

TCE1000N

SKOPE Two Door Upright Fridge
Hydrocarbon

SKOPE ID: EM10BYN



TCE1000N:EM10BYN
Top Mount Fridge
Hydrocarbon
Service Manual

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1 Servicing Hydrocarbon

Overview

This cabinet uses 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 17 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 Hydrocarbon 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 fridge described in Table 1. Refer to the relevant product specification sheet (available on the SKOPE website: www.skope.com) for detailed specifications.

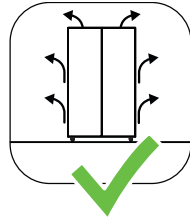
Table 1: Model specifications

Series	Model	SKOPE ID
EM10BYN/W0591	TCE1000N	EM10BYN

3 Installation

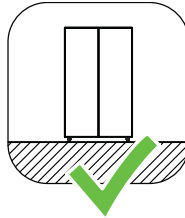
Installation Guidelines

When installing this cabinet, ensure you consider and meet the installation guidelines below.



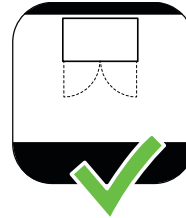
Ventilation

Ensure all ventilation requirements below are met.



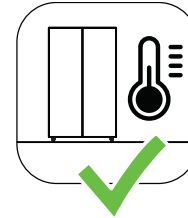
Surface

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



Door Opening

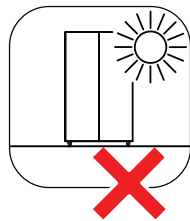
Allow adequate space for the door/s to open and close properly.



Climate Class

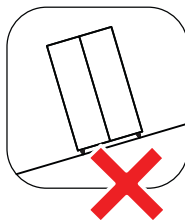
The fridge must be installed in an environment within its climate class.

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



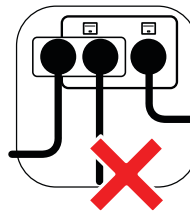
Sunlight

Do not install the fridge in direct sunlight.



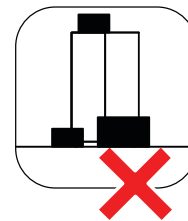
Uneven Surface

Do not install the fridge on an uneven surface.



Power Supply

Do not overload the power supply.

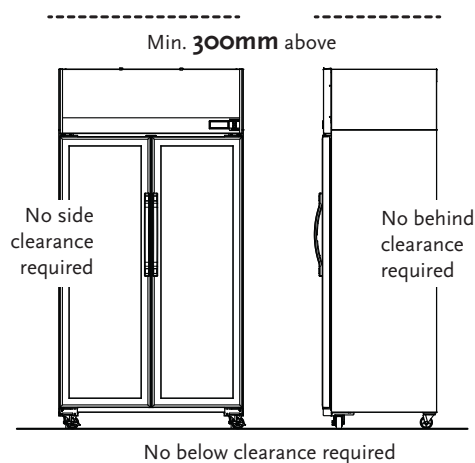


Blocking Ventilation

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

Ventilation Requirements

This cabinet must have the following ventilation clearances at all times:



Door Handles

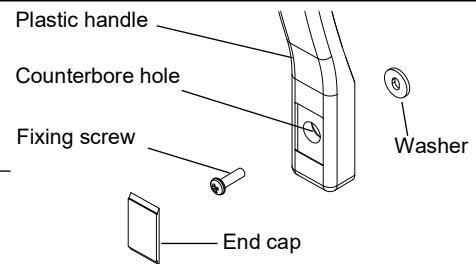
Fitting Door Handles The cabinet is supplied with door handles when it is shipped. If you need to fit a handle, follow Procedure 1.

Procedure 1: To fit a door handle

Before you start

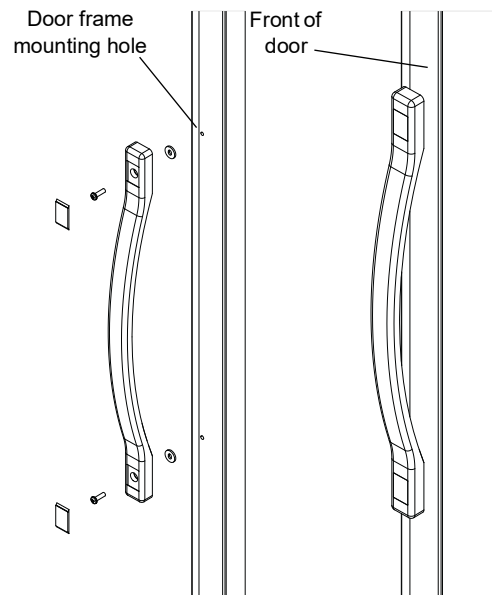
1. Make sure all handle components are ready to assemble.
2. Ensure you have a screwdriver to fit the mounting hardware.
3. Note that the fixing screw is fastened through a counterbore hole, washer and into the nut bar in the door frame. The handle is fixed to mounting holes in the door frame.

1. Fix the fixing screw through counterbore hole and washer, and into the nut bar in the door frame.



2. Fix the handle to the mounting holes in the door frame.

3. Place **both** handle counterbore holes simultaneously onto door frame mounting holes.



4. Fasten fixing screws through the handle to lock the handle position.

CAUTION

Ensure **both** handles are securely fixed to the door frames before using the cabinet.

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

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

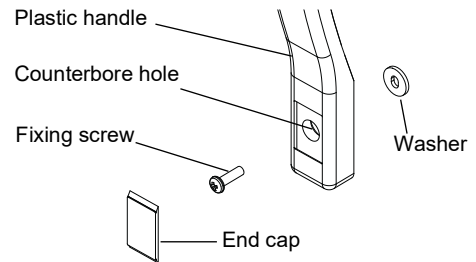
Procedure 2: To remove a door handle

Before you start

Make sure you have a screwdriver and a flat end tool, to remove the mounting hardware.

1. Use the flat end tool to gently pry off the handle end caps. This will expose fixing screw heads.

2. Unscrew handle fixing screws from both the top and bottom mounting points. You can now remove the handle.



Shelves

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

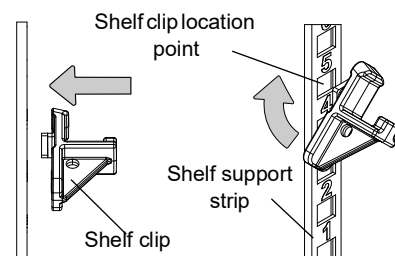
Shelf Clips Each wire shelf is held in place with four shelf clips, which engage in the shelf support strips and slide up and down to the required shelf position.

The support strips are numbered for to help you place the shelf clips. You can see the numbers in the bottom left hand corner of the shelf clip.

Procedure 3: To fit a shelf clip

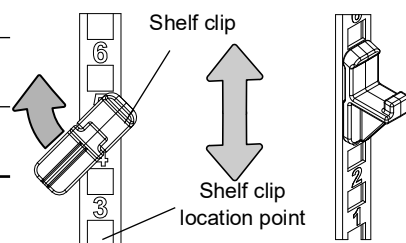
The shelf clip twists onto the shelf support strip.

1. Place the square pin on the back of the clip into the support strip.
2. Twist the clip so that it sits level and locks in place.



Procedure 4: To adjust the shelf clip height

1. Twist shelf clip off the shelf support strip.
2. Slide the clip up or down to the required position.
3. Engage the square pin onto shelf clip location point.
4. Twist the shelf clip back onto the support strip and lock into position.



Procedure 5: To remove a shelf clip

1. Twist the shelf clip left or right at 45°.
2. Pull the clip directly back to release it.

Repositioning Shelves

Procedure 6: To reposition a shelf

1. Unload and remove the shelf to be repositioned.
2. Adjust the height of the shelf clips (see Procedure 4).
3. Sit the shelves on the shelf clips.
4. Reload the product.

4 Electronic Controller

Introduction The cabinet 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 changing the settings unless it is absolutely necessary.

Temperature Setpoint The cabinet 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 Procedure 7). SKOPE do not recommend that the setpoint range be changed unless it is absolutely necessary, and then only by small increments at a time.

Procedure 7: 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.

Table 2: Messages and alarms

Display	Description
	<p>The cabinet's internal temperature</p> <p>The temperature is what the sensor inside the fridge detects, and not necessarily the temperature of the product. However, they may be very close depending on how the controller is set to sense temperature.</p>
	<p>Electronic controller lock indicator</p> <ul style="list-style-type: none"> • On when the electronic controller is locked. • Off when the electronic controller is unlocked. <p>Press and hold the up and down buttons for 3 seconds to unlock the electronic controller.</p>
	<p>Compressor indicator</p> <ul style="list-style-type: none"> • On when the compressor starts. • Off when the compressor stops.
	<p>Temperature sensor fault</p> <p>This indicates a fault with the temperature sensor. Arrange a service call.</p>

5 Replacement Procedures

Lighting

The cabinet is fitted with LED interior lights and LED sign lights. Ensure lights are 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 Table 3 for replacement light specifications.

Table 3: Replacement 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, remove it and replace it with a SKOPE OEM new component.

Refer to:

- Table 4 to determine which component may be at fault.
- the procedures over the next few pages for replacement instructions.

Ensure the cabinet is disconnected from the power supply before removing parts.

Table 4: Lighting fault diagnostics

Problem	Possible cause	Repair
No lights working. Cabinet is dark.	Lights switched off.	Switch the lights on using the light switch.
	Controller alarm.	Check the controller for an alarm code.
	Plug not connected properly.	Check and clean the plugs on top of the cabinet.
	Light power supply fault.	Replace the light power supply (see page 14).
Light component not working.	Plug not connected properly.	Check and clean the plug connection in the sidelight channel, behind the loom cover.
	Faulty light.	Replace the light.
Segment of light not working.	Faulty light.	Replace the light.

Procedure 8: To replace an interior light component

1. Unplug the cabinet from the mains power supply.

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

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

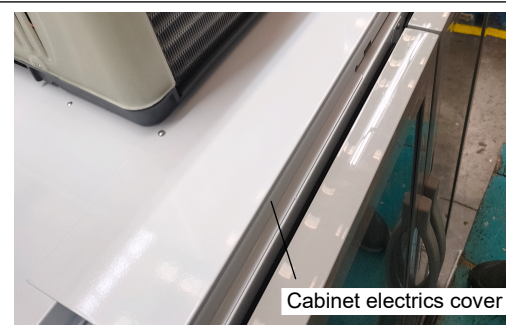


4. Fit the new light strip and plug into the circuit. Refit the diffuser.
5. Reconnect to the power supply and check for correct operation.

