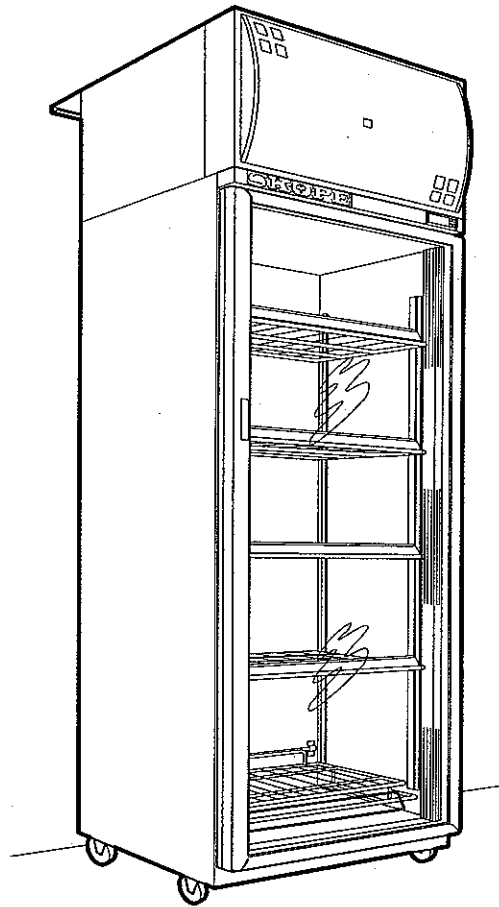


SKOPE®

INDUSTRIES LIMITED

SKF650 Parts & Service Manual



SKF650



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is accredited to the
International Quality
Assurance System
ISO 9002

**SKF650
Single Door
Freezer**

2001 Edition

MANUFACTURED BY SKOPE INDUSTRIES LIMITED

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is a registered company
of the Republic of South Africa
with registration number
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Quality International) and
IAS-ANZ (International
Assurance System - Australia
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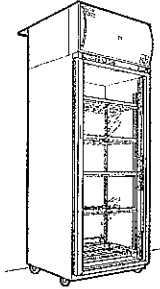


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SKF650 FREEZER

Note !
*Servicing and replacement of parts **MUST NOT** be attempted while the machine is connected to mains supply.*

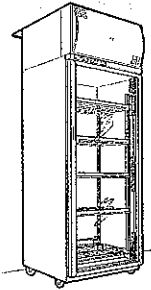


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SKF650 FREEZER

S P E C I F I C A T I O N S

CABINET CONSTRUCTION

Exterior:	White epoxy powder on galvanised steel
Interior:	White epoxy powder on galvanised steel
Insulation:	75mm thick, direct injected, polyurethane foam

DIMENSIONS

Height:	with standard castors: 2195mm with adjustable castors: 2215 - 2230mm
Width:	740mm
Depth:	800mm (includes 100mm back panel)
Weight:	199 kg
Internal Volume:	520 litre

DOOR

Triple glazed, toughened safety glass, self-closing, heated door with silver anodised aluminium frame

SHELVES

Plastic coated steel wire construction. Adjustable for height
Fixed bottom shelf (hinged for cleaning purposes)

ELECTRICAL

220-240 Volts a.c. 50 Hz, single phase power supply
6.8 Amps maximum

REFRIGERATION UNIT

Top mounted SKOPE Cyclone® unit
Induced draught condenser and evaporator coils

Models	SKF650E-D	SKF650-D
Part number:	V6338/375	V6358/375
Compressor:	Kirby AJ26LZ	Danfoss SC18CL
Displacement:	26cc	18cc
Duty (SST -30°C):	695 Watts	525 Watts
Refrigerant:	R404A	R404A
Charge:	650 grams	565 grams

ELECTRICAL

220-240 Volts a.c. 50 Hz, single phase power supply

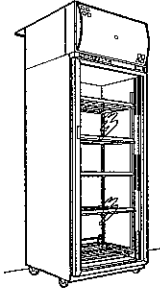
Unit Amps:	Run	4.2 A	4.0 A
	Defrost	4.8 A	4.8 A



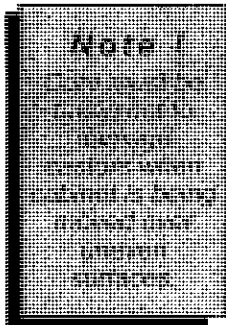
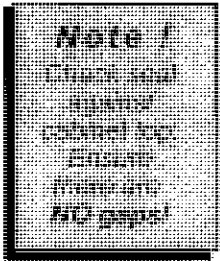
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SKOPE Industries Limited reserve the right to alter specifications without notice.

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SKF650 FREEZER



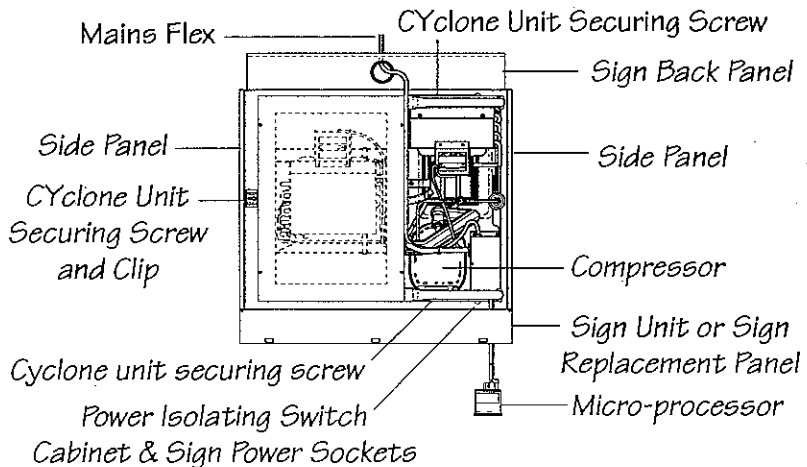
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INSTALLATION

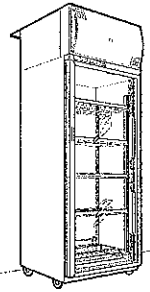
If the SKOPE SKF650 cabinet has been supplied with the SKOPE Cyclone® unit and sign assembly already attached, commence installation at "Positioning of Machine" on next page.

ASSEMBLY INSTRUCTIONS

- Remove wooden packing from unit where applicable.
- Lift the SKOPE Cyclone® unit onto the cabinet top. Steps or a platform about 1 metre high are suggested. Note: Cyclone® Unit weight = 57.5 Kg.
- Take care to avoid damaging sealing strips on underside of the SKOPE Cyclone® unit and cabinet power supply flex.
- Fix unit to cabinet top by screwing the three fixing screws provided firmly down. The unit should be flush with the back of the cabinet when positioned correctly.
- Check seal against cabinet top - ensure there are **No gaps!**
- Fit side panels onto cabinet by sliding the two slots under the screws on the cabinet top. These screws should be raised approximately 1.5mm off the cabinet top.
- Fit mains flex through the exit hole in the top of the sign back.
- Clip sign back panel into place.
- Connect "cabinet" and "sign" plugs into power sockets, where applicable.
- Fit the Microprocessor by extending the controller plug and the controller loom through the control panel cutout and connect them into the microprocessor. Push microprocessor into control panel cutout for final location. (pages 4.7, 4.8)
- Connect illuminated sign into sign power socket and check that the power isolating switch on the unit is in the ON position. Clip sign unit or sign replacement panel into place.
- Proceed with installation as outlined in "Positioning of Machine."



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SKF650 FREEZER

Note !
Adequate ventilation is essential.

Note !
Please advise client to never store cardboard cartons or other items on top of the refrigeration unit.
Adequate ventilation is essential.



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INSTALLATION

POSITIONING OF MACHINE

The mains flex exits through the rear panel behind the refrigeration unit. The flex should be retrieved before the machine is positioned, when walls and partitions may make access difficult.

