

SC112N-A

Four Glass Sided Chiller

Type: HSC112N/Z156



SC112N-A
Four Glass Sided Chiller
Type: HSC112N/Z156
Service Manual

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1 Servicing Hydrocarbon

Overview

This cooler uses hydrocarbon (HC) R600a as its refrigerant. R600a is a natural refrigerant that has a very low environmental impact.

Special service requirements are needed as R600a is a flammable refrigerant.

Safety hazards

The main R600a safety hazards are:

- Flammable refrigerant.
- Venting of R600a and compressor oil.
- Asphyxiation.

SKOPE does NOT recommend performing hazardous activities on the refrigeration system.

2 Specifications

Chiller

Model: SC112N-A

Description: Four Glass Sided Chiller

Type: HSC112N/Z156

| Dimensions | | |
|-----------------------------|---|-----------------|
| | <i>External</i> | <i>Internal</i> |
| <i>Height</i> | 1080-1095mm | 725mm |
| <i>Width</i> | 470mm | 382.6mm |
| <i>Depth</i> | 470mm | 369.5mm |
| <i>Floor area</i> | 0.22m ² | |
| Refrigeration system | Bottom mounted, integral, electronically controlled refrigeration system | |
| Electronic controller | CAREL S4 | |
| Refrigerant | R600a/40g (natural refrigerant) | |
| Operating temperature range | 0°C to 5°C | |
| Tested climate | 25°C @ 60% RH (climatic class 3) | |
| Electrical | 220-240 volts a.c. 50 Hz, single phase supply, 1.5 amps | |
| Nominal capacity | 250 watts | |
| Sign lighting | Bottom sign: 2 × horizontal LED lights (total 3W) | |
| Internal lighting | 4 × vertical corner LED lights (total 8W) | |
| Doors | 2 × double-glazed, single low-e, lockable, toughened glass swing doors (right hand hinge) | |
| Shelves | 3 × adjustable height wire shelves (346mm wide x 281mm deep) | |
| Internal volume | 109 litres | |
| Total weight: | 55 kg | |

Tools required for servicing may include:

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

3 Electronic Controller

Electronic Controller Operations

Introduction The SC112N-A chiller is fitted with a CAREL S4 electronic controller. The electronic controller is visible on the front panel and is housed inside the controller box at the front of the refrigeration system.

The electronic controller controls and displays the chiller temperature and signals temperature alarms. It uses two temperature probes within the refrigeration system to collect data and runs the chiller accordingly.

The electronic controller is pre-programmed; SKOPE does not recommend that the settings be changed unless it is absolutely necessary. To ensure efficient operation, the electronic controller automatically forces a defrost cycle when required.

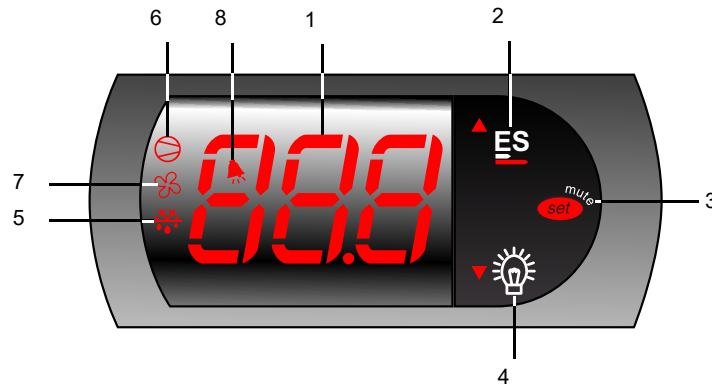
IMPORTANT

The electronic controller must only be adjusted by an authorised service agent.



Figure 1: CAREL S4 electronic controller

Faceplate Because the electronic controller plays such an important role, it's helpful to know the parts of the faceplate you may use.



| No. | Item | Description |
|-----|------|---|
| 1 | | Digital display of cabinet temperature or messages. The temperature is what the sensor inside the chiller detects, and not necessarily the product temperature. However, they may be very close depending on how the controller is set to sense temperature. |
| 2 | | Energy Save (up): Press to view the current chiller mode. 'EnS' = Energy Saving and 'nor' = Normal. Press and hold for 3 seconds to switch the chiller between 'Energy Save' and 'Normal' mode. |
| 3 | | Set (mute): Press to mute the alarm. Press and hold to access parameters. |
| 4 | | Light (down): Press and hold to switch the cabinet lights on and off. |
| 5 | | Defrost: ON when the defrost is activated. Flashes when the activation of the defrost is temporarily delayed due to procedures in progress. |
| 6 | | Compressor: ON when the compressor and condenser fan starts. Flashes when activation of the compressor is temporarily delayed. |
| 7 | | Fan: ON when the internal cabinet fans are activated. Flashes when activation of the fans is temporarily delayed. |
| 8 | | Alarm: ON when alarm is signalled. |

Running the Chiller

- Operating Modes** The electronic controller will automatically switch the chiller between 'Normal' and 'Energy Saving' modes depending on use. If the front door (electronic controller side) is not opened for four hours, the chiller will automatically enter Energy Saving mode and the sign and interior lights will switch off. To manually switch the chiller between Normal and Energy Saving modes, press and hold the Energy Save (up) button on the electronic controller faceplate. The chiller can also be brought into 'Day' mode by opening the front door (electronic controller side).
- Compressor** The compressor cycles on and off during Normal and Energy Saving modes. It does not run when the chiller is in defrost mode. If the electronic controller displays 'Err' there is a fault within the refrigeration system and the compressor will not run.
- Evaporator Fan** The evaporator fan starts a few minutes after the chiller is turned on and runs continuously during normal operation defrost and CCP mode, and stops when the front door is open or if the electronic controller displays 'Err' indicating a fault within the refrigeration system.
- Condenser Fan** The condenser fan runs continuously when the chiller is on except if the electronic controller displays 'Err' indicating a fault within the refrigeration system.
- Temperature Probes** Two temperature probes feed data to the electronic controller – the control probe and the evaporator probe. The control probe controls the chiller temperature, provides the chiller temperature for the electronic controller to display, and notifies the electronic controller of any erratic or abnormal temperatures that could identify a problem within the refrigeration system. The evaporator probe controls the refrigeration system defrost initiation and termination.
- Door Switch** The chiller is fitted with a door switch below the front door (electronic controller side). A small magnet in the door frame activates the switch. The door switch tells the electronic controller to turn off the evaporator fan motor (i.e. if door opened) during normal run operation, initiate Energy Saving mode if the door is not opened for four hours, and to reactivate Normal mode if the door is opened for a period of time during night mode.
- Defrost Cycle** The first automatic defrost occurs 3 hours after the chiller is switched on. During the defrost cycle the compressor stops and the evaporator fan runs continuously. The defrost cycle will terminate (stop) when the evaporator probe reaches 6°C or after the defrost cycle has been running for 60 minutes.
- Lighting** The chiller is fitted with bottom sign lights and interior pillar lights. The lights will come on when the chiller is first plugged in. When in Normal mode the sign and interior lights are on. When in Energy Saving mode the sign and interior lights are off. Press the Light button on the electronic controller faceplate to manually switch the sign and interior lights on and off (see page 8).

