

TCE1000N

SKOPE Two Door Upright Fridge
Hydrocarbon



TCE1000N
Top Mount Chiller
Hydrocarbon
Service Manual

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CONTENTS

1 Servicing Hydrocarbon	
Overview	4
SKOPE HC Service Requirements	5
2 Specifications	
Model	6
3 Electronic Controller	
Introduction	7
Temperature Setpoint	7
Messages and Alarms	7
4 Wiring	
Model: TCE1000N	8
Notes	9
5 Spare Parts	
Main Assembly – TCE1000N	10
Parts — Main Assembly TCE1000N	10
Cabinet Assembly – TCE1000N	11
Parts — Cabinet Assembly TCE1000N	11
Glass Door Assembly	12
Parts — Glass Door Assembly	12
Sign Assembly	13
Parts — Sign Assembly	13
Unit Assembly HB0070832517C	14
Parts — Unit Assembly	15
Electrics Box Assembly	16
6 Installation	
Installation Guidelines	17
Ventilation Requirements	17
Door Handles	18
Fitting Door Handles	18
Removing Door Handles	19
Shelves	20
Shelf Clips	20
Repositioning Shelves	20
7 Replacement Procedures	
Lighting	21
Doors	25
Replacing the Gasket	25
Removing and Refitting the Door	25
Adjusting Door Tension	26
Refrigeration Unit	27
Before Servicing	27
Refrigeration Unit Assembly	28
Gas Detector	30
Leak Detector	30
On-Site Work	30
Not Cooling Fault	30
Hydrocarbon Workshop	30
Removing the Unit	31
Replacing the Unit	32
Unit Electrics Box Assembly	33
Unit Cover	34

Condenser Fan	34
Evaporator Fan	36
Compressor	37
Compressor Electrics	37
Refrigeration System	38
Unit Removal	38
Diagnostics	38
Electronic Controller	39
Controller Location	39
Controller flexes	39
Replacing the Controller	40
Control Probe	41
Cleaning	42
Cabinet	42
Condenser Coil	42
8 Troubleshooting	
Cabinet and Refrigeration Unit	43
Diagnostic Table	43
On-site work procedure	45
On-site work procedure (continued)	46

1 Servicing Hydrocarbon

Overview

This cooler utilises hydrocarbon (HC) R290 as its refrigerant. R290 is a natural refrigerant that has a very low environmental impact.

Special service requirements are needed as R290 is a flammable refrigerant.

Safety hazards

The main R290 safety hazards are:

- Flammable refrigerant.
- Venting of R290 and compressor oil.
- Asphyxiation.



SKOPE does NOT recommend performing hazardous activities on the refrigeration system. See “Refrigeration System” on page 39 for more information including examples of hazardous activities.

SKOPE HC Service Requirements

Servicing must only be performed by Approved SKOPE Service Technicians, and must meet all requirements in the SKOPE HC Service Policy (available from SKOPE), including the following:

Hydrocarbon work – SKOPE Service Policy

It is the responsibility of the service technician to follow SKOPE's Hydrocarbon equipment service policy and by accepting a service work order they agree to the following (where applicable):

- **MUST** – Ensure all workers are trained in the SAFETY of hydrocarbon products to the appropriate level for the work required.
- **MUST** – Follow all Local Safety Regulations relevant to flammable refrigerant gases.
 - Australia should reference - AIRAH Flammable Refrigerants – Safety Guide
 - New Zealand should reference – Flammable Refrigerant Safety Documentation (Refrigerant License NZ)
- **MUST** – Adhere to all on-site (workplace) Health and Safety requirements
- **MUST** – Not modify or alter the design of SKOPE equipment in any way
- **MUST** – In cases where the refrigeration system is not readily removable from the cabinet; then the entire cabinet **MUST** be sent to the Hydrocarbon workshop for repair.
- **MUST** – **ONLY** use SKOPE OEM Spare Parts; or identical replacement parts. Any variation in replacement part may render the system non-compliant and unsafe.
- **MUST** – Follow all best practice work activities for servicing hydrocarbon refrigerants (SKOPE recommend attending specific hydrocarbon refrigeration handling training courses). Nitrogen must be used for purging system before commencing “Hot Work” – brazing.
- **MUST** – Adhere to relevant SKOPE Service Manual. If any contradiction, the local Regulations take precedence over SKOPE requirements
- **MUST** – Work only in suitable, safe and compliant work spaces. Personal Protective Equipment must always be used when working on Hydrocarbon equipment.
- **MUST** – Service people diagnosing refrigeration faults must always carry and utilise Flammable Gas detectors when working on Hydrocarbon equipment.
- **MUST** – Prior to any service work; know where and how to safely and quickly isolate power supply to cabinet
- **MUST** – Not perform any Hot Work (brazing etc.) in the field. These are to be completed in a suitable service depot / workshop (in a dedicated specific Hazardous Work Area compliant to local flammable gas regulations)
- **MUST** – Not transport a refrigeration system with a known active leak. If there is an active leak the refrigerant must be safely removed (with use of Bullet Piercing Valve or Line Tap valves) before transporting. Valves must be removed at the hydrocarbon service depot once repair is completed.
- **MUST** – All hydrocarbon workshop areas must have emergency plans; that includes suitable evacuation and fire control plans and equipment.
- **MUST** – Only use refrigerant grade hydrocarbon, to precise mass specified on removable refrigeration system serial label.
- **MUST** – Be accurate refrigerant charge; The refrigerant mass is ultra-low charge and must only be measured in by accurate scales to +/- 1.0gram. Refrigerant **MUST** not be overcharged; or added to an already charged system.
- **MUST** – Use identical drier replacement; as any change will affect gas charge volume; and effect reliability compliance and safety.
- **MUST** – Any pipework replacement, must be identical to genuine SKOPE parts.
- **MUST** – Not introduce a sparking device inside a cabinet or inside a removable refrigeration system. Battery drills should not be used.
- **MUST** – Not perform any activity that could stress a refrigeration pipe (unless in a workshop).
- **MUST** – Get customer authorisation to permanently swap a removable refrigeration system.
- **MUST** – Have the Wellington Drive SCS Field app installed on a Bluetooth enabled device carried by the service technician (exception is for cabinets that do not utilise the Wellington Drive Controller). The app should be utilised for safe, accurate diagnosis of the system and it is required to complete a controller replacement in the field.
- **RECOMMENDED** – Have the Wellington Drive SCS Track app installed on a Bluetooth enabled device carried by the service technician. This passive app collects system data from the Wellington Drive SCS Connect Controller and transmit it to the cloud.
- Logistics companies may be used to transport a complete refrigerator where no separation of the refrigeration system occurs. Logistics companies are not required to be contracted to this SKOPE Service Policy.

2 Specifications

Model

This service manual is applicable to the Haier TCE top mount chiller. detailed in the table below. Refer to the relevant product specification sheet (available on the SKOPE website: www.skope.com) for specifications.

Series	Model	SKOPE ID
EM10BYN/W0591	TCE1000N	EM10BYN

3 Electronic Controller

Introduction The chiller is fitted with an electronic controller which is visible through a cutout below the sign. The electronic controller is pre-programmed and requires no initial setup or additional programming. SKOPE does not recommend that the settings be changed unless it is absolutely necessary.

Temperature Setpoint The chiller temperature is set to stay between 1.5°C and 3.5°C. The setpoint can be adjusted to other temperature ranges for specialist applications if required (see below).

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

To change the temperature setpoint range





1. Refer to the table below to determine the required temperature range.

Set	Temperature range	Set	Temperature range
0	0.0°C to 1.5°C	5	3.5°C to 5.5°C
1	0.5°C to 2.5°C	6	4.0°C to 6.0°C
2	1.5°C to 3.5°C	7	5.0°C to 7.0°C
3	2.5°C to 4.5°C	8	6.0°C to 8.0°C
4	3.0°C to 5.0°C	-	-

2. Press and hold the up and down buttons on the electronic controller for 3 seconds to unlock the controller.
3. Use the up and down buttons to scroll to the set number assigned to the required temperature range, as shown in the table above.
4. Once the desired set is displayed, leave the controller for 5 seconds. The display changes back to the cabinet internal temperature and the new set is saved.

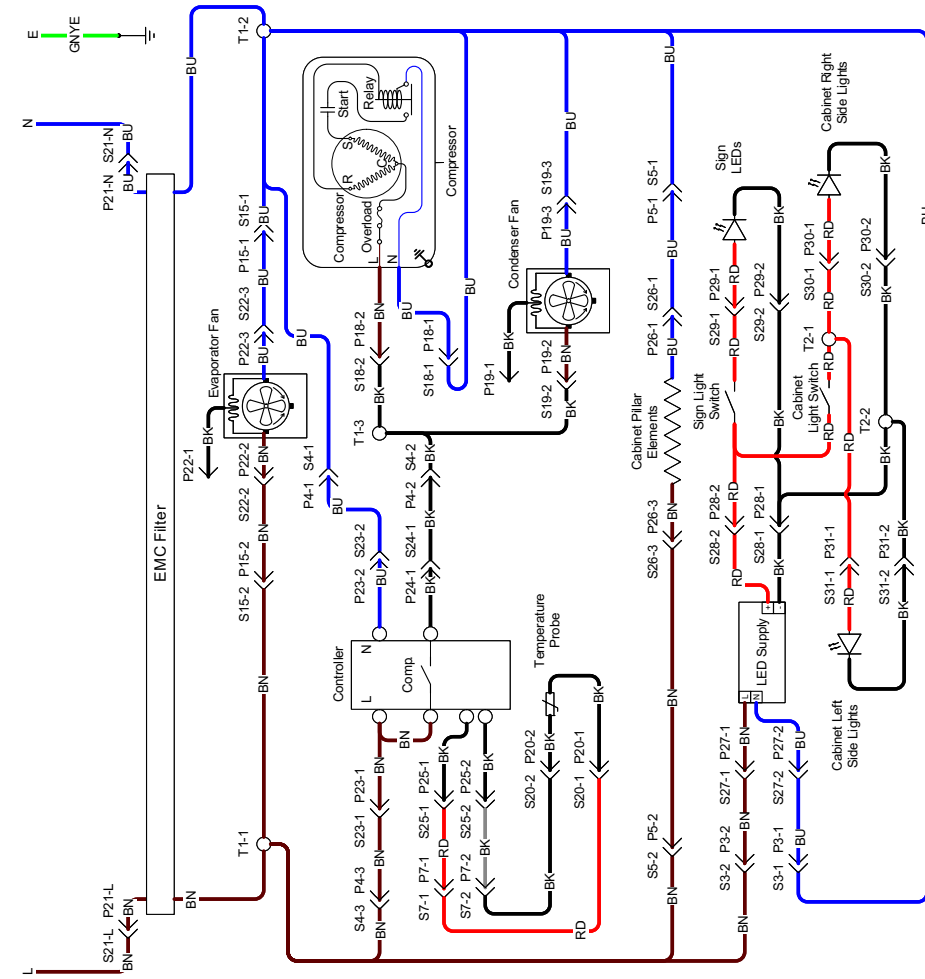
Messages and Alarms The following table explains messages and alarms that the electronic controller displays.

Messages and alarms

Display	Description
	The cabinet internal temperature. 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.
	Electronic controller lock indicator. On when the electronic controller is locked. Off when the electronic controller is unlocked. Press and hold the up and down buttons for 3 seconds to unlock the electronic controller.
	Compressor indicator. On when the compressor starts. Off when the compressor stops.
	Temperature sensor fault. This indicates a fault with the temperature sensor. Arrange a service call.

