Food Preparation and Storage

PG500HC
PG800HC

SKOPE PEGASUS

Horizontal Gastronorm PREP Cabinets

Operating and Service Manual

MAN0460 Rev. 1.0 January 2003 edition

SKOPE® Refrigeration

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1 SPECIFICATIONS

1.1 Cabinet and Refrigeration Unit

Cabinet Construction

Exterior:	Stainless steel cabinet, doors and bench top
Interior:	Stainless steel with coved corners
Insulation:	50mm thick, polyurethane foam Cyclo-iso Pentane blowing agent: C_5H_{10}/C_5H_{12}

Dimensions

Models:	**PG500HC PREP**	**PG800HC PREP**
Height:	860 to 890mm	860 to 890mm
Width:	1750mm	2435mm
Depth:	830mm	830mm
Floor area:	1.45m^2	2.02m^2
Internal volume:	480 litres	750 litres

Refrigeration

Electronic controlled, side mounted, refrigeration unit:

Nominal capacity:	1120 Watts	1230 Watts
Compressor:	KIRBY AE16MG-3	KIRBY AE18MG
Refrigerant:	R404A	R404A
Charge:	700 grams	700 grams
Defrost:	Hot gas	Hot gas

Electrical

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

Run Amps:	5.5 Amps	8.5 Amps

Doors

Self-closing, foam filled, stainless steel, solid swing doors

Shelves

Adjustable height, white plastic coated, steel wire shelves - two per door

Table 1: Specifications

2.1 Positioning of Machine

The mains flex exits below the unit front cover. For convenience, the flex should be retrieved before the machine is positioned, when walls and partitions may make access difficult.

Ventilation

For efficient operation of machine, it is essential that adequate ventilation be provided around the refrigeration unit. Maximum recommended operating ambient temperature for the machine is 30°C.

Siting Machine

When siting the machine, avoid direct sunlight, and warm draughts etc. Adequate allowance should be made for door opening. The door has an internal torsion bar which is pretensioned at the factory. The machine must be positioned on a level surface for the door to shut and seal correctly, and to prevent the condensate tray from overflowing.

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

Maximum air movement around the open pan area of the table must not exceed 0.3 m/s. Excessive air movement will cause failure of the air curtain above the product and excessive temperature rise.

Remove all packaging material from the shelves. Fit shelf support brackets at the desired heights and relocate shelves.

2.2 Ventilation

Never store cardboard cartons or other items on top of the refrigeration unit.

Position the cabinet with minimum 50mm clearance to either back wall or side wall closest to the refrigeration unit.

Warning:

Adequate ventilation of the refrigeration unit is essential. Failure to adequately ventilate the unit voids warranty.

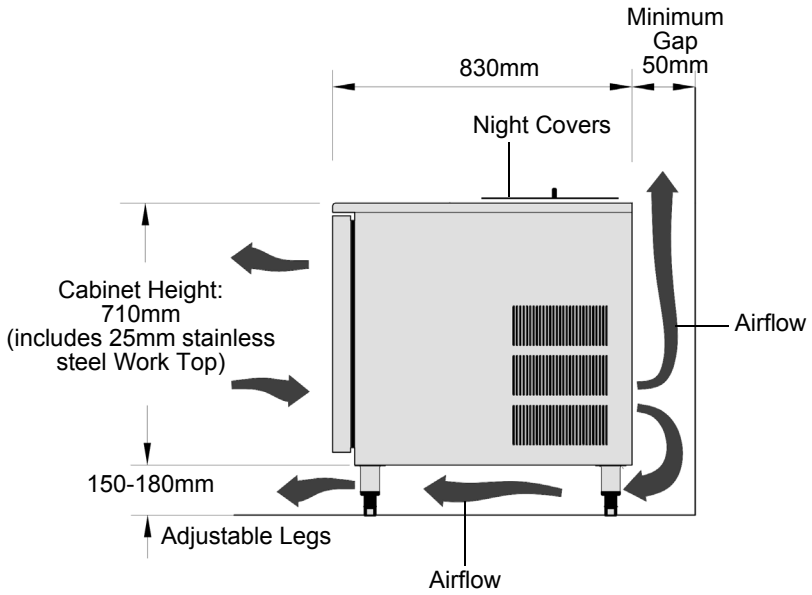

Figure 1: Airflow and Cabinet Ventilation

3 OPERATION

3.1 Safety Information

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

Warning:

Do NOT overload power supply:
Model PG500HC is rated at 5.5 Amps at 230-240 Volts
Model PG800HC is rated at 8.5 Amps at 230-240 Volts

- Only use this appliance with voltage specified on the rating label.
- Ensure adequate ventilation of SKOPE refrigeration unit.
- Condenser coil MUST be kept clean. To ensure trouble free performance, it is recommended that on a regular basis the unit be isolated from the power supply and a vacuum cleaner used to remove dust and fluff from the condenser.
- Be careful not to touch moving parts.
- Do NOT cover grilles or block the entry or exhaust of airflows.
- Do NOT probe any opening.
- Regulations require that all electrical work be carried out by authorised persons. For your own safety and that of others, ensure this is done.
- If the refrigeration unit is required to be installed or removed from the cabinet, ensure all necessary safety precautions are observed.

Caution:

Disconnect machine mains power supply before attempting to perform any electrical service or maintenance.

3.2 Operation of Machine

The operation of this machine is controlled by a pre-programmed Microprocessor Controller.

Condenser Fan

Condenser fan runs continuously, except during hot gas defrost when it switches off.

Refrigeration Run Cycle

Initiated by the controller when ‘Cabinet Ambient Probe Temperature’ is warmer than the setpoint plus the differential temperature (e.g. setpoint 2°C; differential 2°C; therefore refrigeration run initiates at temperatures warmer than 4°C).

