

ProSpec

SKOPE Top Mount Fridge Hydrocarbon



ProSpec
SKOPE 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 hydrocarbon safety hazards are:

- Flammability
- Venting of hydrocarbon and compressor oil
- Asphyxiation



Service requirements

Do not interfere with the refrigeration system. All refrigeration maintenance and repairs must be undertaken according to the SKOPE HC Service Requirements. See the “SKOPE HC Service Requirements” below for more information, including examples of hazardous activities.

Electrical safety precautions

Correct wiring routing is as important as using correct components for compliance with safety and radio interference regulations. In order to maintain safety and compliance with regulations, any wiring that is disturbed during servicing must be replaced and secured in its original position.

SKOPE Hydrocarbon 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

Models

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

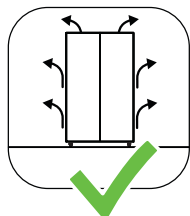
Table 1: Model specifications

Series	Model	SKOPE ID	Cartridge
ProSpec Fridge Series	PG21.UPR.1.SD	PP1R	HB0070832517A
	PG21.UPR.2.SD	PP2R	

3 Installation

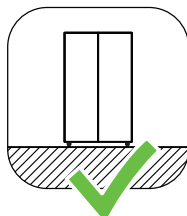
Installation Guidelines

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



Ventilation

Ensure all ventilation requirements below are met.



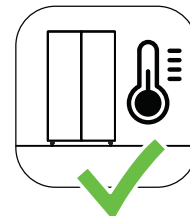
Surface

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



Door Opening

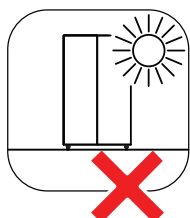
Allow adequate space for the door/s to open and close properly.



Climate Class

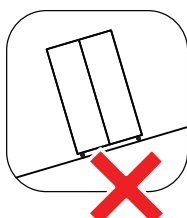
The cabinet must be installed in an environment within its climate class.

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



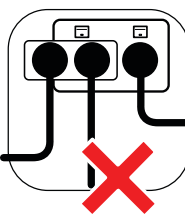
Sunlight

Do not install the cabinet in direct sunlight.



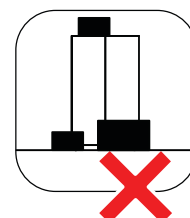
Uneven Surface

Do not install the cabinet 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 cabinet.

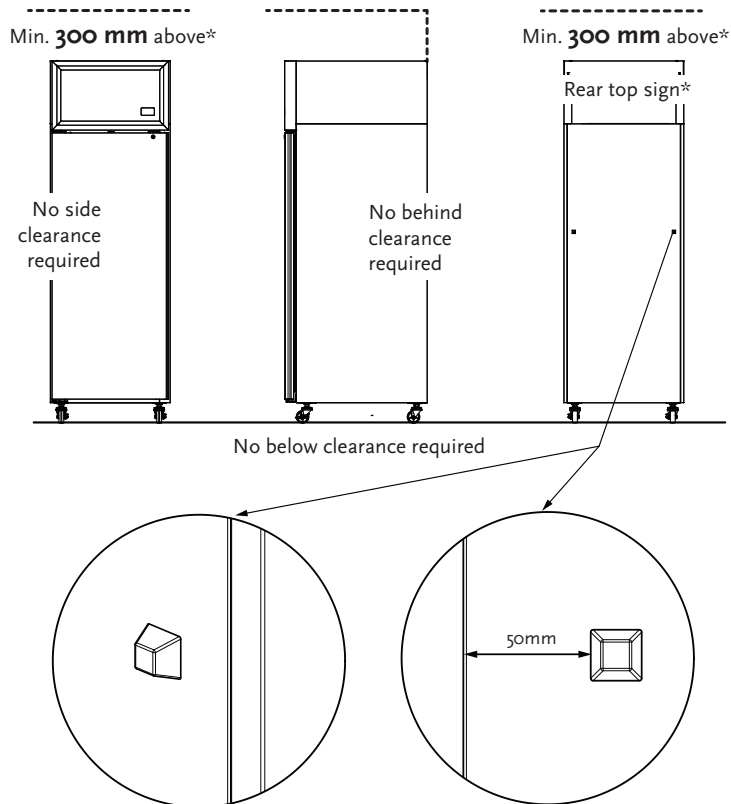
Ventilation Requirements

See the diagram over for ventilation requirements.

When positioning the cabinet, ensure there is at least a 300 mm space above the top panel. Adequate ventilation around the refrigeration cartridge is essential for efficient operation. The air surrounding the refrigeration cartridge must not exceed 40°C.

Keep the ventilation slots at the top of the cabinet clear at all times and **never** store cardboard cartons or other objects on top of the cabinet.

In certain climatic conditions, condensation may form on the back of the cabinet. If this is observed, ensure air circulation between cabinet and wall by adhering two of the enclosed self-adhesive blocks to the cabinet back as shown.



Adhesive Blocks

If required use two adhesive blocks on the rear of the cabinet. Position the blocks on the left and right hand sides of the cabinet, approximately in the centre and 50 mm from the cabinet edge.

Shelves

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

Shelf Support Strips Each wire shelf is held in place by two shelf support strips, 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 left hand corner of the shelf clip.

Procedure 1: To fit a shelf support strip

The shelf support strips hook into vertical supports on the left and right sides of the cabinet.

1. Engage the rear hook on the shelf support strip first, then the front hook.

2. Check that the shelf support strip is secure.



Procedure 2: To remove a shelf support strip

1. Pull the front of shelf support strip **up** and **away** from the vertical support. This will free up the front section of the support strip.
 2. Pull the rear shelf support strip **forward** and **away** from the cabinet.
-

Procedure 3: To adjust the shelf support strip

The cabinet vertical supports are spaced at different heights to allow for various shelf positions.

1. Remove the shelf support strip as above.
 2. Hook the shelf support strips into the notch features on the cabinet vertical supports.
-



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 see "Procedure 3" above. Sit the shelves on the shelf clips.

4 Operation

Loading Product

Let the cabinet run for 30 minutes before loading it with product for the first time. When loading the cabinet:

- Do not exceed a maximum load of 46kg per shelf (standard shelves).
- Remove some product if the shelves are flexing and do not let anything overhang the shelves because this might stop the doors from shutting or cause potential cabinet damage.

Light Switch

Switch the lights on and off by pressing and holding the **AUX** button on the electronic controller display (see page 13).

5 Electronic Controller

Overview

The product is fitted with a Wellington Drive SCS Connect electronic controller. The controller is located above the door/s and is visible from the outside of the cabinet.

Controller servicing can be performed via the controller faceplate, or the SCS Connect Field app.

This does not control the cabinet body and door heater elements

Apps

SCS Connect Field App The SCS Connect Field app is designed for service techs, and provides access to the controller from mobile devices with Bluetooth capability. The app provides information on data logging, alarm notification and diagnostic control.

See “SCS Connect Field App and Track App” on page 14 for information on setting up and using the app.

SCS Connect Track App The SCS Connect Track app is used to upload data from cabinets fitted with a Wellington SCS Connect electronic controller.

SKOPE-connect App The SKOPE-connect app is designed for end-users and provides wireless access to the controller from mobile devices with Bluetooth capability.
The app allows end users to adjust some electronic controller settings including energy saving modes, open/close hours and preset temperature set points for specific product.
The app may be useful for diagnostics. Download from the Google Play Store, or Apple App Store.



Apple App
Store



Google
Play Store

Controller Faceplate

Buttons and Display The controller faceplate includes the front display panel and interface buttons.

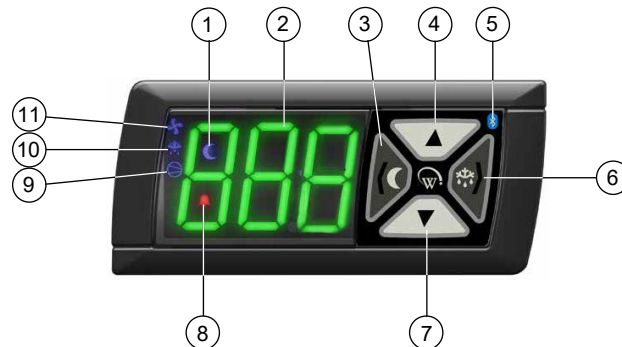


Table 2: Controller faceplate

No.	Description
1	Night Mode: Indicator. On during cabinet night mode.
2	Display: Indicator. Digital display of cabinet air temperature or messages. The temperature is what the sensor inside the cabinet detects, and not necessarily the product temperature. However, they may be very close depending on how the controller is set to sense temperature.
3	Light Switch - Night Mode (back/abort): Button. Press to switch the lights on or off. Press and hold to switch cabinet between day and night mode. Used during programming.
4	Up: Button. Used for programming.
5	Bluetooth: Indicator. Flashing when connected to a device.
6	Defrost Cycle (next/enter): Button. Press and hold to initiate manual defrost. Used during programming.
7	Down: Button. Used for programming.
8	Fault - Alarm: Indicator. On during fault or alarm. Note: Alarm message is also shown on the display during alarm.
9	Compressor: Indicator. On when the compressor is running.
10	Defrost Mode: Indicator. On during defrost cycle.
11	Fan: Indicator. ON when evaporator fan running.

Service Mode Service mode can be accessed and used via the SCS Connect Field app (see “SCS Connect Field App and Track App” on page 14), or the controller faceplate (see below).

Note: A 9 digit pin code is required to access service mode via the controller buttons. Contact your User Manager to receive your activation code.

Procedure 4: To enable and use service mode via the controller faceplate

1. Press and hold the up and down buttons simultaneously until prompted to enter the 9-digit pin code.
2. Enter service mode pin code.
3. Use the up, down, back/abort and next/enter buttons to navigate to the desired category.

Service mode includes:

Parameters

Provides access and editing of individual controller parameters.

It is not recommended that parameters are changed unless absolutely necessary. If incorrect parameter settings are suspected, reload the complete parameter set.

Reset

Returns the controller back to factory settings. Parameter set must be reloaded after performing a reset.

Manual test

Allows inspection of input values from sensors, and check the effects of output adjustments to peripherals, and to run preset test routines.

Statistics

Displays logged values and event counts to assist with fine tuning and diagnostics.

About

Lists the properties of the refrigeration system and the controller, including cabinet model codes, firmware, hardware and software versions.

SCS Connect Field App and Track App

Connecting Follow the procedures below to install and set-up the app, and connect to a controller.

Note: The SCS Connect Field app and Track app is separate from the SKOPE-connect app.

Procedure 5: To install the SCS Connect Field app

1. Download and install the Connect Field app or Track app from Google Play or Apple Store (search for "scs wellington" to find it).
 2. When you first run the app, you will be requested to enter an activation code. Contact your Service Manager or SKOPE to receive your activation code (you must be connected to the internet at the time of activation).
 3. Your activation code is unique to you, and should NEVER be shared with anyone else, as it determines your personal access level for the app. The same code will give you access to all SCS apps you are authorised to use.
 4. Once activation is complete, you must define a 4-digit PIN code. This can be any code unique to you. Each time you start the app, you will be required to enter this same PIN code. This is to prevent other people accessing the app from unlocked phones.
 5. You can see which databases you are activated against from the "Settings" screen. You can be activated to more than one database at the same time. Simply select ACTIVATE ANOTHER DATABASE, and enter the new databases unique activation code, as in Step 2.
-

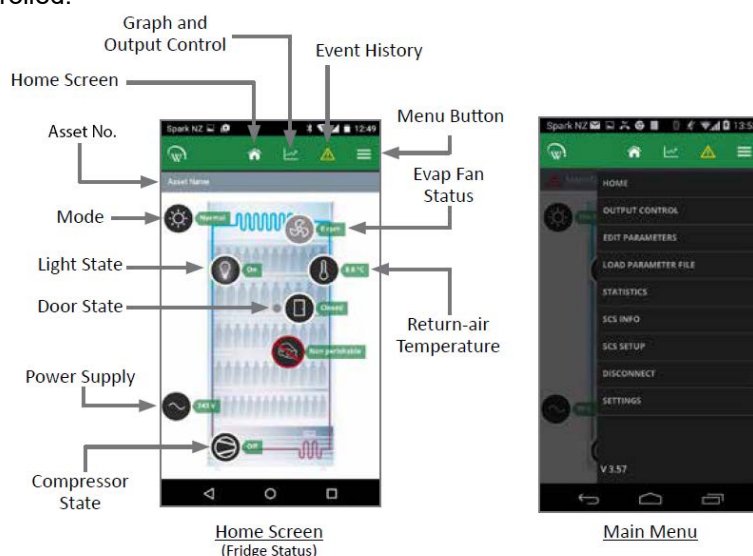
Procedure 6: To connect to a controller

1. Check that the Bluetooth logo on the top right of the controller faceplate is unlit, and when connection is achieved it will begin to flash.
 1. **Note:** A flashing Bluetooth logo indicates that the controller is currently connected to a device.
 2. Open the SCS Connect Field app.
 3. Select a controller to connect to from the list of visible controllers.
 4. **Note:** This list is filtered by your activation permissions, so devices you are not authorised to connect to will not be displayed.
 5. Select 'connect' to connect to the controller.
 6. Check that the Bluetooth logo on the top right of the controller faceplate is flashing, indicating that the controller is connected.
-

App Categories Various options are available in the app menu to provide information about the connected controller and its cabinet. Depending on user access level, some menu options may not be available.

Home screen

The home screen shows a graphic representation of the current state of the cabinet being controlled.



Output control

Provides control of the controller input sensors and switches, and output relays.

Edit parameters

Provides access and editing of individual controller parameters.

Note: Parameter changes must be recorded on warranty/job card.

It is not recommended that parameters are changed unless absolutely necessary. If incorrect parameter settings are suspected, reload the complete parameter set. **Note:** Updated parameters are not applied until DISCONNECT has been selected from the menu (after loading new parameter set).

Load parameter file

Allows reloading of the default parameter set or changing to new parameter set. See "Replacing the Controller" on page 36 for instructions. **Note:** Updated parameters are not applied until DISCONNECT has been selected from the menu (after loading new parameter set).

Table 3: Parameter numbers

Model	Parameter numbers	
ProSpec Fridge Series	PG21.UPR.1.SD	616
	PG21.UPR.2.SD	617

Statistics

Information from the past seven days on activity including temperatures, door openings and alarms.