Messages and Alarms

Controller Display The following table explains messages that the electronic controller displays, and related alarms. Alarms signal unexpected operational changes in the chiller and can be muted by pressing the Set (mute) button on the electronic controller faceplate (see page 8).

| Display | Description |
|---------|---|
| 20 | The chiller is in 'Normal' mode and the electronic controller displays the chiller temperature. |
| E75 | The chiller is in 'Energy Saving' mode. When in Energy Saving mode the temperature inside the chiller is moderated and the cabinet lights turn off. The lights can be switched on and off by pressing the Light button on the controller faceplate, and the chiller can be switched into 'Normal' mode by pressing the Energy Saving button on the electronic controller faceplate. |
| door | The front door has remained open for over two minutes. An alarm sounds, and the compressor and evaporator fan turn off. |
| E0 | Regulation probe fault. |
| E1 | Evaporator probe fault. |
| E3 | There is a refrigeration system error and the controller has turned the chiller off to avoid damage. An alarm sounds, and the compressor and evaporator fan turn off. |

Programming the Electronic Controller





Parameters The parameter configuration program is set by SKOPE at the factory. A label on the controller box indicates the parameter configuration program number (e.g. the SC112N-A chiller uses program '102').

The electronic controller parameters can be modified using the keypad. Access to the parameters is protected by a password to prevent accidental or unauthorised modifications. Only an authorised service agent should modify the parameters.

To access the parameters

1. Press and hold the **Set (mute)** button for 5 seconds until the display shows '**PS**' (password).
2. Press the **Set (mute)** button. The display shows '**0**'.
3. Use the **ES (up)** and **Light (down)** buttons to select password '**22**' (default password).
4. Press the **Set (mute)** button to confirm the password. The display shows '**PS**'.
5. Use the **ES (up)** and **Light (down)** buttons to scroll through the parameter codes and locate the required parameter.

Parameter categories can be identified by the initial symbol or letter of the code, and the icon displayed on the electronic controller faceplate:

| Category | Initial | Icon |
|-----------------------|---------|---|
| Probe parameters | / | - |
| Control parameters | r | - |
| Compressor parameters | c |  |
| Defrost parameters | d |  |
| Alarm parameters | A |  |
| Fan parameters | F |  |

6. Press the **Set (mute)** button to display the value associated with the parameter code.
 7. Use the **ES (up)** and **Light (down)** buttons to increase or decrease the value of the parameter.
 8. Press the **Set (mute)** button to save the new value temporarily. The display shows the parameter code.
- Note:** If no buttons are pressed for 60 seconds or the power is disconnected before the temporarily saved values are permanently saved, the temporarily saved values will be cancelled and the previous setting will be restored.
9. If necessary, repeat steps 5 to 9 to change other parameters as required.
 10. Press and hold the **Set (mute)** button for 3 seconds to permanently save the parameters and exit the parameter menu.

Parameter list – SC112N-A program 102



Electronic Controller Parameter Sheet

Application **SC112N-A**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKCOH002K (Rev 1.414)**
 SKOPE Part Number **ELZ11478-102**

102

Revision: 3.0

Full List

SET0

CPS1017-102-SET0

Last revised on
5-Mar-2021

| Parameter | Setting | Unit | Access Level | Range | | Description |
|---|---------|------|--------------|--------|------|---|
| | | | | Min | Max | |
| Probe Parameters | | | | | | |
| PS | 22 | | F | 0 | 200 | Password (Read Only) |
| /2 | 4 | | C | 1 | 15 | Measurement stability (Applies to all probes) |
| /4 | 1 | | C | 1 | 5 | Select probe displayed |
| /5 | 0 | | C | 0 | 1 | Select °C/°F (0=°C ; 1=°F) |
| /6 | 0 | | C | 0 | 1 | Disable decimal point |
| /8 | 0 | °C | C | -99.00 | 99.0 | Display Offset (Only if /E > 0) |
| /9 | 0 | °C | C | -40.0 | /A | Minimum Display value (Only if /E > 0) |
| /E | 1 | | C | 0 | 50 | Display Dampening Coefficient |
| /C1 | 3.5 | °C | C | -50.0 | 50.0 | Probe 1 Calibration Offset |
| /C2 | 0.0 | °C | C | -50.0 | 50.0 | Probe 2 Calibration Offset |
| /C3 | 0.0 | °C | C | -50.0 | 50.0 | Probe 3 Calibration Offset |
| Regulation Parameters | | | | | | |
| St | 3.0 | °C | F | r1 | r2 | Set point |
| rd | 3.0 | °C | C | 0.0 | 19.0 | DAY differential |
| r1 | 0.0 | °C | C | -50.0 | r2 | Minimum set point value |
| r2 | 4.0 | °C | C | r1 | 150 | Maximum set point value |
| r3 | 1 | | C | 0 | 1 | Enable Auto Day/Night Mode Switching |
| r4 | 2.0 | °C | C | -50.0 | 50.0 | Night Mode set point delta (added to St) |
| r5 | 3.0 | °C | C | 0.0 | 19.0 | Night differential |
| r6 | 90 | hrs | F | 0 | 90 | Night Mode Start Delay (time period with no door openings) |
| r7 | 8 | hrs | F | 1 | 90 | Night Mode Timeout (time period in night mode) |
| r10 | 0 | hrs | C | 0 | 24 | Light Delay On Time after entering DAY mode |
| Cold Climate Protection Parameters | | | | | | |
| CCt | 2.0 | °C | C | 0.1 | 20.0 | Cold Climate Protection Temperature Delta |
| CCd | 30 | mins | C | 0 | 199 | Cold Climate Protection Delay |
| Pull Down Mode Parameters | | | | | | |
| Pt | 127 | °C | C | 0 | 127 | Pull-down Mode - Activation Temperature |
| Pd | 250 | hrs | C | 0 | 250 | Pull-down Mode - Maximum Duration |
| Compressor Parameters | | | | | | |
| c0 | 2 | mins | C | 0 | 200 | Comp. and Fan start delay at power-up. |
| c1 | 6 | mins | C | 0 | 100 | Minimum time between consecutive compressor starts |
| c2 | 5 | mins | C | 0 | 100 | Minimum compressor off time |
| c3 | 0 | mins | C | 0 | 100 | Minimum compressor on time |
| c4 | 15 | mins | C | 0 | 100 | Compressor on time with duty setting |
| c5 | 1 | | C | 0 | 1 | Enable mains voltage protection (0 = disabled, 1 = enabled) |
| Defrost Parameters | | | | | | |
| d0 | 0 | | C | 0 | 1 | Type of defrost (0 = Electric, 1 = Hot Gas) |
| d1 | 3 | hrs | C | 0 | 199 | Defrost interval time (Time between defrosts) |
| d2 | 1 | | C | 0 | 1 | Run defrost interval timer only when compressor running |
| dt | 6 | °C | C | -50.0 | 127 | Defrost Termination temperature |
| dP | 60 | mins | C | 1 | 199 | Maximum defrost duration |
| d4 | 0 | | C | 0 | 1 | Defrost request at power-on: (0 = no, 1 = yes) |
| d5 | 0 | mins | C | 0 | 199 | Defrost delay on power-up (when d4=1) |
| d6 | 1 | | C | 0 | 1 | Display during defrost (0 = "dEF", 1 = Temperature at start of defrost) |
| dd | 3 | mins | C | 0 | 15 | Dripping time (compressor and fans stopped after defrost) |
| d8 | 0 | mins | C | 0 | 199 | Bypass high temperature alarm after defrost or door opening |
| d9 | 0 | | C | 0 | 1 | Defrost priority over compressor protectors |
| d/1 | - | °C | F | - | - | Probe reading on 2nd Input (read only) |



Electronic Controller Parameter Sheet

102

Revision: 3.0

Application **SC112N-A**
 Controller Type **SKOPE S4 EVO**
 Controller Model & Revision **PZSKCOH002K (Rev 1.414)**
 SKOPE Part Number **ELZ11478-102**