The compressor will start and run until setpoint temperature is reached (except during defrost). The compressor has a one minute time delay, when cabinet is first plugged into power supply.

Evaporator fan will start after the ‘Defrost Probe’ drops below 10°C, and will remain running while the evaporator is below this temperature (except during defrost).

Refrigeration Off-Cycle

Refrigeration off-cycle is initiated:

- by the controller, when the ‘Cabinet Ambient Probe’ reaches the setpoint (e.g. 2°C)
- when compressor shuts off

Defrost Cycle

Defrost Cycle will override the refrigeration cycle. Initiation by either:

- 3 hourly intervals after being plugged in, or
- a manual defrost occurring, when the Defrost button on the controller is held down for 5 seconds (if keypad is enabled)

Note:

Defrost will NOT occur if the evaporator temperature is above 25°C.

Defrost Initiation

Defrost initiation is verified by checking that the:

- compressor is ON
- evaporator fan is OFF
- defrost solenoid is ON
- display flashes ‘df’ if parameter d6 = 0, see p.23
  (SKOPE setting is d6 = 1)

Defrost Termination

Defrost termination is achieved when defrost probe reaches 25°C or after 20 minutes, whichever occurs first.

Defrost termination is verified by checking:

- the defrost solenoid is OFF
- a drip time of 1 minute, then
- compressor and evaporator fan delay of one minute
- refrigeration run cycle begins

High Pressure Switch

The SKOPE PREP refrigeration unit is fitted with a 450 psig high pressure switch, which has to be manually reset.

If activated, the high pressure switch cuts power to both the refrigeration unit and cabinet, including the electronic controller.

If the high pressure switch trips, generally there are two faults:

1. Blocked condenser
2. Faulty condenser fan motor

The cut-out pressure is such that nuisance tripping should not occur. To reset the high pressure switch, in the event it trips:

1. Disconnect cabinet from power supply
2. Remove cabinet front cover
3. Clean condenser
4. Reset high pressure switch by pressing the red button under the electrical box
5. Reconnect power supply, to check operation of condenser fan motor
6. Refit cabinet front cover

Note:

If condenser fan does not start, disconnect from power supply and contact your refrigeration service technician.

3.3 Loading

Shelves may be positioned at different heights to suit various products. Always ensure that the shelf clips are securely engaged in each of the four shelf support strips. Support strips are marked '+' for easy location of shelf clips.

Product

For even cooling and efficient operation, allow air space around packages etc. Do not allow products to overhang the front of the shelf as this could prevent the door from shutting. Leave an airspace of at least 75mm (3") above packages etc. on the top shelf. Products must NOT be stored on the floor of cabinet. Ensure the pots are only filled to the maximum level, indicated by the load level labels.

3.4 Cleaning

This cabinet should be cleaned every day, to remove excess food from the 'food area'. During the cleaning procedure the cabinet should be emptied and turned off. If product is to remain in the cabinet, the night lids should be refitted. The fitting of the night lids is especially important when the plastic air grills are removed, as an excessive amount of warm air can enter the cabinet during this period.

Special care should be taken with the plastic air grilles, as once broken the unit performance will suffer due to the weakening of the air curtain above the product.

Condenser Coil

The condenser coil should be brushed clean once a month, and blown clean by qualified service personnel, every six months. The machine must be disconnected from the mains supply before cleaning condenser.

4 ELECTRONIC CONTROLLER

4.1 Controller Display

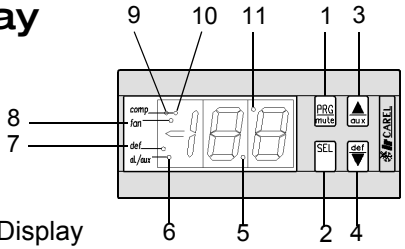

Figure 2: Controller Display

1	PRG mute	Silences alarm buzzer. Allows entry to frequent parameters section, if pressed for 5 seconds. Allows entry to configuration parameters section, if pressed simultaneously with **SEL** for 5 seconds. Locks in new parameters, and exits parameter sections. Activates reset procedure.
2	SEL	Displays setpoint in run mode. Displays selected parameter in parameter mode. Allows entry to configuration parameters section if pressed simultaneously with **PRG** for 5 seconds.
3	aux	Adjustment locked out Alters parameters in parameter mode. Activates and deactivates 'continuous refrigeration' mode with **def** key.
4	def	Adjustment locked out Activates manual defrost cycle. Alters parameters in parameter mode. Activates and deactivates 'continuous refrigeration' mode with **aux** key.
5	Decimal point indicator.	
6	Unused.	
7	Defrost cycle on indicator	
8	Evaporator fan on indicator.	
9	'Continuous refrigeration' mode on indicator (fast freeze).	
10	Compressor on indicator.	
11	Remote controller indicator.	

Table 2: Controller Functions

4.2 Controller Components

Component	Description
Microprocessor:	Located behind ventilated unit cover.
Controller Module:	Located in control box. Performs processor switching.
Module Connector Cable:	Flat black cable connecting module to microprocessor.
Probes:	2 x NTC probes are used.

Table 3: Controller Components

- A controlling probe located on a receptacle in the evaporator box, referred to as a ‘Cabinet Ambient Probe’.
- An evaporator probe located within the evaporator coil, referred to as a ‘Defrost Probe’.

4.3 Operation Of Controller

Microprocessor

The operation of this cooler is controlled by a pre-programmed microprocessor. The Microprocessor display indicates the temperature of the cabinet ambient probe, except during a defrost where the temperature of the cabinet probe is locked in, and during an alarm condition.

