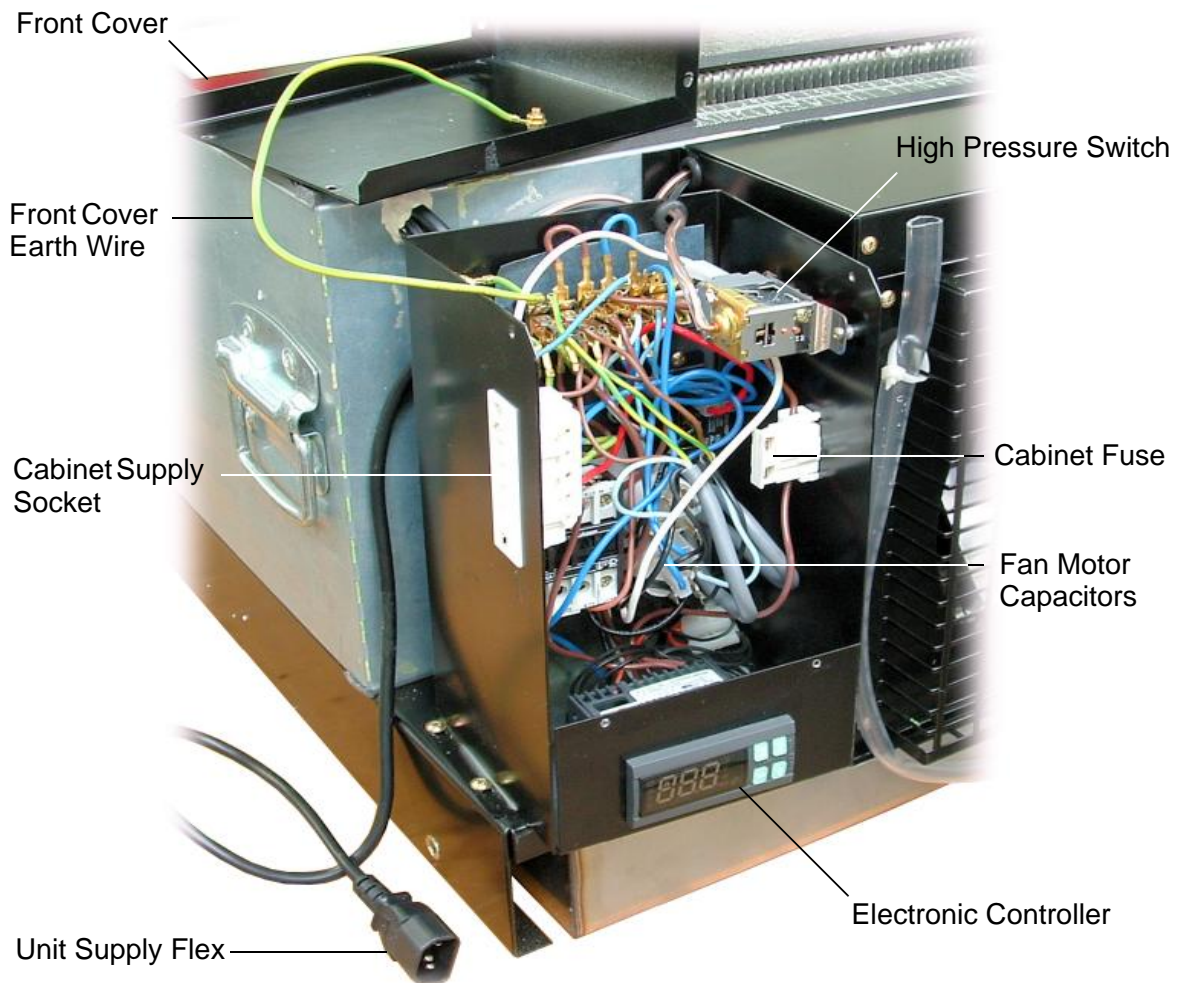The SKOPE Open Deck Chiller refrigeration unit is fitted with a manually resettable 450 psig high pressure switch. The high pressure switch is particularly important for cabinets in high ambient conditions, as the purpose of the pressure switch is to protect the refrigeration system from damage due to over-pressure (high temperature) conditions.

Conditions that may activate the high pressure are:

- High ambient conditions (ensure adequate ventilation)
- Lack of refrigeration ventilation
- Blocked or restricted condenser
- Faulty condenser fan motor. Note: the condenser fan motors operate in contra fan rotation.
- Poor refrigeration unit sealing. Note: the condenser uses a pressurised air cooling system which must be airtight.

The high pressure switch is mounted inside the controller box (see Figure 32 below) and is recognisable by the red reset button on the right hand side of the box (see Figure 33 on the next page).

If activated, the high pressure switch cuts power to only the compressor. The electronic controller display and cabinet lighting remains activated as normal. There is no link between the high pressure switch and the controller.