Full List

SET0

CPS1017-102-SET0

Last revised on
5-Mar-2021

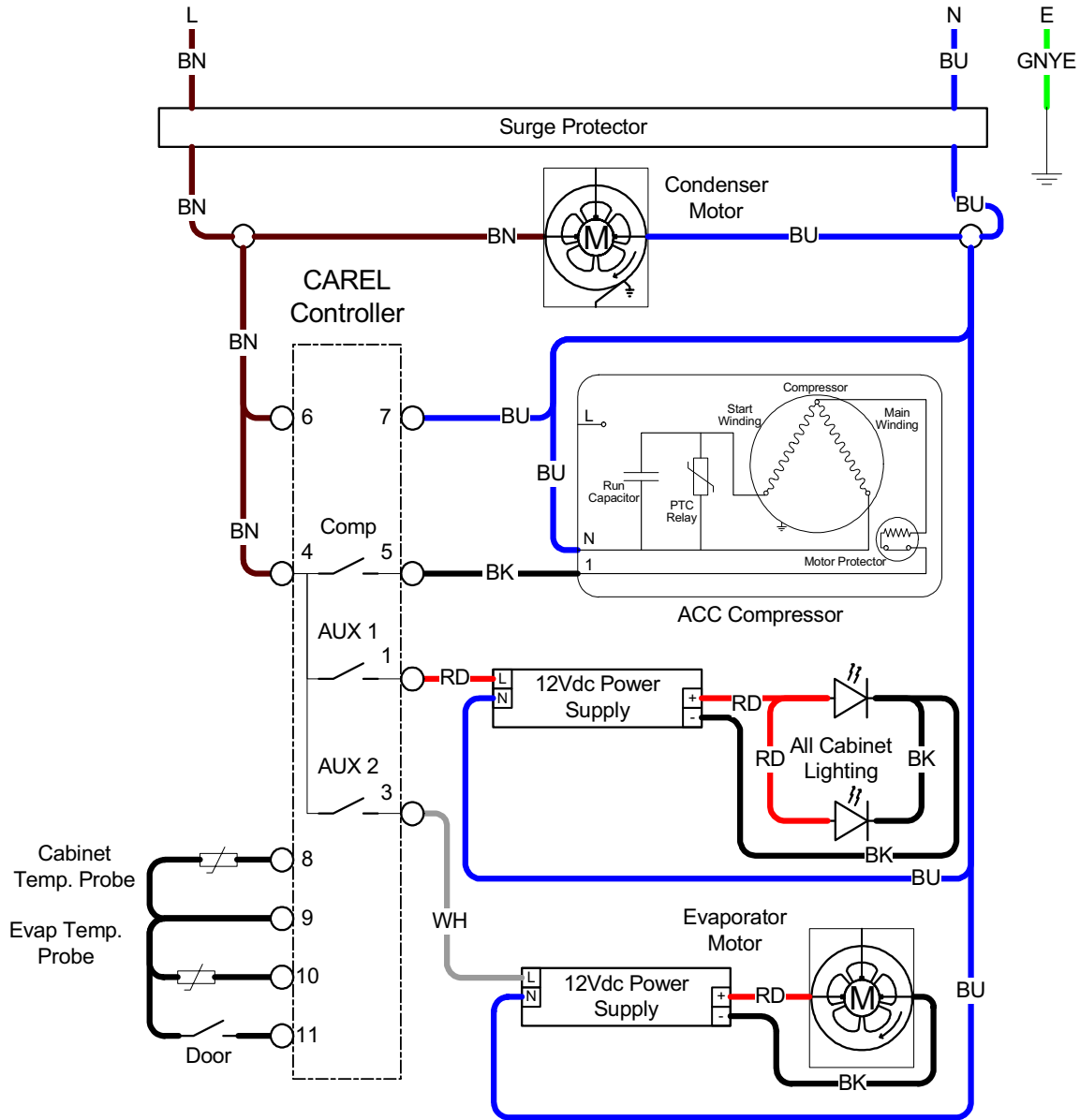
| Parameter | Setting | Unit | Access Level | Range | | Description |
|---|---------|------|--------------|-------|-------|--|
| | | | | Min | Max | |
| d/2 | - | °C | F | - | - | Probe reading on 3rd Input (read only) |
| d10 | -50.0 | °C | C | -50.0 | 127 | On demand defrost Start Temperature |
| d11 | 0 | mins | C | 0 | 60 | On demand defrost: start delay |
| d12 | 127 | °C | C | -50.0 | 127 | Enabling defrost condition: Control probe threshold |
| d13 | 1 | | C | 0 | 1 | Evaporator Fans During Defrost (0 = Off 1 = ON) |
| d19 | 30 | mins | C | 0 | 200 | No Downward Tendency Defrost - Start Delay (0 = function disabled) |
| d20 | 3 | mins | C | 1 | < d19 | No Downward Tendency Evaluation (Sample Time) |
| d21 | 3 | | C | 0 | 5 | Number of NDT defrosts before R.S.F. "Err" alarm (0 = function disabled) |
| d22 | 0.1 | °C | C | 0.0 | 5.0 | No Downward Tendency Evaluation (Temperature Delta) |
| Alarm & Input Configuration Parameters | | | | | | |
| A0 | 2.0 | °C | C | -20.0 | 20.0 | Temperature Alarm Differential |
| AL | 0.0 | °C | C | -50.0 | 150 | Low temperature alarm setpoint. (Relative if A0>0, Absolute (A0≤0)) |
| AH | 0.0 | °C | C | -50.0 | 150 | High temperature alarm setpoint. (Relative if A0>0, Absolute (A0≤0)) |
| Ad | 0 | mins | C | 0 | 199 | Temperature alarm delay (0 = AL and AH alarms disabled) |
| A10 | 2 | mins | C | 0 | 10 | Door Open Alarm delay (0 = door open alarm disabled) |
| A11 | 1 | | C | 0 | 5 | 2nd Input Configuration |
| A12 | 3 | | C | 0 | 16 | Number of cA alarm events to trigger manual reset 'CA' alarm |
| A13 | 24 | hrs | C | 0 | 240 | cA alarm counter reset delay |
| A14 | 60 | mins | C | 0 | 240 | cA alarm reset delay |
| A15 | 1 | | C | 0 | 1 | Lights switched OFF when CHT, cA or CA alarm occurs |
| A18 | 1 | | C | 0 | 1 | Allow power cycle to reset CA alarm |
| A20 | 4 | mins | C | A10 | 60 | Faulty door/curtain switch E2 alarm delay |
| Ac | 70.0 | °C | C | -50.0 | 250 | High condenser temperature alarm set point |
| AE | 5.0 | °C | C | 0.1 | 20.0 | High condenser temperature alarm differential |
| Acd | 0 | mins | C | 0 | 250 | High condenser temperature alarm delay |
| Acr | 1 | | C | 0 | 2 | High condenser temperature alarm reset method |
| A21 | 2 | | C | 0 | 5 | 3rd Input Configuration |
| Evaporator Fan Parameters | | | | | | |
| F0 | 3 | secs | C | 1 | 100 | Loads Activation Delay |
| Fd0 | 20 | mins | C | 1 | 100 | Fan DAY Duty Cycle : ON time |
| FdF | 0 | mins | C | 0 | 100 | Fan DAY Duty Cycle : OFF time |
| Fn0 | 25 | mins | C | 1 | 100 | Fan NIGHT Duty Cycle : ON time |
| FnF | 0 | mins | C | 0 | 100 | Fan NIGHT Duty Cycle : OFF time |
| Other Parameters | | | | | | |
| H0 | 1 | | C | 0 | 207 | Supervisor Serial address |
| H01 | 1 | | C | 0 | 1 | Baud Rate (0 = 9600, 1 = 19200) |
| H02 | 2 | | C | 0 | 2 | Stop Bits |
| H03 | 0 | | C | 0 | 2 | Parity (0 = None, 1 = Odd, 2 = Even) |
| H2 | 1 | | C | 0 | 3 | Enable Keypad |
| H4 | 0 | | C | 0 | 1 | Disable buzzer (0 = Buzzer Enabled, 1 = Buzzer Disabled) |
| H5 | 102 | | F | 0 | 199 | ID code (read-only) |

Warning

1. Only make program modifications with reference to relevant Operating Manual.
2. This programming sheet is exclusively for SKOPE refrigeration systems with its dedicated Carel controller.
3. Any alteration from this program may adversely affect the SKOPE Refrigeration System operation.
4. Specification may change without notice. Please check with SKOPE Customer Service for latest revision.