SCS info

Controller version and asset information.

SCS setup

Add or change SCS info (see above).

Disconnect

Disconnect from currently connected controller.

Settings

Change app general settings.

Faults and Alarms

If a fault occurs, it is logged, the Fault - Alarm indicator is lit on the controller faceplate, and a message may be displayed. Faults do not affect product temperature, and do not require action from the shop owner, unless they turn into an alarm.

If an alarm occurs, it is logged, the Fault - Alarm indicator is lit, and the alarm message is displayed on the controller faceplate. Alarms may result in abnormal product temperature.

Some faults and alarms can be cleared by the shop owner, and others can only be cleared by a service technician. Faults and alarms can be cleared by the shop owner by power-cycling the cabinet. However the fault or alarm will only clear if the problem has been fixed. If the problem still exists after a power-cycle, a service technician will need to fix the problem.

Table 4: Faults

Description	Possible root cause	Actions
Over-voltage protection The maximum allowable mains supply voltage has been exceeded. The cabinet has temporarily shut down to prevent damage and will restart once the supply voltage decreases.	Should be a one-off. If it continues, consider: poor line voltage	Test the incoming voltage to ensure it is correct. The test voltage needs to be between 198 and 264 volts. - If outside this, the controller will shut the system down until the voltage returns to between these measurements. - If the voltage is correct and the controller is still showing a fault, replace the controller.
	rural location	
	voltage setting parameter	Check the voltage parameter settings are between 198 and 264 volts. If this parameter is outside the correct voltage, changing it may damage the controller.
	controller	The controller may be reading incorrectly and need replacing.
Under-voltage protection The mains supply voltage has dropped below the minimum allowable level. The cabinet has temporarily shut down to prevent damage and will restart once the supply voltage increases.	Should be a one-off. If continues, consider: power supply overloaded	Test the incoming voltage to ensure it is correct. The test voltage needs to be between 198 and 264 volts. - If outside this, the controller will shut the system down until the voltage returns to between these measurements. - If the voltage is correct and the controller is still showing a fault, replace the controller.
	poor line voltage	
	multi-box use	Check that there are not too many plugs using the same multi-box adaptor causing the voltage to drop.
	rural location	
	voltage setting parameter	Check the voltage parameter settings are between 198 and 264 volts. If this parameter is outside the correct voltage, changing it may damage the controller.
	controller	The controller may be reading incorrectly and need replacing.

Table 4: Faults (continued)

Description	Possible root cause	Actions
High condensing temperature protection The system was operating at an elevated temperature and has temporarily shut down to prevent damage. Extended operation in this condition may result in ALARM 15, increased energy consumption and a reduction in cabinet life.	Condenser not clean	Cartridge swap is not required. - Remove and clean the condenser filter. - Check that the condenser is free of debris. - If the coil is dirty, clean it with a vacuum cleaner or soft brush.
	Poor installation or ventilation	- Check the installation guidelines. - If fitted, check the rear stand-offs are extended.
	Condenser fan motor or blade	Check that the condenser fan blades are in place and all condenser fans are operating correctly.
	Controller	The controller may be reading incorrectly and need replacing. Confirm the temperature reading with an independent thermometer.
	Very high ambient temperature	Check if the probes are faulty and reading incorrectly.
Excessive compressor cycling protection The system has been turning on and off too frequently.	Door not self-closing	Open the door and let it go. If it does not close on its own, repair the self-closing mechanism.
	Blocked condenser	- Remove and clean the condenser filter. - Check that the condenser is free of debris. - If the coil is dirty, clean it with a vacuum cleaner or soft brush.
	Poor installation or ventilation	Check the installation guidelines.
	Cartridge or cabinet gasket seals leaking	- Remove the cartridge and check the integrity of the gaskets and seals. - If required, replace the door gasket.
	Hot product	Check if the product has been recently loaded, and is causing the extra heat.
	Product blocking cabinet airflow	Check if the return air grille is covered by product. If so, move the product from the grille and observe.
	Compressor is overloaded from excess door openings or ambient temperature	Ensure that the cabinet is operating in its climate class.
	Condenser or evaporator fan motor or blade	Inspect the condenser and evaporator fans safely, and replace if faulty.
	Controller	The controller may be reading incorrectly and need replacing.
	Compressor or gas leak	Swap the cartridge.

Table 5: Alarms

Code	Description	Possible root cause	Action
8	Estimated product temperature below allowable range	Low ambient temperature	Ensure that the cabinet is operating in its climate class.
	The estimated product temperature has been below the allowable range for longer than the permissible time.	App settings	Check all app settings, and reinstall the parameters if required.
		Controller	Check the probe calibration to make sure that the controller is reading the temperature correctly.

Table 5: Alarms (continued)

Code	Description	Possible root cause	Action
9	Estimated product temperature above allowable range The estimated product temperature has been above the allowable range for longer than the permissible time.	• Excessive door openings	• Make sure the door is not opened unnecessarily.
		• Door being left open	• Ensure the door is closed.
		• Door leaking air (bad gasket or door not self-closing)	• Open the door and let it go. If it does not close on its own, repair the self-closing mechanism. • If required, replace the door gasket.
		• Sealed refrigeration system	• Consider a cartridge swap.
		• Incorrect setpoint	• Reload the correct parameters using the SCS Connect Field app.
		• Too much product	• If the cabinet is overloaded, remove the excess product.
		• Blocked return air grille	• Check if the return air grille is covered by product. If so, move the product from the grille and observe.
		• Warm product loaded into cabinet	
		• Blocked condenser	• Remove and clean the condenser filter. • Check that the condenser is free of debris. • If the coil is dirty, clean it with a vacuum cleaner or soft brush.
		• Poor installation or ventilation	• Check the installation guidelines.
		• Frozen or blocked evaporator coil	• De-ice the coil and check that the evaporator fan motor is working. • Check the defrost cycle and that the defrost probe are working correctly. • Check that the drain is clear.
		• Cartridge gasket leaking (to cabinet seal or lid seal)	• Check that the gasket is intact and not broken and leaking. • Ensure the installation levers are lifting the cartridge up onto the case correctly.
		• Compressor is overloaded from excess door openings or ambient temperature	• Ensure that the cabinet is operating in its climate class.
		• Condenser or evaporator fan motor or blade	• Inspect the condenser and evaporator fans safely, and replace if faulty.
		• Incorrect parameter settings	• Use the SCS Field app to check that the correct setpoint and parameters have been selected.
15	Excessive condensing temperature protection The system was operating at an excessive temperature and has shut down to prevent permanent damage.	• Controller	• Check the probe calibration to make sure that the controller is reading the temperature correctly.
		• Compressor or gas leak	• Swap the cartridge.
			Cartridge swap is not required.
		• Very high ambient temperature	• Ensure that the cabinet is operating in its climate class.
		• Condenser is not clean	• Remove and clean the condenser filter. • Check that the condenser is free of debris. • If the coil is dirty, clean it with a vacuum cleaner or soft brush.
		• Poor installation or ventilation	• Check the installation guidelines.
		• Condenser fan motor or blade	• Inspect the condenser and evaporator fans safely, and replace if faulty.
		• Incorrectly placed condenser probe	• Either: • Measure the probe resistance to make sure it is within the range. • Compare the probe's temperature with the known temperature, using an external trusted thermometer. • Replace the probe if required.

Table 5: Alarms (continued)

Code	Description	Possible root cause	Action
17	Control probe failure A critical system sensor has failed and the cabinet can no longer operate.	Control probe or circuit	Cartridge swap is not required. - Either: - Measure the probe resistance to make sure it is within the range. - Compare the probe's temperature with the known temperature, using an external trusted thermometer. - Replace the probe if required.
		Controller	If you have replaced the probe and it is still reading incorrectly, replace the controller.
18	Electrical over-current protection activated The compressor was drawing too much current and has shut down to prevent permanent damage.	Blocked condenser	- Remove and clean the condenser filter. - Check that the condenser is free of debris. - If the coil is dirty, clean it with a vacuum cleaner or soft brush.
		Product blocking cabinet airflow	Check if the return air grille is covered by product. If so, move the product from the grille and observe.
		Compressor is overloaded from excess door openings or ambient temperature	Ensure that the cabinet is operating in its climate class.
		Compressor or gas leak	Swap the cartridge.
19	Failed to reach set temperature The refrigeration system has been operating continuously for a long period without reaching the set temperature.	Blocked condenser	- Remove and clean the condenser filter. - Check that the condenser is free of debris. - If the coil is dirty, clean it with a vacuum cleaner or soft brush.
		Poor installation or ventilation	Check the installation guidelines.
		Frozen or blocked evaporator coil	- De-ice the coil and check that the evaporator fan motor is working. - Check the defrost cycle and that the defrost probe is working correctly.
		Cartridge, cabinet, or door gasket leaking	- Check that the gasket is intact and not broken and leaking. If required, replace the door gasket. - Ensure the installation levers are lifting the cartridge up onto the case correctly.
		Product blocking cabinet airflow	Check if the return air grille is covered by product. If so, move the product from the grille and observe.
		Compressor is overloaded from excess door openings or ambient temperature	Ensure that the cabinet is operating in its climate class.
		Condenser or evaporator fan motor or blade	Inspect the condenser and evaporator fans safely, and replace if faulty.
		Controller	The controller may be reading incorrectly and need replacing.
20	Over-cooling product The internal temperature is too low. The system has temporarily shut down until the temperature has returned to normal.	Set temperature has been raised by a large amount	1. Confirm if really too cold. 2. Change parameters accordingly.
		Controller	The controller may be reading incorrectly and need replacing.
22	Evaporator fan over-current protection The current supplied to the evaporator fan motor is too high.	Faulty fan motor	Replace the fan motor.
		Fan blade fault (imbalance, debris, blockage)	Visually inspect the fan blades and replace if faulty.
23	Condenser fan over-current protection The current supplied to the condenser fan motor is too high.	Faulty fan motor	Replace fan motor.
		Fan blade fault (imbalance, debris, blockage)	If the fan motor is working correctly, update the controller firmware to the latest version.
		Controller	The controller may be reading incorrectly and need replacing.

Table 5: Alarms (continued)

Code	Description	Possible root cause	Action
24	Controller communication error	Parameters	Load the correct parameter settings.
	Controller has lost communication channels.	Controller or circuit	The controller may be reading incorrectly and need replacing.
25	Controller update failed	Parameters	Load the correct parameter settings.
	Controller update could not be completed.	Controller or circuit	The controller may be reading incorrectly and need replacing.
26	Controller hardware failure	Parameters	Load the correct parameter settings.
	Controller hardware has failed.	Controller or circuit	Replace the controller.
27	Probe failure A probe other than the control probe has failed. The cabinet will continue to operate with partial function but requires service.	Evaporator probe or connections	Cartridge swap is not required. - Either: - Measure the probe resistance to make sure it is within the range. - Compare the probe's temperature with the known temperature, using an external trusted thermometer. - Replace the probe if required.
		Controller	The controller may be reading incorrectly and need replacing.
28	No downward tendency The temperature is no longer decreasing.	Blocked condenser	- Remove and clean the condenser filter. - Check that the condenser is free of debris. - If the coil is dirty, clean it with a vacuum cleaner or soft brush.
		Poor installation or ventilation	Check the installation guidelines.
		Cartridge or cabinet gasket seals leaking	- Check that the gasket is intact and not broken and leaking. If required, replace the door gasket. - Ensure the installation levers are lifting the cartridge up onto the case correctly.
		Door not self-closing or door gasket leaking	- Open the door and let it go. If it does not close on its own, repair the self-closing mechanism. - If required, replace the door gasket.
		Product blocking cabinet airflow	Check if the return air grille is covered by product. If so, move the product from the grille and observe.
		Compressor is overloaded from excess door openings or ambient temperature	Ensure that the cabinet is operating in its climate class.
		Condenser or evaporator fan motor or blade	Inspect the condenser and evaporator fans safely, and replace if faulty.
		Controller	The controller may be reading incorrectly and need replacing.
30	Excessive automatic defrosting The system is automatically defrosting too frequently.	Compressor or gas leak	Swap the cartridge.
		Door not self-closing or door gasket leaking	- Open the door and let it go. If it does not close on its own, repair the self-closing mechanism. - If required, replace the door gasket.
		Evaporator probe	Either: - Measure the probe resistance to make sure it is within the range. - Compare the probe's temperature with the known temperature, using an external trusted thermometer.
		Evaporator motor or fan	Check that the fan motors are working and the fan blades are not damaged.
		Controller	The controller may be reading incorrectly and need replacing.
		Blocked drain	- Clear the blockage with a wet vacuum. - Clear the debris to prevent a blockage.
		Defrost setting too high	Reload the correct parameters using the SCS Connect Field app.
		Compressor or gas leak	Swap the cartridge.

6 Replacement Procedures

Lighting

The cabinet is fitted with LED modular interior light(s). 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.

Table 6: Light specifications

Model	Interior light	
	Description	Part No.
PG21.UPR.1.SD – PP1R	Interior LED light	SKC-2-190-0099-0 – Opaque
PG21.UPR.2.SD – PP2R		

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 door/s) via the wiring looms which run down through a port on top of the cabinet.

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 which 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 removing parts.

Table 7: Lighting fault diagnostics

Problem	Possible Cause	Repair
No lights working. Cabinet is dark.	Lights switched off.	Switch lights on at electronic controller faceplate (see page 13), or the app.
	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.

Procedure 7: To replace an interior LED light assembly

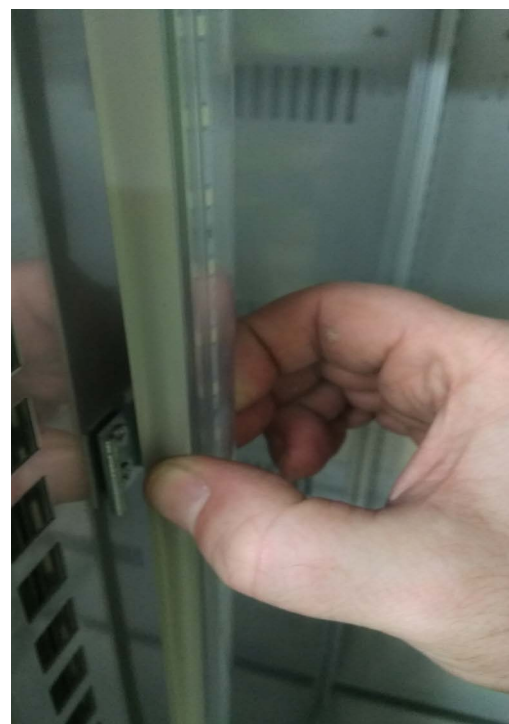
1. Disconnect the cabinet from the power supply.
 2. Remove all wire shelves from cabinet.
-

3. Shelf support strips will need to be removed on one side of the cabinet. This will depend on if you are replacing a left or right side LED assembly.