When positioning the machine, a gap must be left between the top of the sign panels and ceiling, of at least 200mm.

Adequate ventilation must be provided above the SKOPE Cyclone® unit for efficient operation. Maximum recommended ambient temperature 32°C.

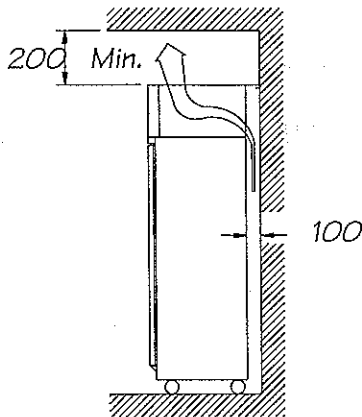
Avoid direct sunlight, warm draughts etc.

When siting the machine, adequate allowance should be made for door opening. The door has an internal torsion bar which is pretensioned at the factory and 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.

Before the machine is positioned, ensure that the condenser fan is unobstructed and free to rotate.

VENTILATION

Freezer cabinet must have the sign back or the back duct kit fitted to ensure that the machine cannot be positioned closer than 100mm to a wall, and to assist condenser airflow.



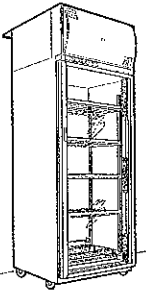
Adequate ventilation is essential.

Positioning the machine closer than 100mm will result in freezer unit failure. Air surrounding condenser must not exceed 40°C.

NOTE!
For installations where the freezer is to be built in, see page 2.3.

WARNING!
Never store cardboard cartons or other items on top of the refrigeration unit.
Adequate ventilation is essential.

SKOPE®



SKF650 FREEZER

Note !

Freezer cabinet must have the sign back or the Back Duct Kit fitted to ensure that the machine cannot be positioned closer than 100mm to a wall, and to assist condenser airflow.

Note !

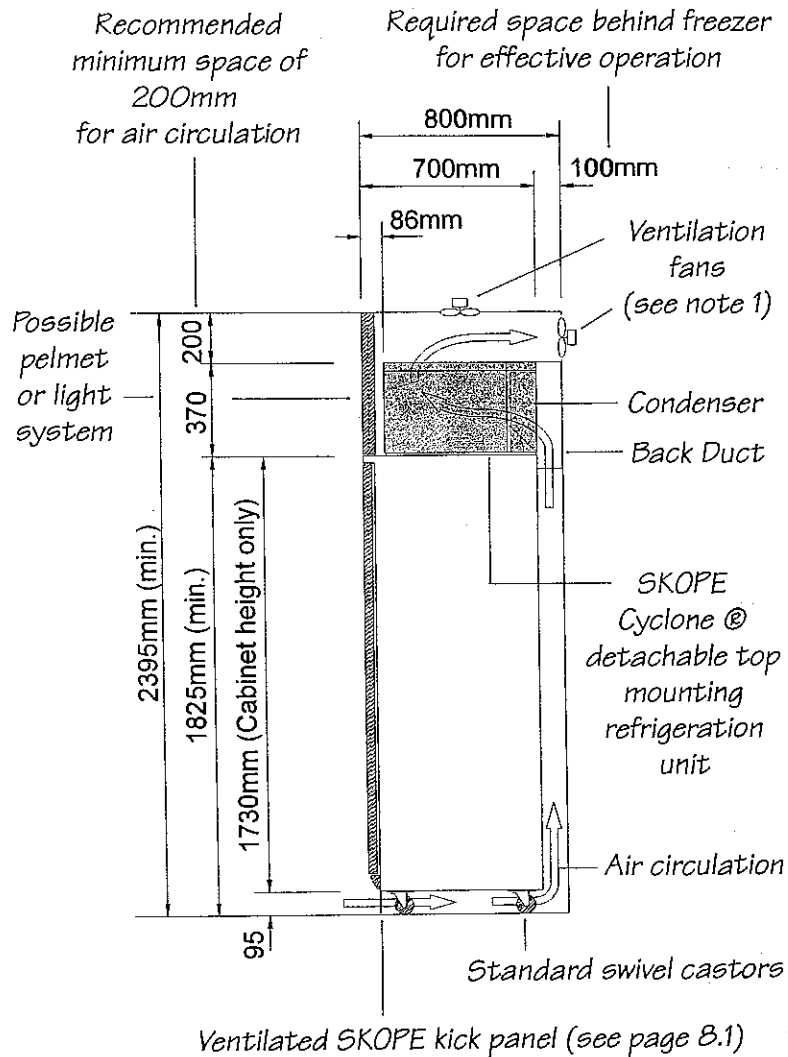
Positioning the machine closer than 100mm will result in freezer unit failure. Air surrounding condenser must not exceed 40°C.



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INSTALLATION

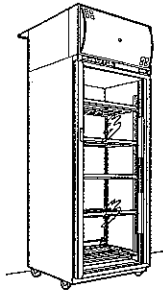
ENCLOSED INSTALLATION



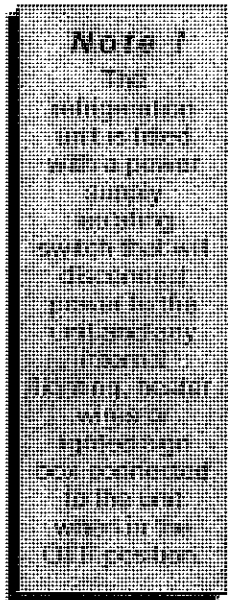
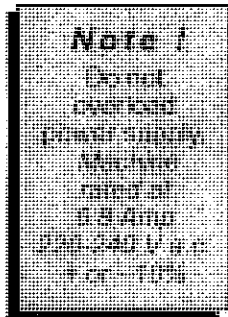
Notes:

- Optional positions of ventilation fan (min. 0.1m³ / sec. airflow required per freezer).
- The height will vary for non-standard castors:
 - Standard castor height: 95mm (as shown).
 - Optional adjustable castor height: 115mm to 130mm.
 - Optional feet height: 32mm to 69mm.

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SKF650 FREEZER



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OPERATION

SAFETY INFORMATION

When using any electrical appliance, basic safety precautions should always be observed.

READ THESE INSTRUCTIONS CAREFULLY.

Do not use this appliance for other than its intended use.

**DO NOT OVERLOAD POWER SUPPLY
MACHINE RATED AT 6.8 AMPS
220-240 V a.c. (50/60 Hz)**

- Use this appliance only on the voltage specified on the rating plate, or in these instructions.
- Be very careful not to touch moving parts.
- Do not cover the grilles or block the entry or exhaust of airflow by placing any object or material up against or on top of the unit.
- Do not probe any opening.
- Remove SKOPE Cyclone® unit for transportation.
- The cabinet is not designed to be moved while loaded.
- Regulations require that all electrical work be carried out only by authorised persons. For your own safety and that of others, ensure this is done.

OPERATION OF MACHINE

The refrigeration unit is fitted with a power supply isolating switch that will disconnect power to the unit and any internal lighting, heater wires or lighted sign box connected to the unit when in the OFF position.

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

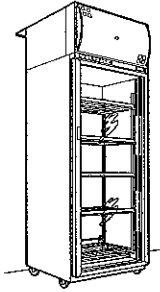
Lights

- Lights run continuously when plugged into SKOPE Cyclone® unit.

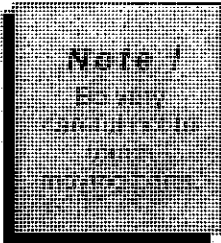
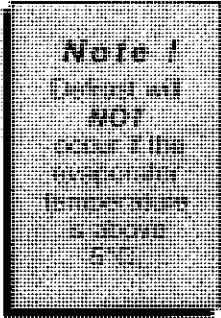
Condenser Fan

- Condenser Fan runs continuously.