4 Wiring

Model: SC112N-A

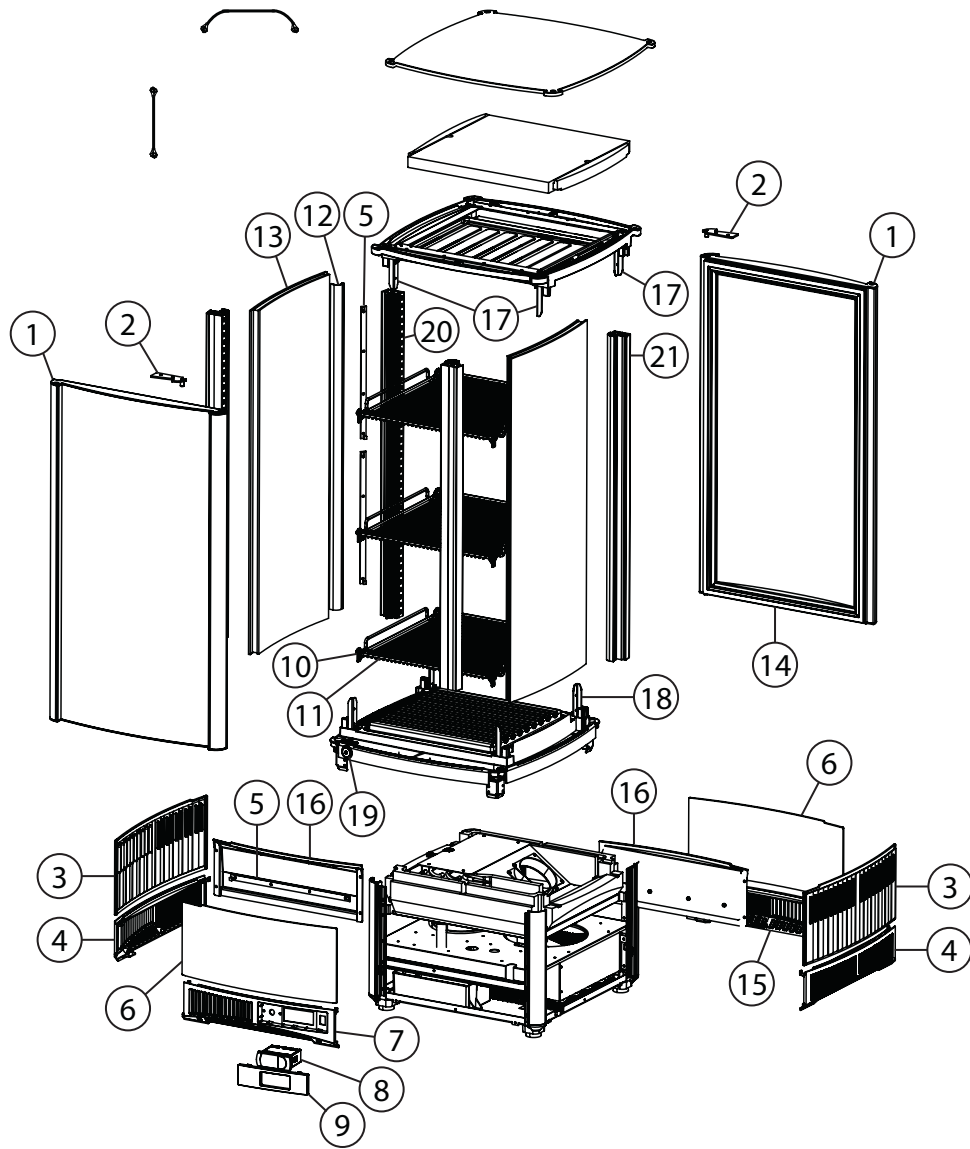


Wire Colours

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

5 Spare Parts

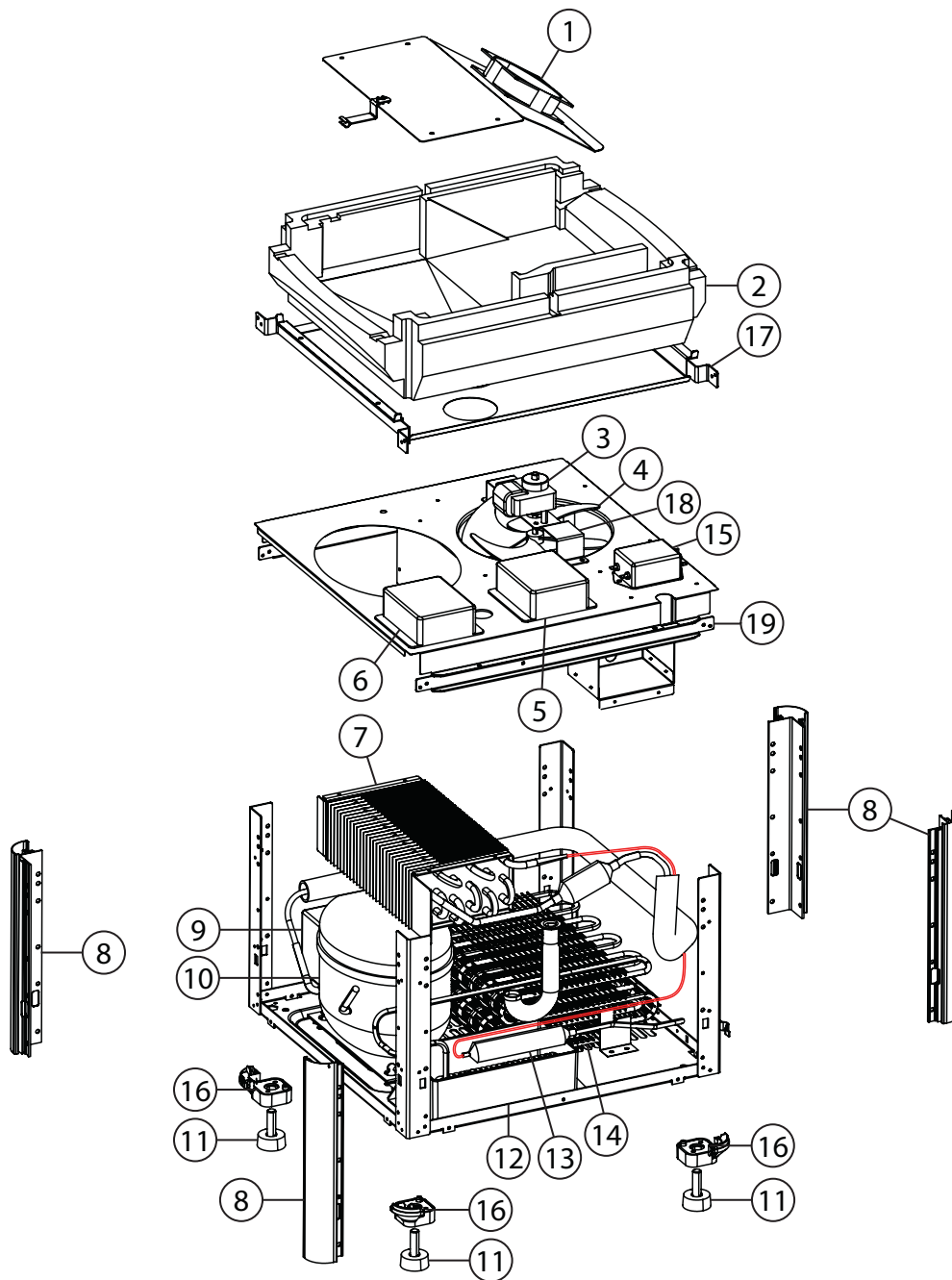
Cabinet Assembly



Parts - Cabinet

| Item | Description | SKOPE Part No. | Customer Part No. |
|------|--|----------------|-------------------|
| 1 | Glass door assembly | HB0070807597 | |
| 2 | Top hinge | HB0070109359 | |
| 3 | Side panel | HB0070204927 | |
| 4 | Lower side panel | HB0070204933 | |
| 5 | LED strip light (bottom sign) | HB0071800053 | |
| 6 | Bottom sign panel (transparent) | HB0070509671 | |
| 7 | Lower control panel | HB0070204936 | |
| 8 | Electronic controller (CAREL S4) | ELZ11478-102 | |
| | Control probe | ELZ1255 | |
| | Evaporator probe | ELZ7644 | |
| | Door switch (including cable and magnet) | HB0074091496 | |
| 9 | Controller insert | HB0070204937 | |
| 10 | Shelf clip | HB0070204928 | |
| 11 | Wire shelf | HB0070109355 | |
| 12 | Diffuser | HB0070204930 | |
| 13 | Side glass | HB0071400156 | |
| 14 | Door gasket | HB0070204932 | |
| 15 | Lower side panel | HB0070204933 | |
| 16 | LED reflector | HB0070204935 | |
| 17 | Top cover bracket | HB0070109297 | |
| 18 | Floor bracket | HB0070109301 | |
| 19 | Door lock | HB0070804947 | |
| 20 | Shelf support strip LH | HB0070204934 | |
| 21 | Shelf support strip RH | HB0070204934A | |
| | Lighting wiring | HB0070402809 | |

Refrigeration System Assembly



Parts - Refrigeration System

| Item | Description | SKOPE Part No. | Customer Part No. |
|------|-------------------------------|----------------|-------------------|
| 1 | Evaporator fan motor | HB0074001220 | |
| 2 | Evaporator tub | HB0070509640 | |
| 3 | Condenser fan motor | HB0074001214 | |
| 4 | Condenser fan blade | HB0074000311 | |
| 5 | Fan motor 12Vdc power supply | HB0071800116 | |
| 6 | LED lights 12Vdc power supply | HB0071800202 | |
| 7 | Evaporator coil | HB0070700492 | |
| 8 | Lower outer extrusion | HB0070109356A | |
| 9 | PTC starter | HB0074000381FJ | |
| 10 | Wanbao compressor ETA110L | HB0074000910 | |
| 11 | Adjustable foot | HB0070101405 | |
| 12 | Condensate tray | HB0070204929 | |
| 13 | Drier | HB0060703262 | |
| 14 | Condenser coil | HB0070700493 | |
| 15 | Surge protector | HB0074600001 | |
| 16 | Base foot | HB0070204924 | |
| 17 | Tub side support | HB0070109349 | |
| 18 | Condenser fan bracket | HB0070109354 | |
| 19 | Side chassis support | HB0070109350 | |
| | Wiring in the unit | HB0070402808 | |
| | Suction line | HB0070702925 | |

6 Replacement Procedures

Shelves

Adjusting the Shelves The chiller is supplied with three wire shelves which may be positioned at different heights to suit various products. Each shelf is held in place with four shelf clips which engage in the corner shelf support strips.

To adjust the cabinet shelves

1. Remove the shelves from the chiller.
 2. Remove the shelf clips from the four shelf support strips at each corner of the chiller interior.
 3. Establish the desired position for the shelves and securely engage a shelf clip in each of the shelf support strips.