The display also has LED indicators showing the activation of the compressor, the fan and the defrost. At alarm activation, the display indicates the type of alarm signal, and an audible alarm sounds. The alarm can be muted at the controller.

Changing Controller Settings

To access / entry:

1. Press and hold PRG and SEL simultaneously for more than 5 seconds, until **00** is displayed.
2. Press aux (up) until **22** is displayed.
3. Press SEL to confirm selection. The first parameter **/C** is displayed.

To turn Keypad on:

1. Follow Access / Entry above, until the first parameter **/C** is displayed.
2. Press def (down) two times, until **H2** is displayed.
3. Press SEL to display the ‘value’ of the parameter.
4. Press aux (up) to increase or def (down) to decrease, until **01** is displayed.
5. Press SEL to accept the ‘value’.
6. Press PRG to lock in new value and to exit program.

Setpoint

Factory setting:	2°C
Maximum:	6°C
Minimum:	0°C

To adjust Setpoint (with keypad on):

1. Press SEL key for 1 second and the 'Setpoint' will be displayed. On releasing the key, the display will flash.
2. To alter the 'Setpoint', press aux (up) or def (down).
3. Press SEL to lock in the value and return to cabinet temperature.

Manual Defrost (with keypad on)

Press def (down) key for more than 5 seconds to manually initiate a defrost.

Continuous Refrigeration (with keypad on)

Press aux (up) and def (down) together, (down key first) to initiate a 'Continuous Refrigeration' mode. The compressor will run without interruption to the parameter '**cc**' (6 hours: SKOPE programme). Its purpose is to achieve a fast product pull-down.

Display Function

During run mode, the display shows the value measured by the 'Cabinet Ambient Probe'. In alarm status, the display indicates the relative alarm code.

Buzzer Off

Press mute key to silence the buzzer. The alarm display remains while the alarm condition exists.

4.4 Parameters

Frequent Parameters 'F' (with keypad on)

No password is required to enter this section.

1. Press PRG key for more than 5 seconds to enter this parameter section.
2. Press aux (up) or def (down) to scroll through the parameters.

Configuration Parameters 'C'

A password is required to enter.

1. Press PRG and SEL simultaneously for more than 5 seconds. **00** is displayed.
2. Press aux (up) or def (down) until **22** is displayed.
3. Press SEL to confirm. The first modifiable parameter code is displayed.

Parameter Modification

1. Press aux (up) or def (down) to show the code of the parameter that has to be changed.
2. Press SEL to display the selected parameter value.
3. Press aux (up) or def (down) to increase or decrease the value.
4. Press SEL to temporarily confirm the new value, and display its code.
5. Repeat above procedures to alter further parameters.
6. Press PRG to lock in the new parameters and exit parameter modification procedure.

Special Note:

For parameters **A6** and **c4**: If parameter = 0; the compressor would not run at all. If parameter = 100; the compressor would run continuously.

4.4 Parameters

SKOPE Parameters for CAREL Controller IR32POLBRO

SETPOINT: 2°C to 4°C

SKOPE Settings			Type	Min	Max	Def	PARAMETER
PA		22	C	00	199	22	Password
							PROBE PARAMETERS
/0	0	NTC probe	n.a.	0	1	0	Type of probe used (NTC or PTC). Available after 'Reset Procedure'
/C	00	0°C	F	-20	20	0	Calibration offset for cabinet temperature display (0.1°C)
/2	04	-	C	1	15	4	Probe reading stability (lower the number, faster the response)
/3	08	-	C	1	15	8	Probe reading speed (lower the number, slower the response)
/4	00	probe	C	0	100	0	Designation as controlling probe
/5	00	°C	C	0	1	0	Units of temperature measurement
/6	00	Yes	C	0	1	0	Decimal point display
							CYCLE PARAMETERS
rd	2.0	2°C	F	0.1	20	2	Refrigeration differential
r1	0	0°C	C	-40	r2	-40	Minimum allowable set point
r2	6	6°C	C	r1	199	90	Maximum allowable set point
r3	01	Yes	C	0	1	0	Enabling of ED alarm (defrost interrupted because maximum duration has been reached, parameter dP) 0=No, 1=Yes
r4	3.0	3	C	0	20	3	Not used. Must be 3
r5	01	Yes	C	0	1	0	Enabling of minimum / maximum temperature monitoring
rt	-	-	F	0	199	-	Actual interval in maximum / minimum temperature reading
rH	-	-	F	-50	+90	-	Maximum temperature reading in the 'rt' interval
rL	-	-	F	-50	+90	-	Minimum temperature reading in the 'rt' interval
							COMPRESSOR PARAMETERS
c0	01	1 min	C	0	15	0	Compressor and evaporator fan start delay at power on
c1	03	3 mins	C	0	15	0	Minimum time between compressor starts
c2	03	3 mins	C	0	15	0	Minimum compressor OFF time
c3	00	0	C	0	15	0	Minimum compressor ON time
c4	60	60 mins	C	0	100	0	Comp backup for 'Ambient' probe failure (On for c4, off for 15 min)
cc	04	4 hours	C	0	15	4	Duration of 'Continuous Refrigeration Mode'
c6	02	2 hours	C	0	15	2	Duration of alarm override after 'Continuous Refrigeration Mode'
							DEFROST PARAMETERS
d0	01	Hot Gas	C	0	1	0	Type of defrost
dI	03	3 hours	F	0	199	8	Time interval between defrosts
dt	25	25°C	F	-40	199	4	Defrost termination temperature
dP	20	20 mins	F	1	199	30	Maximum defrost time
d4	00	No	C	0	1	0	Defrost at cabinet plug in
d5	00	No	C	0	199	0	Defrost delay at cabinet plug in
d6	01	Yes	C	0	1	1	Lock in temperature display during defrost
dd	03	3 mins	F	0	15	2	Defrost drip time, before compressor and evaporator fan start
d8	01	1 hour	F	0	15	1	Continuation of d6 at defrost end (until setpoint or d8 elapses)
d9	00	No	C	0	1	0	Compressor protection times observed at defrost (c1, c2, c3)
d/	-	-	F	n.a	n.a	n.a	Evaporator temperature (via defrost probe) is displayed
dC	00	hrs / mins	C	0	1	0	Time basis for parameter "dI" and "dp"