Figure 32:
High Pressure Switch

Once the compressor has been off for a period of time, the 'HI' alarm will activate due to a warm cabinet.

Resetting the High Pressure Switch
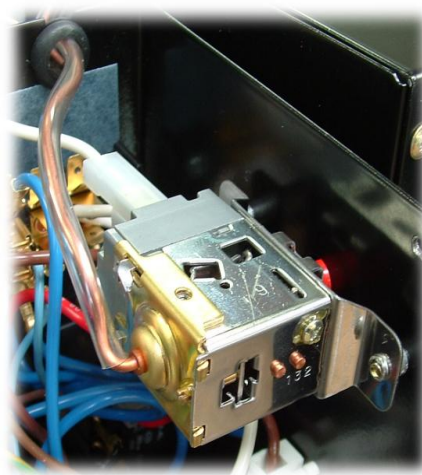
In the event the high pressure switch is activated:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Determine and eliminate what caused the high pressure switch to activate (see 'Troubleshooting' section on pages 70-72).
4. Reset the high pressure switch by pressing the red reset button on the side of the controller box (see Figure 33 below).
5. Reconect the unit supply flex to the isolation box and switch on the mains islolating switch.
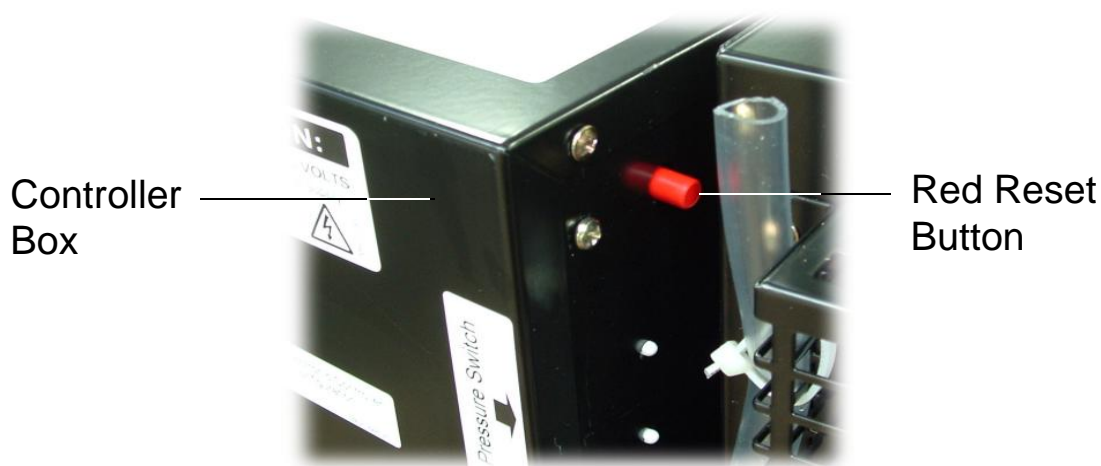6. Refit the cabinet kick panel and check operation of the cabinet.

Controller Box — Red Reset Button

Figure 33: High Pressure Switch Reset Button

5 REFRIGERATION UNIT

Condenser Fans

The condenser assembly incorporates two condenser fans. The condenser fan motors and fan blades have different rotation directions and must be replaced with the same fan blade. Note: the same fan motor is used for both directions, with only a wiring change to alter the motor direction (refer to the refrigeration unit wiring diagram on page 76). As viewed from the front of the unit, the left hand fan must rotate CCW and the right hand fan must rotate CW.

To replace a condenser fan motor:

1. Remove the cabinet kick panel (see page 63).
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Undo the 2 top fixing screws holding the unit lifting arms.
4. Lower both the lifting arms until they are horizontal (see Figure 40 on page 64).
5. Remove the condenser grille by undoing the 4 front mounting screws (see Figure 34 below).
6. Remove the controller box by undoing the 3 bottom screws.
7. Remove the front cover from the controller box by undoing the 2 front and 2 side screws. Leave the front cover Earth wire attached (see Figure 31 on page 57).

Mounting Screws

Condenser Fan Blade

Condenser Fan Motor Assembly
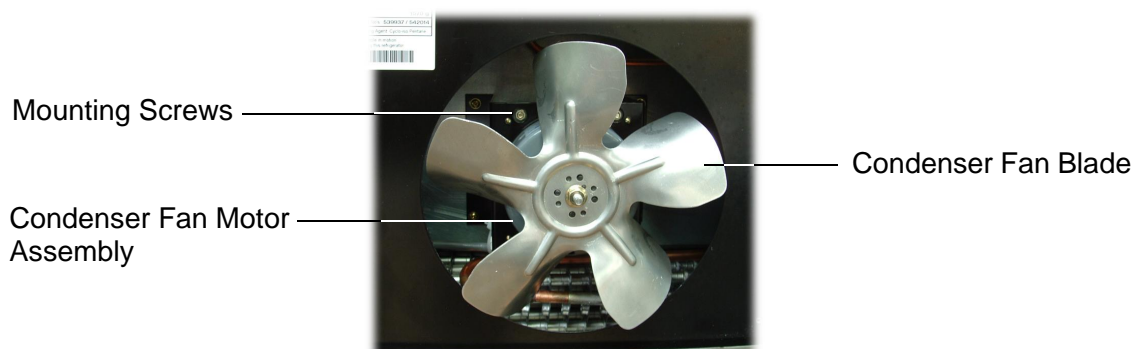
Figure 34: Condenser Fan Motor