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OPERATION

Refrigeration Run Cycle

Initiated by Controller when the "Cabinet Ambient Probe" is lower than the setpoint minus the differential temperature (e.g. setpoint -21°C; differential 3°C; therefore refrigeration run initiates at temperatures warmer than -18°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" reaches -8°C, and will remain running while the evaporator is below this temperature (except during defrost).

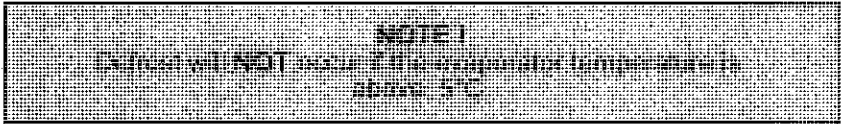
Refrigeration Off Cycle

- Initiated by Controller when the "Cabinet Ambient Probe" reaches the setpoint (e.g. -21°C).
- Compressor shuts off.

Defrost Cycle

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

- At 6 hourly intervals after being plugged in.
- A manual defrost will occur if the Defrost button on the controller is held down for 5 seconds (if keypad is enabled. See page 4.2)



Defrost Initiation

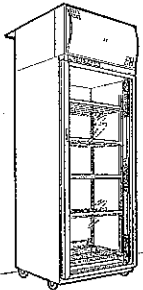
- Compressor off.
- Evaporator fan off.
- Defrost elements on.

Defrost Termination

Defrost termination is achieved when defrost probe reaches 12°C or after 22 minutes, whichever occurs first.

- Defrost elements off.
- A drip time of 1 minute, then
- Compressor and evaporator fan delay of one minute.
- Refrigeration run cycle begins.

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SKF650 FREEZER

Note !
Product **MUST NOT** be stored on the cabinet floor.

Note !
Condenser coil **MUST BE** kept clean for efficient and reliable operation. Disconnect machine from power supply before cleaning.



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OPERATION

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.

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 or cause glass breakage. Leave an airspace of at least 75mm (3") above packages etc. on the top shelf.

PRODUCT MUST NOT BE STORED ON THE CABINET FLOOR.

Do not remove or adjust fixed (hinged for cleaning purposes) bottom shelf as this would adversely affect cabinet performance.

Loading of the machine should be avoided during a defrost cycle.

To facilitate the loading and display of such items as ice-creams and frozen chickens, various baskets are available as optional extras. (see page 8.2)

CLEANING

When necessary, wash both interior and exterior of cabinet with soapy water. Exterior of cabinet may be waxed with automobile polish for extra protection.

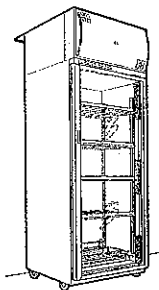
Condenser coil **must** be kept clean for efficient and reliable operation. Clean with a brush and vacuum cleaner regularly.

Access to the condenser is gained by removal of the rear panel.

The preventative maintenance recommendation is to clean the condenser at 1 to 6 month intervals. Certain conditions may necessitate more regular attendance. (e.g.. dusty or kitchen environment)

CONDENSER COIL MUST BE KEPT CLEAN FOR EFFICIENT AND RELIABLE OPERATION.

DISCONNECT MACHINE FROM POWER SUPPLY BEFORE CLEANING.



SKF650 FREEZER

Note !
 SKOPE recommends that all controller parameters are maintained to SKOPE specifications as per Table 1. Variation may void warranty.

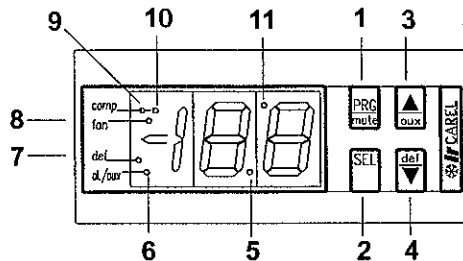
Note !
 L.E.D. indicators 7, 8, 9 & 10 will flash when that function is experiencing its time delay.



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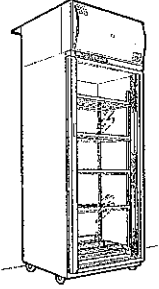
ELECTRONIC CONTROLLER

MICROPROCESSOR DISPLAY



1		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		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.
Adjustment locked out		
3		Alters parameters in parameter mode.
		Activates and deactivates the "continuous refrigeration mode" with 'def' key.
Adjustment locked out		
4		Activates manual defrost cycle.
		Alters parameters in parameter mode.
		Activates and deactivates "continuous refrigeration mode" with the 'aux' key.
5		Decimal point.
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.

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**Note !
IMPORTANT!
ENABLE
KEYPAD**

To prevent tampering, the controller keypad is disabled, therefore to initiate any of the following enter "configuration parameters" to parameter "H2" and alter setting to "01" to enable keypad (page 4.3).



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ELECTRONIC CONTROLLER

CONTROLLER COMPONENTS

Microprocessor: Located in control panel (page 2.1, 6.2).

Controller Module: Located in control box. Performs processor switching (page 6.7).

Module Connector Cable: Flat black cable connecting module to microprocessor (page 6.7).

Probes: 2 x NTC probes are used (Page 6.7).

- A controlling probe located on a receptacle in the evaporator box; called a "Cabinet Ambient Probe".
- An evaporator probe located within the evaporator coil; referred to as a "Defrost Probe" (probe fault page 5.5).

Setpoint

Factory setting -21°C. Maximum -16°C / minimum -26°C.

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

Manual Defrost

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

Continuous Refrigeration

- 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.

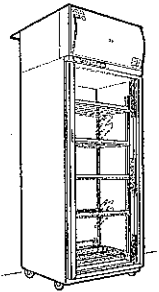
Buzzer Off

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

Evaporator Probe Temperature

- To check the temperature of the evaporator probe, enter the "F" parameter section (see parameter section) and into the "dl" parameter, and the temperature will be shown.

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SKF650 FREEZER

Note !
 SKOPE freezers use a purpose built dedicated Carel controller whose functions are unique, therefore the controller must be programmed only to SKOPE specifications.

Note !
 If no key is pressed for 60 seconds (in parameter mode) the controller will exit without modifying any parameter.



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ELECTRONIC CONTROLLER

PARAMETERS

Frequent Parameters " F "

Note !
 Under parameter H2 (" c " parameter) the keypad is disabled, which prevents alteration of the " F " parameters (and manual defrost) without first entering the password.

No password is required to enter this section.

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

Configuration Parameters " C "

A password is required to enter.

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

Parameter Modification (if keypad is enabled)

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

Special Notes

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

Warning

- This programming sheet is set exclusively for the SKOPE Freezer Program with its dedicated Carel controller.
- Any alteration from this program may adversely affect the SKOPE freezers operation.
- A detailed Carel controller manual is available for full specifications.