Table 4: CAREL Controller Parameters - continued on next page

4.4 Parameters

SKOPE Parameters for CAREL Controller IR32POLBRO

SETPOINT: 2°C to 4°C

SKOPE Settings			Type	Min	Max	Def	PARAMETER
							ALARM PARAMETERS
A0	1.0	1.0°C	C	0.1	20	0.2	Alarm and fan differential
AL	6	-2°C /-1°C	F	0	199	10	Low temp alarm (On=Setpoint -AL-A0) (Off=Setpoint -AL)
AH	6	10°C /11°C	F	0	199	10	High temp alarm (On=Setpoint +AH+A0) (Off=Setpoint +AH)
AD	60	60 minutes	C	0	199	120	Alarm delay time
A4	00	Off	C	0	5	0	Immediate external alarm i.e. High pressure switch trip
A5	00	-	C	0	5	0	Not used. must be 0
A6	99	99 minutes	C	0	100	0	Compressor run lock time due to A4 function. Compressor will still cycle with HP switch
A7	00	-	C	0	199	0	Not used. must be 0
							FAN PARAMETERS
F0	02	ON	C	0	1	0	Evap. fan control type (controlled by Evap. Defrost Probe)
F1	6.0	10°C /11°C	F	0	20	5	Evaporator fan start temperature (On=Setpoint +F1 -A0) (Off=Setpoint =F1)
F2	00	No	C	0	1	1	Fans off while compressor is off
F3	01	Yes	C	0	1	1	Fans off during defrost
Fd	01	1 minute	F	0	15	1	Fan delay after defrost
							OTHER SELECTIONS
H0	00	-	C	0	15	0	Serial address
H1	00	-	C	0	1	1	Not used. Must be 0
H2	00	No	C	0	3	1	Enable keypad and remote control (Must be '01' to enable)
H3	00	00	C	0	199	0	Password for remote control

Warning:

The above parameters are set exclusively for the SKOPE PREP cabinet program, with its dedicated CAREL controller.

Any alterations from this program may adversely effect the SKOPE PREP cabinet operation.

For full specifications, a detailed CAREL controller manual is available.

Table 4: CAREL Controller Parameters - continued from previous page.

4.5 Alarms and Signals

A flashing LED indicates a time delay on the indicated function. The following is a list of the LED displays.

EI flashing...

- Indicates faulty defrost probe.
- Defrost cycle will only terminate on 'maximum defrost time' (**d4**).
- Evaporator fan will start immediately after its time delay (**dd**, **Fd**, **c0**).
- The refrigeration cycle will continue as normal.
- The alarm buzzer does not sound.

EO displayed...

- Indicates a faulty cabinet ambient probe.
- The controller switches to parameter **c4**; where the compressor will cycle with run intervals of **c4** time, followed by 15 minutes off. No defrost is possible. The alarm is on.

LO flashing...

- Indicates low temperature alarm. The cabinet has reached -3°C (parameter **AL** =10).
- The alarm is overridden when temperature returns above -2°C (parameter **AO** =1).

HI flashing...

- Indicates high temperature alarm. The cabinet has been warmer than 10°C for over 60 minutes.
- The alarm is overridden when temperature returns below -10°C.
- Check parameters; **AH** =9, **AO** =1, **Ad** = 60.

Ed flashing...

Defrost has terminated on 'maximum defrost time' function (**dP**). Confirm **dt**, **dP** and **d4** parameters are to SKOPE specification. Possible causes of **Ed** alarm:

- High cabinet usage / high humidity, causing excessive ice build up.
- Defrost failure: If the defrost solenoid has failed; check electrical connections and cables.
- Refrigeration unit defrost Amps is rated at 240 Volts, and includes condenser fan motor, but not cabinet which must be unplugged at 'cabinet' ENSTO connection on control box to test.
- Faulty defrost probe: When this has occurred **EI** and **Ed** blinks. If a faulty defrost probe occurs, the controller will only terminate the defrost cycle on time (see **EI** fault, on previous page).

df flashing...

To indicate defrost in progress if parameter **d6** =0 (If programmed to SKOPE settings, **d6** =1).

EA, EB or EE displayed...

Data acquisition failure. Reset procedure must be performed.

Reset Procedure

Performed by unplugging the cabinet, then press PRG key, keeping it pressed while plugging in the cabinet. The display will then show '**_C_**'. After a few seconds, access is gained to the parameters which will have reverted to the default settings; therefore the controller must be re-programmed to the SKOPE settings.

After modifying the parameters, press PRG key to exit the procedure and return to run mode.

If **EE** returns after the reset procedure, press def (down) until **EE** disappears. If it will not clear, the controller is defective.

Controller Failure

Possible causes of controller failure are:

- high humidity (over 85% R.H.)
- excessive vibration or shock
- exposure to moisture
- exposure to corrosive or pollutant gases
- strong magnetic and/or radio interference
- exposure to direct sunlight or weather

4.6 Replacement

Microprocessor Removal

NOTE: Take care to avoid scratching visible surfaces of the refrigerator.