4 Wiring

Model: TCE1000N



WIRE COLOURS

BK	Black
BN	Brown
RD	Red
OG	Orange
GN	Green
BU	Blue
GY	Grey
WH	White
GNVE	Green-Yellow

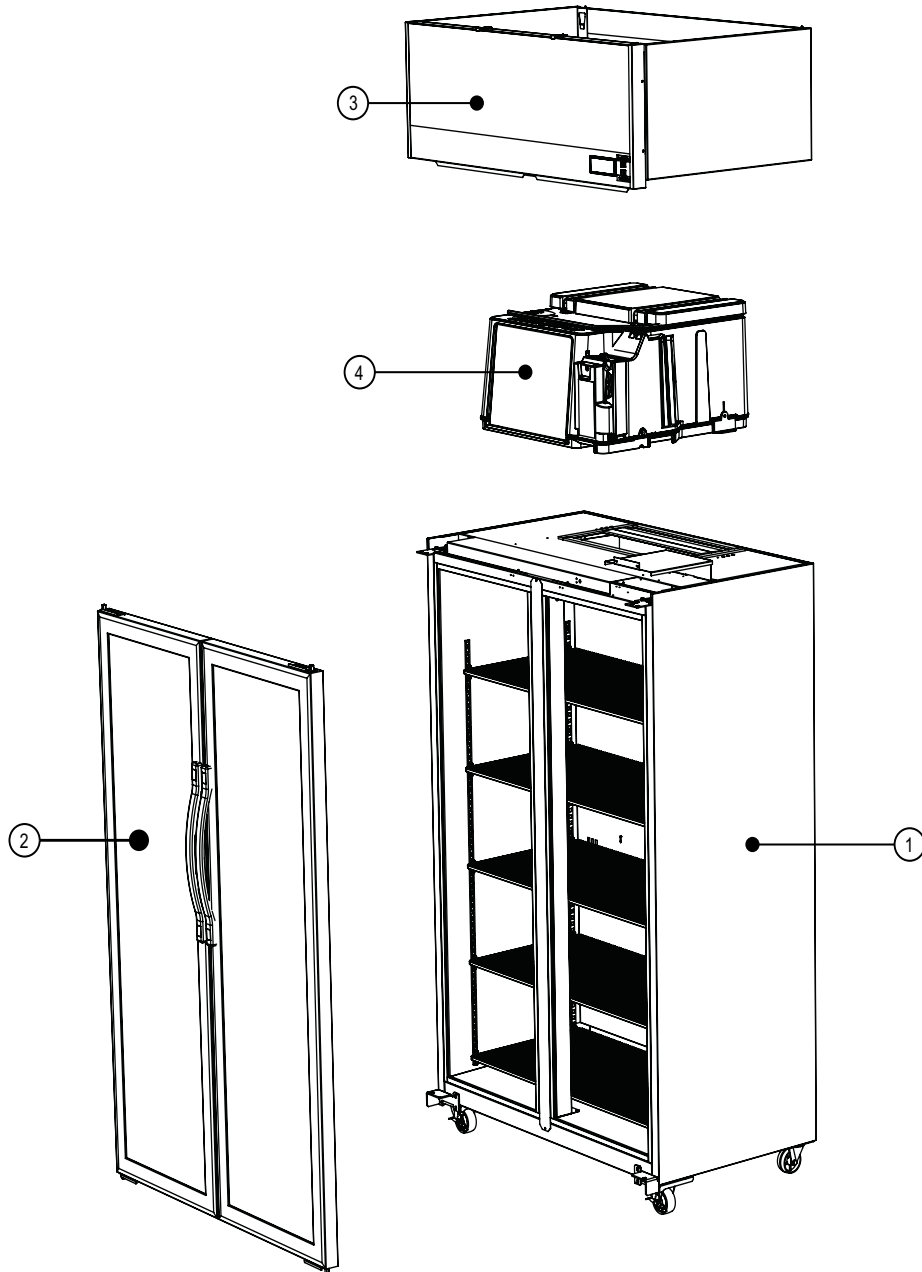
Based upon IEC 757 Standard

LEGEND

S1/P1	Unused	S17/P17	Unused	S25/P25	Signal on Controller (Molex)
S2/P2	Unused	S18/P18	Compressor (4-Way Blue)	S26/P26	Cabinet Pillar Connection
S3/P3	Cabinet Lighting (4-Way Yellow)	S19/P19	Condenser Fan Motor (4-Way White)	S27/P27	LED Power Supply Input
S4/P4	Controller Power (3-Way White)	S20/P20	Unit Temperature Probe (2-Way Red)	S28/P28	LED Power Supply Output
S5/P5	Cabinet Heating (3-Way Black)	S21/P21	Mains IEC Connection	S29/P29	Sign Connection
S6/P6	Unused	S22/P22	Evaporator Fan Extension (4-Way White)	S30/P30	Right Lights Connection
S7/P7	Controller Sensor (2-Way Black)	S23/P23	Power on Controller 1 (Molex)	S31/P31	Left Lights Connection
S8/P8	Unused	S24/P24	Power on Controller 2 (Molex)	T1	Unit Joints

5 Spare Parts

Main Assembly – TCE1000N

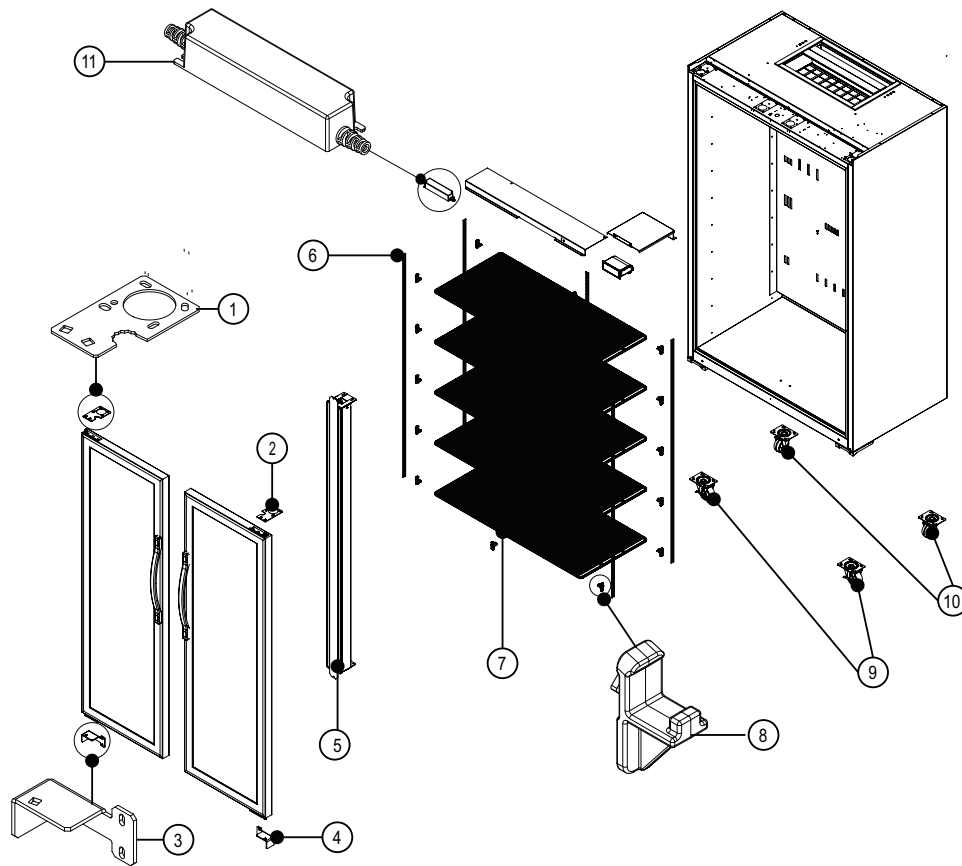


Parts — Main Assembly TCE1000N

No.	Description	Page
1	Cabinet assembly	Page 12
2	Door assembly	Page 13
3	Sign assembly	Page 14
4	Unit assembly	Page 16

Note: Check the part colour before ordering. If the colour differs from the list above, state the specific colour when ordering.

Cabinet Assembly – TCE1000N

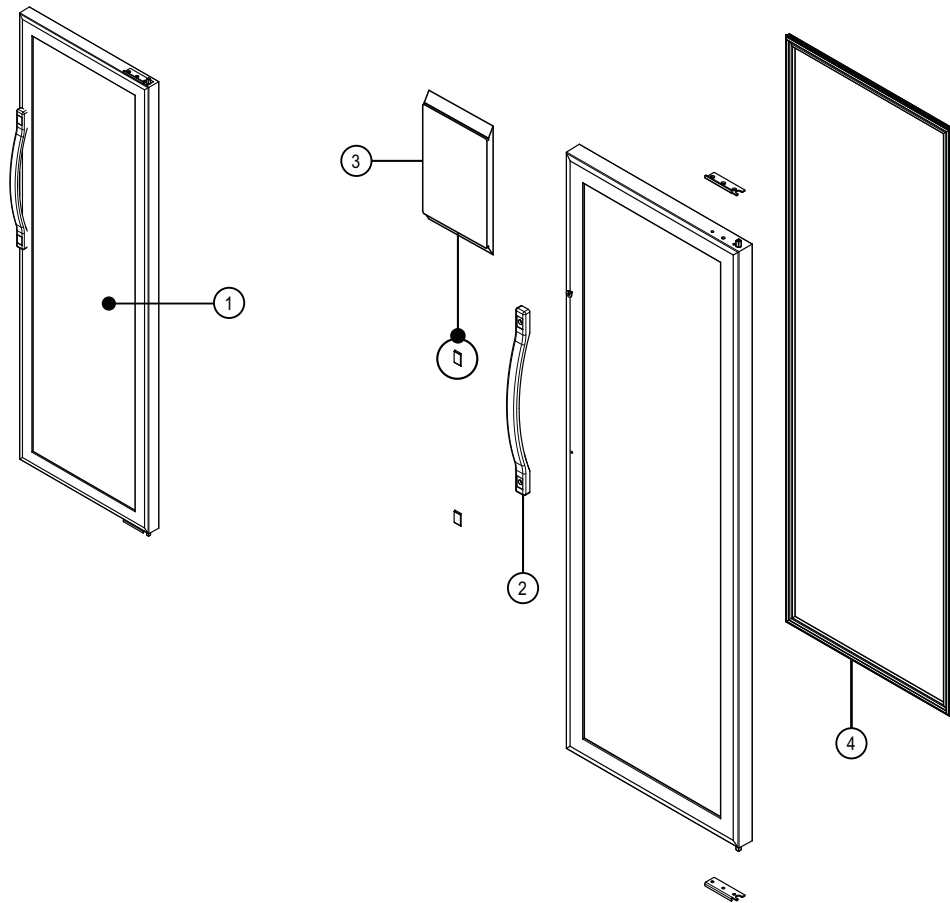


Parts – Cabinet Assembly TCE1000N

No.	Description	SKOPE Part No.
		<i>Colour: White</i>
1	Top hinge - LH	HB0070111940
2	Top hinge - RH	HB0070111943
3	Bottom hinge - LH	HB0070111941
4	Bottom hinge - RH	HB0070111942
5	TCE1000 Centre pillar assembly	HB0070825318A
6	Shelf support strip	HB0070108447
7	Wire shelf - split (5 per cabinet)	HB0070110863A
8	Shelf clip	HB0070201371
9	Front castor lockable	HB0070105065B
10	Rear swivel castor	HB0070105066
11	Light power supply	HB0071800189

Note: Check the part colour before ordering. If the colour differs from the list above, state the specific colour when ordering.