8. Trace the condenser fan motor flex back to the terminal block and fan motor capacitor inside the controller box. Disconnect all 4 terminals and carefully pull the flex through the grommets.
9. Remove the fan motor assembly by undoing the 4 front screws.
10. Refit the new fan motor assembly.
11. Feed the motor flex through the grommet in the back of the controller box and connect the wires to the terminal block and capacitor inside the box (see Figure 35 below).
12. Refit the front cover to the controller box.
13. Refit the controller box to the unit base.
14. Reconnect the unit supply flex to the isolation box and switch on the mains isolating switch.
15. Refit the condenser grille and cabinet kick panel.
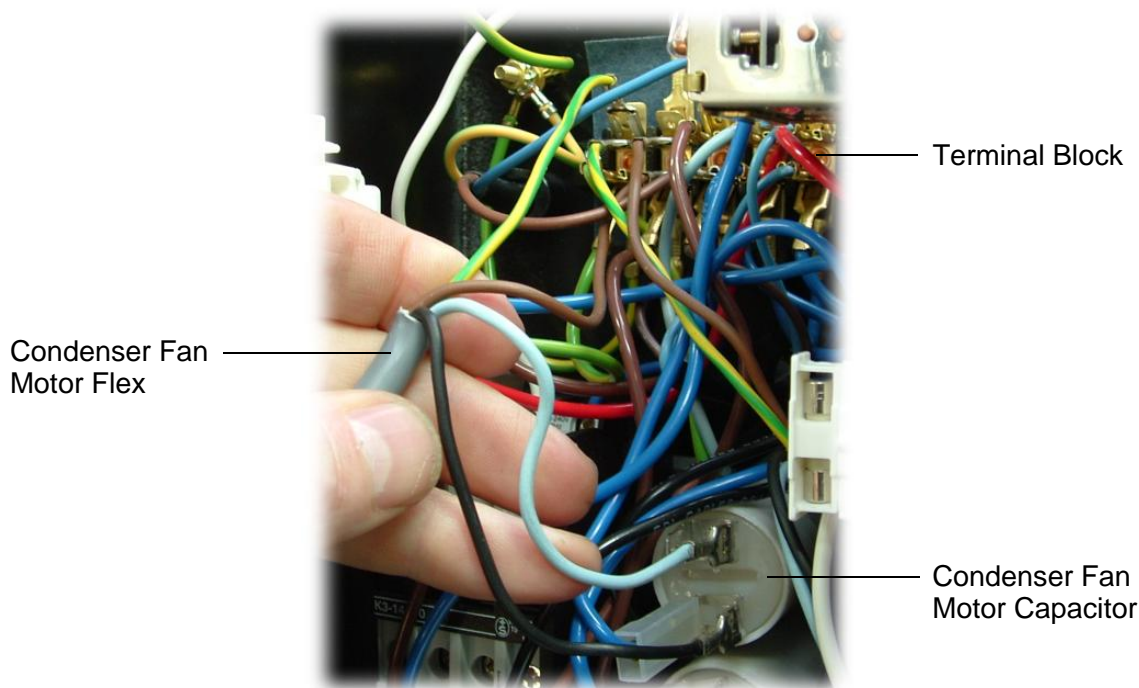
Figure 35: Condenser Fan Motor Wiring

5 REFRIGERATION UNIT

5.3 Major Servicing

For major servicing, the refrigeration unit unplugs and pulls out from the cabinet (see page 63).

Major servicing includes:

- Removing the refrigeration unit (page 63)
- Replacing the evaporator fan motors (page 67)
- Servicing the evaporator coil (page 65)
- Servicing the condenser coil (page 66)
- Servicing compressor and compressor electrics (pages 68-69)

Caution:

The refrigeration unit weighs approximately 75 kg and requires two able-bodied people to lift the unit out of the cabinet.