To remove the microprocessor from the electrical box:

1. Disconnect machine from power supply.
2. Remove ventilated plain facia panel by removing the two screws at base of facia panel, and then sliding panel vertically down 30-40mm, to clear mounting lugs. This will allow access to the electrical box.
3. Remove three screws from the electrical box cover, and manoeuvre cover into a position which allows ready access to the screw terminals at the top rear of the microprocessor.
4. Draw microprocessor out from the mounting clip.
5. Disconnect the microprocessor cables. A small screwdriver is required

Microprocessor Installation

NOTE: Take care to avoid scratching visible surfaces of the refrigerator.

To refit the microprocessor into the electrical box:

1. With the machine disconnected from power supply, insert rear of microprocessor into the mounting clip on electrical box cover.
2. Push flat black connector cable into receptacle at rear of microprocessor, until it latches into place.
3. Connect probes into back of controller.
4. Refit the cover to electrical box, using three screws.
5. Mount ventilated plain facia panel in position on refrigerator. Ensure microprocessor cables are out of sight and clear of moving parts.

5 SERVICE INSTRUCTIONS

5.1 System Service Notes

R404A Refrigerant

The refrigeration system utilises R404A refrigerant, which is a near azeotropic blend refrigerant. The compressor uses a Polyolester (POE) oil. There are special service handling requirements. Dedicated HFC equipment must be used:

- HFC refrigerant gauges
- HFC vacuum pump (with POE oil)
- R404A pressure temperature chart
- HFC compatible driers
- HFC leak detector (soap bubbles may be adequate)

Table 5: Dedicated HFC Equipment

With HFC R404A being a blend refrigerant, component separation is possible in the gas state. Therefore the system must be liquid charged. The liquid refrigerant should be very slowly charged into the compressor service valve which is cracked off the back seat by only 1/4 of a turn. R404A is a relatively stable blend.

Generally a partial loss of system refrigerant should not effect the composition of the remaining refrigerant to the point of effecting system performance, if this refrigerant is recycled.

POE Oil

The POE oil is highly hygroscopic, and therefore the compressor cannot be open to the atmosphere for longer than 15 minutes, without moisture contamination of the oil occurring. The HFC drier must be replaced during every refrigerant service procedure.

Sight Glass

The Danfoss SGN sight glass's primary function is to indicate system moisture content. The sight glass must always indicate dry refrigerant; if this is not so, the HFC drier must be replaced and the system evacuated before the compressor is damaged.

The sight glass will not necessarily indicate a correctly charged system, but it will indicate a system that is low on refrigerant. For a system to be low on refrigerant, a leak has occurred, which must be located.

Repairing a leak

Once the leak is found and the remaining refrigerant is removed, the compressor must be isolated to prevent moisture contaminating the compressor oil.

The method of isolation will vary depending on where the leak is and the time the system needs to be open. Slowly purging the compressor with dry nitrogen, or front seating the compressor service valve and brazing the discharge line closed are two suggested methods.

The leak can then be repaired, the drier replaced, the system reconnected, evacuated and charged. Always charge using scales.

The cooler has no high side pressure port. Generally it should not be required, but if it is necessary to measure discharge pressure or for a quick evacuation, a line tap valve can be connected to the liquid line process tube, and later must be removed.

Vapour must not be vented off the charging cylinder. To fully charge the cylinder, it should be evacuated and chilled.

5.2 Pre-Service Check Information

- Check setpoint by pressing SEL key (SKOPE setting 2°C).
- Check the airflow is not restricted by product blocking either discharge or return air-ports. Ensure that no product is stored below the bottom shelf.
- During and after defrost the display locks onto the last displayed temperature until the system attains setpoint or after 60 minutes the real temperature is shown again.
- Check that system pressures are within normal ranges for the ambient conditions and cabinet temperatures.

Low pressure readings

Possible reasons for low pressure readings (below 10psi) are:

- low refrigeration load
- gas leak/s
- restricted expansion valve
- frozen evaporator coil

Frozen evaporator coil

Possible causes of frozen evaporator coil are:

- evaporator fan failure
- defrost failure
- gas leak

5.3 Refrigeration Unit

SKOPE Refrigeration Unit Removal

To remove the refrigeration unit from the cabinet:

1. Disconnect power supply from unit.
2. Remove the screws from bottom of unit cover, and slide the cover down to remove. Place the unit cover to the side, taking care not to damage it.
3. Disconnect the ENSTO plug, and remove the screw holding the unit to the cabinet.
4. Remove the four screws holding the air non-return gasket (opposite side to locating screw).
5. Slide unit forward, and out of cabinet.

Caution:

The refrigeration unit weight is approximately 68kg. Ensure all hazards are allowed for when removing unit.

Condenser Fan/Motor Replacement

To replace the condenser fan or fan motor, after removing the unit:

1. Disconnect motor flex from control box.
2. Undo the three screws from motor mounting bracket, and remove complete assembly. Remove securing cable ties, if necessary.

Evaporator Fan/Motor Replacement

To replace the evaporator fan or fan motor, after removing the unit:

1. Undo the screws from motor mounting bracket and remove complete assembly.
2. Ensure motor bracket is replaced in correct position.
3. On replacement, carefully reseal flex hole in evaporator box.

Probe Fault

If a faulty probe is signalled:

1. Remove refrigeration unit (see instructions 5.3, on page 30).
2. Remove control box cover and securing cable ties.
3. Check the cable and its terminations.
4. Check probe resistance in ice water (resistance should be 27k ohms at 0°C).
5. Replace probe if necessary.
6. Ensure sensor is fitted in original position, and re-assemble.