Procedure 9: To replace the LED driver power supply

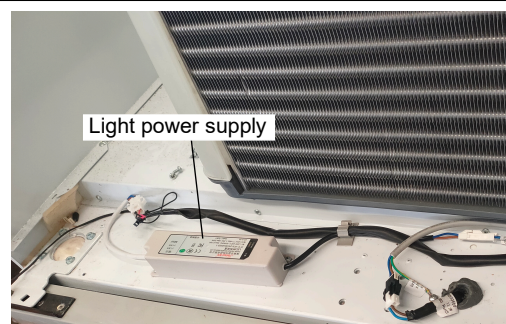
1. Unplug the cabinet from the mains power supply.
2. Remove the sign panel.

3. Detach the refrigeration cartridge and carefully push back or remove (page 22) 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.
7. Reassemble the cabinet and check for correct operation.

Procedure 10: To replace an interior wiring loom

1. Unplug the cabinet from the mains power supply.
2. Unplug the light from the wire loom.
3. Gain access to the cabinet electrics panel (see Procedure 9 on page 14).
4. Move up to the cabinet roof, and unplug the wiring loom from the light power supply, and if applicable the sign light.
5. Ensure the loom is disconnected from the light connector.
6. Remove the loom from the door by pulling it up through the exit point in the door hinge area.
7. Refit the new loom and reassemble. Ensure that:
 - all plugs are clean, correctly fitted and plugged in.
 - the loom is reconnected to the door light connector.
8. Reassemble the cabinet and check for correct operation.

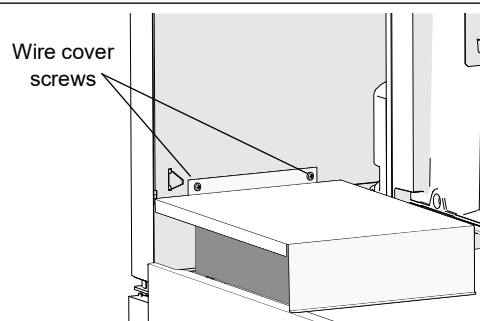
Sign Light The sign is lit by an LED modular light which can be replaced by following the steps below.

Procedure 11: To replace the sign light

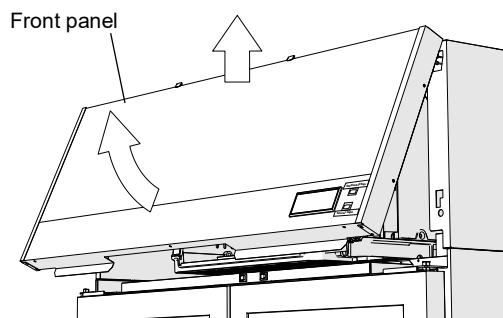
1. Unplug the cabinet from the mains power supply.

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).

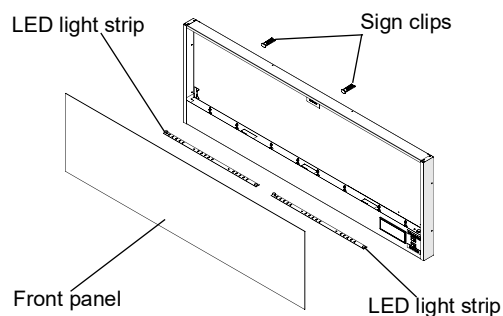
Note: The image shows the back of the sign with the cabinet side removed.



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



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



5. Refit the sign panel and wire cover, and reconnect the 3 × plugs.
6. Reconnect to the power supply and check for correct operation.

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.

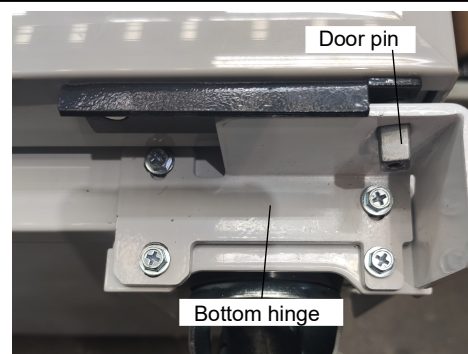
Removing and Refitting the Door For ease of servicing you can remove the doors from the cabinet.

Procedure 12: To remove a door

1. Unplug the cabinet from the mains power supply.
2. Remove the sign panel and sign sides.
3. Unscrew and remove the door's top door hinge(s).
4. Lift the door up, and off the bottom hinge.

Procedure 13: To refit the door

1. Fit the replacement door to the bottom hinge using the door pin to position it correctly.



2. Fit the top hinge spacer under the top hinge.
3. Fit the top hinge to the top of the door, and partially fix in place on the top of the cabinet.
4. Align the door with the cabinet and tighten the fixing screws.

Procedure 14: To replace the top hinge bracket

1. Follow Procedure 12 to remove the top hinge bracket.
2. Remove the door's top hinge and fit the new one.
3. Follow Procedure 13 to refit the door.

Adjusting Door Tension The door has an internal torsion bar pre-tensioned at the factory which allows the door to self-close. If necessary, you can adjust the door tension further by rotating the top and bottom tension pins.

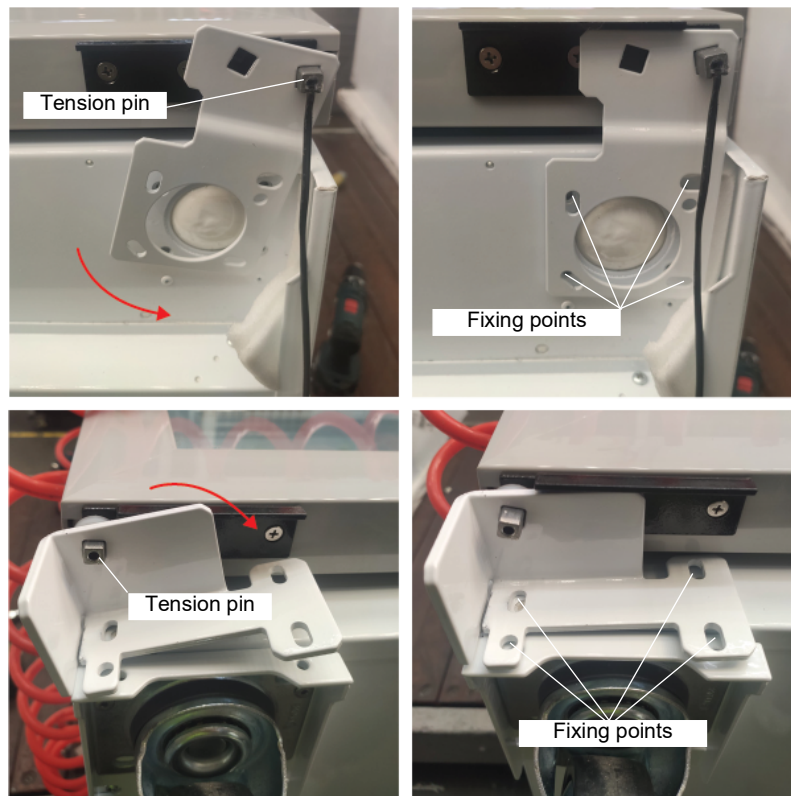
Procedure 15: To adjust the door tension

1. Unplug the cabinet from the mains power supply.
2. Remove the sign and cabinet sides.
3. Place the bottom hinge over the tension pin, and slightly rotate the hinge as shown in the "Bottom Hinge" images. Fix the hinge into position.

Tension has now been applied to the bottom tension pin.

Procedure 15: To adjust the door tension (continued)

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 the tension.
6. Refit the sign and cabinet sides.

Refrigeration System

Before Overview Servicing

Ensure you have read and understood this manual before starting any servicing.

Important

- SKOPE hydrocarbon refrigeration systems must only be serviced by appropriately skilled and qualified refrigeration mechanics.
- Servicing a sealed refrigeration system must occur at a hydrocarbon workshop or service area with dedicated hydrocarbon equipment and personal protective equipment (PPE).
- All local hydrocarbon storage and handling regulations and procedures must be followed at all times.

Ensure all electronic controller alarms diagnostics and refrigeration system diagnostics are performed to confirm a refrigeration system fault is present.

Check all components including the electronic controller and electrical systems.

Ensure your work area is well ventilated.

IMPORTANT

Use only dedicated hydrocarbon SKOPE OEM spare parts.

DO NOT use alternative parts.

For safety compliance, use only SKOPE-supplied components specified for the appliance.



Safety hazards

The main hydrocarbon safety hazards are:

- Flammability
- Venting of hydrocarbon and compressor oil
- Asphyxiation

Refrigerant identification

Correctly identifying the refrigerant is critical to maintain safety and the correct functioning of the cabinet.

- The cabinet rating label (located in the upper inside of the cabinet) states the refrigerant type.
- Warning labels are fitted to hydrocarbon refrigeration cabinets to indicate the use of hydrocarbon refrigerant.

Personal protective equipment (PPE)

Correctly wear or use all PPE required by local regulations and procedures during servicing.

Service equipment

Only use dedicated hydrocarbon service equipment which is hydrocarbon-compliant. Electrical equipment that could be exposed to the refrigerant must be intrinsically safe.

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

- Intrinsically safe refrigeration vacuum pump, rated by the manufacturer as suitable for use with hydrocarbon refrigerant
- Dedicated hydrocarbon gauge set
- Flammable gas detector to warn if flammable refrigerant is present
- Charging scales, rated by the manufacturer as suitable for use with hydrocarbon refrigerant, accurate to 1 gram

Leak detector

A leak detector is used to track and locate the source of hydrocarbon gas leaks. It is:

- recommended for servicing hydrocarbon units on-site.
- required for servicing hydrocarbon units off-site.

Service vehicle

- Must be suitable for transporting flammable gas.
- Vehicle cargo area:
 - Must be well ventilated to outside the vehicle only.
 - Must have no ignition sources, nor any areas where the gas may pool.
- Must be able to transport swap units.
- Should carry minimum SKOPE hydrocarbon service parts.

On-site Work The service technician must have required knowledge, skills, qualifications, and tools before beginning any on-site work on the refrigeration sealed system.