Glass Door Assembly

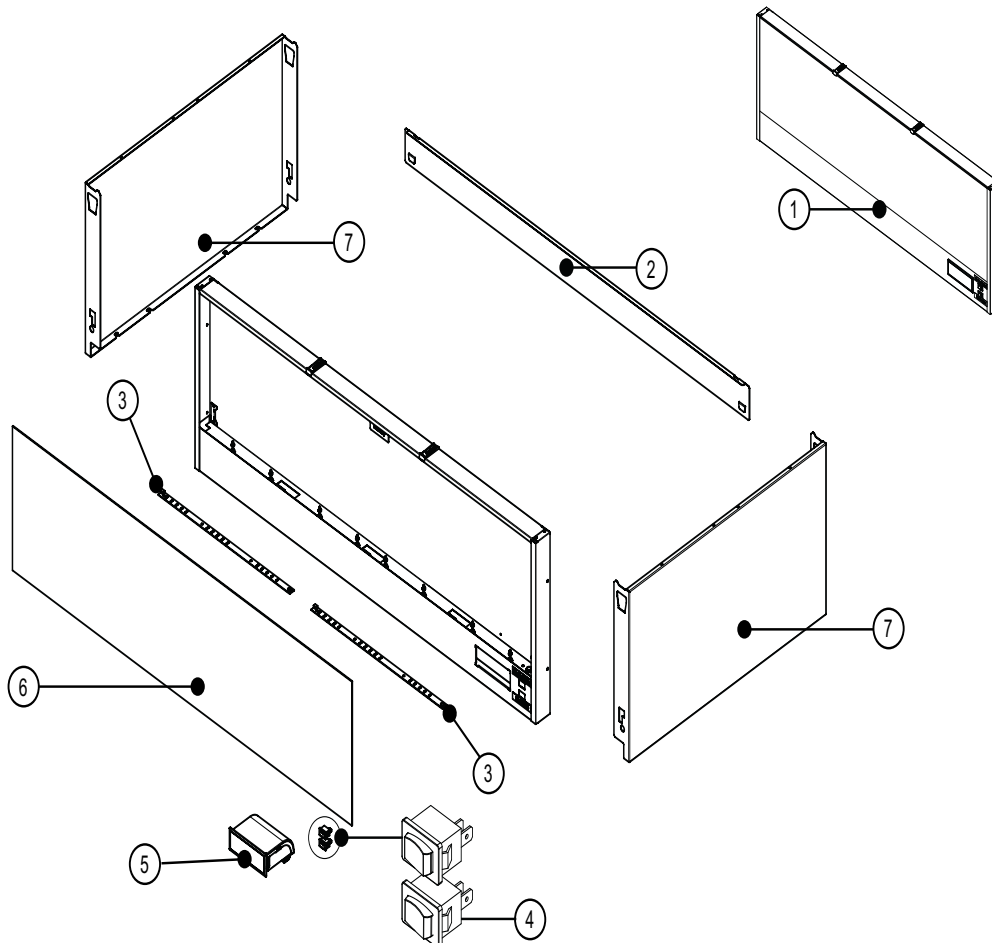


Parts — Glass Door Assembly

No.	Description	SKOPE Part No.
		<i>Colour: White</i>
1	TCE1000N door assembly - LH	HB0070824787A
	TCE1000N door assembly - RH	HB0070824788A
2	Door handle	HB0070202818E (Grey colour)
3	Door handle cap	HB0070202817E
4	Door magnet gasket	HB0070204885C

Note: Check the part colour before ordering. If the colour differs from the list above, state the specific colour when ordering.

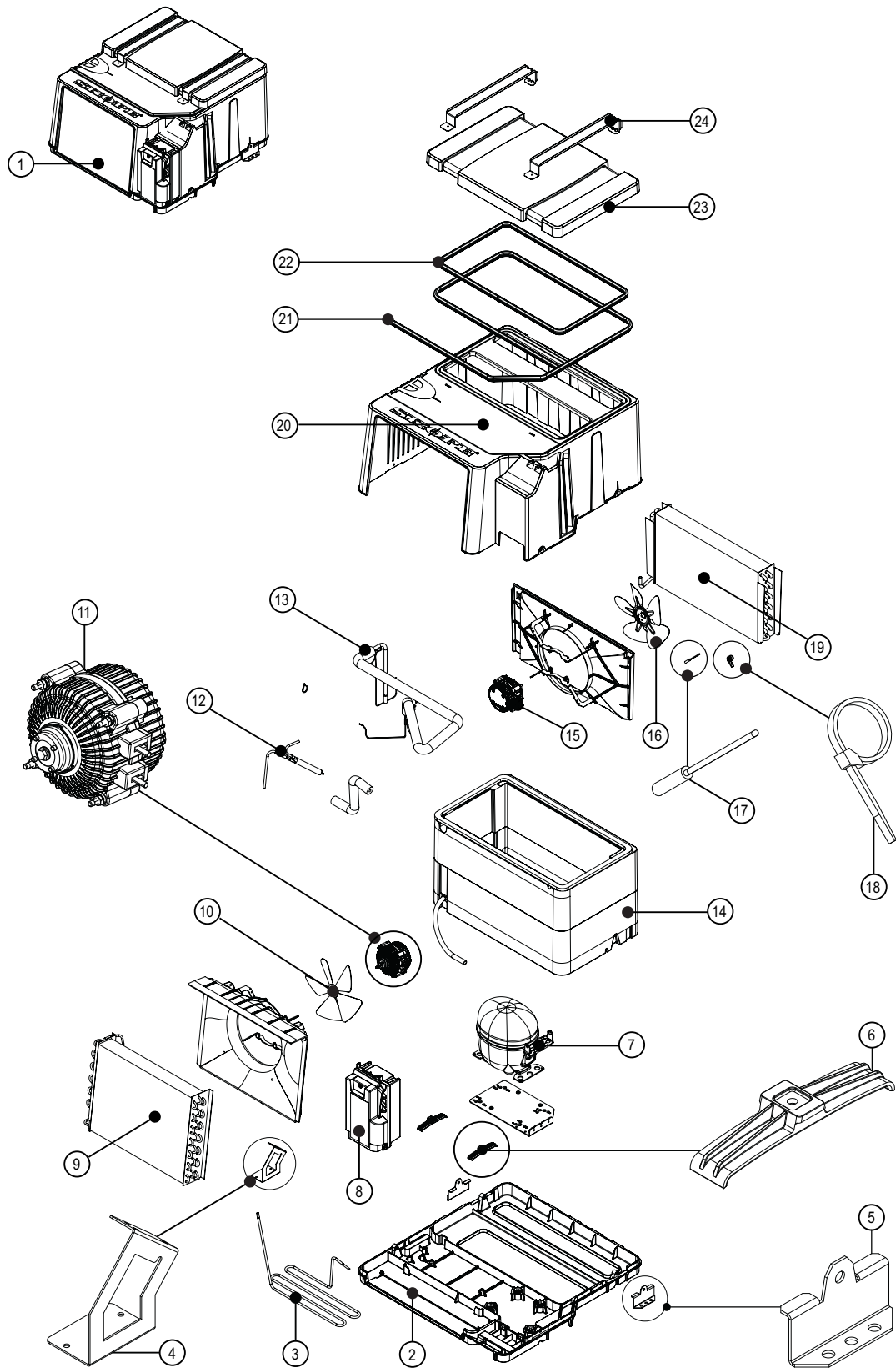
Sign Assembly



Parts — Sign Assembly

No.	Description	SKOPE Part No.
		<i>Colour: White</i>
1	Sign assembly	HB0070836992
2	Sign back strip	HB0070110812
3	LED light strip	HB0074091499A
4	Light switch	HB0070401653
5	Digital controller	HB0070825284S
6	Opal light panel	HB0070207277
7	Sign Sides	SM65BV/182-32

Unit Assembly HB0070832517C

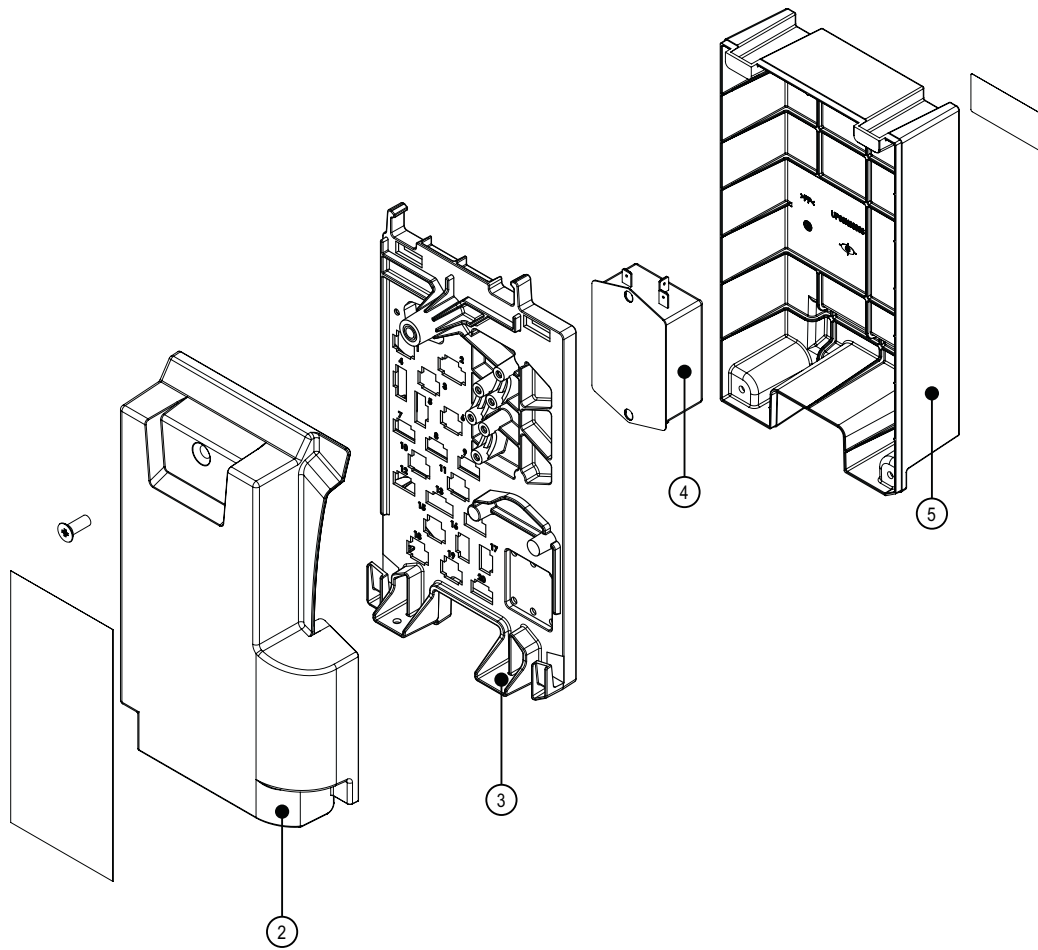


Parts — Unit Assembly

No.	Description	SKOPE Part No.
1	EziCore unit assembly	HB0070832517C
2	Unit plastic bottom	HB0070206212D
3	Condensate line	HB0070702717
4	Drier bracket	HB0070112920
5	Hold down bracket	HB0070110815A
6	Condensate pipe support	HB0070206128
7	Compressor - Wanbao FN90M	HB0074000848
8	Electrics box assembly	HB0070836993
9	Condenser coil	HB0070702972
10	Condenser fan blade	HB0074000314
11	Condenser fan motor	HB0074000793B
12	Drier	HB0074180006
13	Suction line assembly	HB0070702718
14	Evaporator box	HB0070510928A
15	Evaporator fan motor	HB0074000793B
16	Evaporator fan blade	HB0074000313A
17	Temperature probe	HB0070400497
18	Cassette cable clamp	HB0070206127
19	Evaporator coil	HB0070702968
20	Unit plastic top cover	HB0070206133A
21	Unit gasket seal 2306mm	PLE11052-2306
22	Unit gasket seal 1571mm	PLE11052-1571
23	Evaporator box lid	HB0070511356
24	Top metal strap bracket	HB0070110816
-	Ambient temperature probe (not pictured)	
-	Mains power cord (not pictured)	

Note: When ordered as a spare part, the refrigeration unit does not include a hold down bracket, evaporator box lid or top metal strap bracket. If required, these items must be ordered in addition to the refrigeration unit (items 5, 23 and 24).