 4. Sit the shelves onto the shelf support clips.
-
-

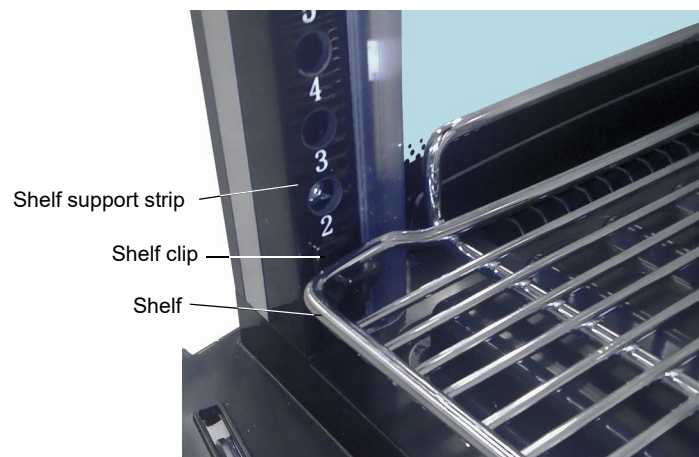


Figure 2: Shelf detail

Lights

The chiller is lit by four interior pillar lights and two bottom sign lights. All lights are powered by a 12Vdc LED power supply located within the refrigeration system (see page 27). If one or several individual light/s fail on a light strip, the remaining lights will still receive power and should work. If an LED strip is damaged (and the circuit broken) no lights will go (including the sign lights). If all the lights are off, check operation via the light switch on the electronic controller (see page 9) before replacing the LED strip lighting.

Interior Lights The cabinet interior is lit by four vertical corner pillar LED lights. Each corner pillar light is made up of two LED strip lights (see page 17 for spare parts).

To replace a single LED interior light strip

1. Isolate the chiller from the power supply by unplugging from the wall socket.
 2. Remove the shelves from the chiller.
-

3. Access the chiller interior via the appropriate door, and unclip the diffuser to expose the failed LED light strip.



4. Unplug the failed LED strip and unscrew from the pillar to remove.



5. Fit the new light and plug into the circuit. Refit the diffuser, refit the shelves and test.
-

Bottom Sign Lights The chiller has two bottom lit signs, one at the front and one at the back. Each sign is lit by one LED strip light (see page 17 for spare parts).

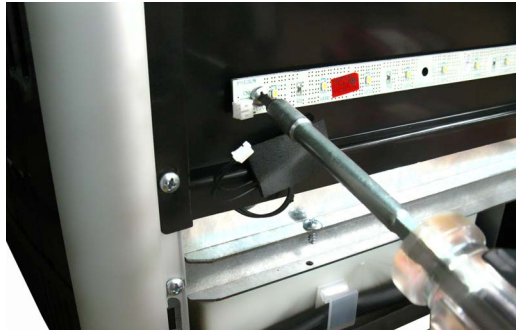
To replace a bottom sign light

1. Isolate the chiller from the power supply by unplugging from the wall socket.
-

2. Remove the lower bottom panel by undoing the three fixing screws, and remove the sign panel and decal from the sign.



3. Unplug and unclip the LED strip light, and remove from the chiller.



4. Fit the new light and plug into the circuit. Reassemble and test.
-
-

Doors

The chiller is fitted with a front and back door. The front door is on the electronic controller side and is fitted with a door switch to monitor door openings. The front door should be directed towards the customer. The rear door is not fitted with a door switch and should face away from the customer. It is used for restocking product.

Replacing Door Gasket

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

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



Figure 3: Door gasket

Removing and Fitting Doors

For ease of servicing, the doors can be removed from the chiller.

To remove a door

1. Isolate the chiller from the power supply by unplugging from the wall socket.

2. Detach the top hinge from the cabinet by opening the door and undoing the two fixing screws.



3. Lift the door up and off the cabinet.

To refit a door

1. Isolate the chiller from the power supply by unplugging from the wall socket.

2. Use a flat hex spanner or strong 2mm steel pin to rotate the capstan about half a turn in the direction the door closes. While holding the tension with the spanner, slot the capstan into the hole on the bottom of the door opening and lock in place.