Minimum knowledge and skills

- Qualifications and certifications required by local/state regulatory bodies to service hydrocarbon refrigeration systems
- Safe working practices, including a safe working environment at all times

Minimum tools and equipment

- Safety signage and/or barrier – suitable to create a safe work zone 1.5 m around the cabinet
- Hydrocarbon gas detector
- Dedicated hydrocarbon gauge set
- Bullet valves/line piercing valves suitable for a 6 mm tube

Off-site Work Hydrocarbon workshop

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

- Dedicated area for hazardous work – suitable for servicing and releasing flammable hydrocarbon refrigerant
- Hydrocarbon leak detector
- Refrigeration gauge set – suitable for flammable hydrocarbon refrigerant
- Dry nitrogen – suitable for purging and high pressure testing
- Intrinsically safe refrigeration vacuum pump, rated by the manufacturer as suitable for use with hydrocarbon refrigerant
- Charging scales, rated by the manufacturer as suitable for use with hydrocarbon refrigerant, accurate to 1 gram
- Hydrocarbon refrigerant supply cylinder

Refrigeration Cartridge

Refrigeration Cartridge Assembly

The refrigeration cartridge is a top-mounted, electronically controlled, removable cartridge.

For safety and compliance, only repair the cabinet with SKOPE-supplied parts made 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.

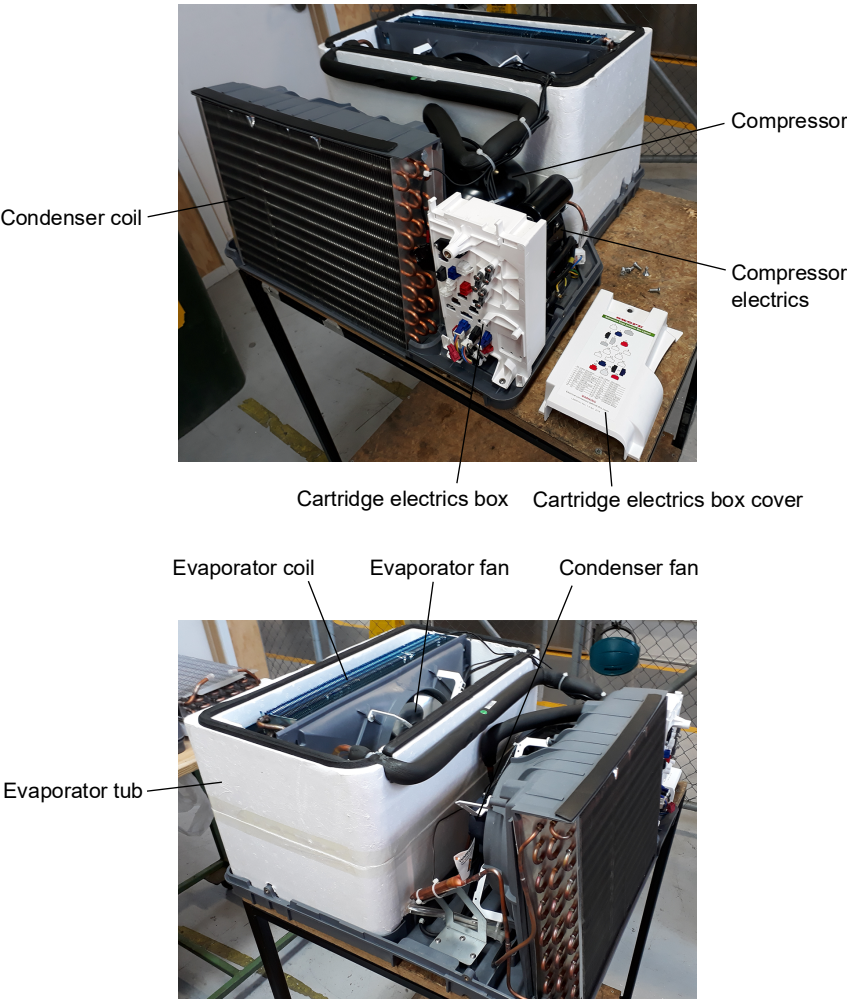
The cartridge must only be used on a SKOPE hydrocarbon-compliant cabinet. Refer to the cabinet rating label to determine if the cabinet is suitable for use with a hydrocarbon cartridge. The rating label **must** state refrigerant as R290. If the label states a different refrigerant, or does **not** state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

WARNING

The hydrocarbon cartridge must only be used on an hydrocarbon-compliant cabinet.

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

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 Table 5. Verify the model and basic requirements before servicing.

Table 5: Refrigeration cartridge specifications

Cartridge model	HB0070832517C
Compressor	Wanbao FN90M
Compressor capacity	740 watts
Refrigerant/charge	R290/95 g

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 43 when making the service visit.

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

It is helpful to have a correctly operating refrigeration cartridge running beside the cartridge being serviced to compare behaviour.

Note: This diagnostic procedure is indicative only.

Procedure 16: To determine if there is a sealed system fault**Before you start**

1. If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.
2. Ensure you are in a suitable workshop (see page 19).

1. Unplug the cabinet from the mains power supply.
2. Remove the refrigeration cartridge (see page 22),
3. Remove the refrigeration cartridge cover (see page 25).
4. Place cartridge on bench and connect service probe to the red plug on the cartridge.
5. Connect the refrigeration cartridge to the power supply and allow to run for approximately 10 minutes until the evaporator temperature stabilises.
6. 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.

Table 6: Frost stop point on a correctly charged system

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 50 mm from compressor	Frosting to compressor
30°C	Dry	Dry	Frosting 20 mm from compressor
40°C	Dry	Dry	Sweating 50 mm from compressor

7. 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.
8. Use the table below to determine whether the system is short of refrigerant or a blocked capillary.

Table 7: System diagnosis

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

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

Removing the Refrigeration Cartridge

Follow the steps below to remove the refrigeration cartridge from the cabinet. Ensure that you disconnect the cabinet from the power supply before removing the cartridge.

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

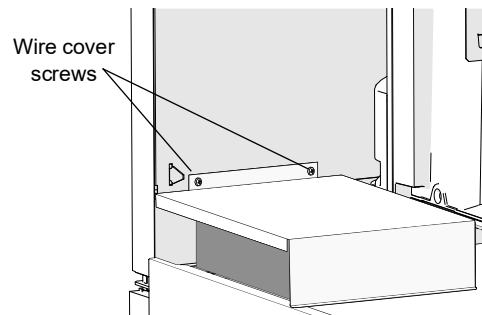
Procedure 17: To remove the refrigeration cartridge**Before you start**

1. If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.
2. Ensure you are in a suitable workshop (see page 19).

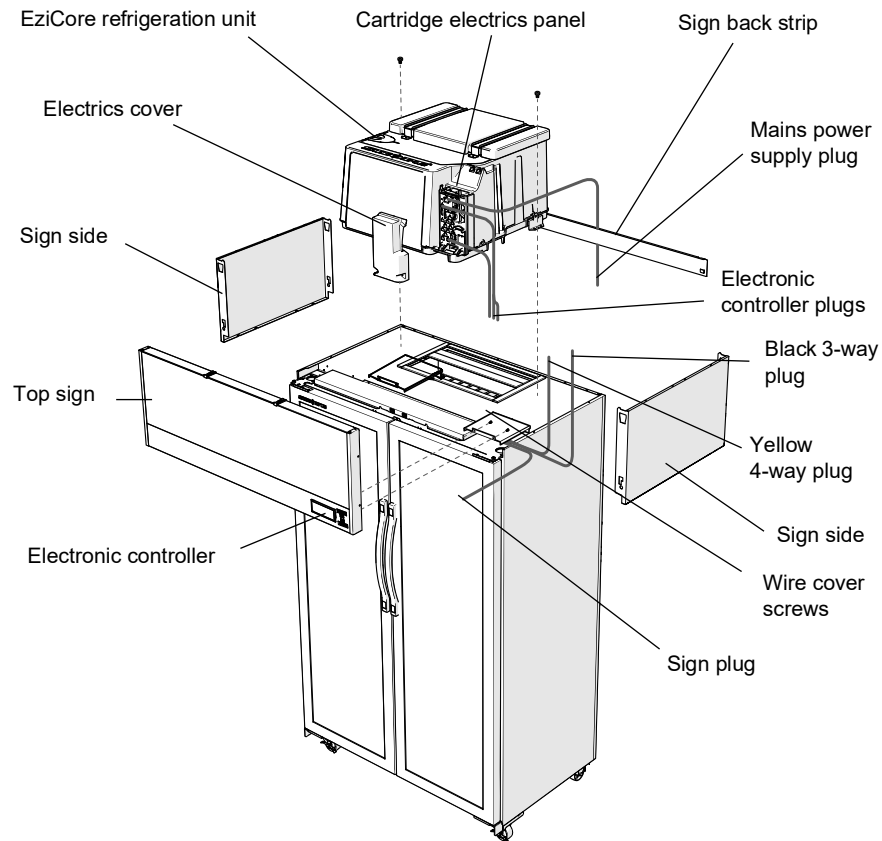
1. Unplug the cabinet from the mains power supply.

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.

Note: The image shows the back of the sign with the cabinet sign removed.



3. Swing the sign out, and unplug the:
 - 3 × electronic controller plugs.
 - 1 × sign plug.
 - 4 × terminals of LED switches.
4. Lift the sign off the cabinet and place it in your workspace.
5. Unscrew and detach the electrics cover from the cartridge.
6. Unplug the yellow 4-way plug for the lighting and the black 3-way plug for the heating from the cartridge 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 cartridge).
9. Using two people, lift the cartridge off the cabinet.
10. When refitting the cartridge, ensure that:
 - the gasket on the top of the cabinet is in good condition.
 - you screw down the cartridge.
 - you reconnect all the plugs.



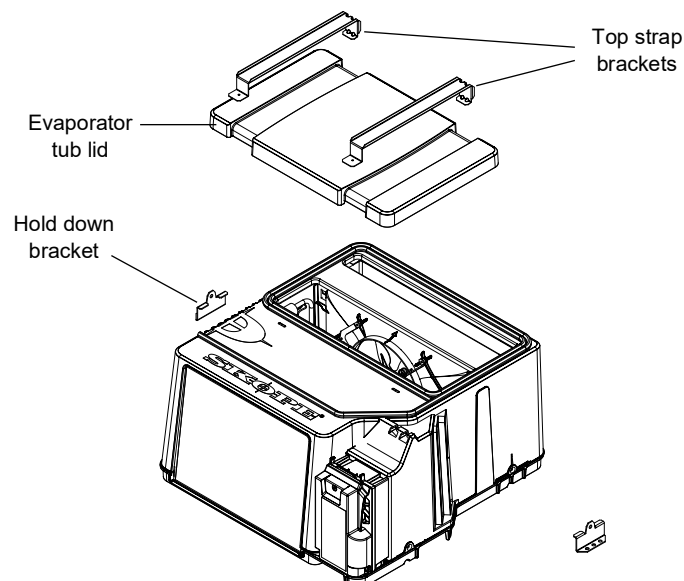
Replacing the Refrigeration Cartridge

WARNING

The hydrocarbon cartridge must only be used on a hydrocarbon-compliant cabinet.