Re-Installing Refrigeration Unit

To allow refrigeration unit to slide back in to the unit compartment, use insulation tape (or similar) to temporarily hold the spring loaded stainless steel duct baffle, flush with the cabinet wall. Note: the tape must be located in such a manner that it can be easily removed after the refrigeration unit is fitted. To re-install the refrigeration unit:

1. Lift refrigeration unit into position, and carefully slide back into unit compartment.
2. Ensure the unit locating bracket, engages with the mating bracket in the back corner of the unit compartment. To check the locating brackets have correctly engaged, inspect from the back of cabinet through the small air vents.
3. Replace front locating screw, which will pull the refrigeration unit up against the cabinet face.
4. Remove the temporary fixing tape from the stainless steel duct baffle, accessed from inside the cabinet.
5. Refit the ENSTO plug underneath control box.
6. Refit vertical air non-return gasket to edge of unit.
7. Start and run refrigeration unit, to check operation.
8. Refit unit front cover.

5.4 Solid Door

Door Alignment

This can be achieved by releasing the bottom hinge fixing bracket. The bracket is provided with slots allowing alignment adjustment.

Door Gasket Replacement

The door gaskets simply clip into the door frame extrusion and may be removed for repair or replacement simply by peeling from frame, starting at corner. New gaskets, when fitted, may be lightly lubricated with a clear silicone grease or similar compound. This will lessen the possibility of the gasket rolling. Should the gasket be out of shape when in place, use hot air (i.e. from hair drier) to realign

Solid Door Removal

Unscrew door bottom hinge bracket, and slide door down to remove from top hinge.

Solid Door Tension

The solid door hinge mechanism has a preset tension and is non-adjustable. Ensure that the square notch in the hinge bracket mates correctly with the door hinge mechanism when replacing.

5.4 Solid Door

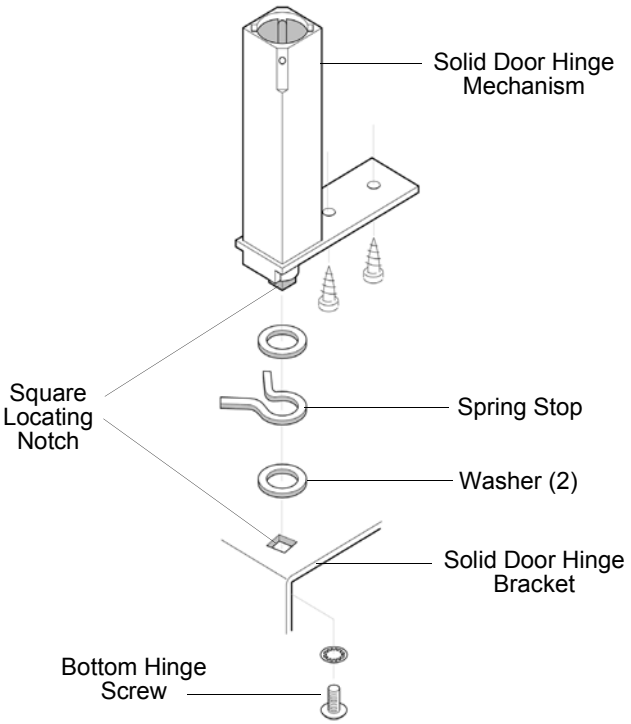

Figure 3: Solid Door Hinge Mechanism

5.5 Pressure Temperature Chart

TEMPERATURE		R134a		R404A	
°F	°C	KPa	psig	KPa	psig
-29.2	-34	-32	9.4	71	10
-27.4	-33	-28	8.4	79	11
-25.6	-32	-25	7.3	86	13
-23.8	-31	-21	6.2	94	14
-22.0	-30	-17	5.0	103	15
-20.0	-29	-13	3.8	111	16
-18.4	-28	-9	2.6	120	17
-16.6	-27	-4	1.3	129	19
-14.8	-26	0	0.0	138	20
-13.0	-25	5	0.7	148	21
-11.2	-24	10	1.4	158	23
-9.4	-23	15	2.2	168	24
-7.6	-22	20	2.9	179	26
-5.8	-21	26	3.7	189	27
-4.0	-20	31	4.5	200	29
-2.2	-19	37	5.4	212	31
-0.4	-18	43	6.3	224	32
1.4	-17	49	7.2	236	34
3.2	-16	56	8.1	248	36
5.0	-15	63	9.1	261	38
6.8	-14	69	10.0	274	40
8.6	-13	77	11.0	288	42
10.4	-12	84	12.0	302	44
12.2	-11	91	13.0	316	46
14.0	-10	99	14.0	331	48
15.8	-9	107	16.0	346	50
17.6	-8	116	17.0	361	52
19.4	-7	124	18.0	377	55
21.2	-6	133	19.0	393	57
23.0	-5	142	21.0	410	59
24.8	-4	151	22.0	427	62
26.6	-3	161	23.0	445	65
28.4	-2	171	25.0	463	67
30.2	-1	181	26.0	481	70
32.0	0	192	28.0	500	73
33.8	1	202	29.0	519	75
35.6	2	213	31.0	539	78
37.4	3	225	33.0	559	81
39.2	4	237	34.0	580	84
41.0	5	249	36.0	601	87
42.8	6	261	38.0	623	90
44.6	7	274	40.0	645	94
46.8	8	287	42.0	668	97
48.2	9	300	44.0	691	100
50.0	10	314	46.0	715	104

Table 6: Pressure Temperature Chart

5.6 Trouble Shooting

Complaint	Possible Cause	Repair
1. Cabinet not operating.	Loss of power supply.	Check power supply.
	High pressure switch cut-out, due to over heating.	Check, and clean condenser. Check unit operation, and reset pressure switch (see p.7).
2. Compressor will not start - no hum.	Fuse removed or blown. No power.	Replace fuse. Check reason.
	Overload protector tripped.	Refer to electrical section.
	Thermostat stuck in open position.	Repair or replace control.
	Thermostat off, due to cold location.	Relocate control.
	Wiring improper, or loose.	Check wiring against diagram.
3. Compressor will not start - hums but trips on overload protector.	Improperly wired.	Check wiring against diagram.
	Low voltage to unit.	Determine reason and correct.
	Start capacitor defective on CSIR or CSR motor.	Determine reason and replace.
	Run capacitor defective on PSC motor.	Determine reason and replace.
	Relay failing to close.	Determine reason and correct. Replace if necessary.
	Compressor motor has a winding open or shorted.	Check resistance values. Replace compressor if necessary.
	Internal mechanical trouble in compressor.	Replace compressor.