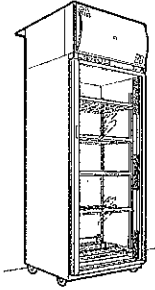
SKOPE Parameters for CAREL Controller SKF650

SETPOINT : -21°C

	SKOPE Settings		Type	Min	Max	Def.	PARAMETER
PA	22		C	00	199	22	Password
PROBE PARAMETERS							
/O	0	NTC probe	N/A	0	1	0	Type of probe used (NTC or PTC). Only available after "Reset Procedure".
/C	2.0	2°C	F	-20	20	0	Calibration offset for cabinet temperature display.
/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	3.0	3°C	F	0.1	20	2	Refrigeration differential
r1	-26	-26°C	C	-40	r2	-40	Minimum allowable setpoint.
r2	-16	-16°C	C	r1	199	90	Maximum allowable setpoint.
r3	1	yes	C	0	1	0	Enabling of ED alarm (defrost interrupted because max. duration has been reached, parameter dP), 0 = No, 1 = Yes.
r4	3	3	C	0	20	3	Automatic Setpoint variation during night functioning. That is when the curtain switch is closed, with either A4 or A5 = 7 (not applicable to SKOPE application).
r5	1	yes	C	0	1	0	Enabling of minimum / maximum temperature monitoring (0 = No, 1 = Yes).
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 minutes	C	0	15	0	Minimum time between compressor starts.
c2	03	3 minutes	C	0	15	0	Minimum compressor off time.
c3	00	0	C	0	15	0	Minimum compressor on time.
c4	99	99 minutes	C	0	100	0	Compressor backup for "AMBIENT" probe failure (compressor on for "c4" - off for 15mins)
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	00	Electric	C	0	1	0	Type of defrost
d1	06	6 hours	F	0	199	8	Time interval between Defrosts.
dt	12	12°C	F	-40	199	4	Defrost termination temperature.
dP	22	22 minutes	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 minutes	F	0	15	2	Defrost drip time; before compressor and evaporator fans start.
d8	01	1 hour	F	0	15	1	Continuation of "d6" parameter at defrost termination until Setpoint is reached 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	hours/mins	C	0	1	0	Time basis for parameter "d1" and "dP".
ALARM PARAMETERS							
AO	1.0	1°C	C	0.1	20	0.2	Alarm differential and Fan differential
AL	10	-32°C/-31°C	F	0	199	10	Low temperature alarm (Alarm on =Setpoint - AL - AO) (Alarm off =Setpoint - AL)
AH	09	-11°C/-12°C	F	0	199	10	High temperature alarm (Alarm on =Setpoint +AH +AO) (Alarm off =Setpoint +AH)
AD	60	60 minutes	C	0	199	120	Temperature alarm delay
A4	01	on	C	0	5	0	Immediate external alarm mode. Due to high pressure switch activation (replug cab. to reset).
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							
FO	02	on	C	0	1	0	Evaporator fan control type (controlled by Evaporator Defrost Probe).
F1	14.0	-8°C/-7°C	F	0	20	5	Evaporator fan start temperature (On =Setpoint +F1 - AO) (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							
HO	00	-	C	0	15	0	Serial address
H1	01	-	C	0	1	1	Not used. Must be 0.
H2	00	no	C	0	3	1	Keypad and remote control enabled.
H3	00	00	C	0	199	00	Password for remote control.

SKOPE Industries Limited reserve the right to alter specifications without notice.

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SKF650 FREEZER

Note !
A blinking LED indicates a time delay on the indicated function.

Note !
Excessive door openings may initiate the high temperature alarm.



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ELECTRONIC CONTROLLER

OPERATION OF CONTROLLER

The operation of this freezer is controlled by a pre-programmed microprocessor. (see page 4.1)

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.

ALARMS AND SIGNALS

A blinking LED indicates a time delay on the indicated function.

E I blinks

- Indicates faulty defrost probe. (page 5.5)
- The defrost cycle will only terminate on "maximum defrost time" (d4).
- The evaporator fan will start immediately after its time delay (dd, Fd, Co).
- The refrigeration cycle will continue as normal.
- The alarm buzzer does not sound.

EO displayed

- Indicates a faulty cabinet ambient probe (page 5.5).
- 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.

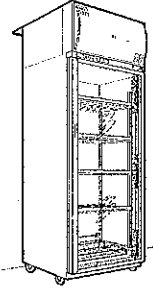
LO blinks

- Indicates low temperature alarm. The cabinet has reached -32°C (parameter AL =10).
- The alarm is overridden when temperature returns above -31°C (parameter AO =1).

H I blinks

- Indicates high temperature alarm. The cabinet has been warmer than -11°C for over 30 minutes.
- The alarm is overridden when the temperature returns below -12°C.
- Check parameters; AH =9, AO =1, Ad =30.

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SKF650 FREEZER

Note !

See Tables 1 and 2 for SKOPE controller parameters.

Note !

IA blinks... refrigeration unit over pressure alarm can only be overridden by unplugging and replugging cabinet into power supply.



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ELECTRONIC CONTROLLER

ALARMS AND SIGNALS

IA blinks

- Refrigeration unit over pressure alarm. The refrigeration unit has tripped on its auto-reset high pressure switch. Once a trip has occurred, a latching relay maintains alarm status.
- Check, and if necessary clean condenser coil.
- Check condenser fan operation, which should permanently run from system power up.
- The compressor will continue to cycle on and off while the high pressure fault exists. The compressor's controlled cycle is to parameter **A6**; where the compressor will cycle with run intervals of **A6** time, followed by 15 minutes off.
- The alarm is **ONLY** overridden by unplugging and replugging cabinet into power supply.

Ed blinks

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. Change "**d I**" parameter from **6** to **4** if necessary.
- Defrost failure: If one or more of the defrost elements have failed; check element connections and cables. (page 5.5)
Check element resistance:
Coil element = 220 ohms approx.
Sump element = 180 ohms approx.
Cyclone unit defrost amps = 4.8 Amps approx. (230V); including 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 **E I** and **Ed** blinks. If a faulty defrost probe occurs, the controller will only terminate the defrost cycle on time (see **E I** fault above).

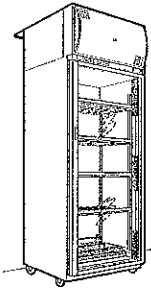
df blinks

- 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 (page 4.7).

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SKF650 FREEZER

Note !

Microprocessor **MUST** be removed prior to removal of Cyclone® Unit from cabinet.



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ELECTRONIC CONTROLLER

ALARMS AND SIGNALS

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:

Possible Causes of Controller Failure

- 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.

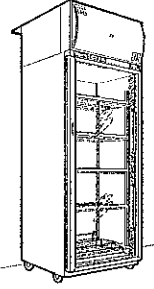
Remote Control

An Infrared remote controller is available for the Carel controller. Its purpose is to give faster response to the programming mode; where many cabinets require programme alteration on the one site.

Microprocessor Removal

- **Disconnect cabinet from power supply.**
- Loosen the two screws beneath the microprocessor on the bottom of the control panel.
- Slide out microprocessor. **Do not lever out.**
- The fit is snug, therefore access to the back of the microprocessor may be required; remove sign panel, or if unit is built in, remove control panel and push microprocessor out of the enclosure.
- The microprocessor can be withdrawn by approx. 200mm, then disconnect the controller cables. A small electrical screwdriver is required.

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SKF650 FREEZER

ELECTRONIC CONTROLLER

ALARMS AND SIGNALS

Microprocessor Installation

- Feed controller cabling through hole in control panel.
- Push flat black connector cable into receptor on microprocessor until it latches into place.
- Connect 4 coloured cables into screw connectors (requires small electrical screwdriver).

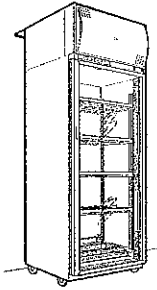
Cable Colour	Screw Connector
Orange	Terminal 6
Blue	Terminal 7
Brown	Terminal 8
White	Terminal 9

- Ensure controller bracket in control panel has its screws loosened. Then slide microprocessor into place, carefully feeding cables back. The microprocessor is a snug fit, and pressure may be required to insert it; but care must be taken to avoid damage.
- Tighten controller bracket screws, fit excess controller cabling into control panel cavity.
- Reassemble cabinet.
- Plug in machine.



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SKF650 FREEZER

Note !
See parameters, Table 2 (page 4.5) for further details.

ELECTRONIC CONTROLLER

NEW FEATURES

May 1997

The Carel controller provided with memorization of the minimum and maximum space temperatures recorded during time intervals of 199 hour. After this period memorization starts again.

To visualise / alter these new features the following parameters can be accessed (by standard viewing procedure, see page 4.3).