Figure 36:
Refrigeration Unit (front)

Figure 37:
Refrigeration Unit (rear)

5 REFRIGERATION UNIT

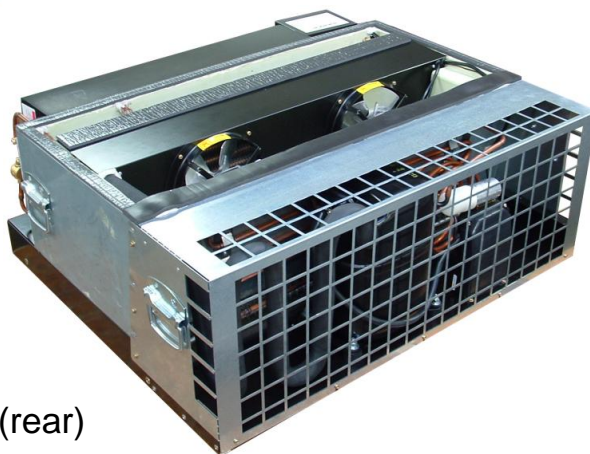## Removing the Refrigeration Unit

For major servicing the refrigeration unit pulls out from the cabinet, allowing access to the evaporator coil, evaporator fans, compressor electrics and refrigeration pipe work (see Figure 41 on next page).

Caution:

The refrigeration unit weighs approximately 75 kg and requires two able-bodied people to lift the unit out of the cabinet.

To remove the refrigeration unit:

1. Remove the cabinet kick panel by undoing the 5 fixing screws concealed behind the top black trim (the bottom black trim is not removed). Lift the kick panel up and then out to remove.
2. Isolate the cabinet from the power supply by switching off the mains isolating switch and unplugging the unit supply flex.
3. Unplug the cabinet supply plug from the side of the controller box.
4. Lower the front drain tube to drain the condensate tray.
5. Undo the 2 top fixing screws holding the unit lifting arms.

Mains Isolation Switch   Unit Lifting Arm Fixing Screw   Controller Box

Unit Lifting Arm

Unit Supply Flex

Cabinet Supply Plug

Figure 38: Isolation Switch   Figure 39: Cabinet Supply Plug
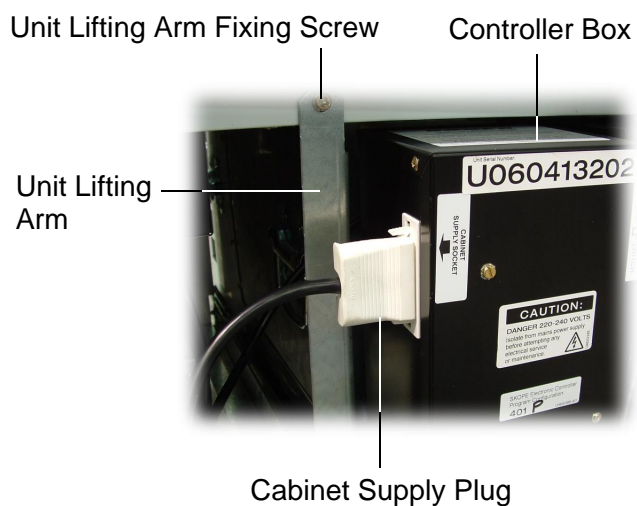
6. Lower both the lifting arms until they are horizontal.
7. Use the two front lifting handles to assist with sliding the unit forward, out onto the lifting arms.
8. Once the unit is out far enough to reach the rear lifting handles, the unit can be lifted out of the unit compartment and placed on the floor. Note: two people are required when lifting the unit (see Figure 41 below).
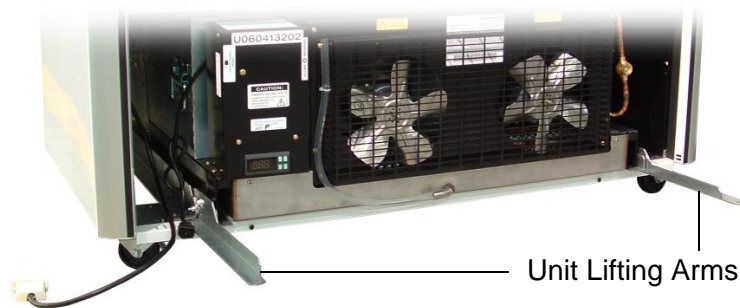
Unit Lifting Arms

Figure 40: Unit Lifting Arms (lowered)

Figure 41: Refrigeration Unit (pulled out)

5 REFRIGERATION UNIT

Evaporator Coil

The evaporator coil is located in the refrigeration unit compartment inside the foam filled evaporator box. The evaporator coil is fed by a thermostatic expansion valve located in front of the coil. It is important that the expansion valve operates with a 4K superheat and is fed by a full liquid line, as confirmed during compressor operation by a full liquid line sight glass (see page 55).

To access the evaporator coil:

1. Remove the refrigeration unit from the cabinet (see page 63).
2. Lift the evaporator coil vertically, to expose the evaporator coil, expansion valve, evaporator fan assemblies and electronic controller sensor probes (see Figure 42 below).
3. If the evaporator coil needs to be substantially lifted, it will be necessary to loosen electrical flexes and refrigeration pipe fixing points.