3. Reattach the top hinge and fix in place with two fixing screws. Check tension.

Adjusting Door Tension Each glass door has an internal torsion bar, pre-tensioned at the factory, that lets the door self-close. If necessary, the torsion can be adjusted by rotating the capstan mounted at the bottom of the door.

To adjust the door tension

1. Isolate the chiller from the power supply by unplugging from the wall socket.
2. Remove the door from the cabinet (see page 23).
3. Refit the door to the cabinet (see page 23), adjusting the tension via the capstan as necessary.

Replacing Torsion Bar When the door tension can no longer be adjusted, consider replacing the torsion bar. The torsion bar assembly is located inside the hinge side of the door frame.

To replace the torsion bar

1. Isolate the chiller from the power supply by unplugging from the wall socket.
2. Remove the door from the cabinet (see page 23).

3. Remove the torsion bar assembly from the door.



4. Detach the existing capstan from the old torsion bar.
5. Thread the capstan over the bottom end of the new torsion bar.

6. Fit the new torsion bar assembly into the door frame. When installed properly the capstan should not turn.



7. Refit the door to the cabinet (see page 23), adjusting the tension via the capstan as necessary.

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 coolers 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

The SC112N-A refrigeration system is a bottom-mounted, electronically controlled serviceable system. It is made up of three levels, each containing specific parts and assemblies. Specifications for the refrigeration system are in the following table. Verify basic requirements before servicing.

| | |
|---------------------|---------------------------|
| Compressor | Wanbao Compressor ETA110L |
| Compressor capacity | 250 Watts |
| Refrigerant | R600a |
| Charge | 40g |

Refrigeration Unit Assembly

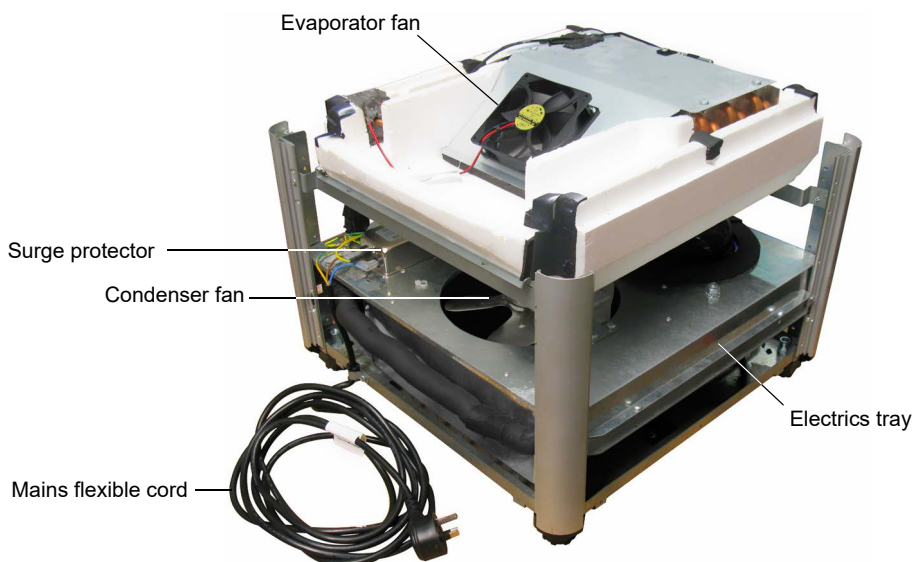
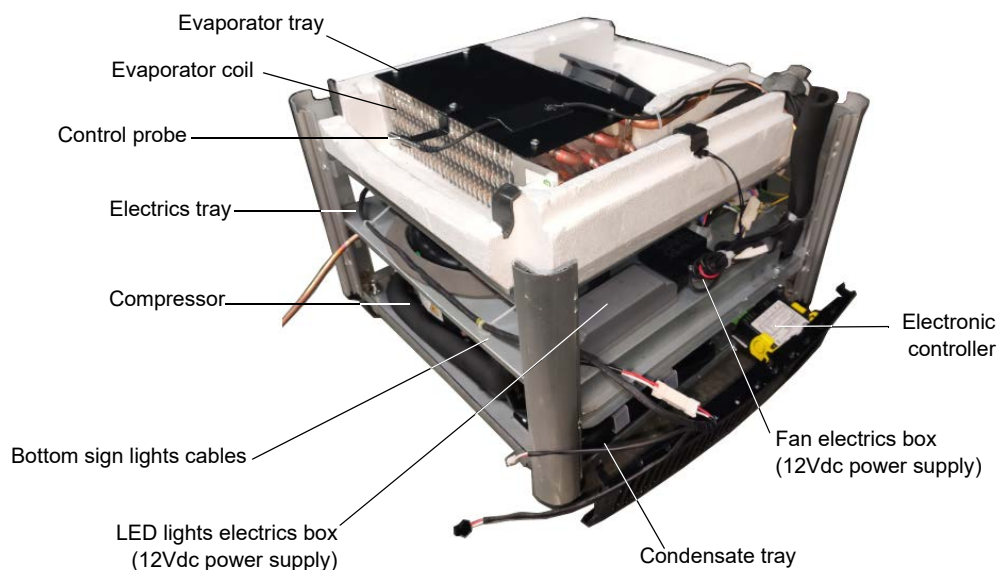


Figure 4: Refrigeration unit components

Refrigeration System Access

The following instructions detail accessing the refrigeration system. Servicing can be completed by separating the top cabinet assembly from the bottom refrigeration system.

To access the refrigeration system

1. Isolate the chiller from the power supply by unplugging from the wall socket.

2. Remove the front and back lower bottom panels by undoing the three fixing screws and sliding them down, and remove the sign panel and decal from the sign.



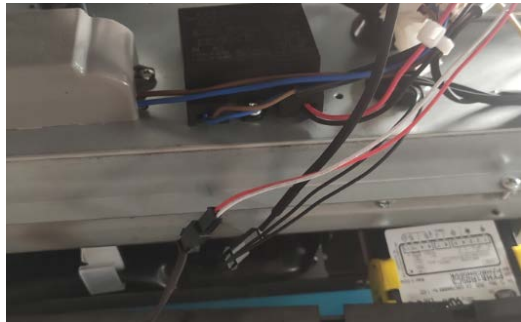
3. Remove the side lower bottom panels by undoing the three fixing screws and sliding the panels down, and unclip the upper bottom panels.



4. Remove the front and back light panels by undoing the fixing screws. Unplug the light panels.

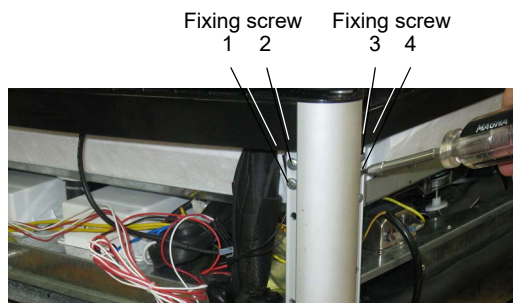


5. Unplug the two plugs from the front of the cabinet (above the electronic controller).



Continued over the page

- Undo the top four screws from each refrigeration system pillar support bracket (16 screws in total) to detach the top part of the chiller.



- Lift the top cabinet assembly from the bottom refrigeration system. It may be necessary for a second person to hold the bottom refrigeration system while separating.

Refrigeration System Dismantling

The refrigeration system is made up of three layers, each containing specific components and parts as detailed in the table below.

| Level | Components and parts |
|------------|--|
| 1 (bottom) | Compressor, compressor electrics, condensate tray, condenser coil |
| 2 (middle) | Condenser fan, fan motor power supply electrics, LED light power supply electrics, surge protector |
| 3 (top) | Evaporator fan, evaporator coil |

Follow the instructions below to dismantle the refrigeration system and access the different levels.