SKOPE Parameters for New CAREL Controller							
Parameter	Parameter Description	Type	Min	Max	U/M	Def	SKOPE Settings
r5	Enabling min / max temperature monitoring (0 = No, 1 = Yes).	C	0	1	flag	0	1
rt	Effective interval of min / max temperature monitoring.	F	0	199	hours	-	-
rH	Max. temperature monitored on the "rt" interval.	F	-50	+90	°C/F	-	-
rL	Min. temperature monitored on the "rt" interval.	F	-50	+90	°C/F	-	-

Once the controller has been running: the "rt" parameter will display how long (in hours) the "rt" interval has been running.

To reset the start of the "rt" period, press the "Down" key during visualisation of the "rt" parameter.

Special Notes

See parameters, Table 2 (page 4.5) for further details.
New controllers are identifiable by Carel label on the controller.

- New controller part number: IR32POLBRO
- Old controller part number: PR00000411

December 1999

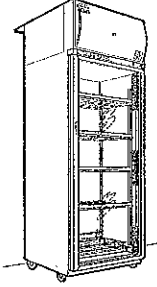
As of December 1999, a new Carel 4-relay module P/No: ELZ9308 is fitted. The fourth relay (module contacts 4,5,6) provides the facility to connect an external alarm to the freezer.



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SKF650 FREEZER

ELECTRONIC CONTROLLER

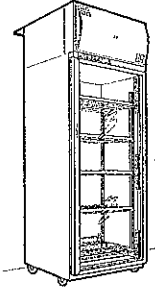
NOTES:



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SKF650 FREEZER

Note !
Servicing and electrical work should be carried out by an authorised Service Agent.



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SERVICE INSTRUCTIONS

Servicing and electrical work should be carried out by an authorised Service Agent. Brief instructions are located on the top of the SKOPE Cyclone® unit.

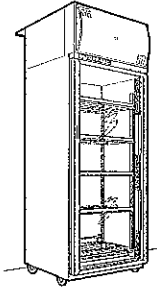
SYSTEM SERVICE NOTES

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. (See page 5.10)
 - HFC compatible driers.
 - HFC leak detector (soap bubbles may be adequate).
- 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 $\frac{1}{4}$ 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.
 - 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 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.
 - The **SKF650E-D** freezer has no high side pressure port. Generally it should not be required.
 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 removed.
 - The freezer has a critical charge requiring 23oz (650grams) of R404a. If using a charging cylinder with no R404a scale, charge the system to 22oz on the R22 scale at 20°C/145 psi.
 - Vapour must not be vented off the charging cylinder. To fully charge the cylinder, it should be evacuated and chilled.

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SKF650 FREEZER

CAUTION!

This method requires in-depth knowledge of the refrigeration process and highly accurate thermocouples that can be thermally bonded to the condenser tubing, and then insulated.



SERVICE INSTRUCTIONS

SYSTEM SERVICE NOTES

- 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. Once the leak is found, the remaining refrigerant is removed and 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.

If it is not possible to weigh the refrigerant or use a charging cylinder, the correct charge can be determined by measuring the condenser sub-cooling.

- Sub-cooling measurement should only be made once the system has reached a stabilised load (i.e. below -27°C evaporating temperature), therefore, initially charging the system to just a full sight glass five minutes after evaporator fans initiation; and then later, confirming the sub-cooling may be necessary. **System performance is significantly reduced if the refrigerant charge is not totally accurate.**

Determine condensing temperature by either:

- Using a line tap valve on the liquid line process tube to determine condensing pressure / temperature.
- or connecting thermocouple to the 1/2 way point of the condenser circuiting.

Determine liquid temperature exiting the condenser by attaching a thermocouple at the condenser outlet.

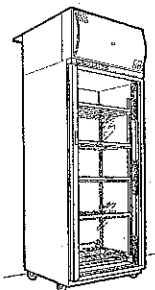
Deduct the liquid temperature from the condensing temperature to determine the condenser sub-cooling. For a correctly charged system the sub-cooling will be:

- 3.5° KTD at stable high ambient conditions (40°C air into condenser).
- 5.5° KTD during warm ambient conditions (23°C ambient air into condenser).
- 6° KTD at low ambient conditions (10°C ambient air into condenser).

Less sub-cooling indicates the system is undercharged. Higher sub-cooling indicates the system is overcharged.

A full sight glass does not necessarily indicate a fully charged system.

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SKF650 FREEZER

Note !

Condenser coil must be kept clean for efficient and reliable operation. Disconnect machine before cleaning.



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SERVICE INSTRUCTIONS

PRE-SERVICE CHECK INFORMATION

Check setpoint by pressing SEL key (SKOPE setting -21°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.

Check refrigeration unit is sealing properly to top of cabinet i.e. unit fixing screws secured down firmly enough to ensure no leaks.

Check evaporator box lid is securely fastened and it is sealing properly.

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.

Suction pressures (at -19°C cabinet temp, stabilised, under load):

- 25°C air onto condenser 14 psi.
- 35°C air onto condenser 16 psi.
- 40°C air onto condenser 17 psi.

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

- Low refrigeration load
- Gas leak/s
- Restricted expansion valve
- Frozen evaporator coil

Possible causes of frozen evaporator coil:

- Evaporator fan failure
- Defrost failure
- Gas leak

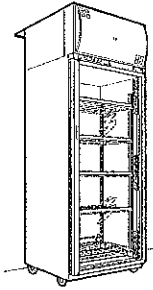
If an electronic controlled unit is taken back to a workshop for repairs, it should be noted that in order to run the unit, you will either need to fit the original microprocessor supplied with the cabinet or have a spare programmed microprocessor.

ELECTRICAL

Power Supply for cabinet fittings enters at the top right hand side of the cabinet and is directed along the inside of the "control panel" to the interior light.

To gain access to the internal connections, open the door fully and remove the control panel fixing screws at each end. When refitting, ensure star washers are refitted.

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SKF650 FREEZER

Note !
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unit weight :
57.5 Kg.

Note !
Avoid damage
to the
underside
sealing strip by
not dragging
the unit.



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SERVICE INSTRUCTIONS

SIGN

Internal access may be gained with the sign unit in place. To replace a tube, ballast, starter etc. undo the five screws securing the sign top cover and remove. Slide the sign panel up carefully to gain access to the interior. When replacing, carefully slide the sign panel down into the retaining lugs, taking care not to scratch the panel. Refit the top cover with screws and star washers.

Removal

Undo two screws which hold the sign top cover to the side panels. The sign can now be lifted vertically and released from its retaining clips. Unplug the power flex and remove the sign.

If required, the sign may be positioned so that its **bottom** clips engage with the side panel **top** clips. This will allow a working space of about 250mm (10") for unplugging power connectors.

Side Panels

To remove: slide the panel out to disengage the fixing slots.

SKOPE CYCLONE® UNIT

Skope Cyclone® Unit Removal

Disconnect machine from power supply.
Remove the sign as described above. Disconnect internal light flex plug and remove microprocessor (see page 4.7). Undo the three unit fixing screws. The use of steps or a ladder about 1m high is advised when lifting the unit off the cabinet.

NOTE!
Unit weight =57.5 Kg.

CAUTION !
Avoid damage to the underside sealing strip by not dragging the unit. If damage to the seal occurs, it must be repaired prior to reinstallation.

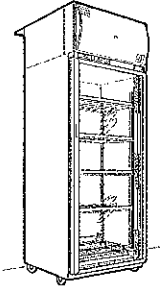
Defrost over temperature cut-out

A defrost over temperature cut-out is fitted inside the evaporator box. It is a safety feature to turn off the elements at 55°C if they lock on. The switch is wired in series with the elements.

Compressor Electrics

Capacitors and relay are located inside the control box.

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SKF650 FREEZER

SERVICE INSTRUCTIONS

SKOPE CYCLONE® UNIT

Condenser Fan/Motor Replacement

- Disconnect flex from control box.
- Undo screws from motor mounting bracket, and remove complete assembly.