Figure 42: Expansion Valve

5 REFRIGERATION UNIT

Condenser Coil

The condenser coil is located at the bottom of the refrigeration unit. The coil is secured from underneath the unit by 4 corner screws, which can be accessed by removing the condensate tray (see page 54). If it becomes necessary to replace the condenser coil there are two methods to access the coil:

a.   Severly tilt the refrigeration unit to one side, where the bottom is accessable for the condenser screws. Ensure the compressor oil does not drain from the compressor, or

b.   Remove the compressor and turn the unit upside down.

5 REFRIGERATION UNIT

Evaporator Fans

The evaporator coil incorporates two evaporator fans. Both evaporator fans are located inside the evaporator box. The evaporator fan motors and fan blades have different rotation directions and must be replaced with the same rotation motor and fan blade. Check the label on top of the fan motor for the correct rotation direction (either CW or CCW). As viewed from the front of the unit, the left hand motor must rotate CW and the right hand motor must rotate CCW. To replace an evaporator fan motor:

1. Partially lift and support the evaporator coil (see page 65).
2. Unplug the fan motor plug from the side of the motor.
3. Remove the fan motor assembly by undoing the 4 mounting screws from around the ring bracket (see Figure 43 below).
4. Remove the 4 nuts to free the motor from the ring bracket.
5. When replacing a fan motor check with the refrigeration unit wiring diagram to ensure the correct rotation fan motor is used.
6. Reconnect the corresponding fan motor plug. Ensure the plug is firmly engaged.
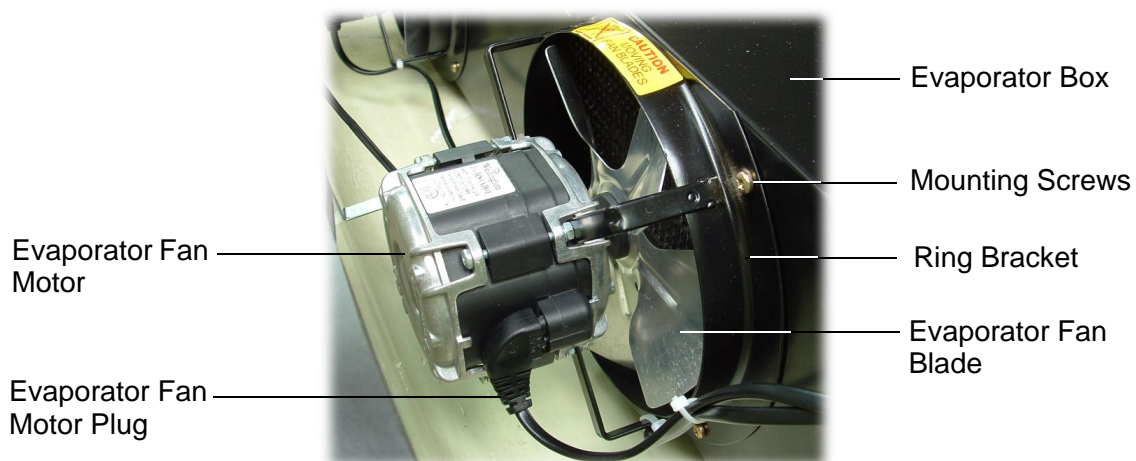7. Ensure the fan motor flexes are clear of the fan blades.

Figure 43: Evaporator Fan Motor

Compressor

The compressor cannot be serviced and if faulty must be replaced. An overload is fitted on top of the compressor. The compressor is located at the rear of the refrigeration unit and is accessed by removing the rear cover (see Figure 44 below).

Before replacing the compressor, ensure the compressor electrics are operating correctly and that the compressor is being supplied with consistant 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 muti-box or extension cord). The compressor is directly powered from the heavy duty contactor within the controller box (see Figure 45 below).