Table 7: Trouble Shooting Chart

5.6 Trouble Shooting

Complaint	Possible Cause	Repair
4. Compressor starts, but does not switch off.	Improperly wired.	Check wiring against diagram.
	Low voltage to unit.	Determine reason and correct.
	Relay failing to open, due to welded contacts or relay incorrectly mounted.	Determine reason and correct. Replace if necessary.
	Run capacitor defective on CSR motor.	Determine reason and replace.
	Excessively high discharge pressure.	Clean condenser. Check power input. Possible overcharge, insufficient condenser cooling, or non-condensible gasses.
	Compressor motor has winding open or shorted. Check continuity and resistance.	Replace compressor if faulty.
	Internal mechanical trouble in compressor (tight). May be lubrication.	Replace compressor.
5. Compressor starts and runs, but short cycles on overload protector (relay may chatter on RSIR, CSIR and CSR motors).	Additional current passing through overload protector.	Check wiring diagram. Check for added fan motors etc., connected to wrong side of protector.
	Low voltage to unit.	Determine reason and correct.
	Overload protector defective.	Check current, replace protector.
	Run capacitor defective on CSR motor.	Determine reason and replace.
	Excessive discharge pressure.	Check condenser, check ventilation, check for restrictions in refrigeration system.
	Suction pressure too high.	Check for possibility of misapplication.
	Compressor too hot - insufficient suction gas cooling.	Check refrigerant charge (fix leak), add if necessary. Check return vapour temperature and suction superheat.
	Comp'r motor has a winding shorted.	Replace compressor.

Table 7: Trouble Shooting Chart - continued

5.6 Trouble Shooting

Complaint	Possible Cause	Repair
6. Unit runs OK, but short cycles.	Overload protector.	See section 4 on p.21.
	Thermostat: requires adjustment or incorrectly positioned.	Adjust or relocate thermostat.
	Incorrect refrigerant charge.	Adjust refrigerant charge.
7. Unit operates long or continuously. Unsatisfactory cabinet temperature.	Short of refrigerant.	Fix leak, and add charge.
	Overcharge of refrigerant.	Remove refrigerant to correct charge.
	Thermostat not cooling correctly.	Adjust thermostat (clockwise colder), and check thermostat bulb location. If necessary, replace thermostat.
	Freezer has excessive load.	Establish load within limits.
	Evaporator coil iced.	Defrost evaporator, check refrigeration. Check thermostat. Check door closing, seals etc.
	Restriction in refrigeration system.	Determine location and clear restriction. Flush with dry nitrogen. Replace component if blockage will not clear.
	Dirty condenser.	Clean condenser. Advise client how to regularly clean condenser.
	Inadequate air circulation.	Internal: Improve air movement, alloe airflow around stock. External: Remove any restrictions to condensing ventilation.
	Compressor not pumping efficiently.	Replace compressor.
	Filter dirty (if applicable).	Clean or replace.
	Faulty fan motor.	Check rotation. Replace if necessary.

Table 7: Trouble Shooting Chart - continued

5.6 Trouble Shooting

Complaint	Possible Cause	Repair
8. Start capacitor open, shorted or blown.	Relay contact not opening properly.	Clean contacts, or replace relay if necessary.
	Prolonged operation on start cycle due to: (a) Low voltage to unit. (b) Improper relay.	(a) Determine reason and correct. (b) Replace relay.
	Excessive short cycling.	Determine reason for short cycling (see section 5 on p.21), and correct.
	Improper capacitor.	Determine correct size and replace.
9. Relay defective or burned out.	Incorrect relay.	Check and replace.
	Line voltage too high or too low.	Determine reason and correct.
	Excessive short cycling.	Determine reason (see section 5 on p.21), and correct.
	Relay being influenced by loose vibrating mount.	Remount rigidly.
10. Suction line frosted.	Evaporator fan not running.	Determine reason and correct.
	Overcharge of refrigerant capillary systems.	Correct charge.
11. Unit noisy.	Loose parts or mountings.	Find and tighten.
	Tubing rattle.	Reform to be free of contact.
	Bent fan blade causing vibration.	Replace blade.
	Fan motor bearing worn.	Replace motor.