New spare part refrigeration cartridges supplied by SKOPE do not come with the evaporator tub lid, top strap brackets or hold down brackets. When replacing a faulty top mount refrigeration cartridge, keep these parts for the new spare part replacement cartridge.

The evaporator tub lid, top strap brackets and hold down brackets can be ordered separately if required. See page 39 for spare part numbers.



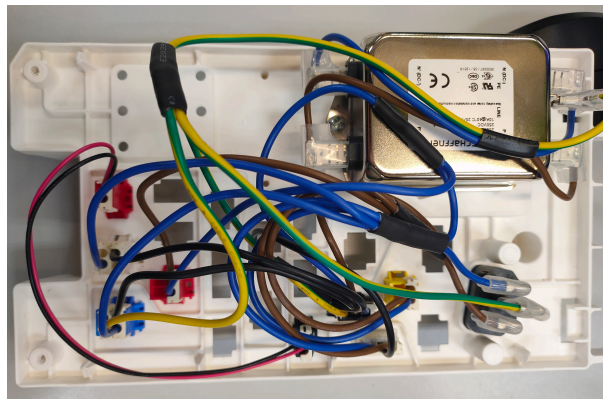
Procedure 18: To replace a cartridge

1. Unplug the cabinet from the mains power supply.
2. Remove the existing cartridge (see page 21).
3. On the new cartridge, push the bottom plugs out of the bottom of the evaporator box.
4. Swap the evaporator tub lid, top strap brackets and hold down brackets from the existing cartridge to the new cartridge.
5. Fit the new cartridge to the cabinet.

Cartridge Electrics Box Assembly

The cartridge electrics box assembly contains the mains supply socket, EMI filter and panel mount socket connectors for the cartridge and cabinet. Refer to the wiring diagram on page 25 or the label on the electrics box cover for socket connection identification.

Plugs may come loose as a result of movement and vibrations. When refitting take care that all plugs are securely attached to the correct sockets.

**Procedure 19: To remove and open the cartridge electrics box assembly****Before you start**

If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

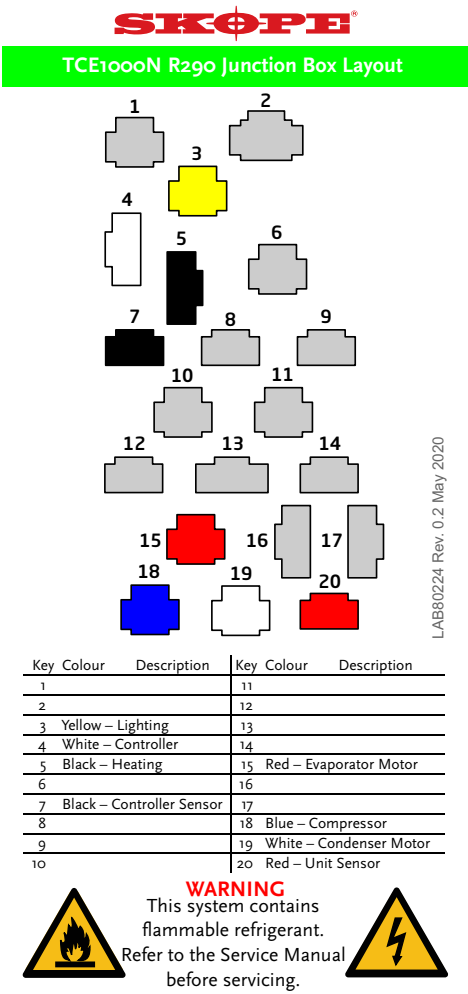
1. Unplug the cabinet from the mains power supply.
2. If present, unclip the electronic controller from the top of the electrics box.

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



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

Wiring diagram



If the fan stops for any reason, check all connections to ensure that no plugs have come loose. Refer to the label on the electrics box cover (see page 25) 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 you replace the fan blade and motor replaced with the same part to ensure safety, correct alignment and refrigeration performance, and compliance. Tighten fan blades to the fan motor manufacturer's recommended torque settings, shown in Table 8.

Table 8: Fan motor manufacturer recommended torque settings

Fan motor manufacturer	Torque setting
Haier	1.5 Nm

Procedure 21: To access and remove the condenser fan assembly

Before you start

If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Unplug the cabinet from the mains power supply.
2. Remove the refrigeration cartridge (see page 22).
3. Remove the cartridge cover (see page 25).
4. Open the electrics box and unplug the condenser fan motor plug (see page 25).

5. Cut the cable ties holding the cables along the cartridge, and free up the condenser fan motor cable.



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

Procedure 22: To replace the condenser fan blade

Before you start

If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Remove the condenser fan assembly (see Procedure 21).
2. Remove the screw and washer from the centre of the condenser fan blade, and lift the blade from the motor.
3. Replace the blade and fix with a 12 mm flat washer and serrated head screw.
4. Tighten the blade to fan motor manufacturer's recommended torque setting (1.5 Nm).
5. Reassemble the cartridge and test.

Procedure 23: To replace the condenser fan motor**Before you start**

If a customer reports a “not cooling” fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Remove the condenser fan assembly (see Procedure 21) and the fan blade (see Procedure 22).
2. Unplug the fan flexible cord from the electrics box (see page 25).
3. Detach the fan motor from the fan mounting brackets by removing the four screws from the mounting bracket.
4. Fit the new motor, and reattach the fan blade with a 12 mm flat washer and serrated head screw.
5. Tighten the blade to fan motor manufacturer's recommended torque setting (1.5 Nm).
6. Reassemble the cartridge, ensuring all cables are neatly cable-tied away from the fan blade.
7. 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 that no plugs have come loose. Refer to the label on the electrics box cover (see page 25) 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 brackets. You can lift the shroud (complete with fan motor and fan blade) off the evaporator tub once you have removed the refrigeration cartridge cover.

IMPORTANT

Replace the motor with the same SKOPE OEM part.
Do not use alternative parts.

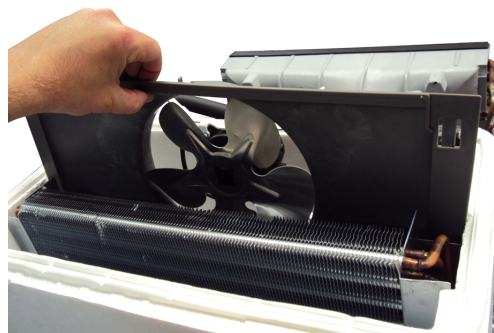
It is important that you replace the fan blade and fan motor with the same part to ensure safety, correct alignment and refrigeration performance, and compliance. Tighten fan blades to the fan motor manufacturer's recommended torque settings shown in page 26 (1.5 Nm).

Procedure 24: To access the evaporator fan assembly**Before you start**

If a customer reports a “not cooling” fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Unplug the cabinet from the mains power supply.
2. Remove the refrigeration cartridge (see page 22).
3. Remove the refrigeration cartridge cover (see page 25).
4. Free up cables from the putty on the evaporator tub perimeter.
5. Cut cable ties to release control probe from the fan bracket.

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



Procedure 25: To replace the evaporator fan blade**Before you start**

If a customer reports a “not cooling” fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Unplug the cabinet from the mains power supply.
2. Remove the refrigeration cartridge (see page 22).
3. Gain access to the evaporator fan assembly (see Procedure 24).
4. Remove the screw and washer from the centre of the evaporator fan blade, and lift the blade from the motor.
5. Fit the new blade, ensuring it is centred within the evaporator shroud.
6. Tighten the blade to the fan motor manufacturer's recommended torque setting (1.5 Nm).
7. Reassemble the cartridge and test for correct operation.

Procedure 26: To replace the evaporator fan motor**Before you start**

If a customer reports a “not cooling” fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

1. Access the evaporator fan assembly (see Procedure 24) and remove the fan blade (see Procedure 25).
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 control probe flexible cords back onto the mounting bracket to prevent high frequency vibration.
5. Fit the fan blade, ensuring it is centred within the evaporator shroud.
6. Tighten the blade to fan motor manufacturer's recommended torque setting (1.5 Nm).
7. Reassemble the cartridge and test for correct operation.

Compressor The compressor is located at the front of the refrigeration cartridge, 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 that the compressor electrics are operating correctly (see “Compressor Electrics” on page 29).

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 cartridge 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 that no pipes touch the plastic base or condenser assembly.

Compressor Electrics The compressor electrics are located on the front of the compressor.

Procedure 27: To access the compressor electrics

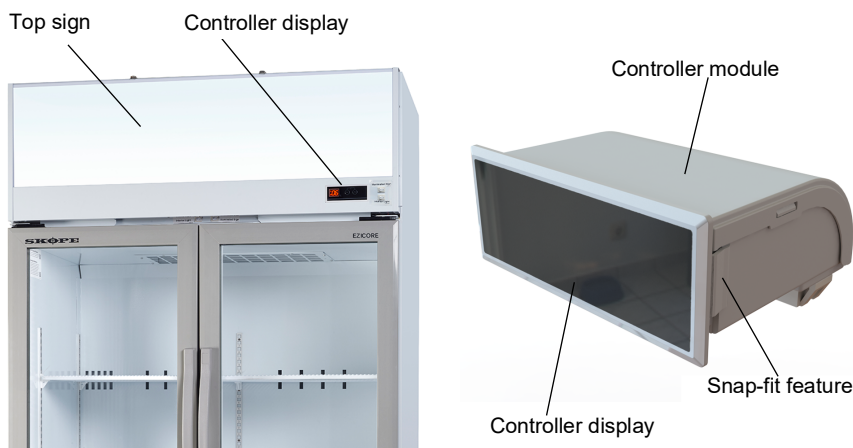
Before you start

If a customer reports a “not cooling” fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.

8. Remove the refrigeration cartridge (see page 22).
9. Remove the cartridge cover (see page 25).
10. Unclip the capacitor from the relay cover.
11. Unclip the relay cover from the compressor.