Electrics Box Assembly

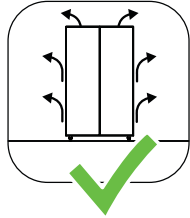


No.	Description	SKOPE Part No.
1	Electrics box assembly	HB0070836993
2	Unit electrics box enclosure front	HB0070207012A
3	Electrical enclosure panel	HB0070207014
4	EMI filter	HB0074600001
5	Unit electrics box enclosure rear	HB0070207013A

6 Installation

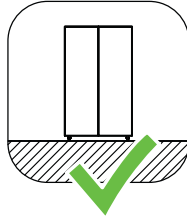
Installation Guidelines

When installing this cabinet, ensure the installation guidelines below are considered and met.



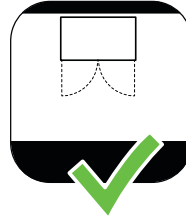
Ventilation

Ensure all ventilation requirements below are met.



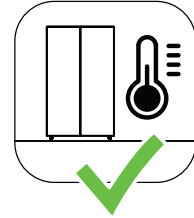
Surface

The installation surface must be capable of supporting the loaded cabinet.



Door Opening

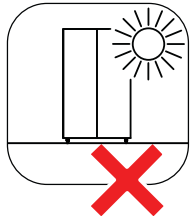
Allow adequate space for the door/s to open and close properly.



Climate Class

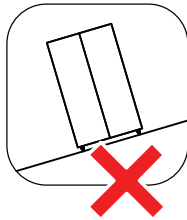
The fridge must be installed in an environment within its climate class.

The climate class is stated on the cabinet rating label inside the fridge.



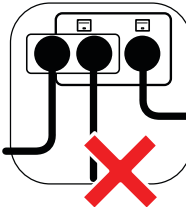
Sunlight

Do not install the fridge in direct sunlight.



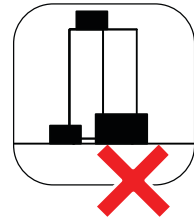
Uneven Surface

Do not install the fridge on an uneven surface.



Power Supply

Do not overload the power supply.

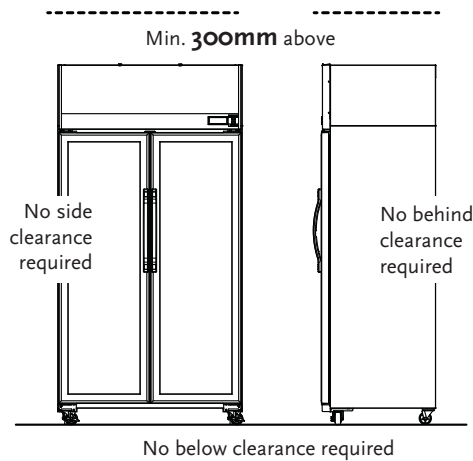


Blocking Ventilation

Do not store boxes or items in front or on top of the fridge.

Ventilation Requirements

This chiller must have the following ventilation clearances at all times.



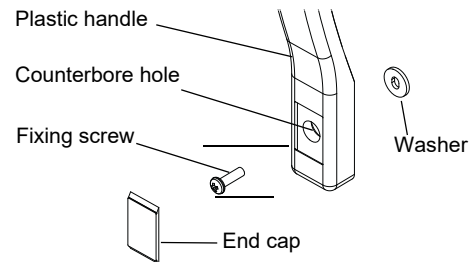
Door Handles

Fitting Door Handles The cabinets are fitted with door handles when they are shipped or supplied. If you are required to fit a handle, follow the steps below to fit them to the door/s.

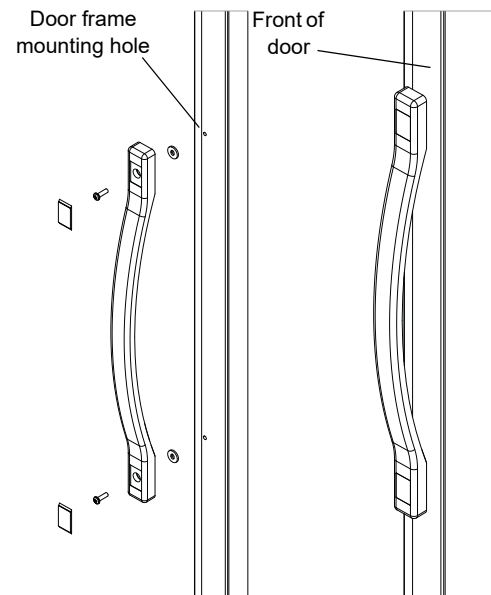
To fit a door handle

1. Ensure all handle components are ready for assembly. A screwdriver will be required to fit mounting hardware.

2. Fixing screw is fastened through counterbore hole, washer and into the nut bar in the door frame. The handle is fixed to mounting holes in the door frame.



3. Locate **BOTH** handle counterbore holes simultaneously onto door frame mounting holes. Fasten fixing screws through handle to lock handle position.



CAUTION

Ensure **BOTH** handles are securely fixed to door frames before operation.

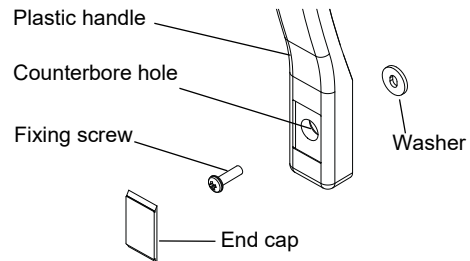
4. Place end caps over screw heads to conceal fasteners. The door handle assembly is now complete.

Removing Door Handles The door handles can be removed for transporting and moving the cabinet through doorways, or for refitting.

To remove a door handle

1. A screwdriver and flat end tool will be required to remove mounting hardware.
 2. Use the flat end tool to gently pry off the handle end caps. This will expose fixing screw heads.
-

3. Unscrew handle fixing screws from both the top and bottom mounting points. The handle is now ready to be removed.



Shelves

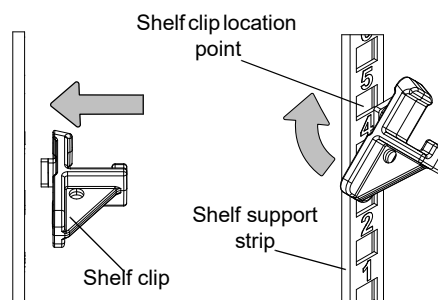
The chiller is fitted with five wire shelves per door, which may be positioned at different heights to suit various products.

Shelf Clips Each wire shelf is held in place with four shelf clips, which engage in the shelf support strips and slide up and down to the desired shelf position.

The support strips are numbered for easy location of shelf clips. View the numbers in the bottom LH corner of the shelf clip.

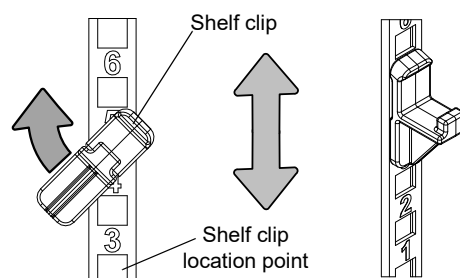
To fit a shelf clip

1. The shelf clip twists onto the shelf support strip. Locate the square pin on the back of the clip into the support strip, and twist the clip so that it sits level and locks in place.



To adjust the shelf clip height

1. Twist shelf clip off the shelf support strip. Go up or down to select clip next position. Engage the square pin onto shelf clip location point. Twist the shelf clip back onto the support strip and lock into position.



To remove a shelf clip

1. Twist the shelf clip left or right at 45° and pull directly back to release clip.

Repositioning Shelves When repositioning standard shelves, unload and remove the shelf, establish the desired position and slide the shelf clip in each of the shelf support strips to the desired position. Sit the shelves on the shelf clips.

7 Replacement Procedures

Lighting

The cooler is fitted with LED interior lights and LED sign lights. Ensure the light is replaced with the same light type. Fluorescent or LED tubes cannot be used in place of LED modular lights.

IMPORTANT

Replace the light with the same SKOPE OEM part.
DO NOT use alternative LED strip or tube lights, or fluorescent tubes.

Refer to the table below for replacement light specifications.

Light specifications

Model	Interior light		Sign light	
	Description	Part No.	Description	Part No.
TCE1000N	interior light	HB0074091499A	Sign light	HB0074091499A

The lighting is made up of three components which are replaceable:

- LED modular light
- Light power supply (1 per cabinet)
- Interior wiring loom (1 per door)

Power is supplied to the lights by the power supply (located in the cabinet electrics panel above the doors) via the wiring loom/s which run down the sidelight channel.

Lighting components are all non serviceable items. If a component is faulty, it should be removed and a SKOPE OEM new replacement component fitted.

Refer to the diagnostics table below to determine what component may be at fault, and the procedures over the next few pages for component replacement instructions.

Ensure the cabinet is isolated from the power supply before cleaning or removing parts.

Lighting fault diagnostics

Problem	Possible Cause	Repair
No lights working. Cabinet is dark.	Lights switched off.	Lights powered on by independent light switch.
	Controller alarm.	Check controller for alarm code.
	Plug not connected properly.	Check and clean plugs on top of the cabinet.
	Light power supply fault.	Replace light power supply.
Light component not working.	Plug not connected properly.	Check and clean plug connection in side light channel, behind the loom cover.
	Faulty light.	Replace light.
Segment of light not working.	Faulty light.	Replace light.

To replace an interior light component

1. Unplug the chiller from the power supply.

2. Remove the diffuser cover to expose the failed LED light strip.

3. Unplug the failed LED strip and unscrew from the door frame to remove.



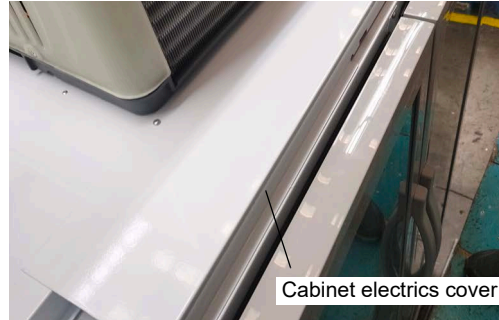
4. Fit the new light strip and plug into the circuit. Refit the diffuser.

5. Reconnect to the power supply and check for correct operation.

To replace the LED driver power supply

1. Disconnect the chiller from the power supply.
2. Remove the sign panel.

3. Detach the refrigeration unit and carefully push back or remove to allow access to the cabinet electrics cover.



4. Unscrew the cabinet electrics cover.

5. Remove the light power supply.



6. Replace the light power supply and reassemble.

To replace an interior wiring loom

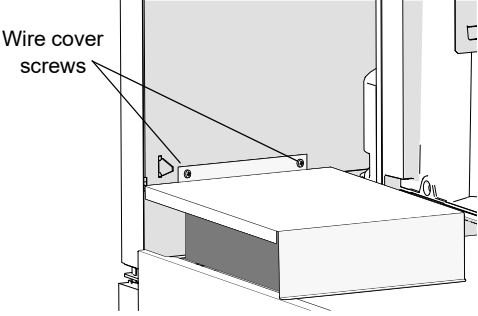
1. Disconnect the chiller from the power supply.
2. Unplug the light from the wire loom.
3. Gain access to the cabinet electrics panel (see procedure above).
4. Move up to the cabinet roof, and unplug the wiring loom from the light power supply, and if applicable the sign light.
5. Remove the loom from the door by pulling it up through an exit point, this is located in the door hinge area. Ensure the loom is disconnected from the light connector.
6. Refit the new loom and reassemble. Ensure:
 - All plugs are clean, correctly fitted and plugged in.
 - Loom is reconnected to the door light connector.