Table 7: Trouble Shooting Chart - continued

5.7 Notes

6 WIRING DIAGRAM

6.1 Model: PG500HC, PG800HC PREP

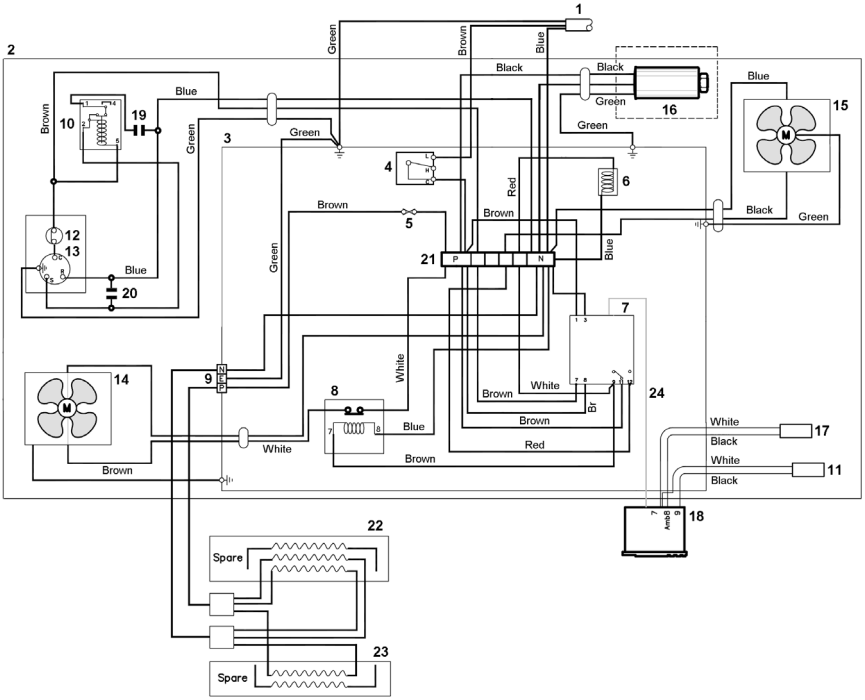

Figure 4: Wiring Diagram

6 WIRING DIAGRAM

6.1 Model: PG500HC, PG800HC PREP

Item	Part Description
1	Mains Supply Flex
2	Refrigeration Unit
3	Control Box
4	High Pressure Switch
5	15 Amp Fuse
6	Hot Gas Solenoid
7	CAREL Module
8	Defrost Relay
9	ENSTO Socket
10	Compressor Start Relay (‘Potential’ relay)
11	Defrost Probe
12	Compressor Overload
13	Compressor
14	Condenser Fan
15	Evaporator Fan
16	R.F.I. Suppression Capacitor (optional)
17	Ambient Probe
18	CAREL Controller
19	Start Capacitor
20	Run Capacitor
21	Terminal Block
22	Cabinet Top Heater Element
23	Pillar Heater Element
24	CAREL Module Supply Cable

7.1 Cabinet Assembly

Part Description	SKOPE Part Numbers	
Models	**PG500HC**	**PG800HC**
Unit Cover	H4100/124-S2	H4100/124-S2
Air Deflector Plastic Grille	H3229/G58	H3329/G58
Grille Holder	H3229/G50-S1	H3329/G50-S1
Shelf	WRKH2100/160	WRKH2100/160
Tray Slide	H2100/154-S2	H2100/154-S2
6” Adjustable Leg	SXX5893	SXX5893
4” Adjustable Leg	SXX6482	SXX6482
Adjustable Swivel Castor	SXX6181	SXX6181
Adjustable Swivel Castor (lockable)	SXX6182	SXX6182

7.2 Bench Top

Part Description	SKOPE Part Numbers	
Model	**PG500HC**	**PG800HC**
Clear Plastic Night Cover	RCH3229/G03	RCH3329/G03
1/3 Stainless Steel Pan - 65mm	SXX0066	SXX0066
1/4 Stainless Steel Pan - 65mm	SXX0252	SXX0252
1/6 Stainless Steel Pan - 65mm	SXX0068	SXX0068
1/6 Stainless Steel Pan - 100mm	SXX0069	SXX0069
1/2 Stainless Steel Lid	SXX0357	SXX0357
1/3 Stainless Steel Lid	SXX0256	SXX0256
1/4 Stainless Steel Lid	SXX0255	SXX0255
Pan Support Bar - Vertical	H3229/G90	H3229/G90
Pan Support Bar - Horizontal	H3229/G91	H3229/G91

7.3 Solid Door

Part Description	SKOPE Part Numbers
Solid Door Assembly - R/H	H3100/D40-S2/S2
Solid Door Assembly - L/H	H3100/D41-S2/S2
Solid Door Gasket	GKT8322
Door Hinge Mechanism	HIN5780
Top Hinge - R/H	H3100/110-49
Top Hinge - L/H	H3100/111-49
Bottom Hinge - R/H	H2200/D55R-49
Bottom Hinge - L/H	H2200/D55L-49
Bottom Hinge Support Bracket	H2100/G12-49

7.4 Refrigeration Unit

Part Description	SKOPE Part Numbers	
Model	**PG500HC**	**PG800HC**
Refrigeration Unit Assembly	H53AKR-130X	H33AKR-130X
Foamed Evaporator Box	H4100/970L	H4100/970L
Compressor	CPR0146	CPR0147
Evaporator Assembly	H53AK/502	H53AK/502
Evaporator Fan Motor	ELM9614	ELM9614
Evaporator Coil	CLS9665	CLS9665
Condenser Coil	CLS9317	CLS9317
Dryer	DRY6110	DRY6110
Pressure Switch	ELS0157	ELS0157
Hot Gas Solenoid	ELZ7654	ELZ7654
OMROM Relay	ELR6183	ELR6183
Unit Base	H4100/994-32	H4100/994-32
Discharge Line Assembly	H53AK/255	H53AK/255
Condenser Motor Assembly	V4500/404	V4500/404
Thermal Mass	V6301/784-32	V6301/784-32
Fan Blade	FAN7355	FAN7355
Sight Glass	REF7622	REF7622
Control Box Assembly	H53AK/E50X	H53AK/E50X
RFI Suppression Capacitor	ELC8068	ELC8068
3.0 Amp Ceramic Fuse	ELZ9654	ELZ9654
CAREL Controller	ELZ7641	ELZ7641
CAREL 4 Relay Module	ELZ9308	ELZ9308
Module Supply Cable	ELZ7643	ELZ7643
Probe	ELZ7644	ELZ7644

7.5 Notes