Evaporator Fan/Motor Replacement

- Undo four screws from evaporator box lid. Remove lid by lifting vertically.
- Disconnect flex from control box.
- Undo two top screws from motor mounting bracket, and remove complete assembly.
- Reseal the flex hole in the evaporator box carefully on replacement.

Probe Fault

If a faulty probe is signalled, remove the evaporator box lid, control box cover and securing cable ties (refer to page 6.22 for defrost probe location detail).

- Check the cable and its terminations.
- Check probe resistance in ice water (resistance should be at 27 k ohms at 0°C).
- Replace probe if necessary.
- Ensure sensor is fitted in the original position, and reassemble unit.

Defrost Elements

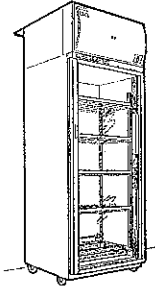
The freezer has 3 evaporator coil defrost elements at 250 watts (approx. 220 Ohms); and one drain/sump defrost element at 300 watts (approx. 180 Ohms). Evaporator assembly must be removed if an element is faulty.

- Reclaim the refrigerant.
- Front seat suction rotalock valve on compressor, disconnect suction line flare nut and plug with 5/8 flare plug.
- Pinch off, cut and braze liquid line, to prevent moisture entering compressor.
- Disconnect and remove electrical connections from defrost elements and evaporator fan.
- Remove the four evaporator fixing screws and lift the evaporator assembly out.
- Replace element/s (fit sleeves as per original assembly).
- Refit evaporator assembly and wiring connections.
- Re-assemble pipework with new HFC drier.
- Open suction rotalock valve.
- Check for leaks.
- Evacuate system.
- Recharge system and test.
- Ensure gauge port is capped and back off service valve to its original fully up position.



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Note !
 To remove light panel from cabinet:
 Disconnect supply terminals behind control panel.



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SERVICE INSTRUCTIONS

INTERIOR LIGHT

Horizontal Interior Light

Early models of the SKF650 were fitted with a horizontal interior light, mounted across the front of the cabinet liner top.

Fluorescent tube, ballast and starter are located inside the top light assembly, and may be replaced without removing shelves or product from the cabinet.

To replace fluorescent tube:

Undo two screws on front of top light assembly and remove cover to gain access to tube and starter. The fluorescent tube may be removed by revolving it until the pin position allows withdrawal. Remove tube shield and end caps and fit to new tube when replacing tube.

To replace ballast:

Disconnect power flex from SKOPE Cyclone® unit. Remove control panel, pull supply flex partially through to front of cabinet. Remove light diffuser. Undo two screws on back of light assembly. Withdraw light panel from light bracket. The ballast is located behind the tube.

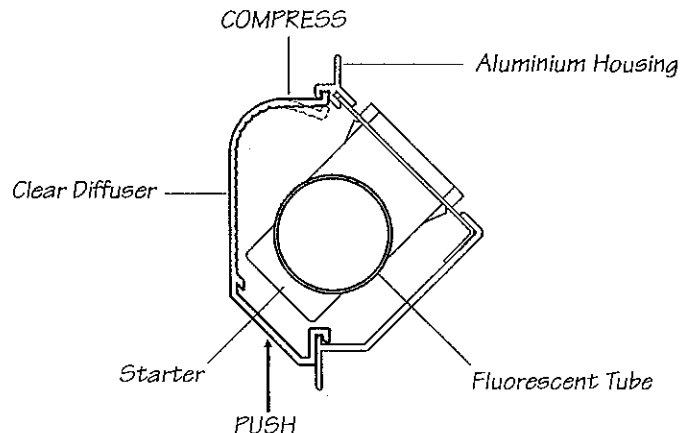
NOTE: To remove light panel from cabinet: Disconnect supply terminals behind control panel.

Vertical Interior Side Light

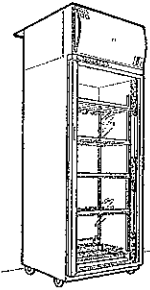
Later models of the SK650 are fitted with a vertical interior sidelight mounted in the front of the cabinet right hand liner side.

To replace fluorescent tube or starter: compress the back section of the diffuser so that it disengages from the side light housing, and push back to gain access to light.

When refitting; engage back section of the diffuser into housing. Compress and snap front section of diffuser into place, progressively, down its full length.



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SKF650 FREEZER

SERVICE INSTRUCTIONS

CABINET

Anti-sweat Element (dew point heater)

110 Watts / 0.47 Amps / 500 Ohms

The anti-sweat Element is fitted around the perimeter of the cabinet front. This ensures that the door gaskets do not freeze and that there is no condensation on the outer surfaces of the cabinet to 32°C/75% RH. To replace this element, the terminations (which can be accessed by removing the control panel) must first be disconnected. The front breaker cap must then be removed. This can be achieved by carefully inserting a screwdriver under one end of the breaker cap and levering upwards so that the remainder can be removed by hand. The element can now be removed by pulling the element tails back through the cabinet and pulling the remainder of the element out from between the cabinet and the breaker seal.

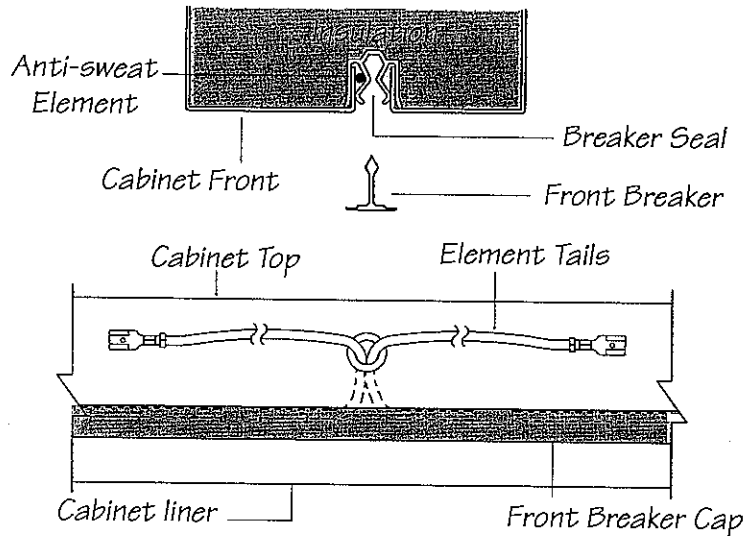
To re-fit new element:

Position as per drawing and push the element back between the breaker seal and the cabinet (to do this, a tool like a small flat bladed screw driver with the end edges removed can be used to push the element down). In some cases the breaker cap sections may need to be replaced upon re-assembly due to damage incurred in removing them.

To refit breaker cap sections:

Push one end of the breaker cap into the breaker seal and slide it to its correct corner position. The remainder of the breaker cap can then be pushed down.

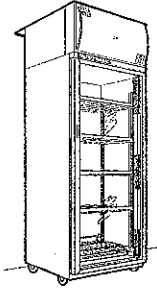
SEE PAGE 6.1 FOR PART NUMBERS



ANTI-SWEAT ELEMENT REPLACEMENT



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SKF650 FREEZER

Note !

*Glass heater
and door
frame heater
are wired in
parallel.*

Note !

*Doors are
heavy and
removal
procedure may
require two
people.*

Note !

*Glass
replacement is
not considered
economical as
the glass is
fixed to the
frame for
integral
strength.*



SERVICE INSTRUCTIONS

DOOR

The door is triple glazed with tempered reflective glass and a mains voltage heated film. The door frame is also heated to prevent condensation. The glass heater and door frame heater are wired in parallel. The total resistance for the standard door is approximately 350 ohms. Performance rated at 32°C ambient / 75%R.H. / -20°C internal cabinet temperature. The standard door is distinguished by its wattage being labelled at 8.5w/sqft.