Electronic Controller

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

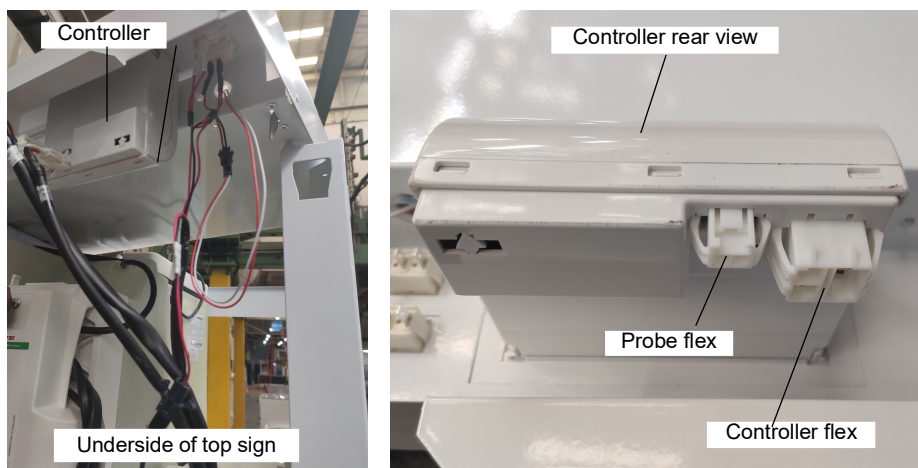


Procedure 28: To access the controller

1. Unplug the cabinet from the mains power supply.
2. Remove sign from cabinet (see page 15) and place in your working area.

Controller Flexes The controller module is positioned in 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.

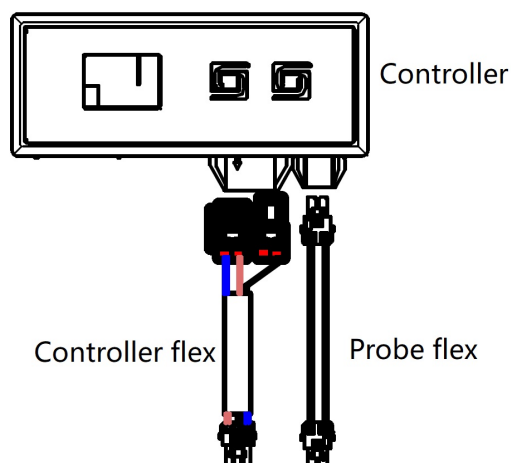
Note: Replacement spare part electronic controllers are supplied with a default parameter set loaded.

Procedure 29: To replace the controller

1. Unplug the cabinet from the mains power supply.
2. Access the electronic controller (see Procedure 28 on page 30).
3. Remove the controller from the sign assembly.

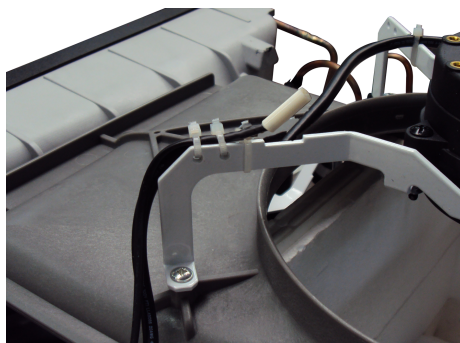
Procedure 29: To replace the controller (continued)

4. Fit the new replacement controller and connect the controller flex and probe flex cables.



5. Reattach the controller module to the sign, and reattach to the cabinet.
6. Perform an electrical safety test as required, and reconnect to the mains power supply.
7. Check that the default parameter settings are showing correctly on the controller (refer to "Electronic Controller" on page 12).

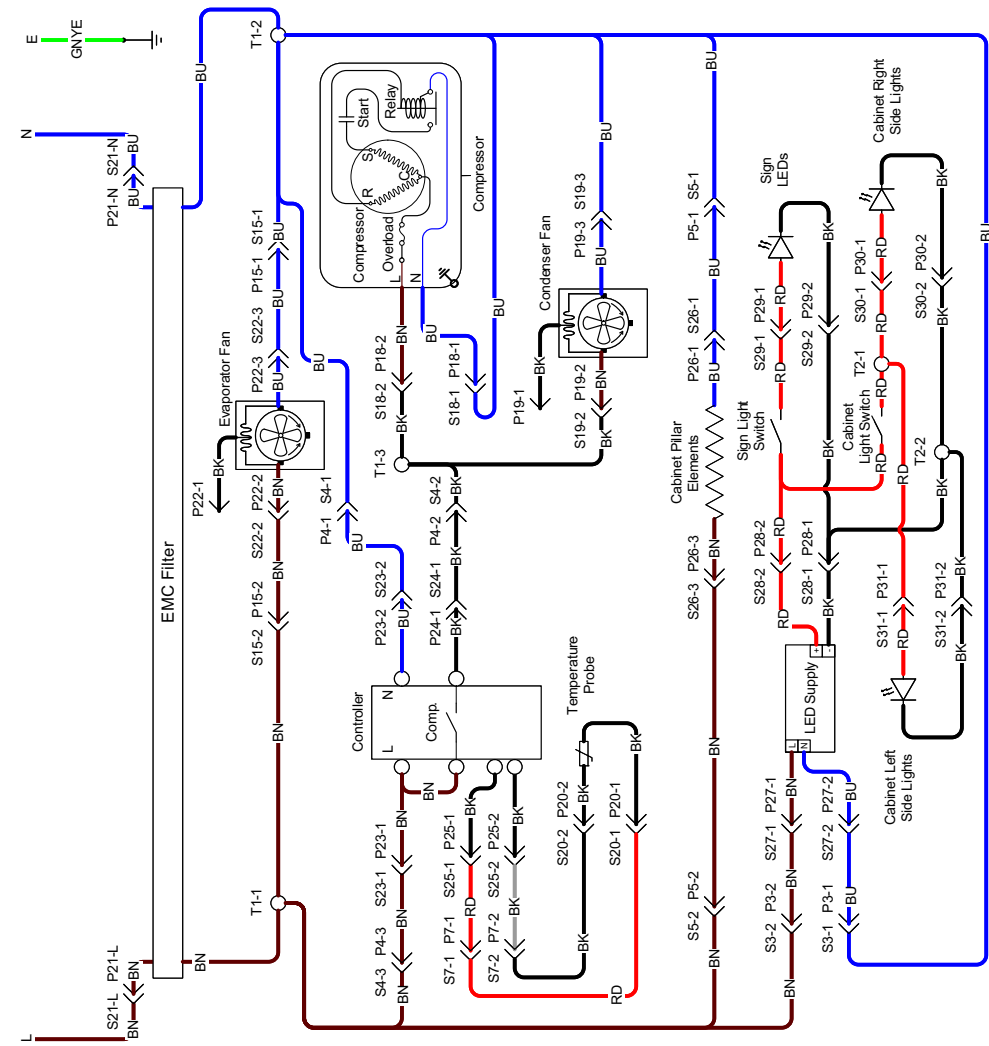
Control Probe The control probe is cable-tied to a bracket on the evaporator fan motor bracket.

**Procedure 30: To replace the control probe****Before you start**

1. If a customer reports a "not cooling" fault, and it has been established that the cabinet is not cooling, follow the procedure on page 43 when making the service visit.
 2. Make sure you take note of the original control probe's path.
1. Remove the evaporator fan assembly (see page 27).
 2. Detach the probe from the evaporator fan shroud bracket and trace the probe cable back to the cartridge electrics box and unplug (see page 24).
 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 cartridge electrics 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.

6 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
S2/P2	Unused
S3/P3	Cabinet Lighting (4-Way Yellow)
S4/P4	Controller Power (3-Way White)
S5/P5	Cabinet Heating (3-Way Black)
S6/P6	Unused
S7/P7	Controller Sensor (2-Way Black)
S8/P8	Unused
S9/P9	Unused
S10/P10	Unused
S11/P11	Unused
S12/P12	Unused
S13/P13	Unused
S14/P14	Unused
S15/P15	Evaporator Fan Motor (4-Way Red)
S16/P16	Unused
S17/P17	Unused
S18/P18	Compressor (4-Way Blue)
S19/P19	Condenser Fan Motor (4-Way White)
S20/P20	Unit Temperature Probe (2-Way Red)
S21/P21	Mains IEC Connection
S22/P22	Evaporator Fan Extension (4-Way White)
S23/P23	Power on Controller 1 (Molex)
S24/P24	Power on Controller 2 (Molex)
S25/P25	Signal on Controller (Molex)
S26/P26	Cabinet Pillar Connection
S27/P27	LED Power Supply Input
S28/P28	LED Power Supply Output
S29/P29	Sign Connection
S30/P30	Right Lights Connection
S31/P31	Left Lights Connection
T1	Unit Joists

Notes

[illegible]

7 Spare Parts

Main Assembly – TCE1000N

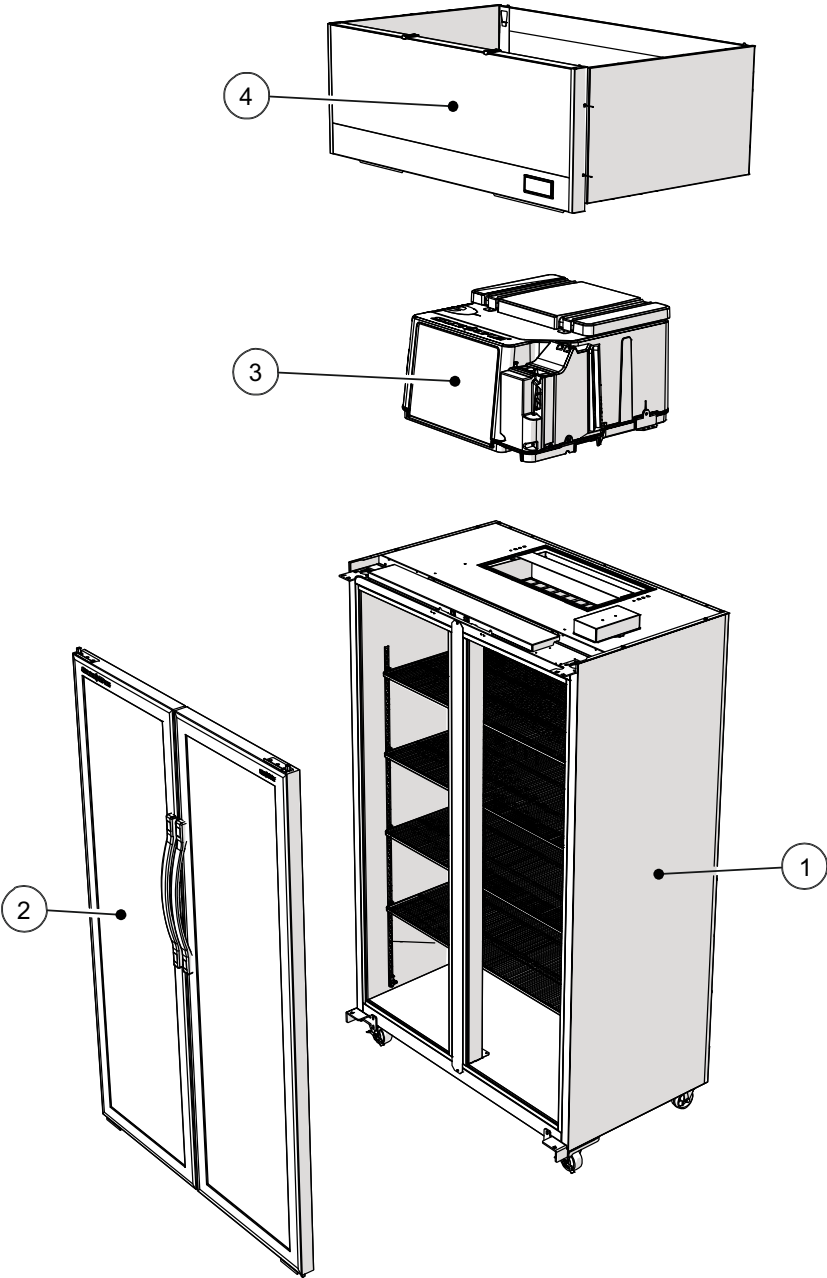


Table 9: Parts – Main assembly

No.	Description	Page
1	Cabinet assembly	Page 35
2	Door assembly	Page 36
3	Sign assembly	Page 37
4	Cartridge assembly	Page 37