4. The lighting loom cable will need to be cut when replacing with a new LED light assembly. The lighting cable will need to be reconnected to the lighting socket.
-

5. Under the LED light assembly are five clips which hold the light in place. These clips are positioned at the top and spaced 300 mm down the cabinet wall. Firmly squeeze the light assembly and pull it away from the clip and remove from cabinet.



6. Rewire the lighting loom to the Ensto connector and connect new LED light assembly
 7. Reattach the LED light assembly and clip into the cabinet
 8. Reconnect to the power supply and check for correct operation.
-
-

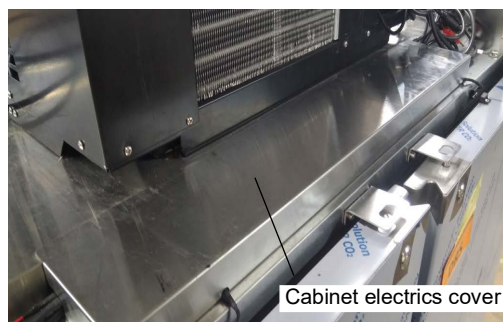
Procedure 8: To replace the LED driver power supply

1. Disconnect the cabinet from the power supply.
2. Remove the front panel assembly, cabinet sides and back strip

IMPORTANT

Lift the cartridge, do NOT slide as cabinet seal may be damaged

3. Detach the refrigeration cartridge 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.



Check that the cabinet top seal is not damaged when refitting the cartridge. Any damaged seal must be replaced. Seal damage may result in ice build up in the cartridge.

6. Replace the light power supply and reassemble

Procedure 9: To replace an interior wiring loom

1. Disconnect the cabinet 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 front panel assembly.
5. Remove the putty from the loom entry point on the cabinet roof, and pull the loom up through the cabinet ceiling.
6. Refit the new loom and reassemble. Ensure:
 - All plugs are clean, correctly fitted and plugged in.
 - That the ceiling and roof hole is completely sealed with putty.

Doors

Door sealing is critical. The gasket must fully seal around the entire cabinet perimeter because any air gaps will form ice inside the cabinet.

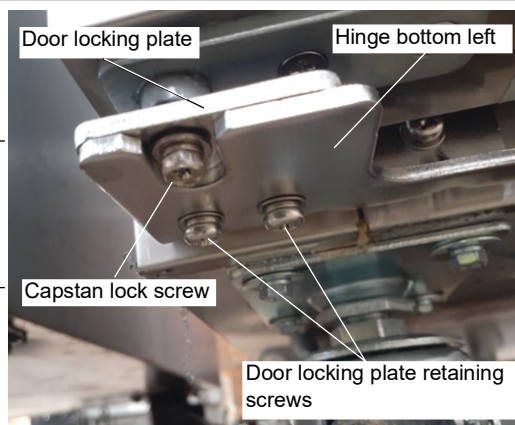
Alignment Adjustment If a door is out of alignment, realign it by loosening the top hinge bracket fixing screws, and move the top of the door as required.

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 door can be removed from the cabinet.

Procedure 10: To remove the door

1. Disconnect the cabinet from the power supply.
2. Loosen door locking plate retaining screws.
3. Use 8 mm socket wrench to take up tension on the capstan lock screw.
4. Remove door locking plate retaining screws.
5. Remove the tension.
6. Remove door from cabinet.

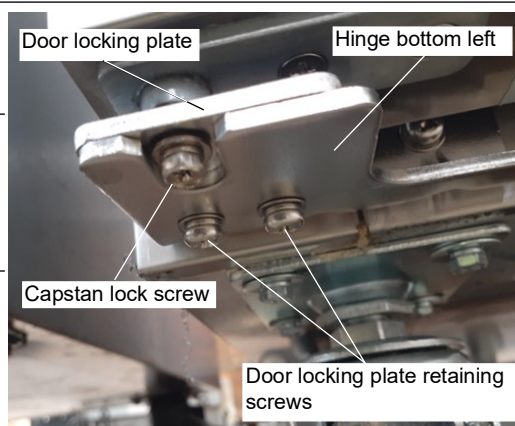


Procedure 11: To replace the top hinge bracket

1. Follow the steps on the previous page to remove the door.
2. Remove the top hinge from the top of the door and replace.

Procedure 12: To replace the door

3. Disconnect the cabinet from the power supply.
4. If new door, confirm door locking plate is located in the correct position.
5. Position door in top and bottom hinges.
6. Use an 8 mm socket wrench on capstan lock screw to position door locking plate and align mounting holes by rotating door locking plate until holes align. This will apply tension through the capstan to close door.
7. Fit door locking plate and retaining screws.

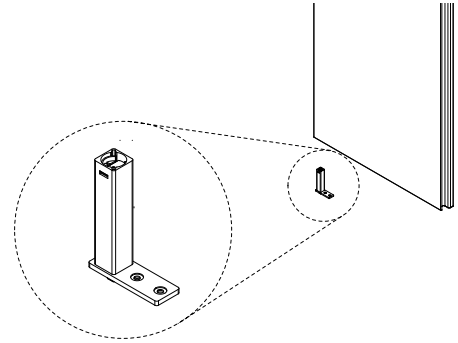


Replacing the Capstan When the door tension can no longer be adjusted, replace the self closing mechanism.

Procedure 13: To replace the capstan

1. Remove the door from the cabinet (see page 24).

2. Remove 2 x screws from the bottom of the capstan. Use screw driver tip or metal instrument to pry out the capstan component.



3. Replace with new capstan and fasten with 2 x screws.

4. Refit the door (see page 24).

Refrigeration System

Before Servicing Overview

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 1.0 gm

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 1.0 gm
- Hydrocarbon refrigerant supply cylinder

Refrigeration Cartridge Assembly

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

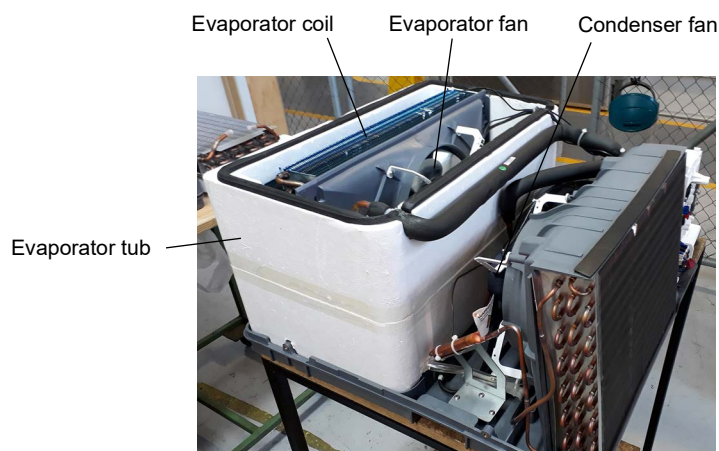
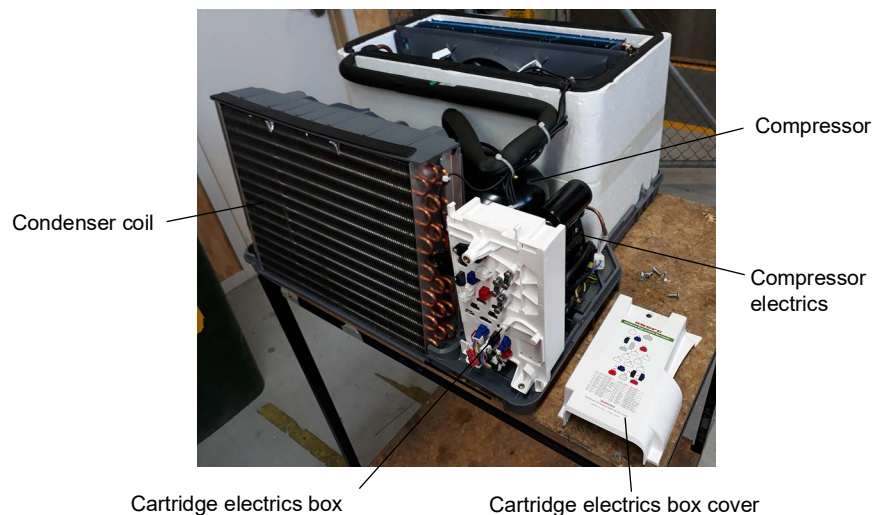
The cartridge must only be used on a SKOPE hydrocarbon compliant cabinet. Refer to the cabinet rating label to determine if the cabinet is suitable for use with a hydrocarbon cartridge. The rating label **MUST** state refrigerant as R290. If the label states a different refrigerant, or does **NOT** state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

Table 8: Cartridge specifications

Cartridge model	UTHCNI-0010 (spare part number: HB0070832517A)
Compressor	Wanbao FN90M
Compressor capacity	740 Watts
Refrigerant/charge	R290/99 g

Gas Detector A gas detector is required and must be used when servicing HC cartridges. 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 HC cartridges. 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 1.5 m around the cabinet.
- Refrigeration gauge set – suitable for R290 flammable refrigerant.
- Bullet valves/line piercing valves suitable for 6 mm 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 cartridges.
- 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 55 when making the service visit.

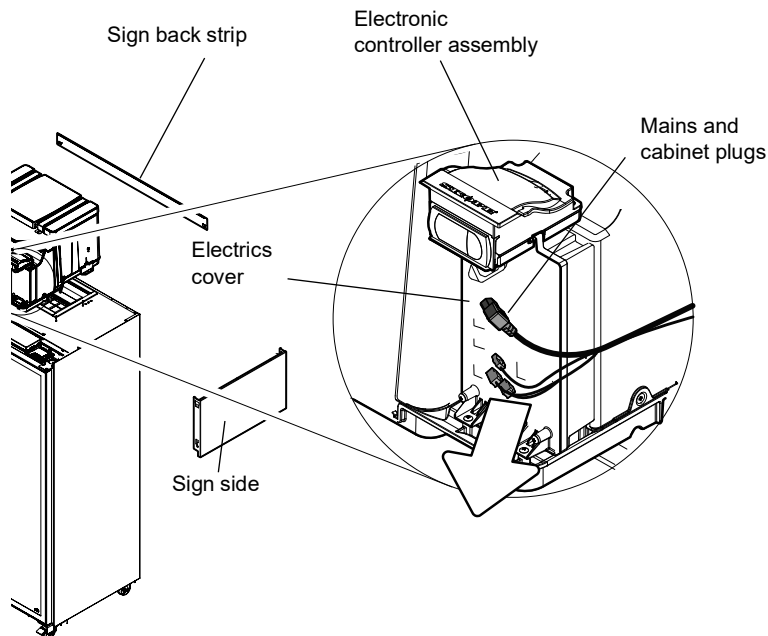
Hydrocarbon Workshop The following tools and equipment are required in the hydrocarbon workshop:

- 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 1.0gm.
- R290 refrigerant supply cylinder.

Removing the Cartridge Follow the steps below to remove the refrigeration cartridge from the cabinet. Ensure the cabinet is disconnected from the power supply before removing the cartridge.
The cartridge 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 cartridge to be safely lifted, carried and put down at waist height.

Procedure 14: To remove the refrigeration cartridge

1. Unplug the cabinet from the power supply.
2. Remove the front panel assembly. If fitted with key locks, open the door/s and unscrew the sign from the brackets below the sign.
3. Detach the electronic controller assembly from the top of the cabinet, and clip it onto the top of the cartridge.
4. Remove electrics cover and unplug the mains supply plug and cabinet plugs.
5. **Note:** The cabinet plugs (plugs feeding into the cartridge) and electronic controller plugs (plugs feeding to the electronic controller assembly) do not need to be unplugged.
6. Remove the sign back strip. **Note:** If necessary the front panel sides can also be removed.
7. Undo the two cartridge fixing screws (one on each side of the cartridge) and lift the cartridge off the cabinet.
8. When refitting the cartridge, ensure:
 - The gasket on the top of the cabinet is in good condition.
 - The mains and cabinet plugs are reconnected.
 - The electrics cover is refitted.
 - The cartridge is re-fixed in place.



Replacing the Cartridge The SKOPE ActiveCore refrigeration cartridge is interchangeable between bottom and top mount hydrocarbon (R290) ActiveCore fridges.

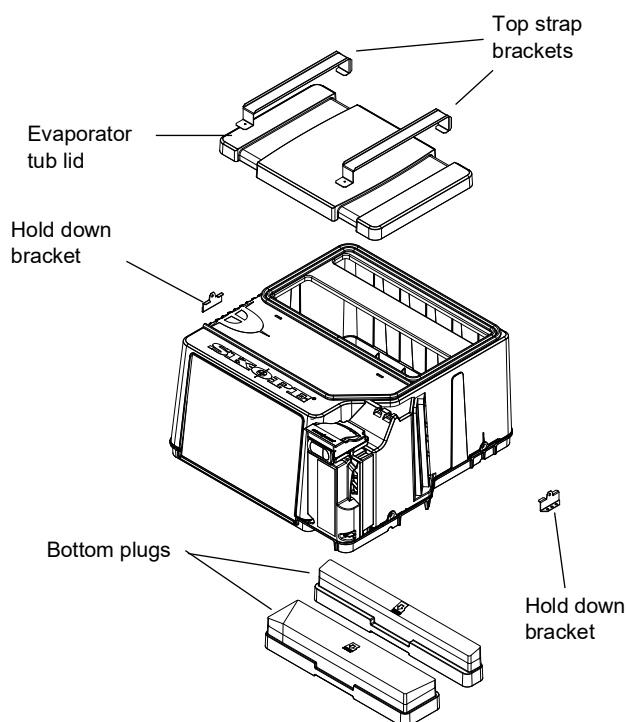
WARNING

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

When changing from a bottom mount fridge to a top mount fridge, an evaporator lid, strap brackets and hold down brackets must be fitted to seal the top of the evaporator tub, and to fix the cartridge to the top of the cabinet.