Sign Light The sign is lit by an LED modular light which can be replaced by following the steps below.

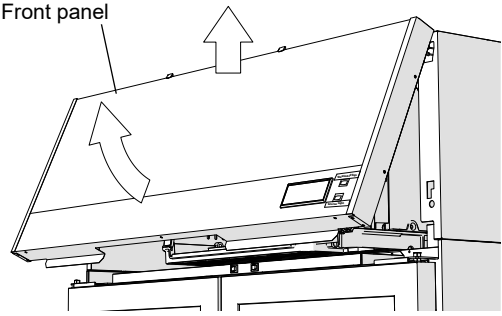
To replace the sign light

1. Unplug the chiller from the power supply.

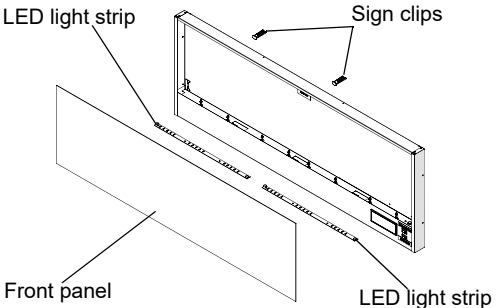
2. Use steps or a platform to access the back of the sign, and unscrew the two wire cover screws (located above the back of the electronic controller housing). **Note:** Image shows back of sign with cabinet side removed.



3. Swing the sign out from the cabinet and unplug the 3 plugs. Lift the sign off and place down on working area.



4. Remove sign clips to release the front panel. Unplug the failed LED strip and fit with new LED strip.



5. Refit the sign panel and wire cover, and reconnect the 3 plugs. Reconnect to the power supply.

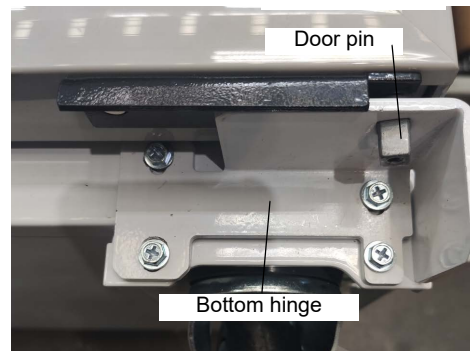
Doors

Replacing the Gasket The one-piece door gasket clips into the door frame and runs around the perimeter of the door. Remove the gasket by peeling it from the door frame, starting at a corner.

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

Removing and Refitting the Door For ease of servicing the doors can be removed from the cabinet.
To remove the door

1. Disconnect the chiller from the power supply.
2. Remove the sign panel and sign sides.
3. The top door hinge(s) can be unscrewed and removed.
4. The cabinet door will need to be lifted up, and off the bottom hinge.



5. The replacement door can be fitted to the bottom hinge. Use the door pin to locate the door on to the bottom hinge.

6. The top door hinge can be mounted to the door and cabinet.

To replace the top hinge bracket

1. Follow the steps above to remove top hinge bracket.
2. Remove the top hinge from the top of the door and replace.

To refit the door

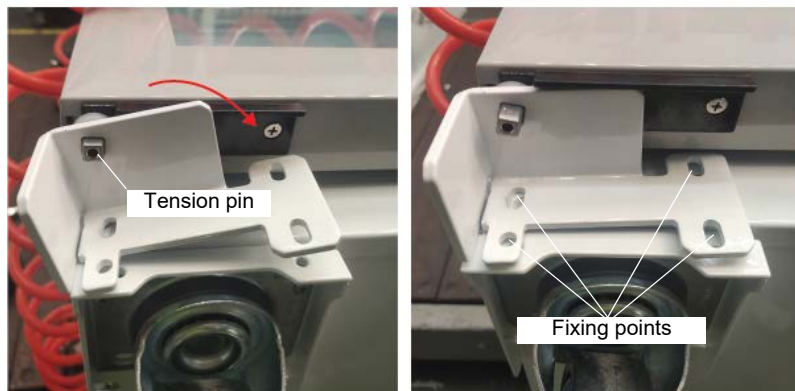
1. Lift the door onto the bottom hinge.
2. Fit the top hinge to the top of the door, and partially fix in place on the top of the cabinet. Align the door with the cabinet and tighten the fixing screws.
 Ensure the top hinge spacer is fitted under the top hinge before fixing the top hinge in place.

Adjusting Door Tension The door has an internal cartridge where pre-tension can be applied, this lets the door self-close. If necessary, the door tension can be further adjusted by rotating the top and bottom tension pins.

To adjust the door tension

1. Unplug the chiller from the power supply.
2. Remove top sign and cabinet sides (see page 25).
3. Place bottom hinge over tension pin, slightly rotate the hinge as shown in "Bottom Hinge" images and fix hinge into position. Pre-tension has now been applied to the bottom tension pin.

Top Hinge



Bottom Hinge

4. Apply the same process to the top hinge as described in step 3. Tension has now been applied to the door.
5. Check that door(s) can functionally open and close with tension.
6. Return top sign and cabinet sides back into position.

Refrigeration Unit

Before Servicing Overview

Ensure you have read and understand this manual before commencing with any servicing.

Important. Ensure the following before servicing:

- ▣ Only technicians contracted to SKOPE hydrocarbon service policy may service this cabinet.
- ▣ SKOPE hydrocarbon refrigeration systems must only be serviced by appropriately skilled refrigeration mechanics.
- ▣ Servicing of sealed refrigeration system must be completed at a hydrocarbon workshop/service area with dedicated hydrocarbon equipment and personal protective equipment.
- ▣ All local hydrocarbon storage and handling regulations and procedures must be adhered to at all times.

Ensure all electronic controller alarms diagnostics and refrigeration system diagnostics are performed to confirm a refrigeration system fault is present. Do **NOT** open the refrigeration system. Check all components such as the electronic controller and electrical systems. If a sealed system fault is suspected, the system must not be opened; it must be sent to a SKOPE approved service depot for repair.

IMPORTANT

Use only dedicated hydrocarbon SKOPE OEM spare parts.

DO NOT use alternative parts.

For safety compliance, only SKOPE supplied components specified for the appliance shall be used for repairs.

Safety hazards

The main hydrocarbon safety hazards are:

- ▣ Flammable refrigerant.
- ▣ Venting of hydrocarbon and compressor oil.
- ▣ Asphyxiation.



Refrigerant identification

The cabinet rating label (located in the upper inside of the cabinet) states the refrigerant type. In addition to this, a warning labels are fitted to hydrocarbon refrigeration coolers to indicate the use of R290 refrigerant.

Personal Protective Equipment

Ensure all required PPE is used correctly during servicing.

Service equipment

All refrigeration service tools must be hydrocarbon compliant and any electrical equipment that could be exposed to the refrigerant must be intrinsically safe. **ONLY** dedicated hydrocarbon service equipment may be used.

In addition to standard tools for accessing and removing parts, specialist tools are required when completing refrigeration system service tasks detailed in this manual:

- ▣ Intrinsically safe vacuum pump.

- Dedicated hydrocarbon gauges.
- Intrinsically safe hydrocarbon combustible gas leak detector.
- Intrinsically safe scales to 1 gram accuracy.
- Well ventilated work area.

Refrigeration Unit Assembly The refrigeration unit is a top mounted, electronically controlled removable unit.

For safety and compliance, only SKOPE supplied parts specifically for this appliance may be used for repairs. Other parts may appear to be suitable, but may not be approved or safe for use in an appliance with hydrocarbon refrigerant.

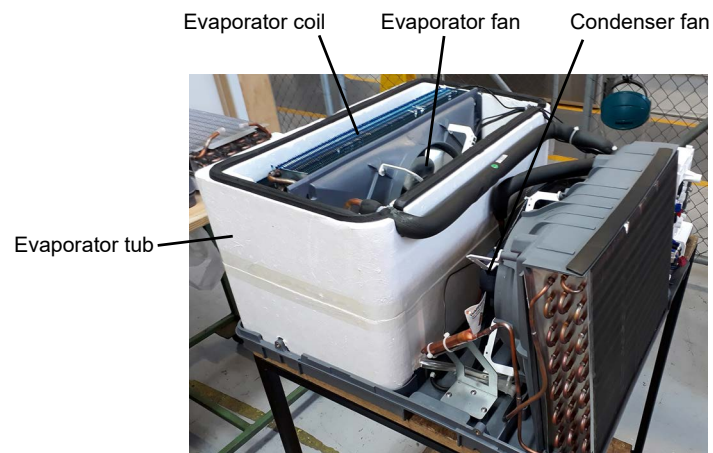
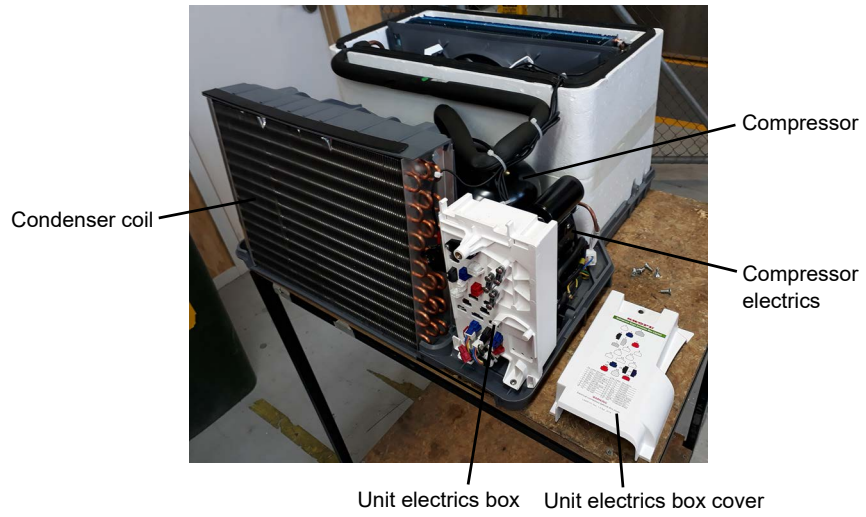
The unit must only be used on a SKOPE hydrocarbon compliant cabinet. Refer to the cabinet rating label to determine if the cabinet is suitable for use with a hydrocarbon unit. The rating label **MUST** state refrigerant as R290. If the label states a different refrigerant, or does **NOT** state a refrigerant, it is **NOT** suitable for a hydrocarbon unit.

WARNING

The hydrocarbon unit must only be used on an hydrocarbon compliant cabinet.

For servicing or transportation, the refrigeration unit unplugs and lifts off the cabinet. Some minor servicing can be performed without removing the refrigeration unit.

The model and serial number are both printed on the unit rating/serial number label attached to the top of the side of the cover.



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

Unit specifications

Unit Model:	HB0070832517C
Compressor:	Wanbao FN90M
Compressor capacity:	740 Watts
Refrigerant / Charge	R290 / 95 g

Gas Detector A gas detector is required and must be used when servicing hydrocarbon units. A gas detector is a safety device for hydrocarbon gas to warn the technician that hazardous flammable gas is present.

Leak Detector A leak detector is recommended for servicing hydrocarbon units. It is used to track and locate the source of hydrocarbon gas leaks.

On-Site Work The service technician must have required knowledge, skills and tools to proceed with on-site refrigeration sealed system diagnostics.

Minimum knowledge and skills

- ▣ Experience and qualifications suitable for work on a flammable refrigeration system.
- ▣ Performs no unsafe activity.
- ▣ Fully complies with SKOPE HC service policy.