If replacing a compressor, ensure the system is clean and non-contaminated. If there is a burn-out, then a suction burn-out filter drier should be used until all contamination is removed (use only as specified by the filter drier manufacturer).
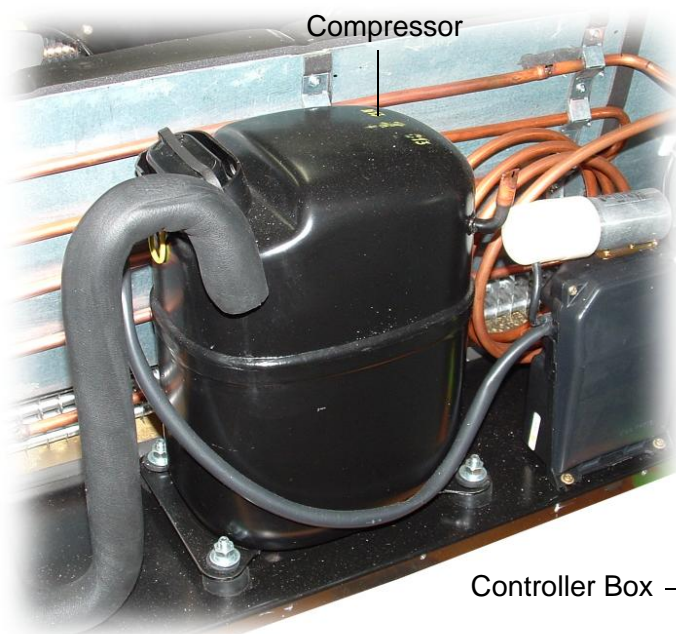
Figure 44: Compressor   Figure 45: Compressor Contactor
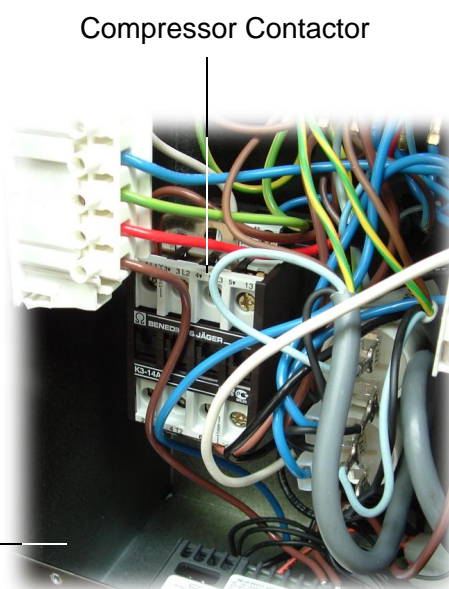
Compressor Electrics

The compressor electrics box houses the compressor start relay and compressor start and run capacitors. The electrics box is located beside the compressor at the rear of the refrigeration unit.

To access the compressor electrics box:

1. Disconnect the cabinet from the mains power supply.
2. Remove the compressor cover from the rear of the refrigeration unit by undoing the 5 top screws and loosening the 3 screws on each side of the compressor cover.
3. Remove the electrics box cover by undoing the 2 top screws.
4. Check the compressor wiring with the wiring diagram located inside the electrics box cover (see Figure 46 below).
5. After servicing, ensure to refit both the electrics box cover and the compressor rear cover.

Figure 46: Compressor Electrics Box

5.4 Troubleshooting (see 'Alarms' on pages 46-47)

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

Complaint	Possible Cause	Repair
1. Cabinet warm, product warm, possible 'HI' alarm activation	• External drafts, possibly from air-conditioning, door ways or ventilation fans. External drafts must be less than 0.2 m/s. Note: 0.2 m/s is not noticable by touch. Generally, any noticable draft is too much. Some drafts may be intermittent, such as when air-conditioning cycles on and off. • Cabinet loaded with very little stock or unusual shelf position.	• Confirm visually any potential airflow draft outlets. It may be necessary to redirect ventilation fans or relocate the cabinet. • Controller setpoint may require change. Note: that an unloaded cabinet generally operates warmer.
2. Cabinet not operating	• Loss of power supply.	• Check mains power supply and cabinet isolation switch.
3. Cabinet not operating but controller is illuminated	• Refrigeration shut-down. High pressure switch has shut-down the refrigeration system and cabinet lighting.	• Check the condenser coil and ventilation, and reset the high pressure switch (see page 59).
4. Compressor not operating - controller displays 'HI' alarm	• Overload protector tripped. • Faulty component. • High Pressure Switch activated.	• Refer to electrical section. • Repair or replace control. • Check condenser and reset.
5. Cabinet lights not operating	• Blown fuse. • Failed fluorescent tube • Faulty night blind light switch. • Loose electrical connections. • Ensto plug not plugged into controller box socket. • Controller alarm	• Replace blown fuse. • Check both fluorescent tubes. • Check switch. • Check all light connections. • Check plug. • Determine cause and eliminate (see pages 46-47).

Table 8: Troubleshooting Chart *(continued on next page)*

5.4 Troubleshooting (see 'Alarms' on pages 46-47)

Complaint	Possible Cause	Repair
6. Lights flickering	• Power supply limiting current supply at compressor start-up.	• Ensure 20A rated power supply. Do not use extension cords or multi-boxes.
7. Unit defrosting excessively	• Unit will demand defrost regularly if the evaporator temperature is over cold due to being short of refrigerant or starved evaporator.	• Check evaporator refrigerant flow and make suitable repairs. Note: Expansion valve superheat set to 4K.
8. Product warm - no alarm	• Blocked or restricted honeycomb air grille. • One evaporator fan not operating or incorrect rotation. • Restricted return air grille.	• Remove and clean, or replace honeycomb. • Check power supply plug is fully engaged into motor. Repair or replace evaporator fan motor. • Remove restriction.
9. Pressure Switch activated - controller displays 'cht' and 'CHT' alarms	• Restricted ventilation. • Excessive heatload into cabinet. • Condenser fan motor failure or intermittant overload trip. • Condenser fan incorrect rotation • Over-charged with refrigerant (critical measured charge required). • Blocked or restricted condenser.	• Ensure no restriction to cabinet airflow at front and rear of cabinet. If possible, space the cabinet slightly out from the wall. • Ensure ambient has not risen above 30°. • Check motor and replace if at all dubious. • Check rotation and change as necessary. • If over-charge is apparent, evacuate and recharge to rating label. • Visually check condenser for possible restriction. Remove condensate tray and clean. If bad, refrigeration unit removal may be necessary.