New spare part refrigeration cartridges 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 cartridge, retain these parts for use on the new spare part replacement cartridge.

The evaporator tub lid, top strap brackets and hold down brackets can be ordered in addition to the refrigeration cartridge if required. See page 48 for spare part numbers.



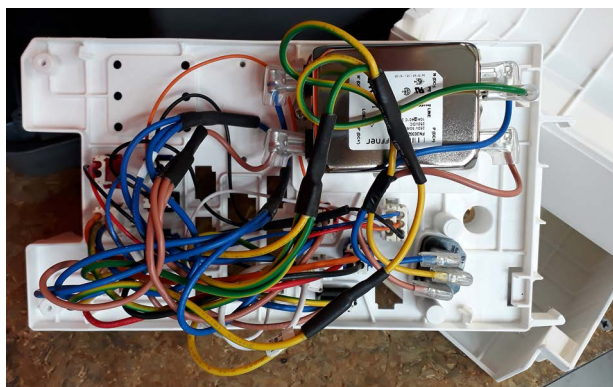
Procedure 15: To replace a cartridge

1. Disconnect the fridge from the power supply and remove the existing cartridge (see page 28).
2. On the new cartridge, 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 cartridge to the new cartridge.
4. 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 diagram over the page or label on the electrics box cover for socket connection identification.

Due to the confined space within the cartridge 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.



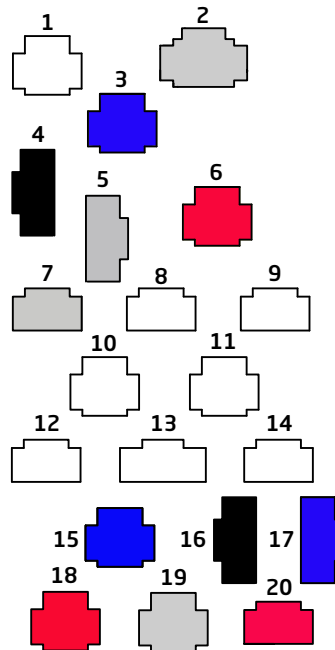
Procedure 16: To remove and open the cartridge electrics box assembly

1. Disconnect the fridge 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 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.

ActiveCore R290 Junction Box Layout

Key	Colour	Description	Key	Colour	Description
1	n.a.	Not used	11	n.a.	Not used
2	White	Controller Signal	12	n.a.	Not used
3	Blue	Controller Return	13	n.a.	Not used
4	Black	Trace Heating	14	n.a.	Not used
5	White	Lighting	15	Blue	Compressor
6	Red	Controller Power	16	Black	Evaporator Sensor
7	White	Door Sensor	17	Blue	Appliance Sensor
8	n.a.	Not used	18	Red	Condenser Fan
9	n.a.	Not used	19	White	Evaporator Fan
10	n.a.	Not used	20	Red	Condenser Sensor

Cartridge Cover

Remove the cartridge cover to access parts within the cartridge assembly.

Procedure 17: To remove the cartridge cover

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).

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



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).

Table 9: Fan motor manufacturer recommended torque settings

Fan motor manufacturer	Torque setting
Wellington Drive	1.5 Nm

Procedure 18: To access and remove the condenser fan assembly

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).
2. Remove the cartridge cover (see page 32).
3. Open the electrics box and unplug the condenser fan motor plug (see page 32).

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



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

Procedure 19: 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 12 mm flat washer and serrated head screw. Tighten the blade to fan motor manufacturer recommended torque setting (1.5 Nm).
4. Reassemble cartridge and test.

Procedure 20: To replace the fan motor

1. Remove the condenser fan assembly and the fan blade (see above).
2. Unplug the fan flexible cord from the cartridges electrics box (see page 30).
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 12 mm flat washer and serrated head screw. Tighten the blade to 1.5 Nm.
5. Reassemble cartridge, 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 cartridge 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 (shown in the table below).

Table 10: Fan motor manufacturer recommended torque settings

Fan motor manufacturer	Torque setting
Wellington Drive	1.5 N m

Procedure 21: To access the evaporator fan assembly

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).
2. Remove the refrigeration cartridge cover.

Procedure 21: To access the evaporator fan assembly (continued)

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.

**Procedure 22: To replace the fan blade**

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).
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 (1.5 Nm).
5. Reassemble cartridge and test for correct operation.

Procedure 23: To replace the fan motor

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 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 the compressor electrics are operating correctly (see "Compressor Electrics" on page 35).

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 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 cartridge (see page 28) and cartridge cover (see page 32). The capacitor unclips from the relay cover, and the relay cover unclips from the compressor.

Electronic Controller

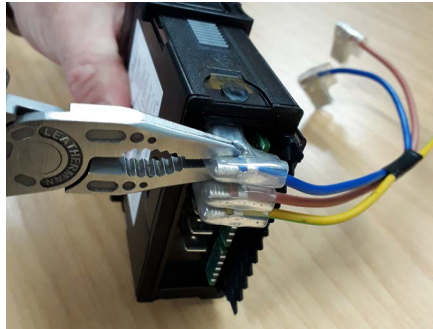
Controller Location The electronic controller is located within the electronic controller box assembly.



Procedure 24: To access the controller

1. Disconnect the cabinet from the power supply.
2. Open the electronic controller box assembly by undoing the two fixing screws at the rear of the assembly. **Note:** On one door cabinets it is necessary to move the cartridge back to access the controller box assembly.

- QC Terminals** The terminals at the back of the controller are locking QC terminals, which cannot be pulled off without pressing in the locking tabs.
Use needle nose pliers to unlock and gently remove the terminals.

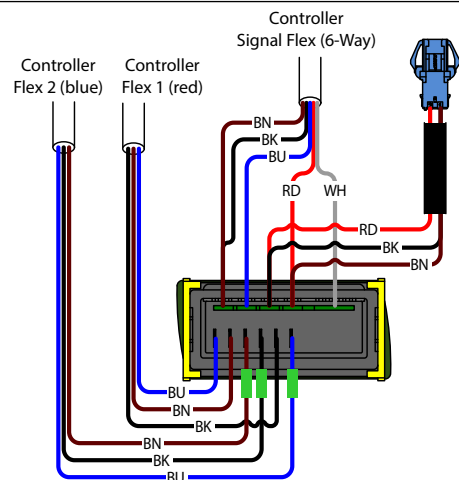


- Replacing the Controller** Follow the steps below to replace the controller.
Note: Replacement spare part electronic controllers are not supplied with the parameter set loaded. This must be loaded via the SCS Connect Field app after replacing the controller. Internet access may be required.

Procedure 25: To replace the controller

1. Disconnect the cabinet from the power supply and access the electronic controller (see “Controller Location” on page 35).
2. Remove the cable clamps and disconnect the terminals from the back of the controller.

3. Fit the new replacement controller, and connect up the terminals at the back of the controller. Fit low voltage terminals before high voltage terminals.



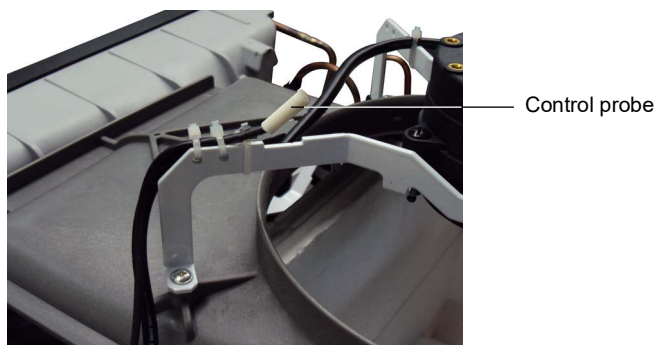
4. Reassemble the controller box and cabinet, perform electrical safety test as required, and reconnect to the power supply.
5. Use a mobile device to connect to the controller with the SCS Connect Field app (see “SCS Connect Field App and Track App” on page 14).
6. Navigate to the LOAD PARAMETER FILE menu.
7. Select the appropriate parameter file from LOCAL. If not available in LOCAL, search for the parameter file in SERVER (internet access required), and download to LOCAL.
8. Confirm correct file and WRITE TO SCS.
9. After WRITE TO SCS is complete, select MENU DISCONNECT to save parameter set on SCS.
10. Power cycle the controller and check that correct parameter set has been applied
11. Set up controller and cabinet links as required:
 - Corporate:
The service tech must link to the controller to the cabinet serial number in the SCS Connect Field app.
 - General Market:
The owner must set up SKOPE-connect (if in use).

Door Switch The cabinet is fitted with a door switch above each door, which tells the electronic controller when a door is opened. A small magnet in the door frame activates the switch. A cable connects the switch to the electronic controller via an inline connector on top of the cabinet.

Procedure 26: To replace the door switch

1. Disconnect the fridge from the power supply.
 2. Disconnect the door switch cable plug from the inline connector on top of the cabinet.
 3. Unscrew the two fixing screws from the door switch and remove.
 4. Fit the replacement door switch and connect via the inline connector.
-

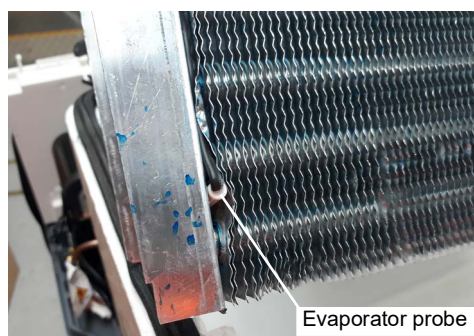
Control Probe The control probe is cable tied to a bracket on the evaporator fan motor bracket.



Procedure 27: To replace the control probe

1. Remove the evaporator fan assembly (see page 33).
 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 30).
 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 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.
-

Evaporator Probe The evaporator probe is located within the evaporator coil. It controls the refrigeration system defrost initiation and termination.



Procedure 28: To replace the evaporator probe

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).
 2. Remove the cartridge cover (see page 32).
 3. Remove the evaporator fan assembly (see page 33).
-

Procedure 28: To replace the evaporator probe (continued)

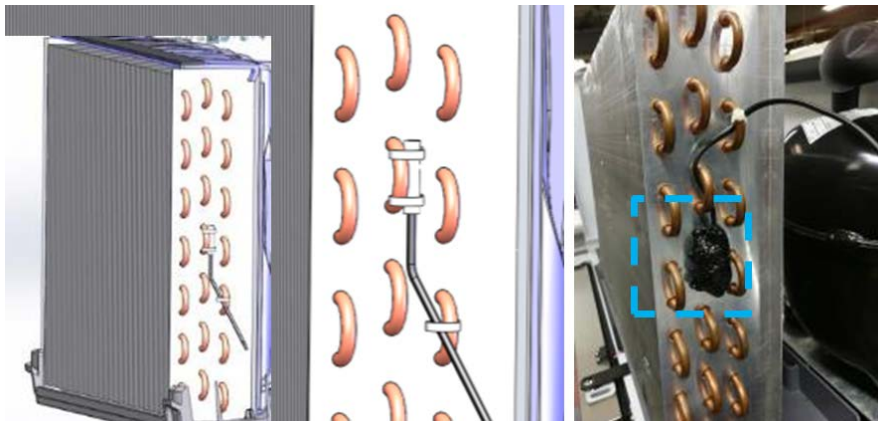
4. Remove both pieces of putty securing the pipes and cables on the evaporator tub perimeter.

5. Carefully lift the coil up and out of the evaporator tub. Take care of pipes and cables when lifting out.



6. Detach the probe from the side of the evaporator coil, and trace the probe cable back to the cartridge electrics box, cutting cable ties as required, and unplug (see page 30).
7. Following the same path as the original probe, run the new probe to the evaporator coil and secure with cable ties. Locate the probe in the same location as the original probe (against the side of the coil above the bottom pipe as pictured above). Plug the probe cable securely into the electrics box.
8. Reassemble the cartridge and test for correct operation.

Condenser Probe The condenser probe is located on the side of the condenser coil. It monitors condenser temperature.



Procedure 29: To replace the condenser probe

1. Disconnect the cabinet from the power supply and remove the refrigeration cartridge (see page 28).
2. Remove the cartridge cover (see page 32).
3. Detach the probe from the side of the condenser coil, and trace the probe cable back to the cartridge electrics box, cutting cable ties as required, and unplug (see page 30).
4. Following the same path as the original probe, run the new probe to the condenser coil and secure with cable ties. Position the probe in the same location as the original probe (as pictured above) and insulate with cork tape. Plug the probe cable securely into the electrics box.
5. Reassemble the cartridge and test for correct operation.

Cartridge Removal For detailed instructions on removing the cartridge, refer to cartridge removal instructions available on the instruction sheet attached to the back of the sign panel, or on page 28 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 cartridge running beside the cartridge being serviced to compare behaviour.

Note: These diagnostic procedures are indicative only.