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

Cabinet Assembly

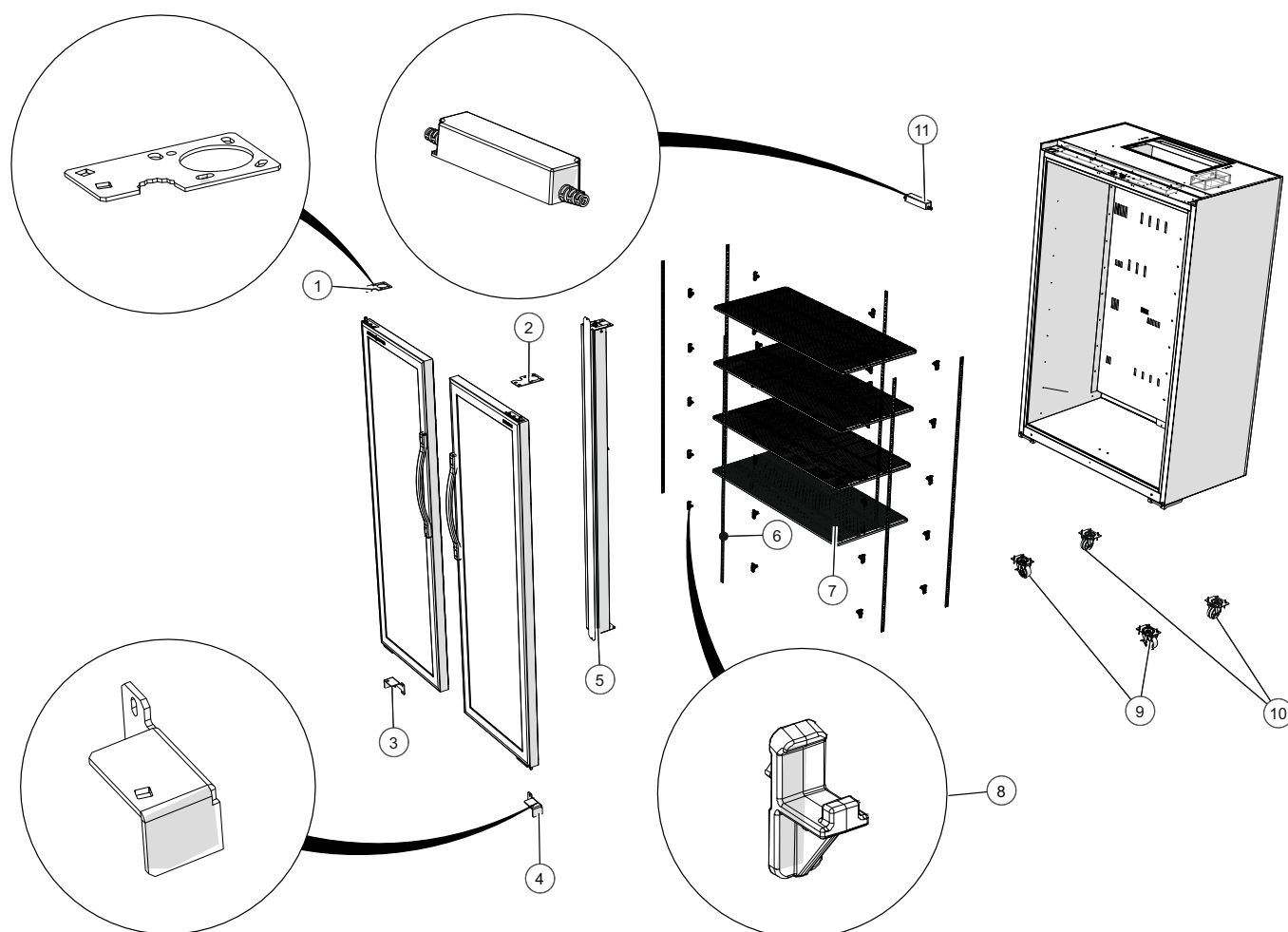


Table 10: Parts – Cabinet assembly

No.	Description	SKOPE Part No.
		<i>Colour: White</i>
1	Top hinge - left hand	HB0070111940
2	Top hinge - right hand	HB0070111943
3	Bottom hinge - left hand	HB0070111941
4	Bottom hinge - right hand	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

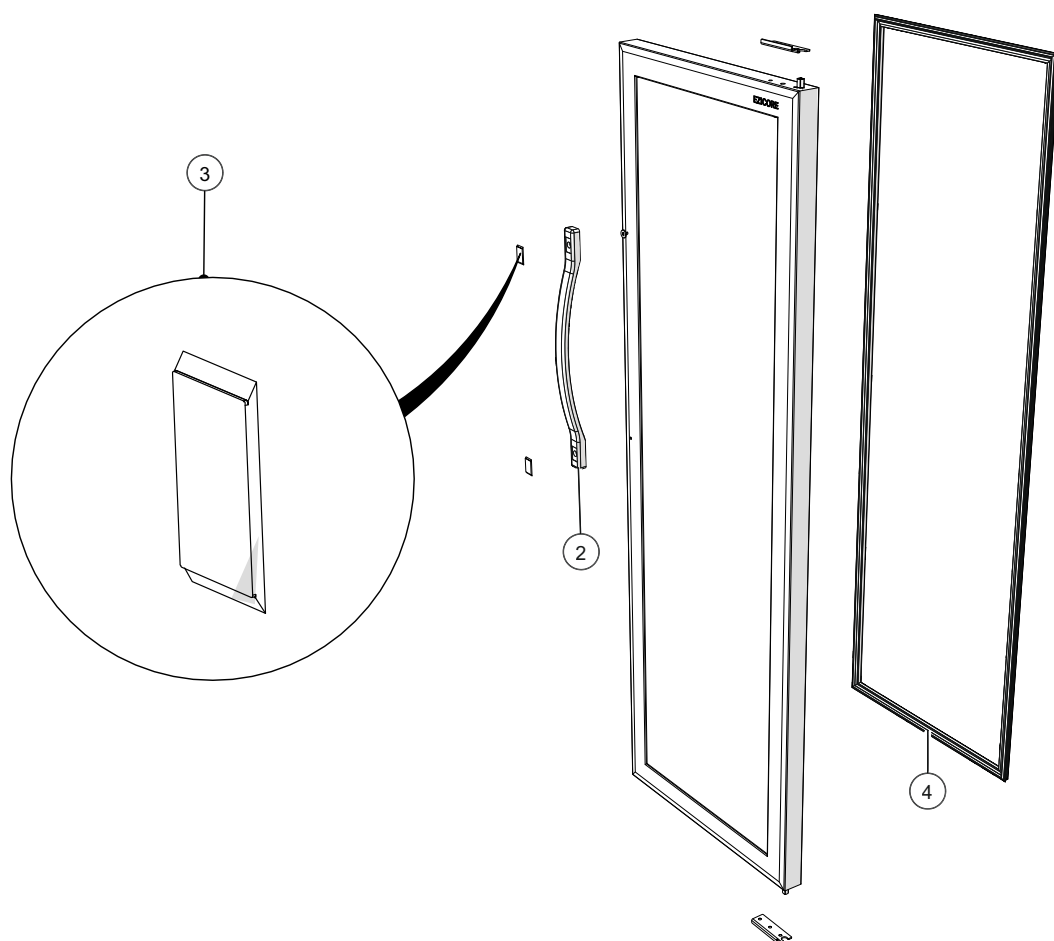


Table 11: Parts – Glass door assembly

No.	Description	SKOPE Part No.
		Colour: White
1	TCE1000N door assembly – left hand	HB0070824787A
	TCE1000N door assembly – right hand	HB0070824788A
2	Door handle	HB0070202818E (grey)
3	Door handle cap	HB0070202817E
4	Door magnet gasket	HB0070204885C
–	LED light strip (not shown)	HB0074091499A