Table 8: Troubleshooting Chart *(continued on next page)*

5.4 Troubleshooting

Complaint	Possible Cause	Repair
10. Water on floor	• Condensate tray overflow. • Excess humidity (would need to be above 85% RH). • Cabinet not level. • Sludge build-up in condensate tray.	• Check condensate tray. • Keep humidity below 65%. • Ensure the cabinet is positioned on a level surface. • Remove condensate tray and clean (see page 54).
11. Water / ice within evaporator box	• Blocked drain tube, causing the box to fill with water. • Inadequate defrost time due to loose or faulty evaporator probe.	• Remove the unit and clean out the bottom of the evaporator box and drain entry. • Secure or replace probe.
12. Moisture or condensation on night blind and internal cabinet product	• When humidity is above 65% RH, this may begin to occur.	• Keep humidity below 65%.
13. Product is deteriorating at an excessive rate (e.g. milk going 'off').	• Incorrect controller program. • Cabinet overloaded and / or restricted internal or external ventilation. • External drafts.	• Confirm perishable program is used (program 401: bn1). Possibly alter setpoint colder. • Ensure the maximum operating ambient condition is 25°/60% RH. • Ensure there is NO noticeable draft and that the cabinet is situated well clear of doorways and other points of ventilation and air-conditioning.

Table 8: Troubleshooting Chart *(continued)*

5.5 Technical Operating Specifications

Typical Stabilised Operation at 25°C / 60% RH	
Discharge pressure:	280 psig (1950 kPa)
Condenser air discharge temp:	40°C
Liquid temperature at drier:	36°C
Suction pressure:	55 psig (380 kPa)
Evaporator air ON temperature:	5.5°C
Evaporator air OFF temperature:	-3.2°C
Suction line temperature:	10°C
Discharge line temperature:	90°C
Compressor run time:	12 minutes
Compressor OFF time:	5 minutes
Defrost interval:	6 hours
Defrost duration time:	13 minutes
Current consumption:	6.7 A (7.5 A peak)
Power consumption:	1340 W

Table 9: Technical Operating Specifications

NOTE: These figures are only a guide. Variations are expected due to individual installation characteristics.

6.1 Cabinet Wiring Diagram

WIRE COLOUR KEY

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

6 WIRING

6.1 Cabinet Wiring Diagram

Item	Part Description
1	Foamed Cabinet
2	Sign Assembly
3	3-Pole Block Connector
4	Night Blind Switch (with pull-on feature)
5	T5 Lamp Holder (4)
6	OSRAM Intelligent Ballast - Twin 28/54W
7	54 Watt T5 Fluorescent Tube (Ø16mm x 1150mm) - Daylight 860/865 (sign light)
8	54 Watt T5 Fluorescent Tube (Ø16mm x 1150mm) - Daylight 860/865 (cabinet light)
9	Heater Element 22.3 W
10	Sign Assembly Earth
11	Cabinet Supply Flex
12	Refrigeration Unit Assembly (see Refrigeration Unit Wiring on the next page)
13	Isolation Box Assembly
14	2-Pole Isolation Switch
15	IEC Appliance Socket
16	Main Earth
17	Refrigerator Chassis Earth
18	Refrigerator Mains Supply Flex (with mains plug fitted)

6.2 Refrigeration Unit Wiring Diagram

Model: UB80ACD

WIRE COLOUR KEY

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

6.2 Refrigeration Unit Wiring Diagram

Model: UB80ACD

Item	Part Description
1	Refrigeration Unit Assembly
2	Compressor
3	Start Capacitor - Compressor
4	Run Capacitor - Compressor
5	Compressor Windings
6	Inrush Limiting NTC - Compressor
7	Start Relay - Compressor
8	Thermal Overload - Compressor
9	Evaporator Fan Motor - WDTL 12W (CCW rotation - LE *)
10	Evaporator Fan Motor - WDTL 12W (CW rotation - LE *)
11	Condenser Fan Motor - FASCO 20W (CW rotation - LE *)
12	Condenser Fan Motor - FASCO 20W (CCW rotation - LE *)
13	Control Box Lid Earth
14	Refrigerator Control Box Assembly
15	Electronic Controller - CAREL ir33
16	Condenser Fan Capacitor (2)
17	HONGFA Relay (digital input)
18	Contactor - Compressor
19	ENSTO 5-Pole Socket
20	7-Pole Terminal Block
21	3 Amp Ceramic Fuse and Holder
22	Supply Flex - IEC Appliance Plug
23	Compressor Supply Flex
24	Compressor Fan Supply Flex (2)
25	Evaporator Fan Supply Flex (2)
26	Control Box Earth
27	Pressure Switch (manual reset)
28	CAREL Temperature Probe - Control
29	CAREL Temperature Probe - Condenser
30	CAREL Temperature Probe - Evaporator
31	2-Pole Connector Block

* LE denotes the motor direction as viewed from the lead end.