Procedure 30: Refrigeration system diagnostic test

Before you start

1. Make sure you are in a suitable workshop.
1. Isolate the cabinet from the power supply and remove the refrigeration cartridge, and remove the cartridge cover.
2. Place cartridge on bench and connect service probe to red plug on cartridge.
3. Connect the refrigeration cartridge 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.
5. 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.
6. The table below details the frost stop point on systems at different levels of charge

Table 11: Frost stop point

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

7 Wiring

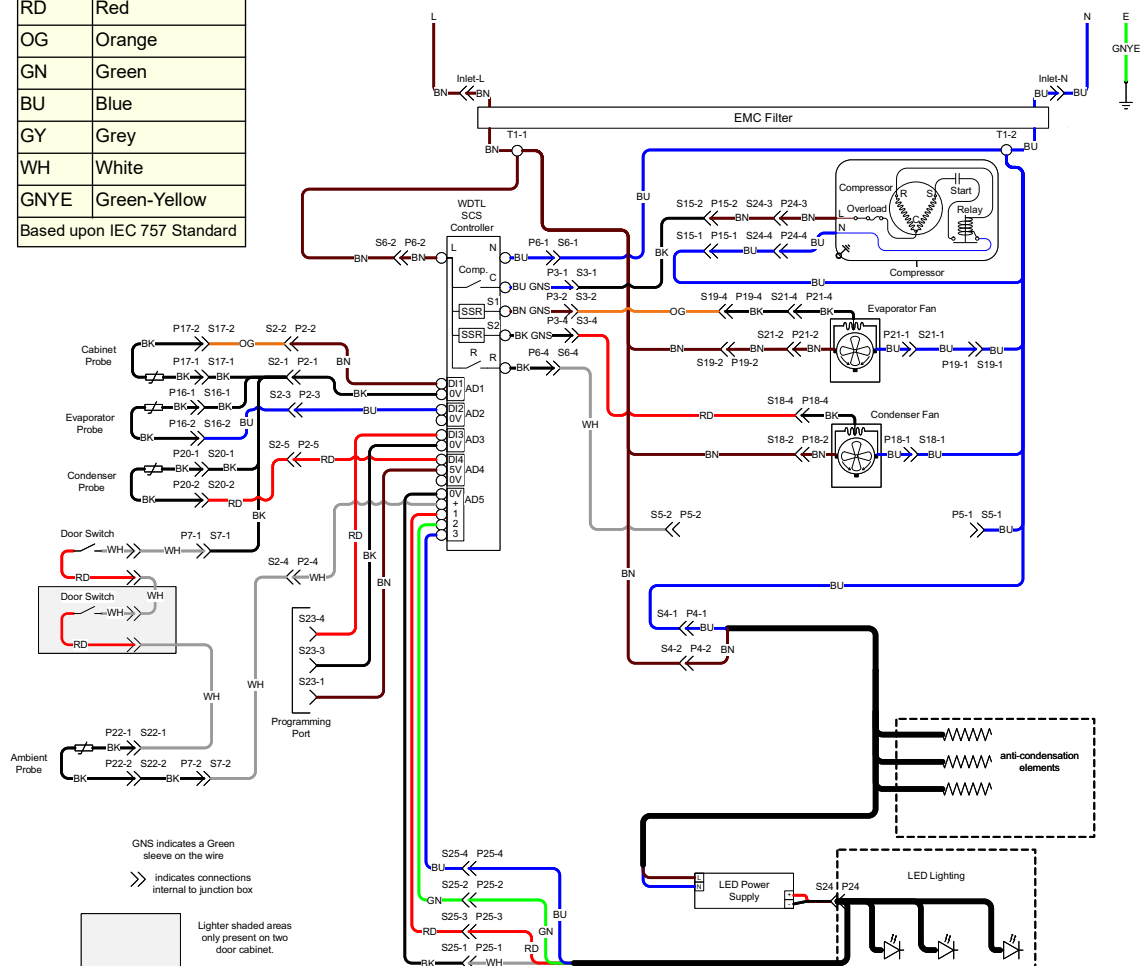
Model: ProSpec 1 and 2-door Fridge

Model Number: PG21.UPR.1.SD, PG21.UPR.2.SD

WIRE COLOURS

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

Based upon IEC 757 Standard



LEGEND

Internal cartridge electrics box sockets/plugs			
Inlet	IEC cabinet socket/plug	S15/P15	Compressor cartridge socket/plug (blue 4-way)
S1/P1	Not used	S13/P13	Not used
S2/P2	Cartridge electrics box to controller signal socket/plug (6-way)	S14/P14	Not used
S3/P3	Cartridge electrics box to controller power socket/plug (blue 4-way)	S15/P15	Compressor cartridge socket/plug (blue 4-way)
S4/P4	Lighting/heater wire cartridge socket/plug (black 3-way)	S13/P13	Not used
S5/P5	Lighting cartridge socket/plug (white 3-way)	S14/P14	Not used
S6/P6	Cartridge junction box to controller power socket/plug 1 (red 4-way)	S15/P15	Compressor cartridge socket/plug (blue 4-way)
S7/P7	Door sensor socket/plug (white 2-way)		
S8/P8	Not used	External sockets/plugs	
S9/P9	Not used	S21/P21	Evaporator motor extension socket/plug (red 4-way)
S10/P10	Not used	S22/P22	Ambient sensor socket/plug (white 2-way)
S11/P11	Not used	S23/P23	Programming/comms port socket (blue 4-way)
S12/P12	Not used	S24/P24	LED driver DC output socket/plug (red 2-way)
S13/P13	Not used	S25/P25	Programming/comms port socket (blue 4-way)
S14/P14	Not used		

8 Spare Parts

Main Assembly – 1-door Fridge

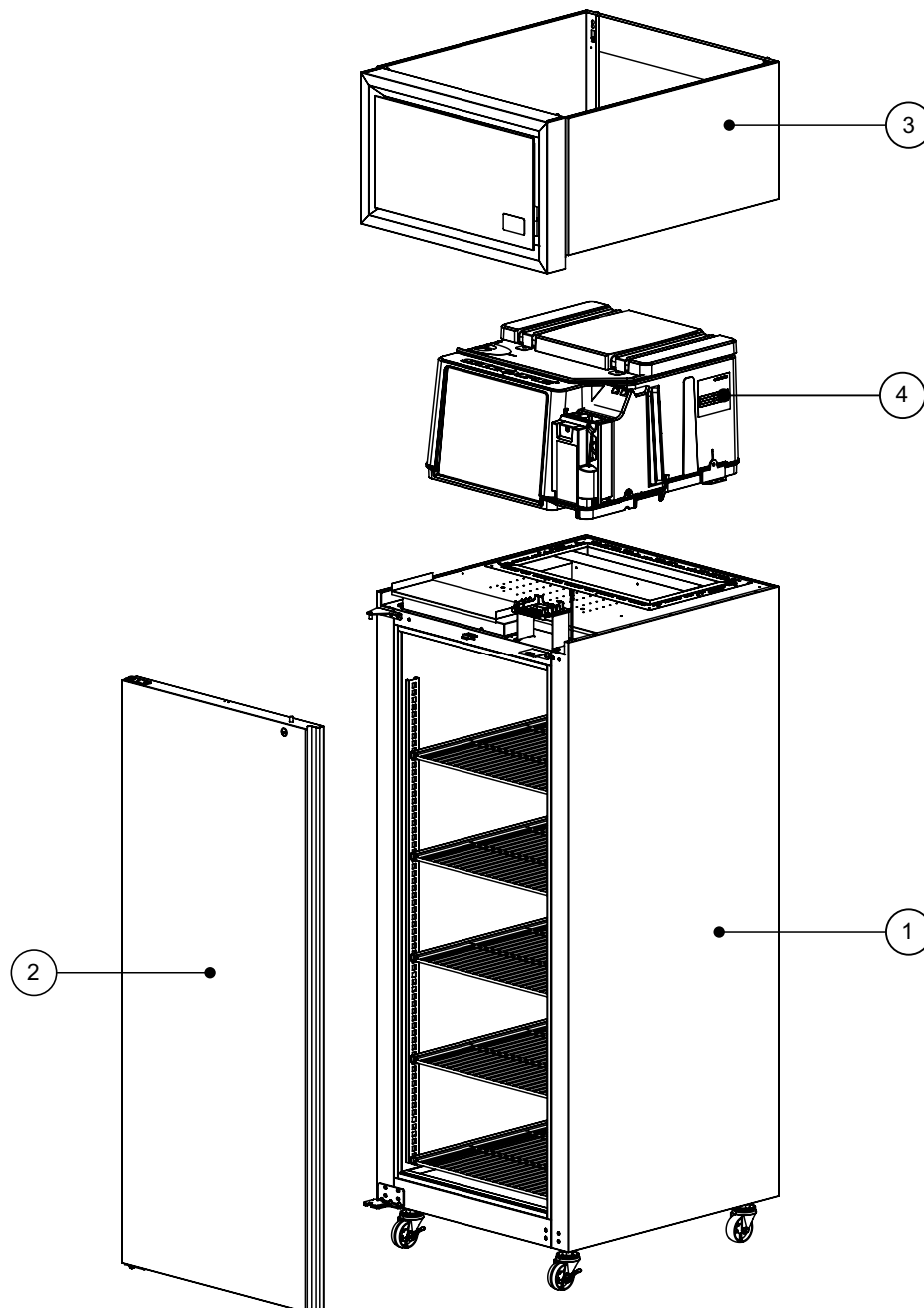


Table 12: Parts – Main assembly: 1-door fridge

No.	Description	Page
1	Cabinet assembly	Page 43
2	Solid door assembly	Page 45
3	Front panel assembly	Page 46
4	Cartridge assembly	Page 47

Main Assembly – 2-door Fridge

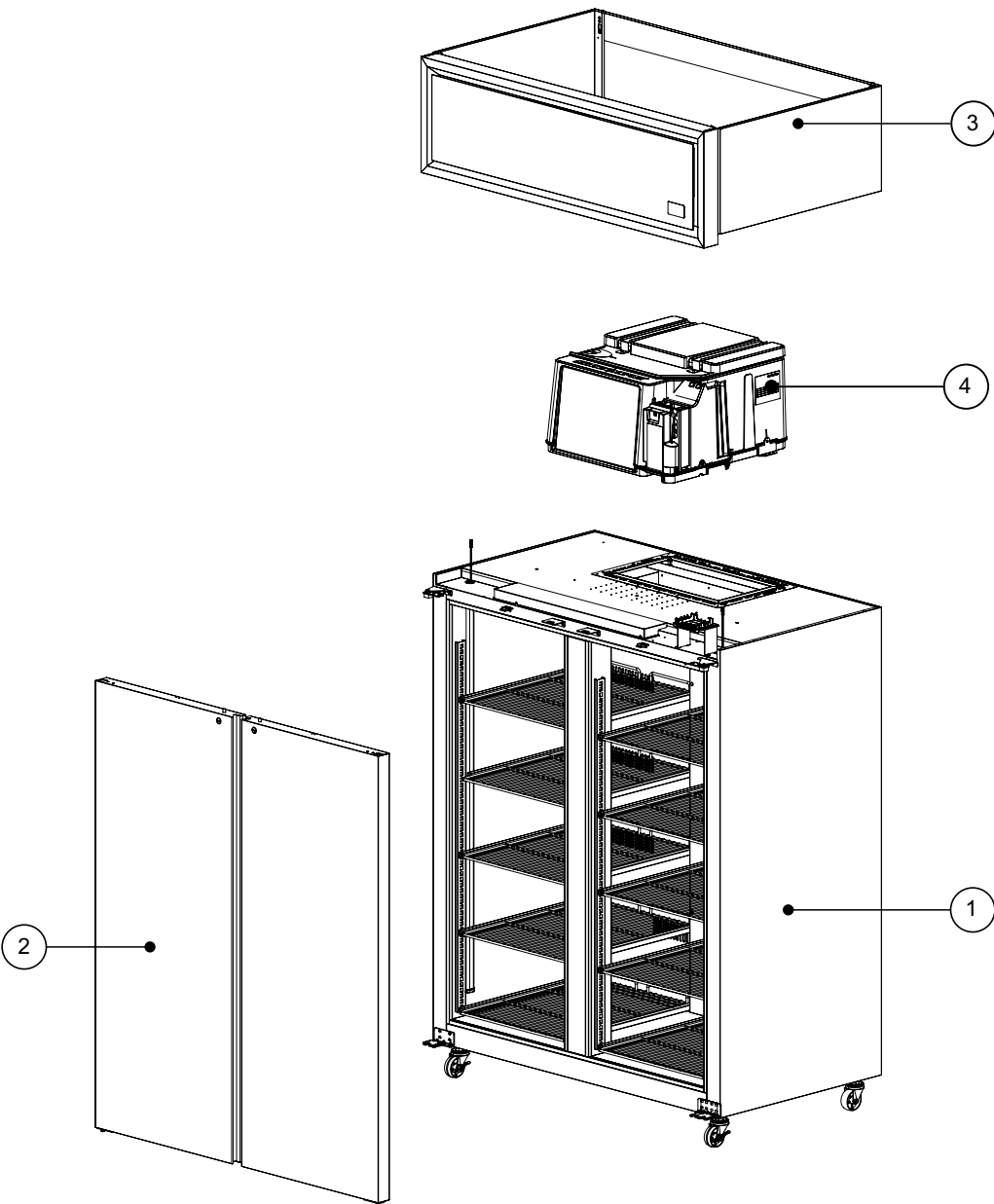


Table 13: Parts – Main assembly: 2-door fridge

No.	Description	Page
1	Cabinet assembly	Page 43
2	Solid door assembly	Page 45
3	Front panel assembly	Page 46
4	Cartridge assembly	Page 47

Cabinet Assembly – 1-door Fridge

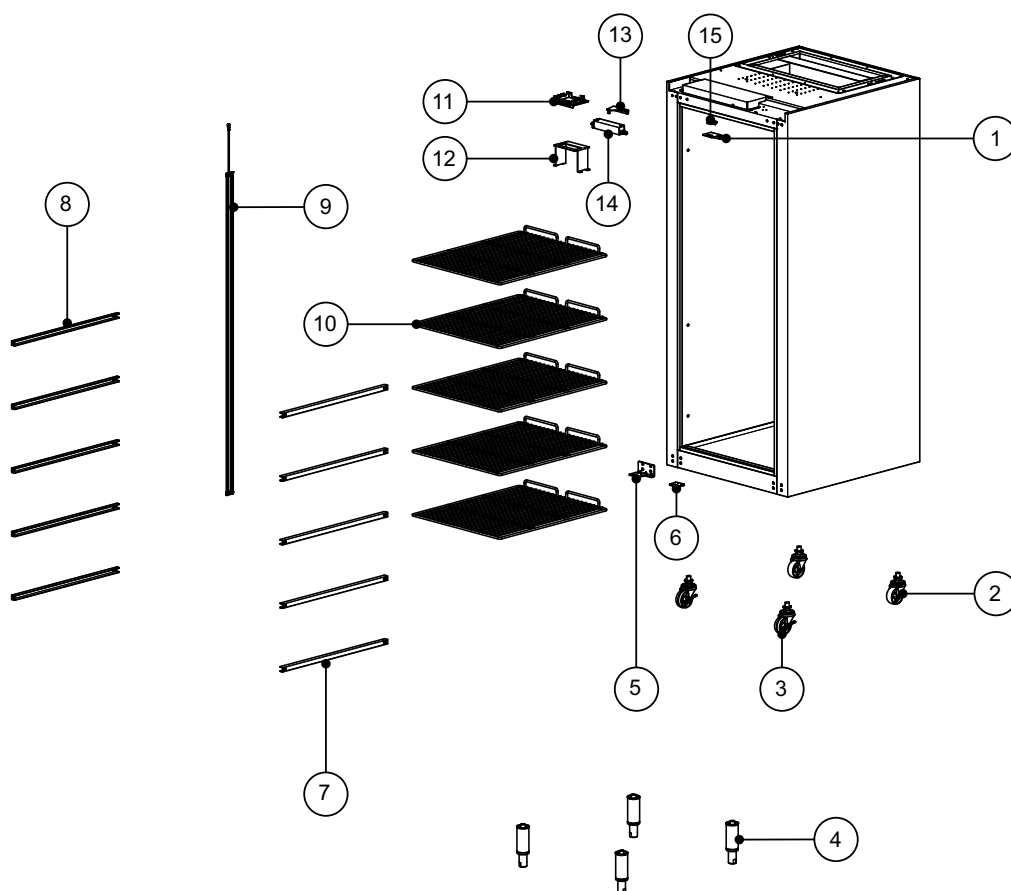


Table 14: Parts – 1-door cabinet assembly

No.	Description	SKOPE Spare Part No.
1	Door locking plate	SKC-2-190-0012-0
2	Adjustable castor (swivel)	SXX6181
3	Adjustable castor (lockable)	SXX6182
4	6" Adjustable Leg (150 mm to 180 mm)	SXX5893
5	Hinge bottom left	SKC-2-190-0008-0
6	Hinge torsion plate	SKC-2-190-0009-0
7	Shelf support strip right	SKC-2-180-0041-0
8	Shelf support strip left	SKC-2-180-0042-0
9	LED light assembly – Clear*	SKC-4-050-0128-0
	LED light assembly – Opaque*	SKC-2-190-0099-0
10	Shelf	SKC-2-190-0013-0
11	Controller clip ABS white	HB0070206333
12	Controller mounting bracket	SKC-2-190-0011-0
13	Hinge top left	SKC-2-190-0007-0
14	LED power supply	ELZ11887
15	Door sensor assembly* (includes magnet)	HB0074091496