Minimum tools and equipment

- ▣ Hydrocarbon gas detector
- ▣ Safety signage - suitable to create a safe work zone 1.5m around the cabinet.
- ▣ Refrigeration gauge set – suitable for R290 flammable refrigerant.
- ▣ Bullet valves/line piercing valves suitable for 6mm tube.

Service vehicle

- ▣ Suitable for transporting flammable gas (being HC refrigeration systems). Vehicle storage area must be well ventilated externally, and not ventilated into the vehicle. There must be no ignition sources in the storage area, nor any areas where the gas may pool.
- ▣ Must be able to transport swap units.
- ▣ Should carry minimum SKOPE HC service parts.

Not Cooling Fault If a customer reports a 'not cooling' fault, and it has been established that the cabinet is not cooling, follow the procedure on page 46 when making the service visit.

Hydrocarbon Workshop The following tools and equipment are required in the hydrocarbon workshop:

- ▣ Hydrocarbon leak detector.
- ▣ Dedicated hazardous workshop area – suitable for servicing and release of flammable refrigerant.
- ▣ Refrigeration gauge set – suitable for R290 flammable refrigerant.
- ▣ Dry nitrogen – suitable for purging and high pressure testing.
- ▣ Refrigeration vacuum pump rated as suitable for use with R290 (by vacuum pump supplier).
- ▣ Charging scales rated as suitable for use with R290 (by scales supplier), accuracy to 1 gram.
- ▣ R290 refrigerant supply cylinder.

Removing the Unit

Follow the steps below to remove the refrigeration unit from the cabinet. Ensure the chiller is disconnected from the power supply before removing the unit.

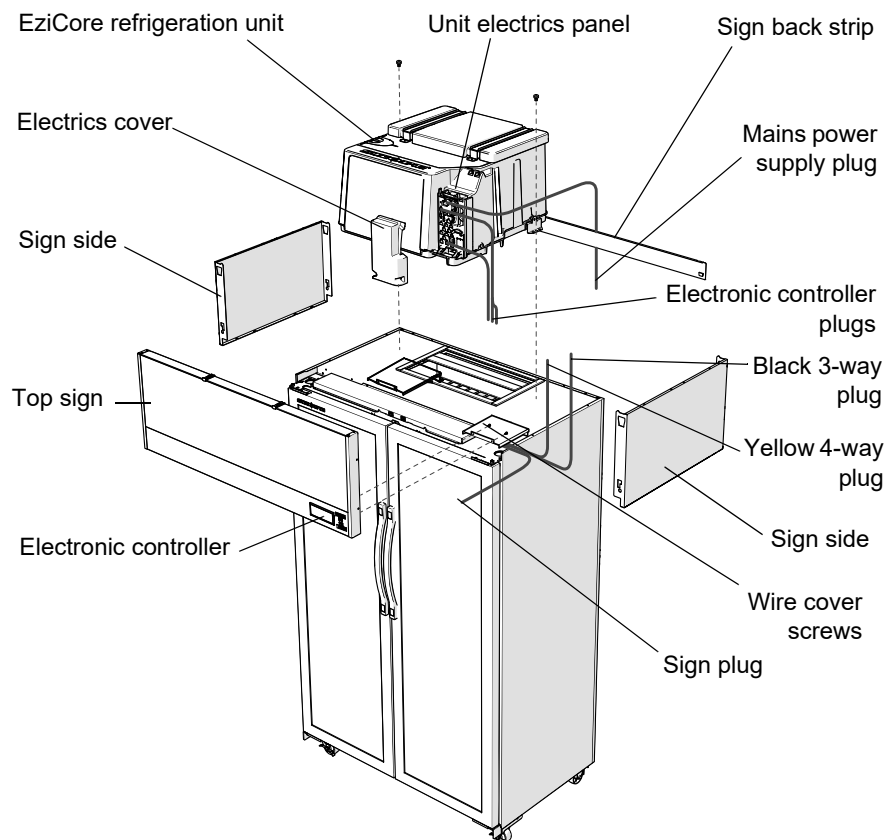
The unit is heavy and requires a minimum of two people to lift from the cabinet. Steps or a platform about one metre high are suggested to allow the unit to be safely lifted, carried and put down at waist height.

To remove the refrigeration unit

1. Unplug the chiller from the power supply.
2. Use steps or a platform to access the back of the sign, and unscrew the two wire cover screws from the back of the sign.
3. Swing the sign out, and unplug the three electronic controller plugs, the one sign plug and four terminals of LED switches.
4. Lift the sign off the cabinet and place out of the way.
5. Unscrew and detach the electrics cover from the unit.
6. Unplug the yellow 4-way plug for the lighting and the black 3-way plug for the heating from the unit electrics panel.
7. Remove the sign back strip, and if necessary the sign sides.
8. Unscrew the two fixing screws (one on each side of the unit).
9. The unit can now be lifted off the cabinet.

When refitting the unit, ensure

- The gasket on the top of the cabinet is in good condition.
- The unit is screwed down.
- All plugs are reconnected.



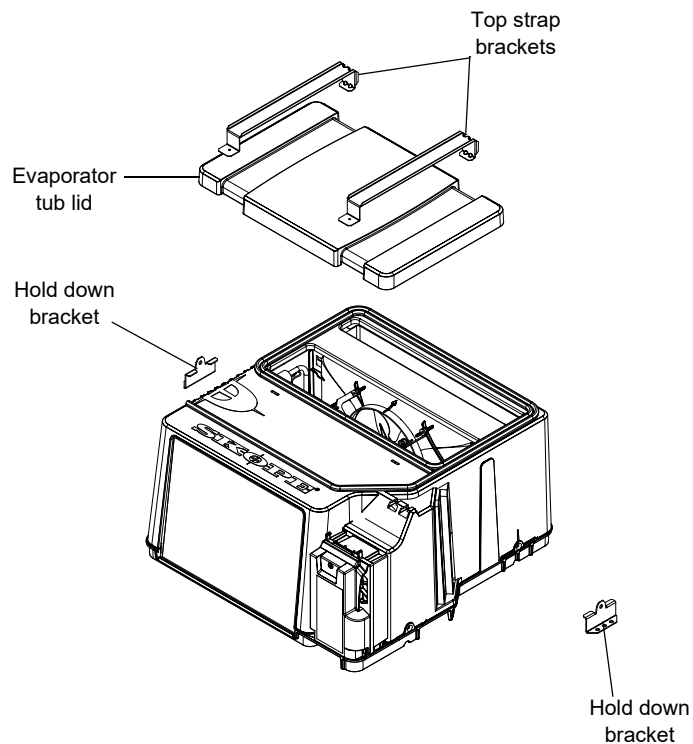
Replacing the Unit

WARNING

The hydrocarbon unit must only be used on a hydrocarbon compliant cabinet.

New spare part refrigeration units supplied by SKOPE are not supplied with the evaporator tub lid, top strap brackets and hold down brackets. When replacing a faulty top mount refrigeration unit, retain these parts for use on the new spare part replacement unit.

The evaporator tub lid, top strap brackets and hold down brackets can be ordered in addition to the refrigeration unit if required. See page 16 for spare part numbers.



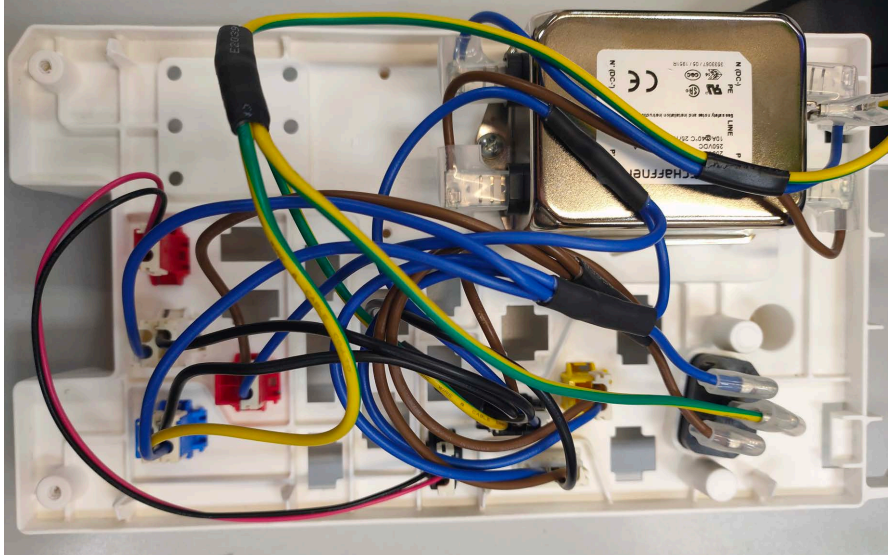
To replace a unit with a SKOPE supplied spare part refrigeration unit

1. Disconnect the chiller from the power supply and remove the existing unit (see page 32).
2. On the new unit, push the bottom plugs out of the bottom of the evaporator box.
3. Swap the evaporator tub lid, top strap brackets and hold down brackets from the existing unit to the new unit.
4. Fit the new unit to the cabinet.

Unit Electrics Box Assembly

The unit electrics box assembly contains the mains supply socket, EMI filter and panel mount socket connectors for the unit and cabinet. Refer to the diagram over the page or label on the electrics box cover for socket connection identification.

Due to the confined space within the unit electrics box, plugs may come loose as a result of movement and vibrations. Take care when refitting to ensure all plugs are securely attached to the correct sockets.



To remove and open the unit electrics box assembly

1. Disconnect the chiller from the power supply.
2. If present, unclip the electronic controller from the top of the electrics box.

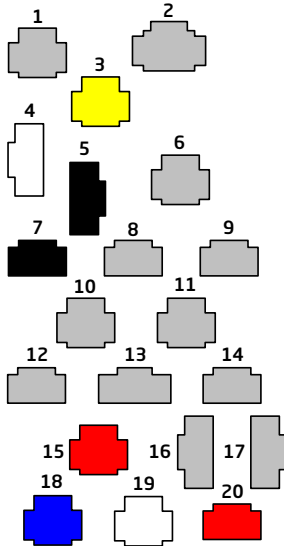
3. Undo the fixing screw at the top of the electrics box cover, and remove the cover.



4. Unplug all unit plugs from the unit electrics box.
5. Undo the two fixing screws at the base of the electrics box, and detach the electrics box from the unit.
6. To open the electrics box, undo the two fixing screws on the back of the electrics box and swing the back cover off.



TCE1000N R290 Junction Box Layout



LAB60224 Rev. 0.2 May 2020

Key Colour	Description	Key Colour	Description
1		11	
2		12	
3	Yellow – Lighting	13	
4	White – Controller	14	
5	Black – Heating	15	Red – Evaporator Motor
6		16	
7	Black – Controller Sensor	17	
8		18	Blue – Compressor
9		19	White – Condenser Motor
10		20	Red – Unit Sensor

WARNING
 This system contains
 flammable refrigerant.
 Refer to the Service Manual
 before servicing.

Unit Cover Remove the unit cover to access parts within the unit assembly.

To remove the unit cover

1. Disconnect the chiller from the power supply and remove the refrigeration unit (see page 32).

2. Unscrew the four machine screws from the sides of the refrigeration unit and lift the cover off the unit.



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

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

IMPORTANT

Replace the motor with the same SKOPE OEM part.
DO NOT use alternative parts.

It is important that the fan blade and/or fan motor is replaced with the same part to ensure safety, correct alignment and refrigeration performance, and compliance. Fan blades should be tightened to the fan motor manufacturer recommended torque settings (shown in the table below).