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

Sign Assembly

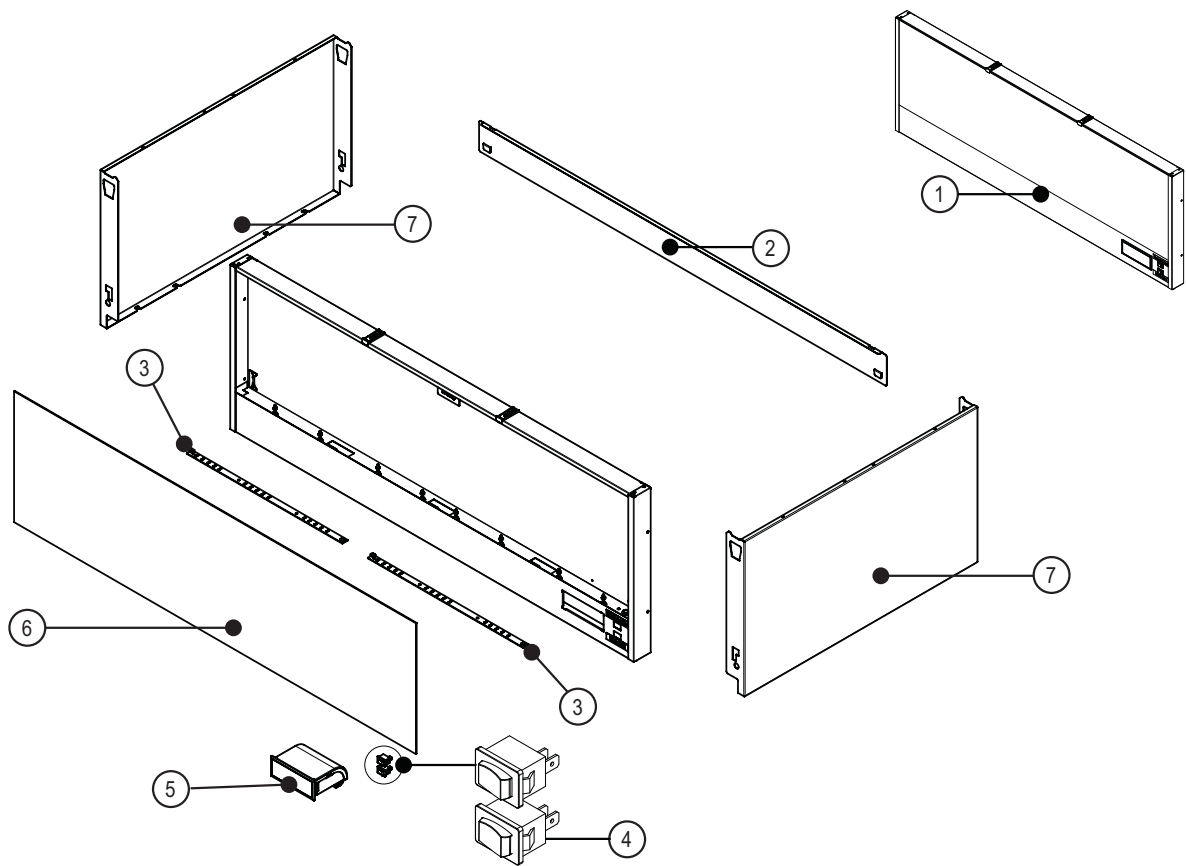


Table 12: Parts – Sign assembly

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

Cartridge Assembly – HB0070832517C

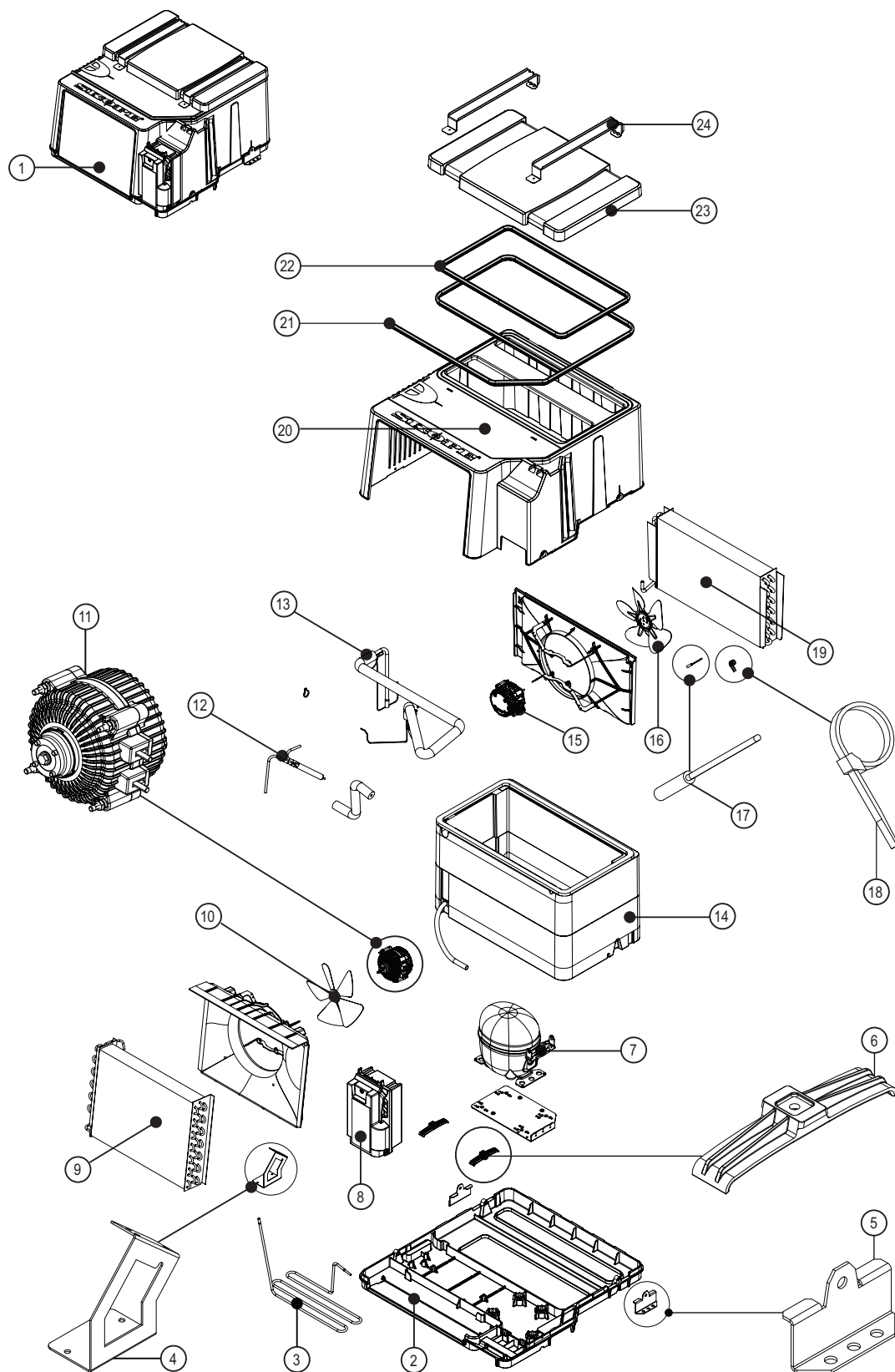


Table 13: Parts – Cartridge assembly

No.	Description	SKOPE Part No.
1	EziCore cartridge assembly	HB0070832517C
2	Refrigeration cartridge 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
–	Condenser fan shroud (not shown)	HB0070206124
12	Drier	HB0074180006
13	Suction line assembly	HB0070702718
14	Evaporator box	HB0070510928A
15	Evaporator fan motor	HB0074000793B
16	Evaporator fan blade	HB0074000313A
–	Evaporator fan shroud (not shown)	HB0070206123
17	Temperature probe	HB0070400497
18	Cassette cable clamp	HB0070206127
19	Evaporator coil	HB0070702968
20	Refrigeration cartridge plastic top cover	HB0070206133A
21	Refrigeration cartridge gasket seal 2306 mm	PLE11052-2306
22	Refrigeration cartridge gasket seal 1571 mm	PLE11052-1571
23	Evaporator box lid	HB0070511356
24	Top metal strap bracket	HB0070110816
–	Ambient temperature probe (not shown)	
–	Mains power cord (not shown)	

Note: When ordered as a spare part, the refrigeration cartridge 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 cartridge (items 5, 23 and 24).

Electrics Box Assembly

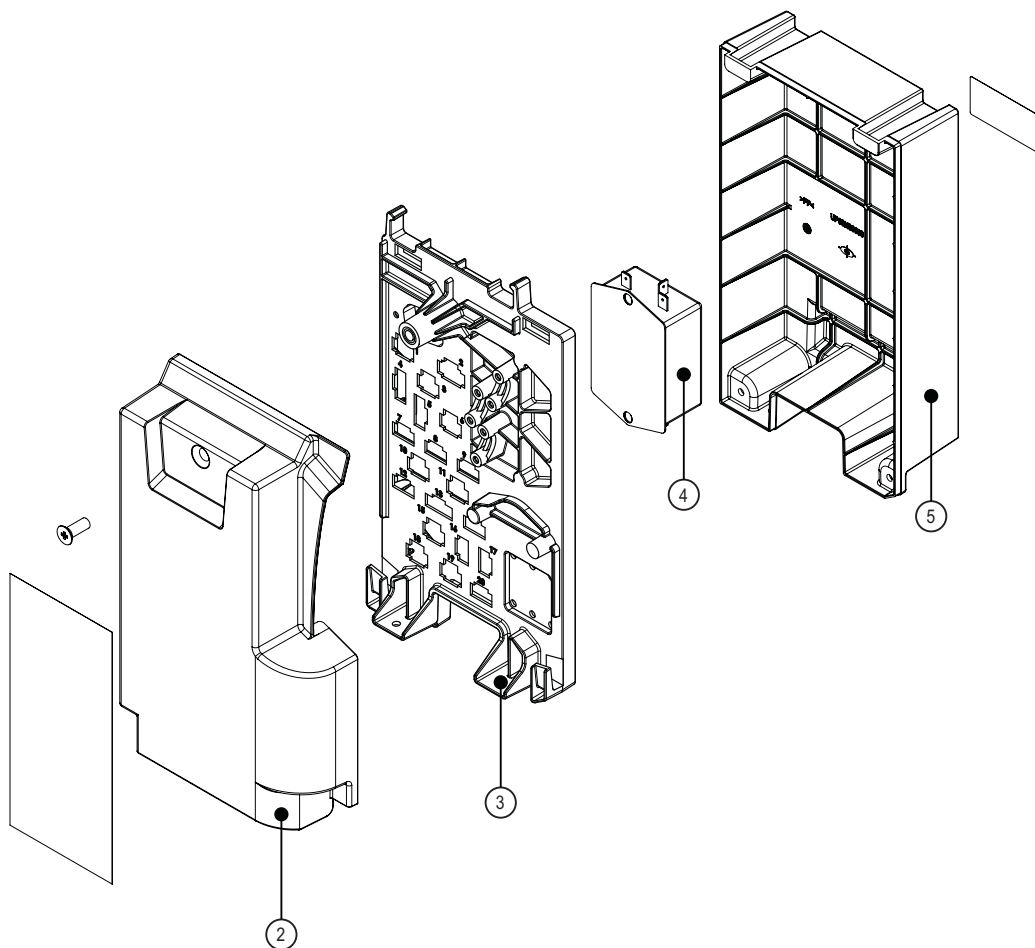


Table 14: Parts – Electrics box assembly

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

8 Maintenance

Cleaning

Before any maintenance, unplug the cabinet from the power supply.

Cabinet Periodically wipe the inside and outside of the cabinet with a damp cloth, taking care to keep moisture away from electrical parts.