* Indicates component sub-assembly

Cabinet Assembly – 2-door Fridge

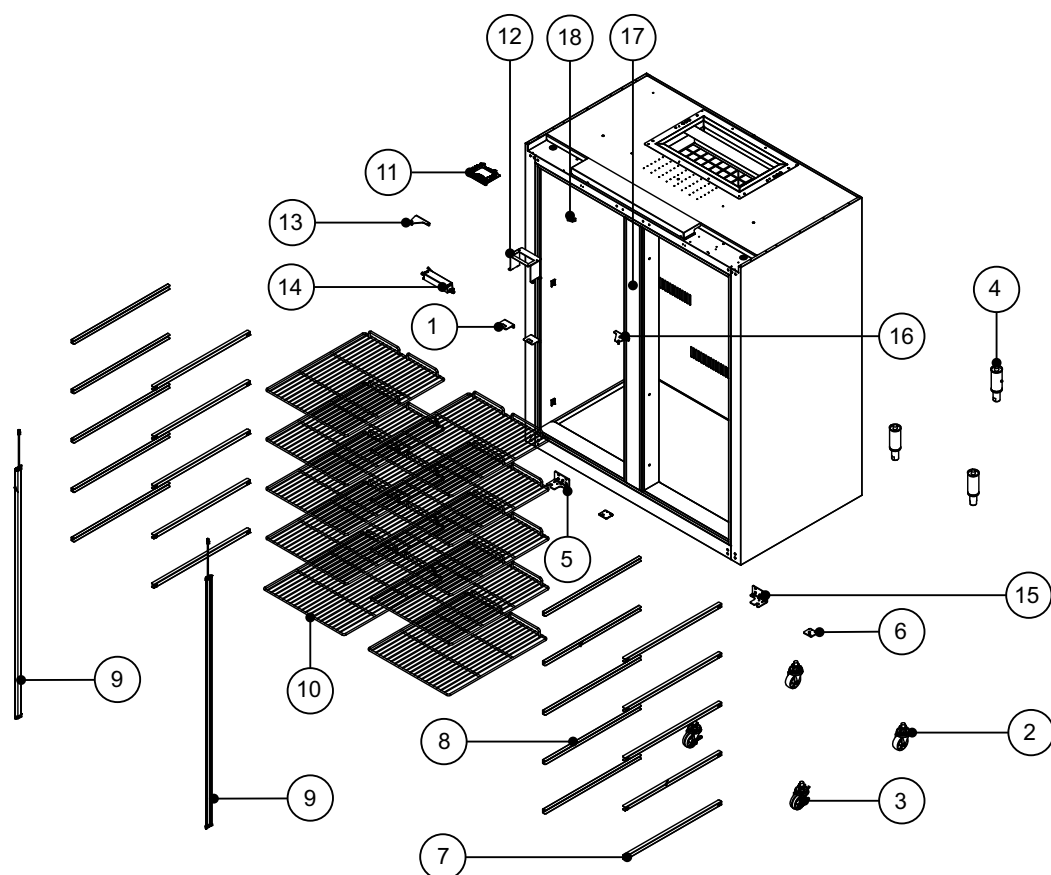


Table 15: Parts – 2-door cabinet assembly

No.	Description	SKOPE Spare Part No.
1	Door locking plate	SKC-2-190-0012-0
2	Adjustable castor (swivel)	SXX6181
3	Adjustable castor (lockable)	SXX6182
4	6" Adjustable Leg (150 mm to 180 mm)	SXX5893
5	Hinge bottom left	SKC-2-190-0008-0
6	Hinge torsion plate	SKC-2-190-0009-0
7	Shelf support strip right	SKC-2-180-0041-0
8	Shelf support strip left	SKC-2-180-0042-0
9	LED light assembly – Clear*	SKC-4-050-0128-0
	LED light assembly – Opaque*	SKC-2-190-0099-0
10	Shelf	SKC-2-190-0013-0
11	Controller clip abs white	HB0070206333
12	Controller mounting bracket	SKC-2-190-0011-0
13	Hinge top left	SKC-2-190-0007-0
14	LED Power Supply	ELZ11887
15	Hinge bottom right	SKC-2-190-0023-0
16	Hinge top right	SKC-2-190-0022-0
17	Centre pillar	SKC-0-000-1013-0
18	Door sensor assembly* (includes magnet)	HB0074091496

* Indicates component sub-assembly

Solid Door Assembly

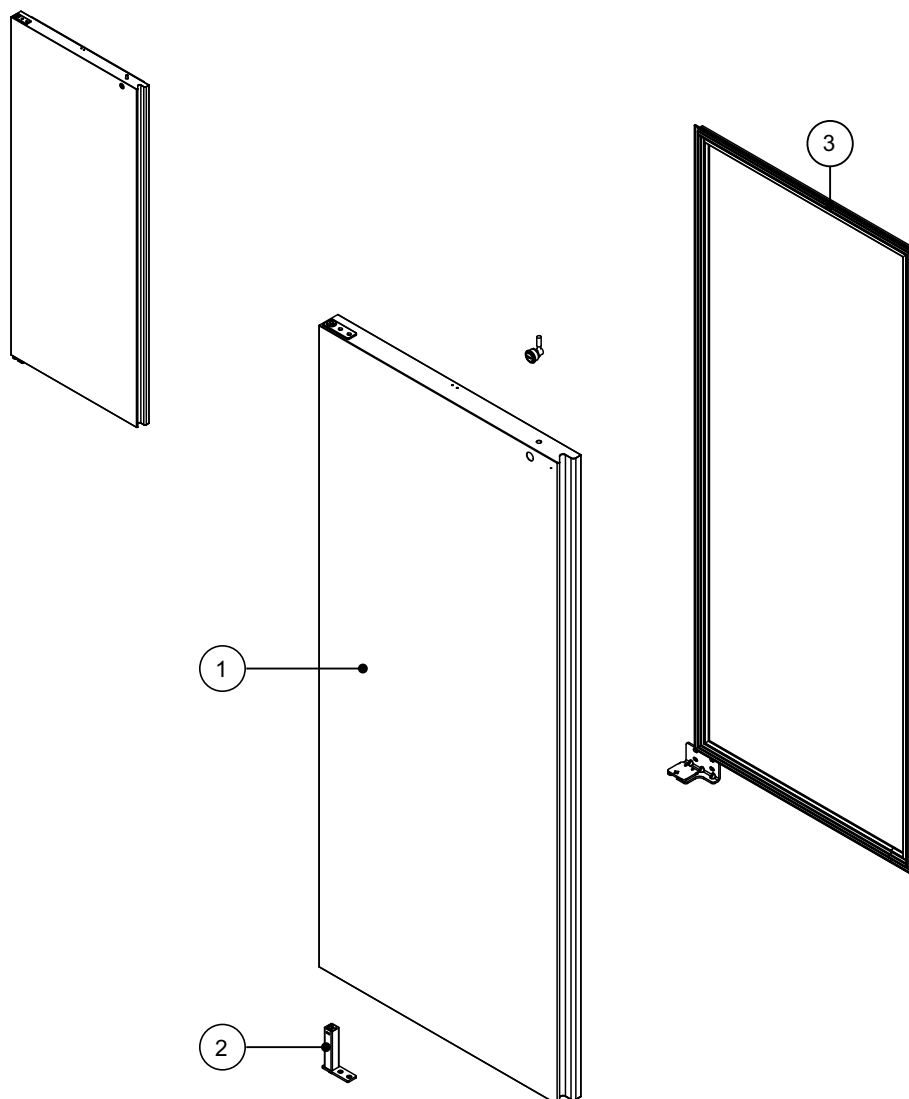


Table 16: Parts – Solid door assembly

No.	Description	SKOPE Spare Part No.	
		1 door	2 door
1	Door assembly - left hand	SKC-0-000-1022-0	—
	Door assembly - right hand (reversible option)	SKC-0010-0040-0	—
	2 Door assembly - left hand	—	SKC-0-000-1014-0
	2 Door assembly - right hand	—	SKC-0-000-1021-0
2	Capstan	SKC-2-170-0410-0	SKC-2-170-0410-0
3	Door gasket	SKC-2-190-0010-0	SKC-2-190-0010-0

Front Panel Assembly

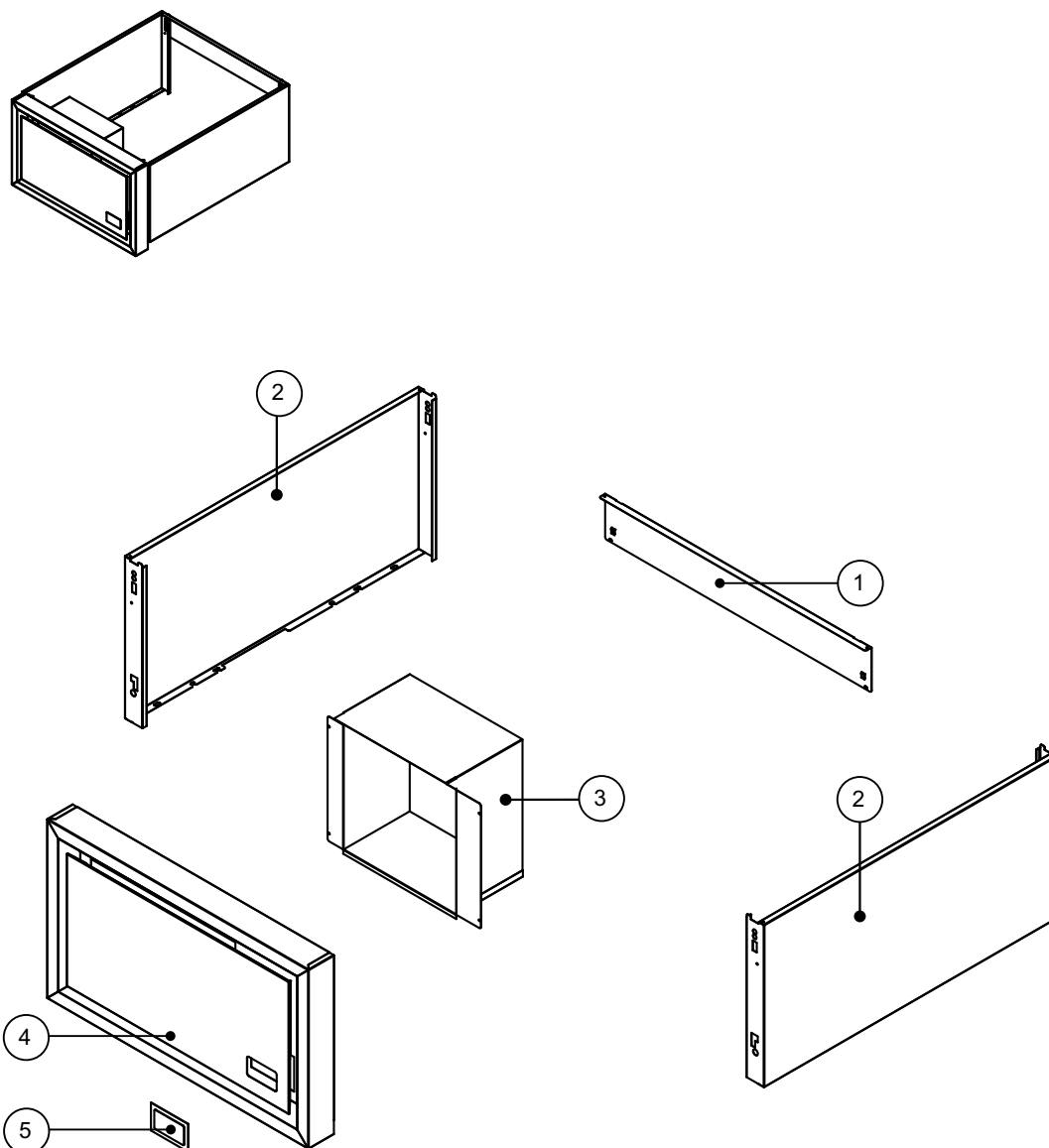


Table 17: Parts – Front panel assembly

No.	Description	SKOPE Spare Part No.	
		1 door	2 door
1	Sign back strip	SKC-2-180-0012-0	SKC-2-180-0057-0
2	Sign panel left	SKC-2-180-0234-0	SKC-2-180-0234-0
	Sign panel right	SKC-2-180-0011-0	SKC-2-180-0011-0
3	Baffle	SKC-0-000-1023-0	SKC-0-000-1023-0
4	Front panel assembly (minus baffle)*	SKC-0-010-0036-0	SKC-0-010-0037-0
5	Controller window	PLY124709	PLY124709