To dismantle the refrigeration system

- Isolate the chiller from the power supply by unplugging from the wall socket.
- Separate the top cabinet assembly from the from the bottom refrigeration system to access the refrigeration system (see page 28).

Components on level three can now be accessed.

- Unclip and detach the control probe and cable from the evaporator shroud.



- Detach the evaporator shroud by undoing the four fixing screws. Place aside.



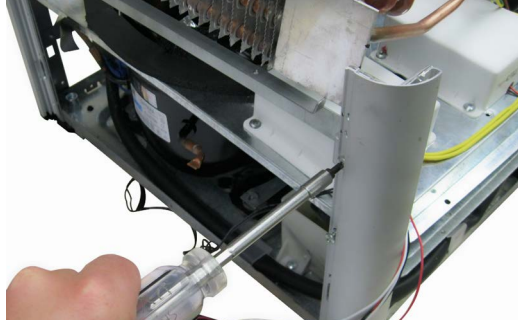
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- Free all pipes and cables from the putty on the evaporator tray edge, detach the drain pipe from the bottom of the evaporator tray, and carefully pivot the evaporator tray out from under the evaporator coil. Place the tray aside.



Components on level two can now be accessed.

- Remove the two horizontal struts from the sides of the refrigeration system by undoing the two fixing screws from each strut.



- Detach the mains flexible cord from the base of the assembly by undoing the mains flexible cord bracket fixing screw.



- Detach the electrics tray from the assembly by undoing the eight fixing screws (two on each edge).



- Tilt the electrics tray up and support with a block.



Components on level one can now be accessed.

Evaporator Fan The evaporator fan is located on the top level (level three) of the refrigeration system. It is mounted on the evaporator shroud, on top of the evaporator tray. The complete fan (motor and blade) is replaced as one part.

To replace the evaporator fan

1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level two of the refrigeration system (see page 29).

2. Trace the evaporator fan cable and unplug.



3. Detach the failed evaporator fan from the evaporator shroud by undoing the four fixing screws.



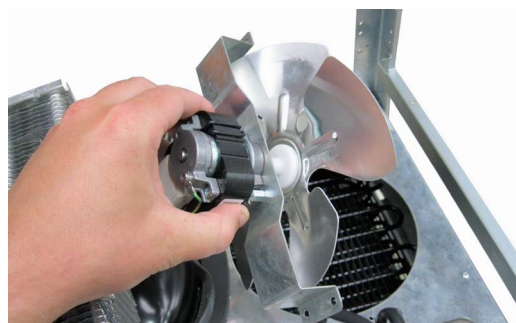
4. Fit the new fan and reassemble. Ensure the cables follow the original path.

Condenser Fan The condenser fan is located on the middle level (level two) of the refrigeration system. It is mounted on the electrics tray. The fan blade and fan motor can be replaced individually if necessary.

To replace the condenser fan blade and condenser fan motor

1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level two of the refrigeration system (see page 29).

2. Detach the condenser fan assembly by undoing the four fixing screws from condenser fan bracket.



3. Remove the fan blade by undoing the fixing nut.

If necessary replace the fan blade, or continue following the steps to replace the fan motor.

Continued over the page

- Trace the condenser fan cable to its connector plug and unplug the condenser fan, cutting the cable ties if necessary.



- Detach the condenser fan motor by undoing the two nuts on the underside of the condenser fan baffle.
- Fit the new condenser fan motor and reassemble. Ensure the cables follow the original path and are cable-tied in place.

Power Supply and Surge Protector

The evaporator and condenser fan motor power supply, the sign and interior LED lights power supply, and the surge protector are located on the middle level (level two) of the refrigeration system. Parts within each power supply cannot be replaced individually. If a power supply has failed, the assembly must be replaced.

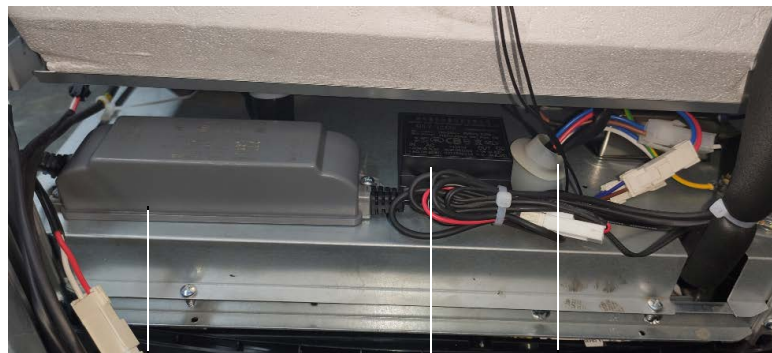


Figure 5: Fan and light power supply, and surge protector

LED lights power supply

Fan motor power supply

Surge protector

To access the power supplies

- Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level two of the refrigeration system (see page 29).
- Service as necessary and reassemble.

Compressor

The compressor is located on the bottom level (level one) of the refrigeration system. 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 plugs and connections and ensure the compressor electrics are operating correctly (see below). The compressor must be supplied with consistent voltage over 220 volts. Ensure the voltage does not drop at start-up. If the voltage does drop, ensure the refrigeration system has a direct power supply (not from a multi-box or extension cord).

To access the compressor

1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level one of the refrigeration system (see page 29).
2. Service as necessary.

Compressor Electrics The compressor electrics are located on the side of the compressor and include the start PTC (positive temperature coefficient) and motor protector. The complete set is supplied as a spare part if required.

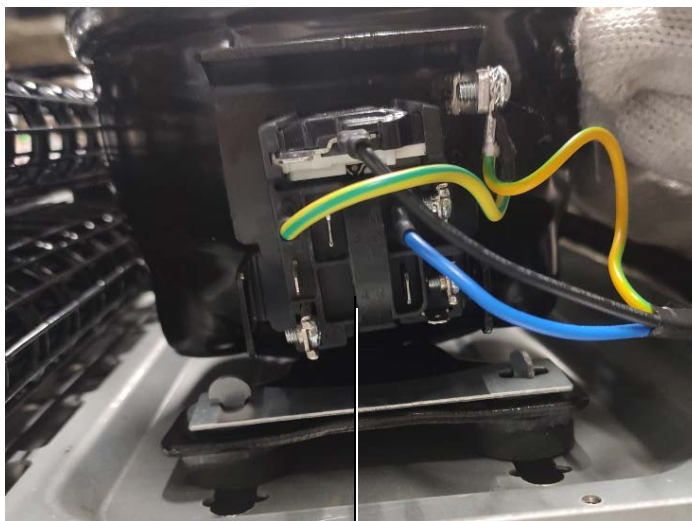


Figure 6: Compressor electrics

PTC and overload protector (OLP) combined

To access the compressor electrics

1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level one of the refrigeration system (see page 29).

2. Lever the compressor electrics cover off with a slotted screwdriver.



3. Service as necessary.

Electronic Controller

Electronic Controller Assembly

The electronic controller is located at the front of the chiller behind the lower bottom panel and is visible from the front of the chiller. For information on operation and programming, refer to the Electronic Controller section of this manual on page 7.

To access the electronic controller terminals

1. Isolate the chiller from the power supply by unplugging from the wall socket.

2. Remove the front lower bottom panel by undoing the three fixing screws and sliding down.



3. The terminals at the rear of the electronic controller can now be accessed.
-

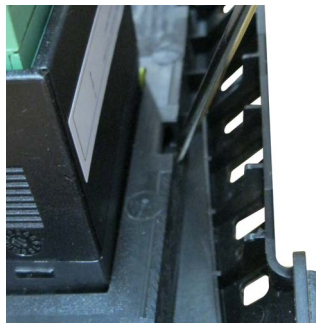
To remove the electronic controller terminals

1. Follow the steps above to access the rear of the electronic controller.
2. Unplug the terminals from the rear of the controller.