Fan motor manufacturer recommended torque settings

Fan motor manufacturer	Torque setting
Haier	1.5 Nm

To access and remove the condenser fan assembly

1. Isolate the chiller from the power supply and remove the refrigeration unit (see page 32).
2. Remove the unit cover (see page 35).
3. Open the electrics box and unplug the condenser fan motor plug (see page 34).

4. Cut the cable ties holding the cables along the unit, and free up the condenser fan motor cable.



5. Remove the fan assembly (fan motor, fan blade, mounting brackets) from the unit by lifting the shroud up and out.

To replace the fan blade

1. Remove the condenser fan assembly (see above).
2. Remove the screw and washer from the centre of the fan blade, and lift the blade from the motor.
3. Replace new blade and fix with 12mm flat washer and serrated head screw. Tighten the blade to fan motor manufacturer recommended torque setting.
4. Reassemble unit and test.

To replace the fan motor (with correct SKOPE spare part only)

1. Remove the condenser fan assembly and the fan blade (see above).
2. Unplug the fan flexible cord from the electrics box (see page 34).
3. Detach the fan motor from the fan mounting brackets by removing the four screws from the mounting bracket.
4. Fit new motor and reattach fan blade with 12mm flat washer and serrated head screw. Tighten the blade to 1.5Nm.
5. Reassemble unit, ensuring all cables are neatly cable tied away from the fan blade, and test for correct operation.

Evaporator Fan The evaporator fan assembly is made up of a fan motor and fan blade, both of which can be replaced when necessary. The evaporator fan flexible cord has a white plug.

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

The fan motor and fan blade are fixed to the evaporator shroud via the brackets. The shroud (complete with fan motor and fan blade) can be lifted off the evaporator tub once the refrigeration unit cover has been removed.

IMPORTANT

Replace the motor with the same SKOPE OEM part.
DO NOT use alternative parts.

It is important that the fan blade and/or fan motor is replaced with the same part to ensure safety, correct alignment and refrigeration performance, and compliance. Fan blades should be tightened to the fan motor manufacturer recommended torque settings (1.5Nm).

To access the evaporator fan assembly

1. Isolate the chiller from the power supply and remove the refrigeration unit (see page 32).
2. Remove the refrigeration unit cover.
3. Free up cables from the putty on the evaporator tub perimeter.
4. Cut cable ties to release control probe from the fan bracket.

5. Lift the assembly up and out of the evaporator box.



To replace the fan blade

1. Isolate the chiller from the power supply and remove the refrigeration unit (see page 32).
2. Gain access to the evaporator fan assembly (see above).
3. Remove the screw and washer from the centre of the fan blade, and lift the blade from the motor.
4. Fit new blade, ensuring it is centred within the evaporator shroud. Tighten the blade to fan motor manufacturer recommended torque setting.
5. Reassemble unit and test for correct operation.

To replace the fan motor (with correct SKOPE spare part only)

1. Follow the above steps to access the evaporator fan assembly and remove the fan blade.
2. Free the fan flexible cord by cutting the cable ties, trace the cable back to the connector (near the compressor electrics) and unplug.
3. Detach the fan motor from the fan mounting brackets by removing the four screws from the mounting bracket.
4. Attach to the replacement motor. Ensure that the flexible cord points towards the bottom of the evaporator tub once reinstalled. Take care to re-cable tie the fan and temperature probe flexible cords back onto the mounting bracket (to prevent high frequency vibration).
5. Fit fan blade, ensuring it is centred within the evaporator shroud. Tighten the blade to 1.5Nm.
6. Reassemble unit and test for correct operation.

Compressor The compressor is located at the front of the refrigeration unit, beside the condenser. If the compressor is causing excessive noise, check the mountings to ensure there is no damage to the rubber or the washers, nuts and screws.

Before replacing the compressor, check all plug connections and ensure the compressor electrics are operating correctly (see “Compressor Electrics” on page 38). The compressor must be supplied with consistent voltage over 220 volts, ensure the voltage does not drop at start-up. If the voltage does drop, ensure the unit has a direct power supply (not from a multi-box or extension cord). Generally a faulty compressor may have a distinct hissing sound and run with a very hot body temperature.



IMPORTANT

To eliminate possible vibration noise, ensure no pipes touch the plastic base and condenser assembly.

Compressor Electrics The compressor electrics are located on the front of the compressor. To access the compressor electrics, remove the refrigeration unit (see page 32) and unit cover (see page 35). The capacitor unclips from the relay cover, and the relay cover unclips from the compressor.

Refrigeration System

Unit Removal For detailed instructions on removing the unit, refer to unit removal instructions available on the instruction sheet attached to the back of the sign panel, or on page 32 of this service manual.

Diagnostics The following diagnostic test is useful for workshop diagnosis of a short of gas situation. Perform the test before opening the refrigeration system.

It is beneficial to have a correctly operating unit running beside the unit being serviced to compare behaviour.

Note: These diagnostic procedures are indicative only.

Refrigeration system diagnostic test (perform in suitable workshop)

1. Isolate the chiller from the power supply and remove the refrigeration unit, and remove the unit cover.
2. Place unit on bench and connect service probe to red plug on unit.
3. Connect the refrigeration unit to the power supply and allow to run for approximately 10 minutes until the evaporator temperature stabilises.
4. Refer to the table below to determine if the system charge is correct. A system with the correct refrigerant charge will frost back towards the compressor. The point where the frost stops is affected by the ambient temperature.
The table below details the frost stop point on a correctly charged system running on the bench.

Ambient	50% charged	75% charged	100% charged
10°C	Cold with light sweat	Cold with light sweat	Frosting to compressor
20°C	Cold with light sweat	Sweating 50mm from compressor	Frosting to compressor
30°C	Dry	Dry	Frosting 20mm from compressor
40°C	Dry	Dry	Sweating 50mm from compressor

5. If the suction pipe frosts to the appropriate frost stop point, the charge is likely correct. If the frost does not go back to the point shown there may be a capillary blockage or compressor fault.
6. Use the table below to determine whether the system is short of refrigerant or a blocked capillary.

Diagnosis	Frost back (after 10 mins)
Blocked capillary	None
Normal operation	Refer to table above

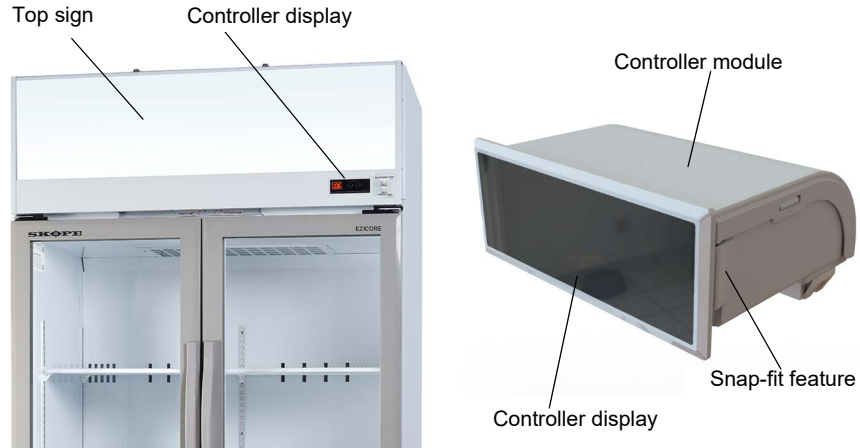
7. After fault has been diagnosed and repaired, reassemble the refrigeration system and test run.

Electronic Controller

Controller Location The electronic controller is located within the top sign assembly.

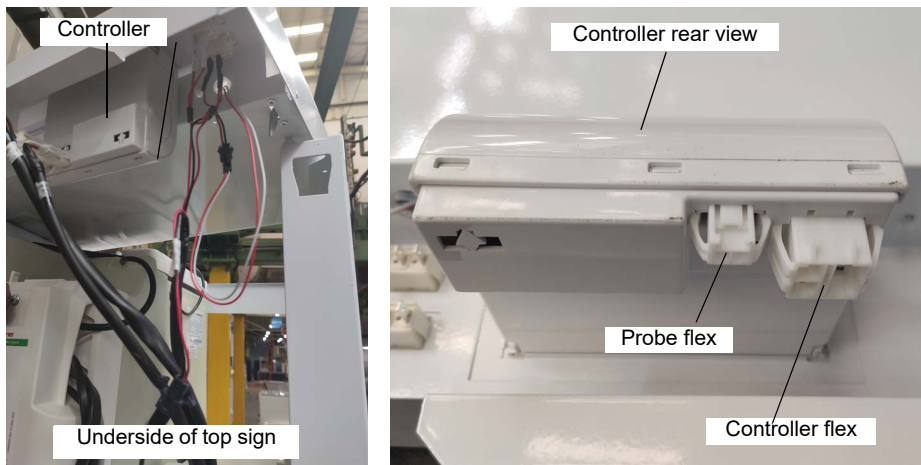
To access the controller

1. Disconnect the chiller from the power supply.
2. Remove top sign from cabinet and place on working area (see "Sign Light" on page 25).



Controller flexes The controller module locates into a cut out in the sign. It can be mounted by a snap-fit feature on the controller sides.

To connect the controller, plug the probe and controller flexes into the correct sockets on the controller. To disconnect the controller, simply unplug the probe and controller flexes.



Replacing the Controller

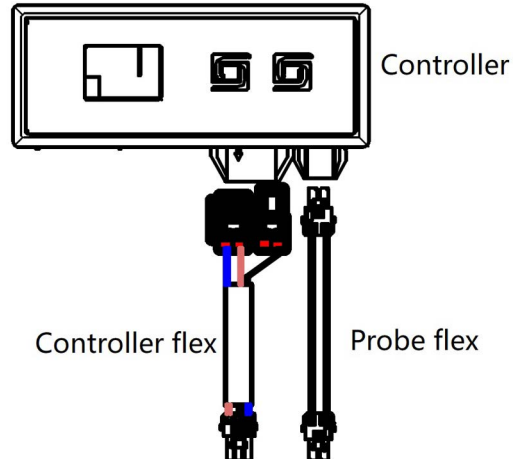
Follow the steps below to replace the controller.

Note: Replacement spare part electronic controllers are supplied with a default parameter set loaded.

To replace the controller

1. Disconnect the chiller from the power supply and access the electronic controller (see "Controller Location" on page 40).
2. Remove the controller from the top sign assembly.

3. Fit the new replacement controller, and connect up the controller flex and probe flex cables.



4. Reassemble the controller module to top sign, and attached to cabinet. Perform electrical safety test as required, and reconnect to the power supply.
5. Check the default parameter settings are showing correctly on the controller (refer to "Electronic Controller" on page 8).

Control Probe The control probe is cable tied to a bracket on the evaporator fan motor bracket (see image below).

To replace the control probe

1. Remove the evaporator fan assembly (see page 37).
 2. Detach the probe from the evaporator fan shroud bracket and trace the probe cable back to the unit electrics box and unplug (see page 33).
 3. Following the same path as the original probe, fit the new probe with cable ties as necessary. Ensure the probe cable is securely plugged into the rear of the unit junction box, and that it is cable tied to the evaporator fan shroud bracket, with the probe bent away from the fan bracket at a 45° angle.
-



Cleaning

Cabinet Wipe the inside and outside of the cabinet with a damp cloth, taking care to keep moisture away from electrical parts. As with any maintenance, ensure the chiller is unplugged from the power supply before cleaning.