* Indicates component sub-assembly

Fridge Cartridge Assembly

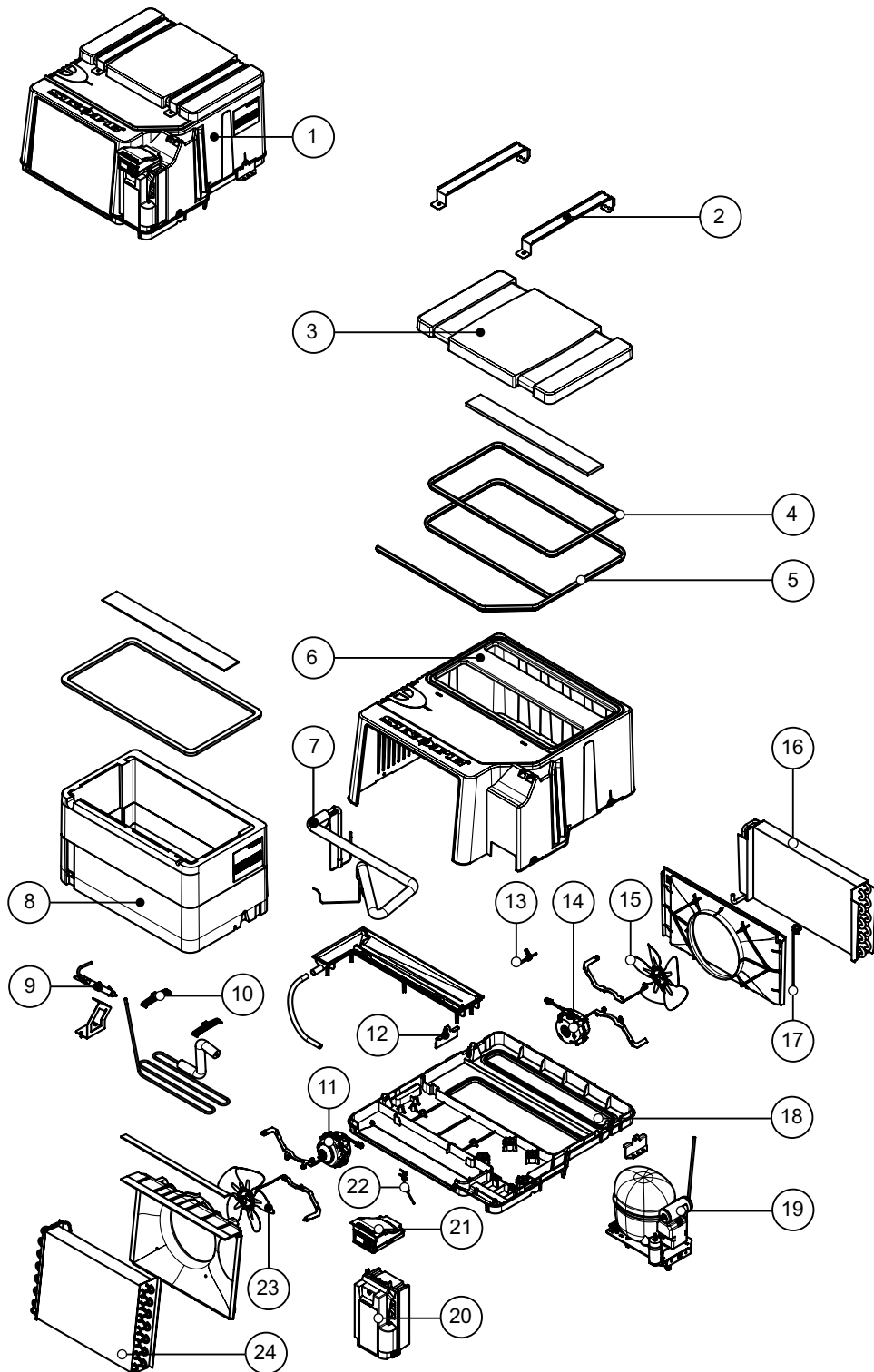


Table 18: Parts – Fridge cartridge assembly

No.	Description	SKOPE Spare Part No.	
		1 Door	2 Door
1	Refrigeration cartridge assembly*	HB0070832517A	HB0070832517A
2	Top metal strap bracket	HB0070114875	HB0070114875
3	Evaporator box lid	HB0070511356	HB0070511356
4	Cartridge gasket seal 1571 mm	PLE11052-1571	PLE11052-1571
5	Cartridge gasket seal 2306 mm	PLE11052-2306	PLE11052-2306
6	Cartridge plastic top cover	HB0070206133	HB0070206133
7	Suction line assembly*	HB0070702718	HB0070702718
8	Evaporator box	HB0070510928A	HB0070510928A
9	Drier	HB0074180006	HB0074180006
10	Condensate pipe support	HB0070110674	HB0070110674
11	Condenser fan motor	ELM11309	ELM11309
12	Hold down bracket	HB0070110815A	HB0070110815A
13	Control temperature probe	HB0070400542	HB0070400542
14	Evaporator fan motor	ELM11309	ELM11309
15	Evaporator fan blade	HB0074000313A	HB0074000313A
16	Evaporator coil	HB0070702232	HB0070702232
17	Evaporator temperature probe	HB0070400506	HB0070400506
18	Cartridge plastic bottom	HB0070206212B	HB0070206212B
19	Compressor – Wanbao FN90M	HB0074000848	HB0074000848
20	“Electrics Box Assembly” on page 50 *	–	–
21	“Electronic Controller Assembly” on page 49 *	UA0300021-616	UA0300021-616
22	Condenser temperature probe	HB0070401693B	HB0070401693B
23	Condenser fan blade	HB0074000313	HB0074000313
24	Condenser coil	HB0070702720	HB0070702720
–	Ambient temperature probe (not pictured)	HB0070401693B	HB0070401693B
–	Mains power cord (not pictured)	HB0070400636	HB0070400636

* Indicates component sub-assembly

Electronic Controller Assembly

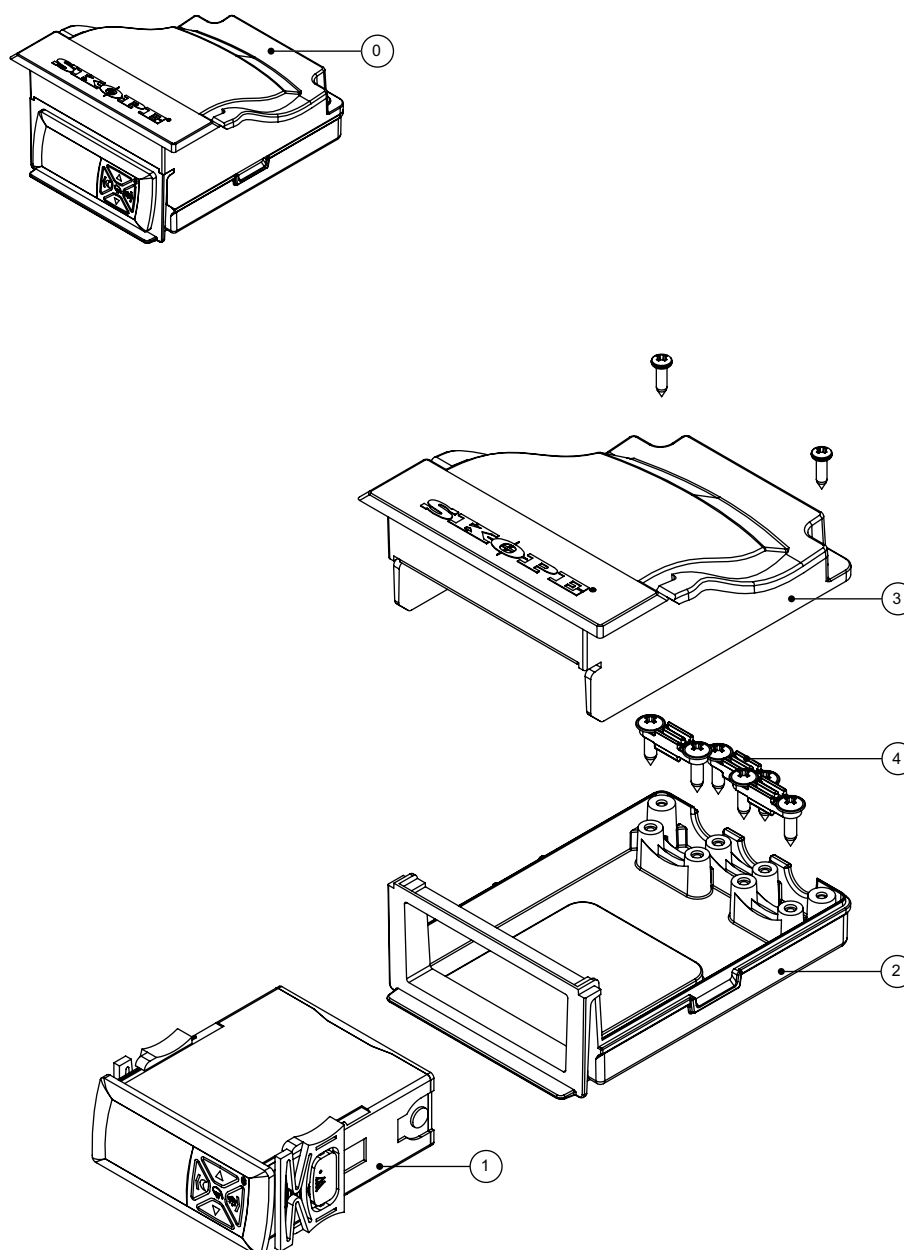


Table 19: Parts – Electronic controller

No.	Description	SKOPE Spare Part No.
0	Electronic controller assembly*	HB0070833377
1	Wellington drive controller	ELZ11749-1629
2	Controller housing base	HB0070206125
3	Controller housing cover	HB0070206126
4	Cable clamp	HB0070206127

* Indicates component sub-assembly

Electrics Box Assembly

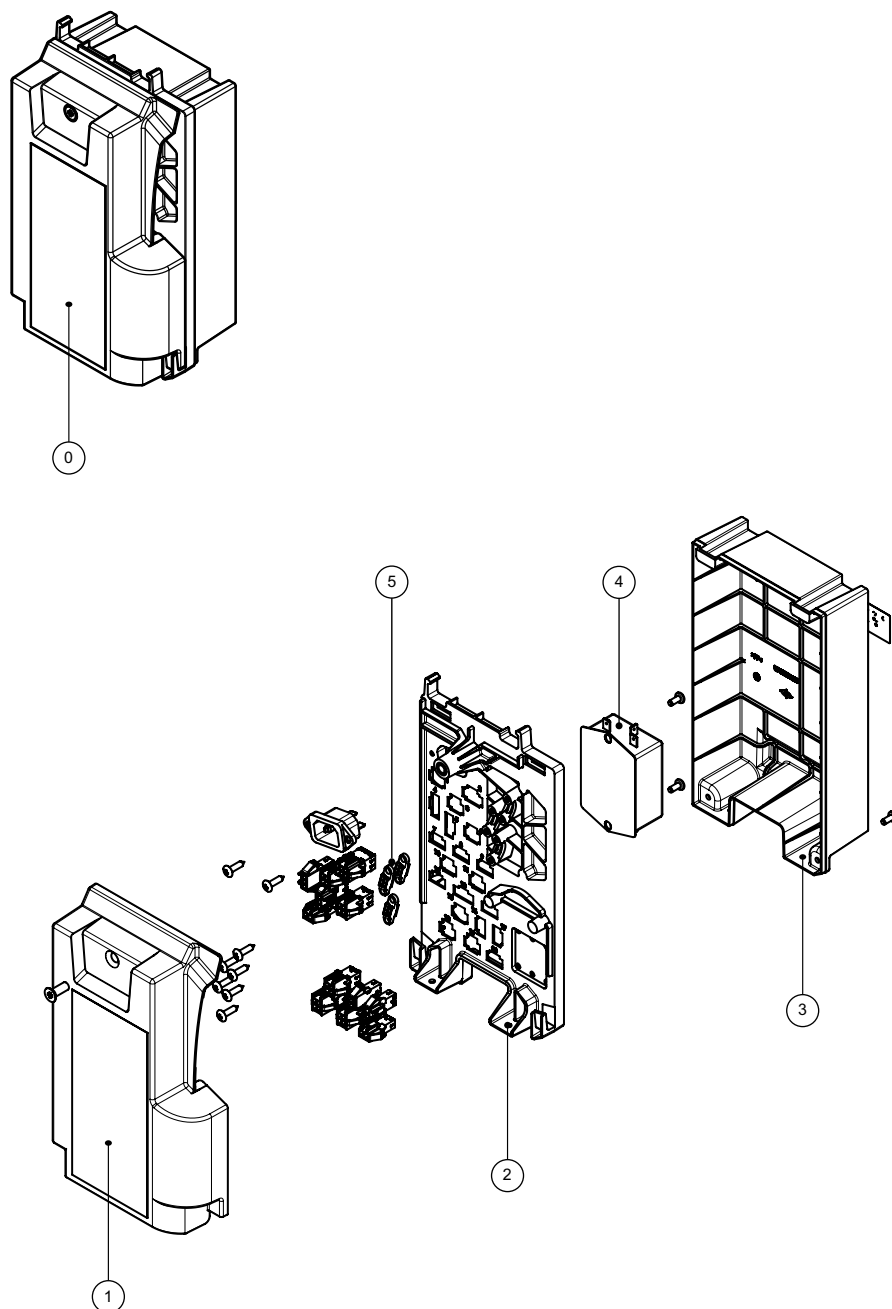


Table 20: Parts – Electrics box assembly

No.	Description	SKOPE Spare Part No.
0	Electrics junction box assembly*	
1	Electrical front panel	HB0070207012A
2	Electrical enclosure panel	HB0070207014
3	Electrical rear panel	HB0070207013A
4	EMI filter	HB0074600001
5	Cable clamp	HB0070206127

* Indicates component sub-assembly

9 Maintenance

Cleaning

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

Cabinet The owner should 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 the following cleaning schedule, which will depend on:

- the cabinet's location and environment.
- the condition of the condenser coil.