3. Detach the electronic controller from its housing by pressing in the yellow tabs and sliding the tabs off.



4. Gently lever the front panel controller insert from the front lower bottom panel with a small slotted screwdriver.



5. Withdraw the electronic controller through the front lower bottom panel to remove.



Controller Terminals Refer to Figure 7 below for controller termination details.

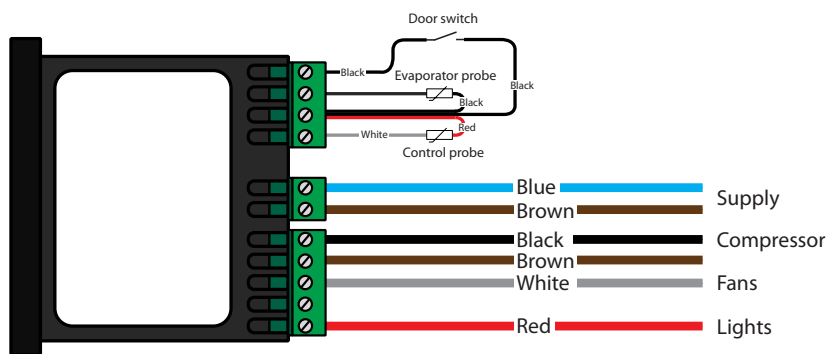


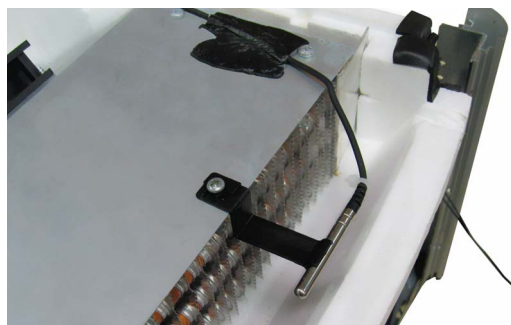
Figure 7: Controller termination

Control Probe The control probe is attached to a bracket on the evaporator shroud and plugs into the rear of the electronic controller.

To replace the control probe

1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level three of the refrigeration system (see page 29).
2. Gain access to the terminals at the rear of the electronic controller (see page 34).

3. Unclip and detach the control probe and cable from the evaporator shroud.



4. Trace the cable back to the terminals at the rear of the electronic controller and detach.
5. Attach the new control probe cable to the terminals at the rear of the electronic controller and fit the cable following the same path as the original probe cable. Clip the probe into the bracket on the evaporator shroud and reassemble.

Evaporator Probe The evaporator probe is located inside the evaporator coil and plugs into the rear of the electronic controller.

To replace the evaporator probe

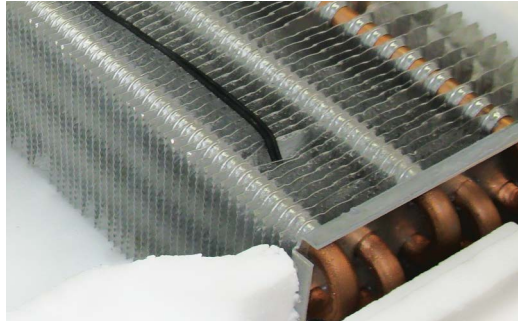
1. Isolate the chiller from the power supply, separate the top cabinet assembly from the bottom refrigeration system and gain access to level three of the refrigeration system (see page 29).
2. Gain access to the terminals at the rear of the electronic controller (see page 34).
3. Unclip and detach the control probe and cable from the evaporator shroud (see above).

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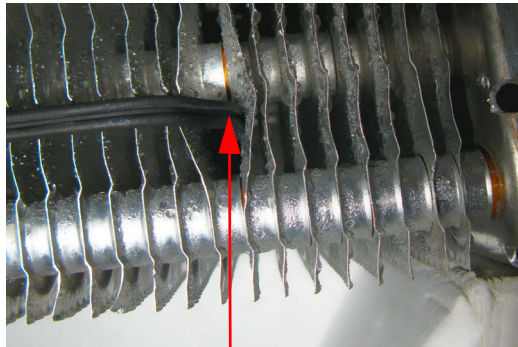
4. Detach the evaporator shroud by undoing the four fixing screws. Place aside.



5. Withdraw the probe from the evaporator coil and trace the probe cable back to the terminals at the rear of the electronic controller. Unplug from the controller.



6. Attach the new evaporator probe cable to the terminals at the rear of the electronic controller and fit the cable following the same path as the original probe cable. The probe is located between the first and second pipes, in between the eighth and ninth fins.



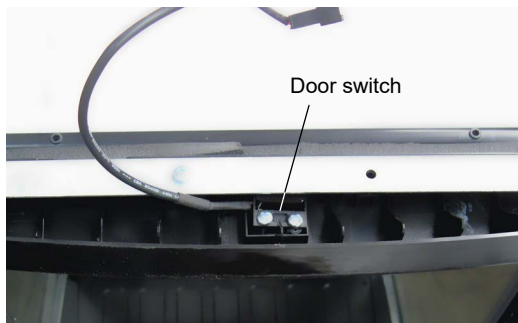
Probe entrance point

Door Switch The front door (electronic controller side) is fitted with a door switch (page 9). The switch is located under the liner bottom below the front door and is activated by a magnet at the bottom of the front door frame.

To replace the door switch

1. Isolate the chiller from the power supply, remove the shelves from the cabinet and lock/secure the doors.
2. Separate the top cabinet assembly from the bottom refrigeration system (see page 28).

3. Flip the cabinet assembly over and place gently onto its roof to access the door switch.



4. Undo and replace the door switch.
5. Reassemble the cabinet and test.

7 Troubleshooting

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

| Problem | Possible Cause | Suggestions |
|--|--|--|
| <ul style="list-style-type: none"> • Chiller not operating. | <ul style="list-style-type: none"> • Loss of power supply. | <ul style="list-style-type: none"> • Check mains power supply. |
| <ul style="list-style-type: none"> • Sign and/or Interior lights not on. | <ul style="list-style-type: none"> • Electronic controller displays 'EnS' indicating the chiller is in Energy Saving (night) mode. • Light switched off. • Electronic controller displays 'Err' indicating a refrigeration system error. • Failed LED light. | <ul style="list-style-type: none"> • Switch the light on while keeping the chiller in night mode by pressing the Light button on the electronic controller faceplate. • Change the chiller into 'Normal' mode by pressing and holding the ES button on the electronic controller faceplate, or hold the door open for ten seconds. • Switch the light on via the button on the electronic controller faceplate. • Arrange a service call. • Arrange a service call. |
| <ul style="list-style-type: none"> • Product is too warm. | <ul style="list-style-type: none"> • Frequent door opening. • Door not closing properly. • Refrigeration unit operating too hot. • Electronic controller displays 'EnS' indicating the chiller is in Energy Saving (night) mode. | <ul style="list-style-type: none"> • Limit door openings. • Check and clean door gasket. • Ensure the cabinet has good ventilation around the refrigeration unit. • Ensure the cabinet is within the maximum operating conditions. • Change the chiller into 'Normal' mode by pressing and holding the ES button on the electronic controller faceplate, or hold the door open for ten seconds. |
| <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 the chiller if necessary. • Limit door openings. • Check and clean door gasket. |
| <ul style="list-style-type: none"> • Chiller door does not shut properly. | <ul style="list-style-type: none"> • Chiller is on an uneven surface. • Door is obstructed. | <ul style="list-style-type: none"> • Level the chiller. • Check shelves and product. |

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