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

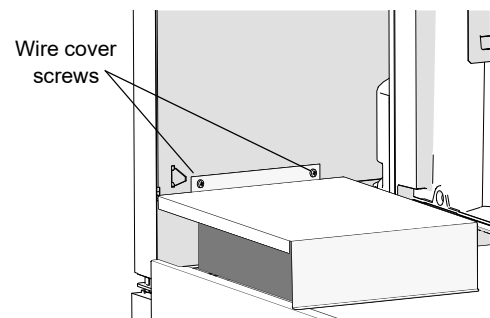
WARNING

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

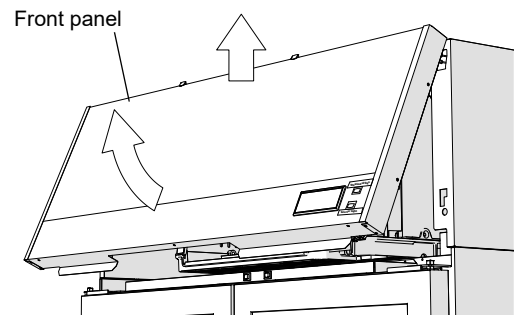
To clean the condenser coil and optional condenser filter

1. Unplug the chiller from the power supply.

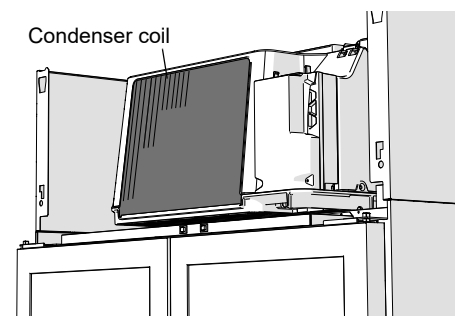
2. Use steps or a platform to access the back of the sign, and unscrew the two wire cover screws (located above the back of the electronic controller housing). **Note:** Image shows back of sign with cabinet side removed.



3. Swing the sign out from the cabinet and unplug the 3 plugs. Lift the sign off and place aside.



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



8 Troubleshooting

Cabinet and Refrigeration Unit

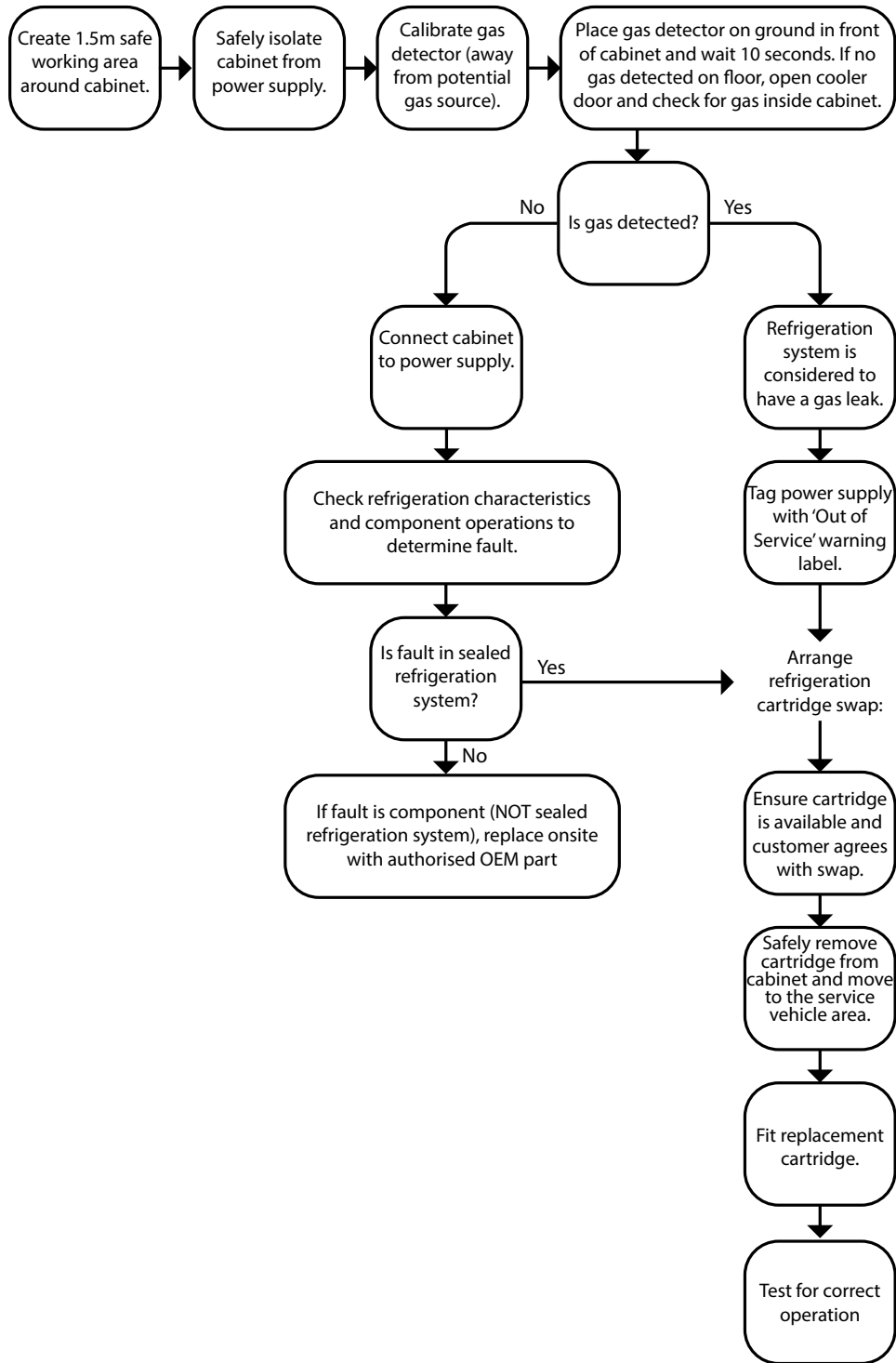
Diagnostic Table For problems with the cabinet and refrigeration unit use the following table.

Problem	Possible Cause	Repair
<ul style="list-style-type: none"> • Cabinet not operating • No controller display 	<ul style="list-style-type: none"> • Loss of power supply • Loose plug in electrics box 	<ul style="list-style-type: none"> • Check mains power supply. • Check all plugs in electrics box are connected correctly.
<ul style="list-style-type: none"> • Sign and/or Interior lights not on 	<ul style="list-style-type: none"> • Electronic controller is in 'Night' mode. • Light switched off. • Failed LED light. 	<ul style="list-style-type: none"> • Switch the light on while keeping the chiller in night mode by pressing the light button on the electronic controller faceplate. • Switch light on via button on the electronic controller faceplate. • Service light.
<ul style="list-style-type: none"> • Excess noise vibration 	<ul style="list-style-type: none"> • Refrigeration pipes transferring vibration into unit 	<ul style="list-style-type: none"> • Re-align pipes.
<ul style="list-style-type: none"> • Frozen evaporator coil 	<ul style="list-style-type: none"> • Set-point is too cold • Controller fault • Short of refrigerant 	<ul style="list-style-type: none"> • Check and raise. • Replace controller. • Perform refrigeration system diagnostics (see page 39) and service as required.
<ul style="list-style-type: none"> • Power consumption is higher than expected 	<ul style="list-style-type: none"> • Unit operating too hot • Cabinet door is opened excessively • Product too cold 	<ul style="list-style-type: none"> • Clean the condenser. • Ensure the cabinet has good ventilation around the refrigeration unit. • Ensure the cabinet is within the maximum operating temperature. • Ensure door is closed more often. • Raise set point
<ul style="list-style-type: none"> • Product is too warm 	<ul style="list-style-type: none"> • Frequent door opening. • Recently loaded • Door not closing properly. • Refrigeration unit operating too hot. • Excessive door opening or refrigeration heat load. • Set point is too high 	<ul style="list-style-type: none"> • Limit door openings. • Allow time for the product to cool down. • Check and clean door gasket. • Ensure the cabinet has good ventilation around the refrigeration unit. • Ensure the cabinet is within the maximum operating conditions. • Lower set point.

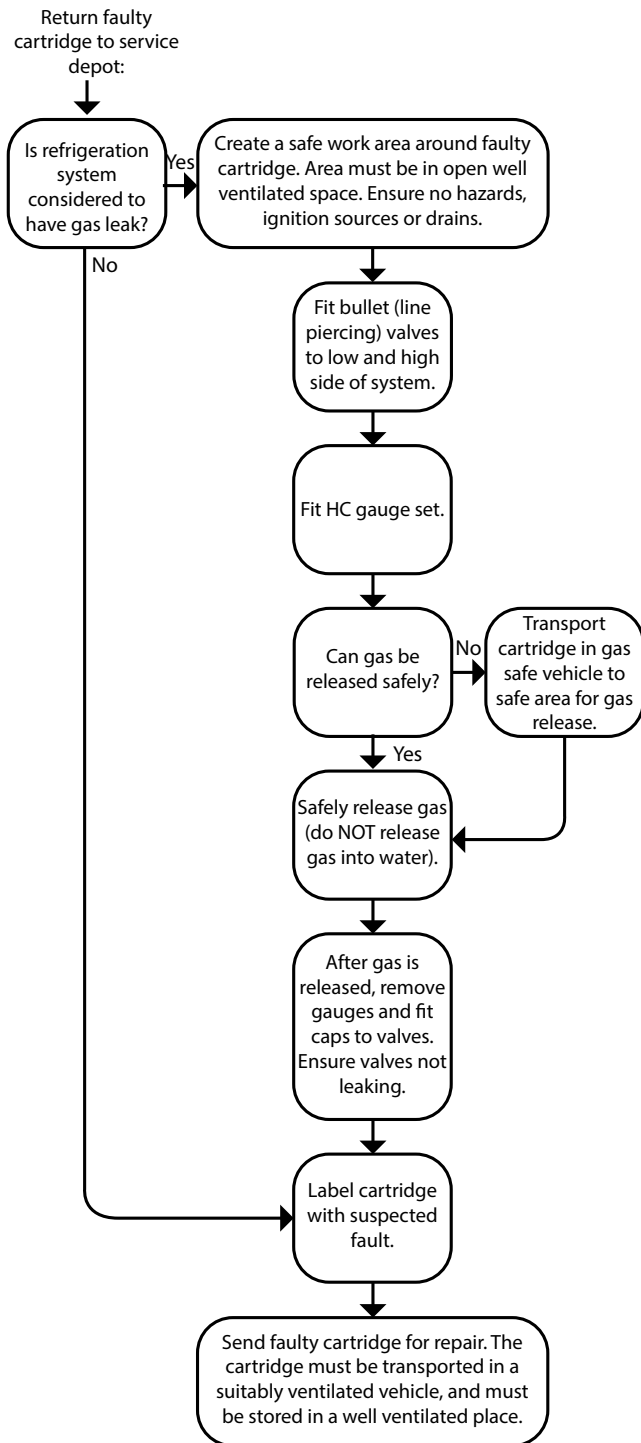
<ul style="list-style-type: none"> Moisture build up on door or exterior 	<ul style="list-style-type: none"> High humidity. Frequent door opening. Door not closing properly. 	<ul style="list-style-type: none"> Check ambient operating temperature and reposition chiller if necessary. Limit door openings. Check and clean door gasket.
<ul style="list-style-type: none"> Chiller door does not shut properly 	<ul style="list-style-type: none"> Chiller is on an uneven surface. Door is obstructed. 	<ul style="list-style-type: none"> Level the chiller. Check shelves and product.
<ul style="list-style-type: none"> Warm cabinet temperatures Compressor operating for long periods (more than 1 hour) 	<ul style="list-style-type: none"> Blocked condenser Poor ventilation around refrigeration unit 	<ul style="list-style-type: none"> Clean the condenser. Ensure the cabinet has good ventilation around the refrigeration unit. Ensure the cabinet is within the maximum operating temperature.

On-site work procedure

If a customer reports a 'not cooling' fault, and it has been established that the cabinet is not cooling, follow the procedure below when making the service visit.



On-site work procedure (continued)



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