Table 21: Cleaning schedule

Timeframe	Performed by	Action
At least once a month	Owner	Condenser coil Brush with a soft brush to remove dust and fluff. If debris can no longer be removed, arrange a service call for comprehensive maintenance and coil clean.
Every 6 months, or as required	Service technician	Condenser coil Comprehensive maintenance based on the condition of the coil, which may include: • a nitrogen blow-out. • a PH-neutral chemical clean.

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

WARNING

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

Condenser Coil To ensure trouble-free performance, the condenser coil must be kept clean. SKOPE strongly urges 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

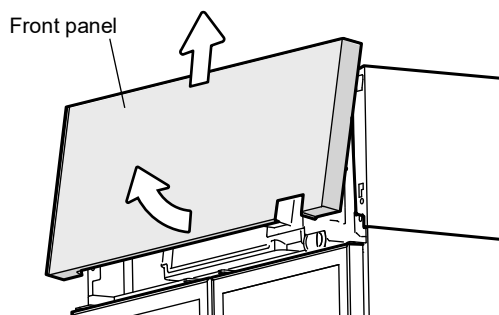
Unplug the cabinet from the power supply before cleaning the condenser coil.

Procedure 31: To clean the condenser coil

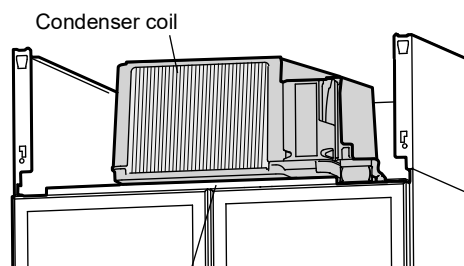
1. Disconnect the cabinet from the power supply.

2. Remove the front panel assembly from the top of the cabinet by swinging it out and off. Lit sign front panels will also need to be unplugged.

WARNING: The front panel is heavy, a two person lift is recommended.



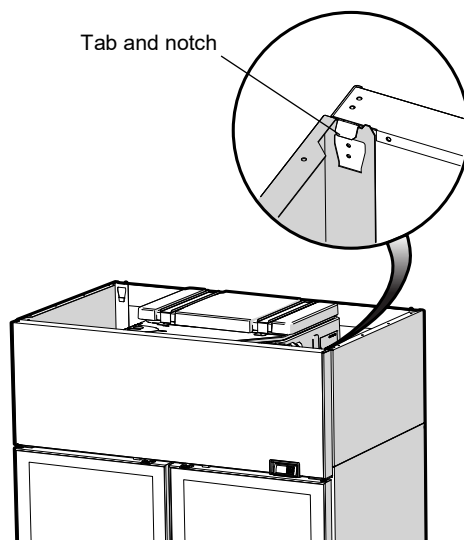
3. Brush the condenser coil with a soft brush to remove any dust and fluff.



4. Refit the front panel and reconnect to the power supply.

Important

When refitting, ensure the tabs on the back of the sign are located in the notches on top of the cabinet, and that the sign is pushed fully in and secure.



10 Troubleshooting

Electronic Controller

Alarms signal unexpected operational changes in the fridge. When an alarm is activated, use the electronic controller app to help diagnose the problem, and service as necessary.

Cabinet and Refrigeration Cartridge

For problems with the cabinet and refrigeration cartridge use the following table.

Table 22: Cabinet and cartridge troubleshooting

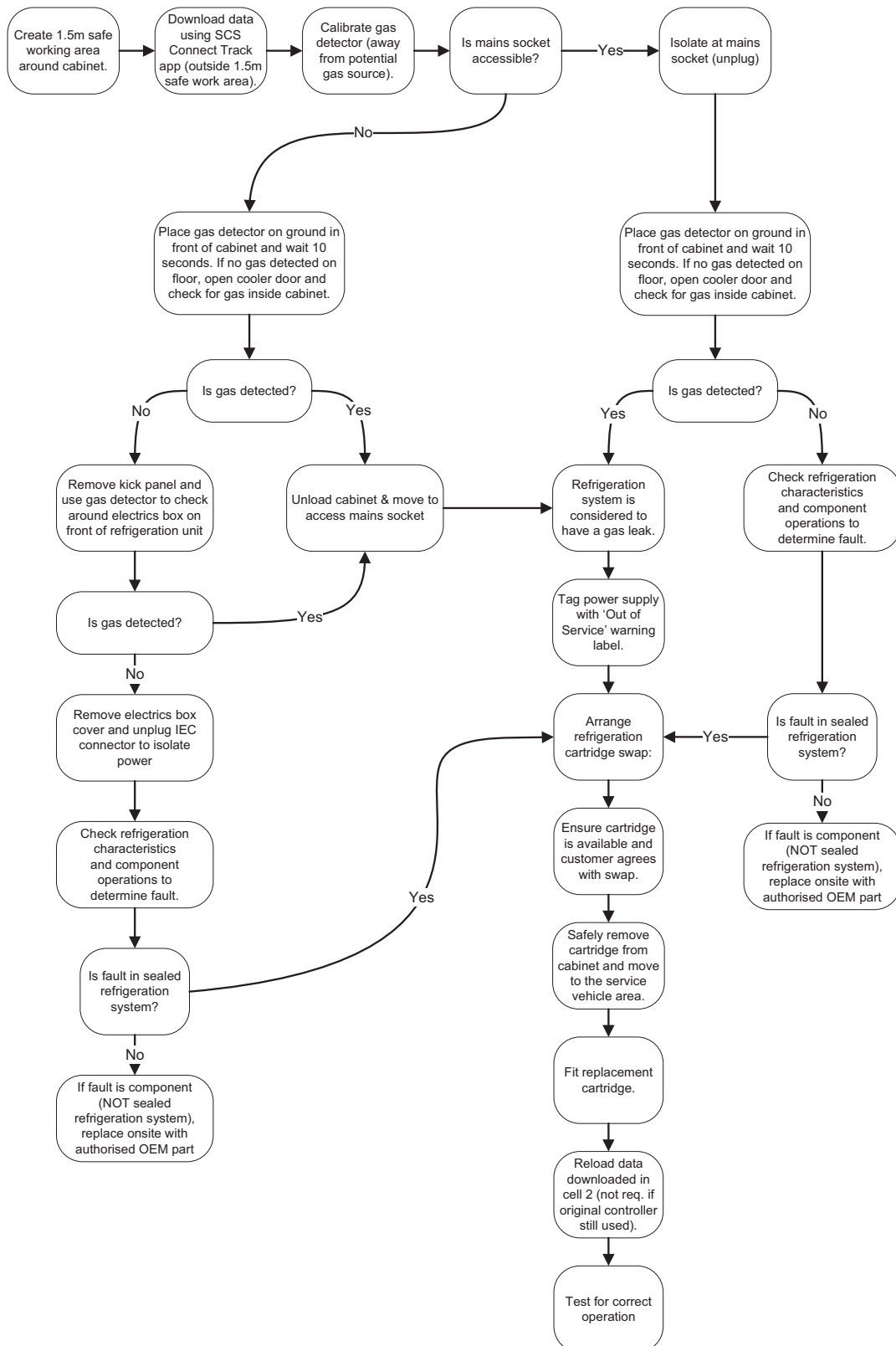
Problem	Possible cause	Recommended action
- Cabinet not operating - No controller display	- Loss of power supply - Loose plug	- Check mains power supply. - Check all plugs are connected correctly.
- Cabinet not operating as usual - Defrost cycle incorrect length	Incorrect parameters	Wellington Drive: Reload the parameter set.
Fan not working	Loose plug	Check all plugs are connected correctly.
Lights not on	- Electronic controller is in "Night" mode - Light switched off - Failed LED light - Refrigeration system error (indicated by the electronic controller) - Plug not connected properly - Power supply fault	- Switch the light on while keeping the cabinet in night mode by pressing the light button on the electronic controller faceplate. - Change the cabinet into 'Day mode' by pressing and holding the light button on the electronic controller faceplate, or holding the door open for 10 seconds. - Switch the light on via the light button on the electronic controller faceplate, or via the app. - Replace the light. - Diagnose and repair. If a system fault is found contact SKOPE for information on how to proceed. - Check and clean the plugs. - Replace the light's power supply.
Light component not working	- Plug not connected properly - Faulty light	- Check and clean the plug connection in the side light channel, behind the loom cover. - Replace the light.
Segment of light not working	Faulty light	Replace the light.
Excess noise vibration	Refrigeration pipes transferring vibration into the cartridge	Re-align the pipes to ensure they are not touching the evaporator tub bottom surface, evaporator tub support legs, plastic base, or condenser coil assembly.
Excess compressor noise	- Noise variation is usual as the variable speed compressor speed changes - Damaged mountings	Check the mountings to ensure there is no damage to the rubber, or the washers, nuts or screws.
Compressor not operating	- Compressor electrics - Failed compressor	- Check all plug connections and ensure that the compressor electrics are operating correctly. - Make sure the compressor is 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) - Replace the compressor.
Frozen evaporator coil	- Evaporator probe fault - Setpoint is too cold - Controller fault - Short of refrigerant	- Replace the evaporator probe. - Check and raise the setpoint. - Replace the controller. - Perform refrigeration system diagnostics and service as required.

Table 22: Cabinet and cartridge troubleshooting (continued)

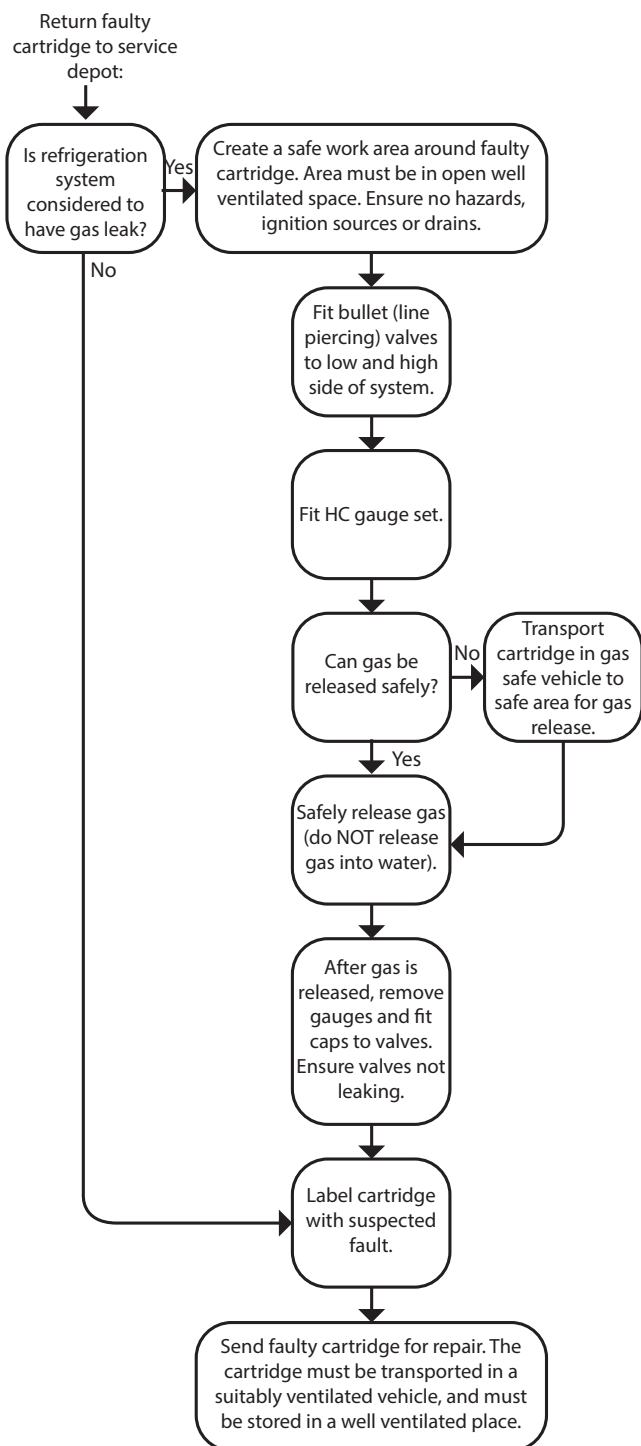
Problem	Possible cause	Recommended action
• Ice build-up inside evaporator box	• Leaking cartridge seal	• Check that the evaporator tub seals are fully clamped, and the cabinet top seal is good without gaps. Micro-gaps will allow ice build-up in the cabinet.
• Power consumption is higher than expected	• Cabinet door is opened too often	• Ensure the door is closed more often.
	• Cartridge is operating too hot	• Clean the condenser. • Ensure the cabinet has good ventilation around the refrigeration cartridge. • Ensure the cabinet is within the maximum operating temperature.
	• Product is too cold	• Raise the setpoint.
• Product is too warm	• Door not closing properly	• Check and clean the door gasket.
	• Excessive door opening	• Limit door openings.
	• Electronic controller is in “Night” mode	• Change the cabinet into “Day” mode by pressing and holding the light button on the electronic controller faceplate, or holding the door open for ten seconds.
	• Refrigeration system error (no active fault alarm)	• Check the SCS Connect Field app statistics to see if and when the controller signalled a fault or alarm.
	• Cartridge is operating too hot • Excessive refrigeration heat load	• Ensure the cabinet has good ventilation around the refrigeration cartridge. • Ensure the cabinet is within the maximum operating conditions.
	• Setpoint is too high	• Lower the setpoint.
	• Recently loaded	• Allow the product time.
	• Cabinet is overstocked	• Remove some product. • Product must not overhang the shelves.
• Moisture build up on cabinet exterior	• Refrigeration system error (indicated by the electronic controller)	• Diagnose and repair. If a system fault is found contact SKOPE for information on how to proceed.
	• Frequent door opening	• Limit door openings.
	• Door not closing properly	• Check and clean the door gasket.
• Cabinet door does not close properly	• High humidity	• Check the ambient operating temperature and reposition the cabinet if necessary.
	• Cabinet is on an uneven surface	• Level the cabinet.
	• Door is obstructed	• Check the shelves and product.
• Warm cabinet temperatures • Compressor operating for long periods (more than 1 hour)	• Door gasket is dirty	• Check and clean the door gasket.
	• Blocked condenser coil	• Clean the condenser coil.
	• Poor ventilation around refrigeration cartridge	• 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 for an authorised service person below when making the service visit.



On-site work procedure (continued)



SKOPE Contacts

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