7 SPARES

7.1 Cabinet

Part Description	SKOPE Part No.
Sign Side (high sign model only)	O1100/S20-32
Night Blind Kit	SXX1481
Top Honeycomb Vent	PLX1223
Bottom Honeycomb Vent	PLX1225
Shallow Shelf Assembly	O1100/599A-32
Deep Shelf Assembly	O1100/599B-32
Bottom Shelf	O1100/589-32
Gravity-Feed Shelf Slides and Divider Kit	SXX1191
Shelf Bracket	V0973-99
Clear Upstand	PLX1360
Bottom Air Vent Panel	O1101/B72-32
Kick Panel Assembly	O1101/131A-32
Kick Panel Black Trim	PLE1301
SKOPE Badge	NAM1080
Security Grille Assembly	GRL0947
Security Pushlock	SXX8480
Swivel Castor - 75mm	SXX4339
Swivel Castor - 75mm (lockable)	SXX4539

7 SPARES

7.2 Lighting

Illuminated Sign

Part Description	SKOPE Part No.
Low Sign Assembly	O1101/S12-49
Low Sign Opal Panel	PLY1197
High Sign Assembly	O1100/S12-49
High Sign Opal Panel	PLY1399
Sign Light Assembly (common)	O1101/L53-32
Light Channel	O1101/L54-32
54 Watt T5 Fluorescent Tube (1150mm)	ELL1296
T5 Lampholder	ELZ0600
28/54W Twin Electronic Ballast	ELZ1293
Night Blind Light Switch	ELS1094

Cabinet Interior Light

Part Description	SKOPE Part No.
Interior Light Assembly	O1100/L85-32
Light Channel	O1100/L86-32
Interior Light Cover	O1100/E71
54 Watt T5 Fluorescent Tube (1150mm)	ELL1296
T5 Lampholder	ELZ0600

7.3 Refrigeration Unit

Part Description	SKOPE Part No.
Refrigeration Unit Assembly	UB80ABC-401IX
Condenser Coil	CLS1109
Evaporator Coil	CLS1110
Compressor - Electrolux MS26TB_T	CPR1150
Compressor Electrics Enclosure	ELZ1150NC
Drier - Danfoss DN83S	DRY7620
Evaporator Fan Motor - WDTL (CCW rotation)	ELM1219
Evaporator Fan Motor - WDTL (CW rotation)	ELM1220
Evaporator Fan Blade - L/H (Ø172mm)	FAN1178
Evaporator Fan Blade - R/H (Ø172mm)	FAN1168
Condenser Fan Motor - FASCO (reversible)	ELM9917
Condenser Fan Blade - L/H	FAN5256
Condenser Fan Blade - R/H	FAN5043
Condenser Fan Guard	UB80AB/R21-49
Compressor Cover	UB80AB/R20-GT
Heat Exchanger	REF1787
Bush Reducer	REF4208
Sightglass	REF7621
High Pressure Switch (manual reset)	ELS0157
No. 3 Orifice - Danfoss	REF8059
CAREL Probe Assembly	UB80AA/E49C
Schrader Recharging Valve	VAL2816
TES2 Expansion Valve	VAL9641

7 SPARES

7.4 Electrical

Controller Box

Part Description	SKOPE Part No.
Controller Box Assembly (program 401)	UB80AA/G29-401
Controller Box	UB80AA/G30-49
Controller Box Cover	UB80AA/G31-49
Capacitor (condenser motor)	ELC9142NC
HONGFA Relay (reversing fan motor)	ELR0494
Contactor	ELZ0456
3-Way EUROTEC Powerbar	ELZ0458
5-Pole ENSTO Socket	ELZ0499-5
5-Pole ENSTO Panel Adaptor	PLM0497-5
CAREL Controller ir33 (program 401)	ELZ1254P-401
3 Amp STUCCHI Ceramic Fuse (20 x 5mm)	ELZ9654
STUCCHI Fused Terminal Block	ELZ9655
IEC Supply Flex (840mm)	FLX0539

Mains Isolation Box

Part Description	SKOPE Part No.
Mains Isolation Box Assembly	O1100/E80
Isolation Box Base	O1100/E81/1-49
2-Pole 16A Rocket Switch	ELS0495
IEC Socket Outlet (panel mounted)	ELK8880
Mains Supply Flex and Plug (3.0m)	V4800/E53