Condenser Coil To ensure trouble-free performance, SKOPE strongly recommends that the condenser coil is cleaned:

- every month with a soft brush to remove dust and fluff.
- every six months, by qualified service personnel.

The condenser coil and air filter **must** be kept clean for efficient and reliable operation.

WARNING

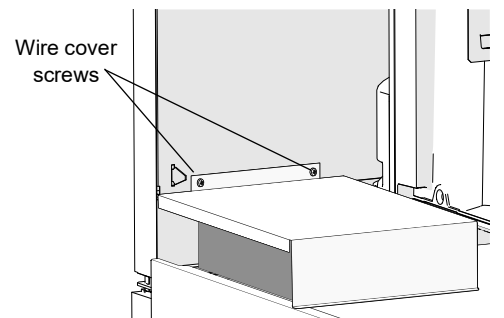
Unplug the cabinet from the power supply before cleaning the condenser coil.

Procedure 31: To clean the condenser coil and optional condenser filter

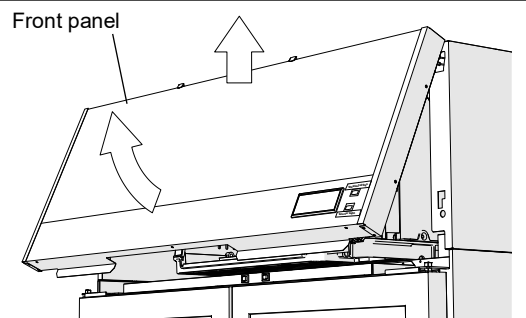
1. Unplug the cabinet from the mains power supply.

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).

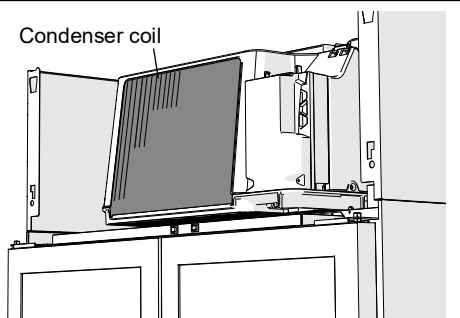
Note: The image shows the back of the sign with the cabinet side removed.



3. Swing the sign out from the cabinet and unplug the 3 × plugs. Lift the sign off and place in your workspace.



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



9 Troubleshooting

Cabinet and Refrigeration Cartridge

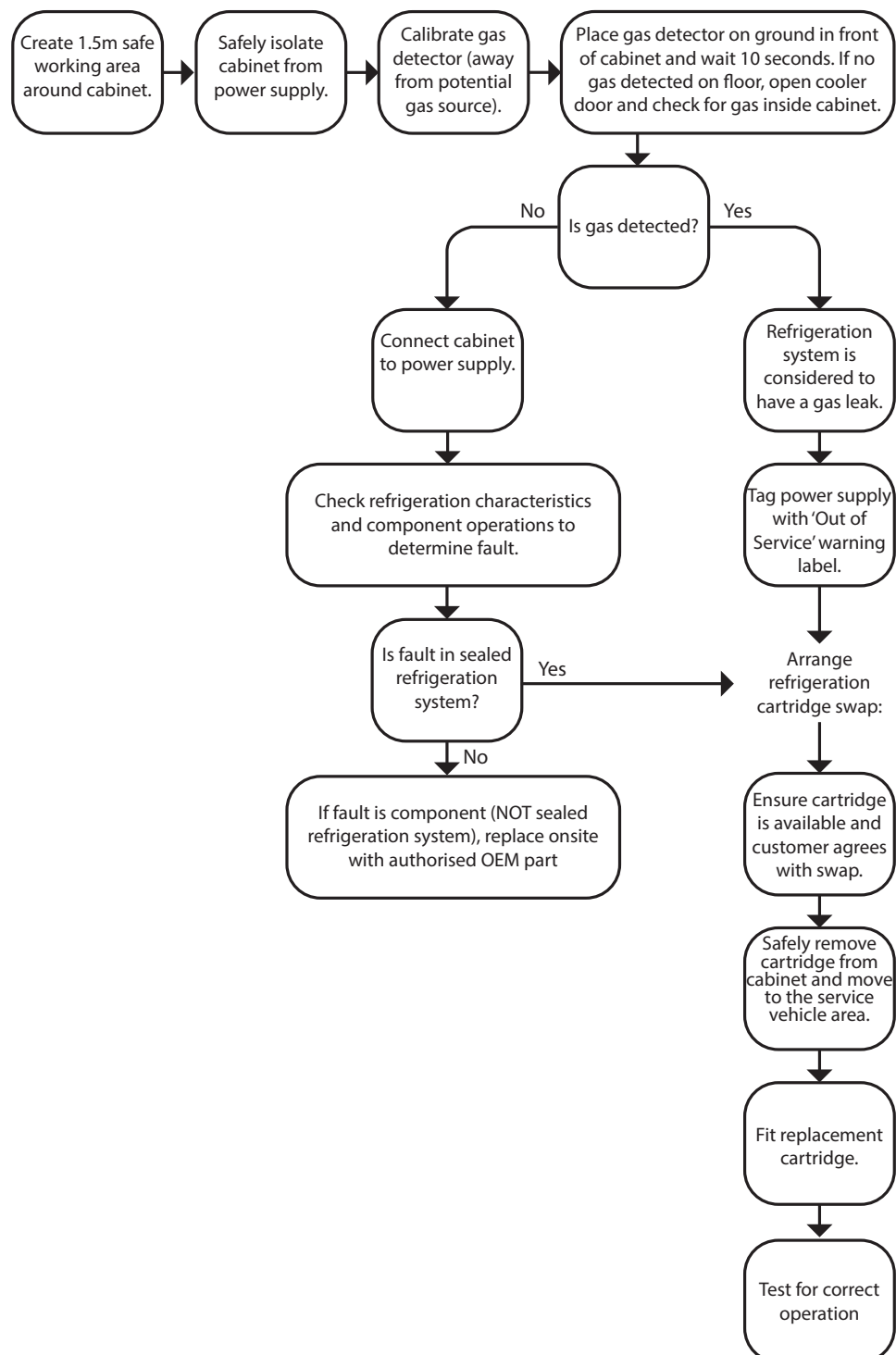
Diagnostic Table For problems with the cabinet and refrigeration cartridge use Table 15.

Table 15: Troubleshooting

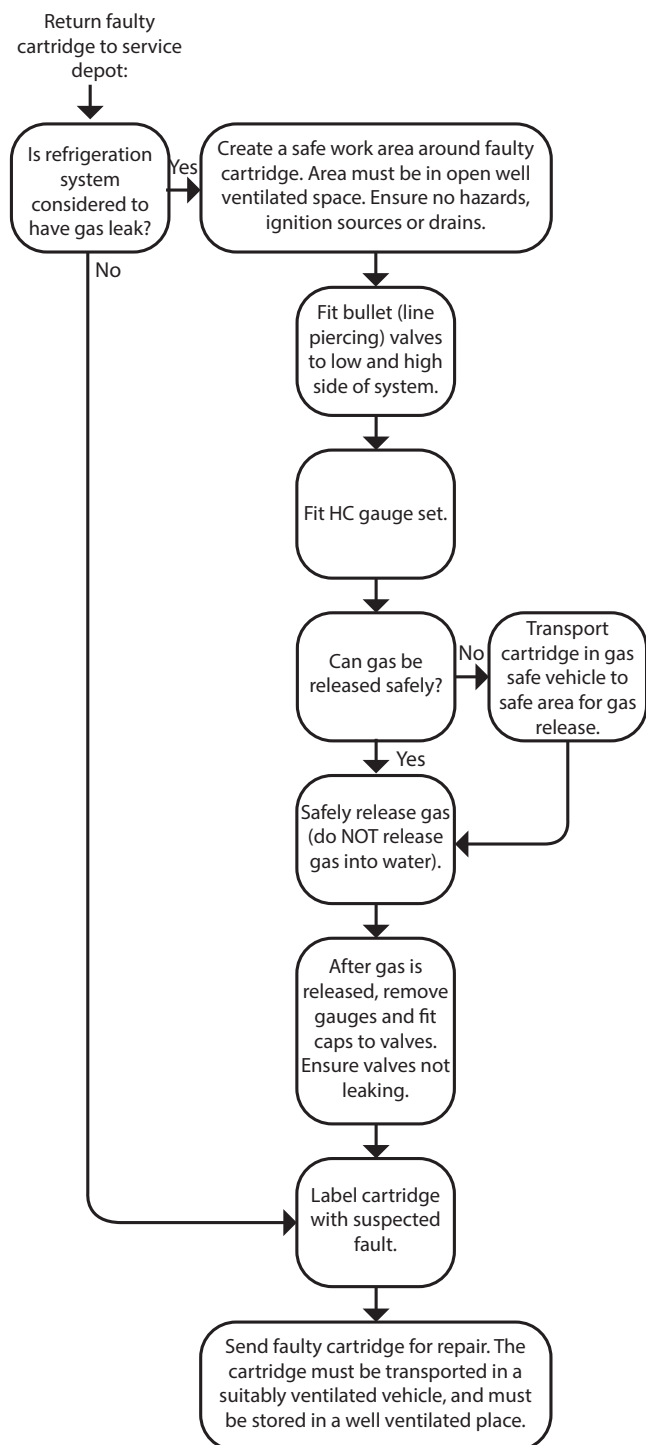
Problem	Possible cause	Repair
<ul style="list-style-type: none"> Cabinet not operating No controller display 	<ul style="list-style-type: none"> Loss of power supply Loose plug in electrics box 	<ul style="list-style-type: none"> Check mains power supply. Check all plugs in electrics box are connected 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 cabinet 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 cartridge 	<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 20) and service as required.
<ul style="list-style-type: none"> Power consumption is higher than expected 	<ul style="list-style-type: none"> Cartridge 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 cartridge. Ensure the cabinet is within the maximum operating temperature. Ensure door is closed more often. Raise setpoint
<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 cartridge operating too hot. Excessive door opening or refrigeration heat load. Setpoint 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 cartridge. Ensure the cabinet is within the maximum operating conditions. Lower setpoint.
<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 cabinet if necessary. Limit door openings. Check and clean door gasket.
<ul style="list-style-type: none"> Cabinet door does not shut properly 	<ul style="list-style-type: none"> Cabinet is on an uneven surface. Door is obstructed. 	<ul style="list-style-type: none"> Level the cabinet. 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 cartridge 	<ul style="list-style-type: none"> Clean the condenser. Ensure the cabinet has good ventilation around the refrigeration cartridge. 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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