A High Performance door for tropical installations is available as an option (labelled at 10.5w/sqft). See chapter 8.

Door Torsion

Turn capstan with a 3.5mm steel rod or drill shank (2 required) to remove tension on pin. Remove pin and turn capstan to achieve desired tension then replace pin. To increase tension on door, turn capstan in the same direction as the door closes.

Door Gasket Replacement

The door gasket simply clips into the door frame extrusion and may be removed for repair or replacement simply by peeling from frame, starting at a 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.

Door Removal

Slacken off door tension and remove pin. Remove control panel, disconnect door flex wires from terminal block, unscrew top hinge and lift door clear of bottom pivot.

Door Repair

To repair torsion bar assembly, turn door upside down and pull out old torsion bar. Angle torsion bar to clear the hook at end. Replace parts as required and refit.

Note: Glass replacement is not considered economical as the glass is fixed to the frame for integral strength. Door replacement is recommended (see page 6.11 for part numbers).

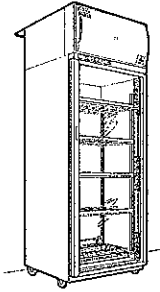
Door Alignment

By backing off the bottom hinge bracket fixing screws, the door and bracket assembly can be moved sideways. This feature provides the ability to align the door square with the cabinet.

Door Reversal

To reverse the opening side of a door, the door must be replaced with one of the opposite hinging. The top and bottom hinge assemblies must also be replaced.

SKOPE®



SKF650 FREEZER

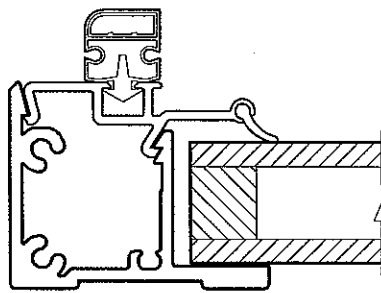
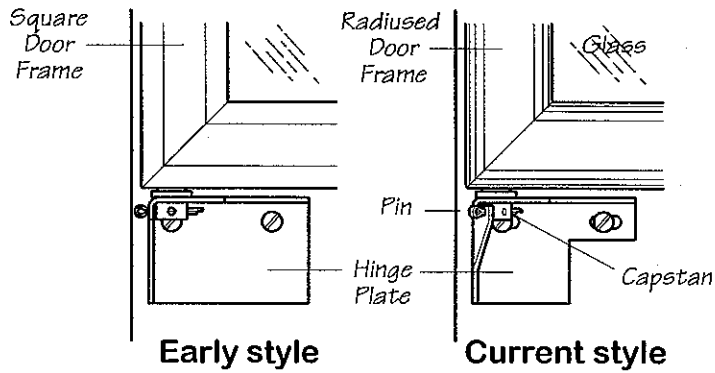
SERVICE INSTRUCTIONS

DOOR

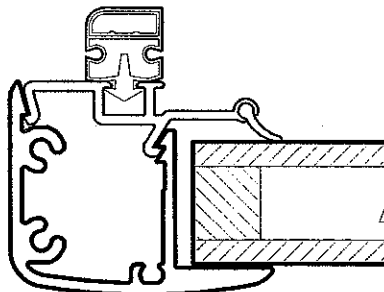
Glass Door Identification

SKOPE glass doors (type SB) fitted to the SKOPE SKF650 have either the square door frame profile (Mk.2) or the new radiused door frame profile (Mk.3).

See diagrams below for the two different door extrusion profiles.



Mk.2 Door
(Square door profile)



Mk.3 Door
(Radiused door profile)



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PRESSURE TEMPERATURE CHART					
TEMPERATURE		R 404 a		R 502	
°F	°C	KPa	psig	KPa	psig
-38.2	-39	37	5.4	34	4.9
-36.4	-38	44	6.3	40	5.8
-34.6	-37	50	7.3	46	6.7
-32.8	-36	57	8.3	53	7.7
-31.0	-35	64	9.3	59	8.6
-29.2	-34	71	10	67	9.7
-27.4	-33	79	11	75	11
-25.6	-32	86	13	82	12
-23.8	-31	94	14	90	13
-22.0	-30	103	15	97	14
-20.0	-29	111	16	105	15
-18.4	-28	120	17	113	16
-16.6	-27	129	19	122	18
-14.8	-26	138	20	131	19
-13.0	-25	148	21	141	20
-11.2	-24	158	23	149	22
-9.4	-23	168	24	160	23
-7.6	-22	179	26	169	24
-5.8	-21	189	27	179	26
-4.0	-20	200	29	190	28
-2.2	-19	212	31	201	29
-0.4	-18	224	32	212	31
1.4	-17	236	34	223	32
3.2	-16	248	36	235	34
5.0	-15	261	38	247	36
6.8	-14	274	40	260	38
8.6	-13	288	42	273	40
10.4	-12	302	44	286	41
12.2	-11	316	46	300	43
14.0	-10	331	48	313	45
15.8	-9	346	50	328	48
17.6	-8	361	52	342	50
19.4	-7	377	55	356	52
21.2	-6	393	57	372	54
23.0	-5	410	59	393	57
24.8	-4	427	62	404	59
26.6	-3	445	65	420	61
28.4	-2	463	67	437	63
30.2	-1	481	70	455	66
32.0	0	500	73	472	68
33.8	1	519	75	490	71
35.6	2	539	78	508	74
37.4	3	559	81	527	76
39.2	4	580	84	547	79
41.0	5	601	87	566	82
42.8	6	623	90	586	85
44.6	7	645	94	607	88
46.8	8	668	97	628	91
48.2	9	691	100	650	94
50.0	10	715	104	672	97
53.6	12	776	113	717	104
57.2	14	828	120	764	111
60.8	16	881	128	814	118
64.4	18	938	136	865	125
68.0	20	996	145	918	133
77.0	25	1154	167	1060	154
86.0	30	1327	193	1220	177
95.0	35	1518	220	1389	201
104.0	40	1728	251	1580	229
113.0	45	1957	284	1779	258
122.0	50	2207	320	2000	290
131.0	55	2479	360	2237	324
140.0	60	2774	402	2500	363
149.0	65	3093	449	2779	403
158.0	70	-	-	3090	448

TROUBLE SHOOTING CHART

Complaint	Possible Cause	Repair	Page
1. Freezer not working.	No power to freezer.	Check freezer is plugged into power supply and that it has power.	1.1
		Check circuit protector (fuse/circuit breaker) is adequately sized.	1.1
		Check the power supply isolating switch, on the unit control box, is in the ON position.	3.1
2. Freezer lights not working.	Cabinet not plugged into unit via Ensto plug.	Plug into Cyclone ® unit.	2.1
	Faulty light.	Check all light components, replace if necessary.	5.4 5.6
3. Freezer has water condensation on its cabinet.	High humidity / temperature.	Standard door rated 32°C / 75% RH. High Performance door rated 32°C / 85% RH.	2.1
	Cabinet not plugged into unit via Ensto plug.	Plug into Cyclone ® unit.	
	Faulty door or faulty cabinet heater.	Check door / cabinet heaters operation. Replace if necessary.	5.7
4. Compressor will not start. • Power on. • Compressor LED indicator off.	Controller setpoint too warm.	Lower setpoint on controller.	4.2
	Controller incorrectly connected.	Check and confirm all connections.	4.8 7.2
	Controller incorrectly programmed.	Check controller programme is to SKOPE specifications.	4.4
	Controller faulty.	Check controller wiring and connections. Check probes and connections. Check control module wiring and connections. Replace faulty components.	4.8 7.2 7.4
5. Compressor will not start. • Power on. • Compressor LED indicator blinking.	Compressor delay operating.	Delay should be one minute. Check controller programme.	4.4
6. Compressor will not start. • Power on. • Compressor LED indicator On.	Compressor cut out on auto reset H.P. switch (indicated as IA alarm on controller).	Check condenser and clean if necessary. Check condenser fan operation (runs continuously). Check condenser has no obstruction to the ventilation of fresh air. Check air surrounding Cyclone ® unit does not exceed 40°C. Check pressure switch operation (cutout approx. 460 psig / cut in 390 psig approx.). Note: To rest alarm IA; freezer must be unplugged, then replugged into power supply.	2.2 2.3
	Compressor cut out on its overload.	Check controller programme is to SKOPE specifications.	4.4

TROUBLE SHOOTING CHART			
Complaint	Possible Cause	Repair	Page
6. Compressor will not start. (continued) Power on. Compressor LED indicator On.	Compressor starting electrics faulty / compressor faulty.	Check all components, replace if necessary.	
7. Compressor runs. Product too warm.	First check and confirm all "Possible Causes" from points 4 to 6 are non existent.		
	Freezer being operated beyond its design specifications.	Check freezer ambient conditions do not exceed 32°C. Check door is not opened excessively.	
	Evaporator airflow restricted.	Check the air - ports are free from product restriction.	
	Condenser coil blocked.	Check and clean if necessary. (must be cleaned regularly).	
	Condenser fan motor failure.	Fan motor should run continuous, check wiring and connections, replace if necessary.	7.2
	Cabinet seals leaking.	Check Cyclone® unit and Evaporator Box Lid sealing strips make an airtight seal. Check door gasket is sealing correctly.	2.1 5.8
	Compressor not pumping efficiently.	Check compressor pump-down performance and its holding ability. Note: If the compressor is pumping against a head pressure; it would not normally be expected to pull down much further than 6" Hg psig to 10" Hg psig. Signs of a compressor not pumping efficiently include: low discharge pressures, high suction pressures, an excessively hot compressor with excessive discharge temperatures. Caution: It is difficult to prove a compressor is pumping inefficiently if the fault is not severe. If there is doubt whether the compressor is faulty, check all other components before condemning the compressor.	
	System short of refrigerant, or incorrectly charged with refrigerant.	Check evaporating temperatures. Check the Sight Glass is full during refrigeration run cycles (sight glass may bubble intermittently as part of the systems normal operation). If short of refrigerant, a gas leak must be found and repaired before regassing.	5.1 5.2 5.3
Evaporator frozen over with ice or Evaporator fan not operating.	Check controller programme is to SKOPE specification. Check Cyclone® sealing strips for air gaps. Check door gasket seal. Check all defrost elements operate at defrost.	4.4	
		4.5	

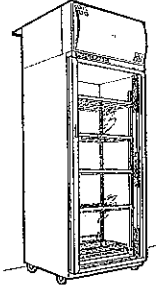
TROUBLE SHOOTING CHART

Complaint	Possible Cause	Repair	Page
7. Compressor runs. Product too warm. (continued)	Evaporator frozen over with ice or Evaporator fan not operating.	Check evaporator defrost probe location in evaporator coil. From front of cabinet, the probe should be located between the back two rows approx. 25mm from the right hand end of the coil. It should be slid down to approx. 25mm from the bottom of the coil.	5.5 6.22
		Check the evaporator coil is being fed evenly by the Expansion valve (except when the valve operates above its MOP of 45 psig.).	
		Check the evaporator fan operates when the fan LED is on. If not check the connections and wiring, replace if necessary.	
	Expansion valve failure.	Check the valve is feeding the entire evaporator coil evenly, with approx. 5°C superheat. The suction line after the heat exchanger should not frost. Note: The expansion valve operates a 45 psig MOP; therefore the coil will only be partially fed above these pressures during normal operation. Adjustment of the expansion valve should not be required. If faulty operation, remove and check valve orifice and its filter for restriction.	3.1 4.1 4.8 7.2 7.4
8. Product too cold.	Controller setpoint too cold.	Raise setpoint on controller.	4.2
	Controller incorrectly programmed.	Check controller programme is to SKOPE specification.	4.4
	Freezer running on Continuous Refrigeration mode.	verified by 2 compressor LEDs on; Deactivate by pressing up & down buttons together on controller.	
9. Temperature alarm HI initiates.	Excessive use. Freezer being used beyond its design conditions.	Educate customer on door openings. Check controller programme is to SKOPE specifications.	4.4 4.5
	Failure of refrigeration. See points 1-7 above.		
10. Alarm initiation.	See page 4.5 to 4.8 of manual.	Check all controller wiring and connections and its associated components. Check controller programme is to SKOPE specification.	4.8 7.2 7.4 4.4
11. Defrost not activating.	Evaporator warmer than defrost termination temperature (5°C). Controller keypad disabled.	Check programme of controller if necessary. Enable controller keypad.	

TROUBLE SHOOTING CHART

Complaint	Possible Cause	Repair	Page
12. Temperature alarm HI initiates less than 30 minutes after activation temperature (-11°C).	At alarm setpoint being reached, the controller times off a 30 minute delay. At delay completion, if the temperature is above the alarm setpoint, the alarm will be initiated. Therefore if a door opening coincides 30 minutes after the alarm setpoint is reached, the alarm will initiate, despite what temperature the freezer may have reached during the 30 minutes.	Check controller programme is to Skope specification.	4.4
		Mute alarm, allow to reset automatically (-12°C) if the refrigeration is OK.	4.1
13. After altering controller programme the controller continues to old values.	Controller has not yet updated its programming.	Controller should update at next cycle; or replug freezer into power supply to immediately enable new programme. Check programme of controller.	4.2
	Programming was not correctly performed.		4.3 4.4
14. At defrost termination the real cabinet temperature is not displayed.	After defrost, cabinet temperature display will be held until set temperature is reached or one hour elapses.		
15. Evaporator fan does not operate.	The fan will not operate until the Evaporator coil reaches -8°C (fan terminates -7°C)	Normally the fan will start within 5 minutes of compressor startup. If not: check controller programme is to SKOPE specification. Check refrigeration; see points 4 to 7.	3.1
			4.1
			4.2
			4.4
16. Continuous refrigeration cycle will not operate.	It is necessary to press the down key before the up key.	Hold them down together for 5 seconds.	4.2
	Controller keypad disabled.	Enable controller keypad.	
17. Unit noisy.	Loose parts or mountings.	Find and tighten.	
	Tubing rattle.	Adjust tubing.	
	Bent fan blade causing vibration.	Replace blade.	
	Fan motor bearings worn.	Replace motor.	
	Liquid hammer from flood-back or refrigerant migration.	Check expansion valve.	
	Frozen evaporator coil (fan hitting ice).	Defrost coil, check for fault (see point 7).	
	Noisy compressor	Check compressor operation and loading. If compressor is noisy due to internal damage, it should be replaced.	

SKOPE®



SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CABINET ASSEMBLY

Early Models

ITEM	DESCRIPTION	PART No.	QTY.
1	Cabinet with Ducts & Shelf Support Strips	V6301	1
2	Sign Unit Assembly Mk.2	V6000/370	1
3	Sign Back	V6300/181	1
4	Sign Sides	V5000/182	2
5	Cyclone @ Unit SKF650E-D	V6338/375	1
6	R/H Top Hinge Assembly	V5301/388-99	1
	L/H Top Hinge Assembly	V5301/389-99	1
7	Control Panel Assembly	V6301/795-80	1
8	Interior Light Assembly	V6300/90-32	1
9	Shelf	V6300/162-99	4
	Shelf Ticket Strip	PLE6615-0540	4
10	Bottom Shelf	V6300/575-99	1
11	Shelf Support Strip	V5000/150	4
12	Shelf Bracket	V973-99	16
13	R/H Glass Door	R2100/740R	1
14	L/H Glass Door	R2100/740L	1
15	R/H Bottom Hinge Bracket	V5000/393-49	1
	L/H Bottom Hinge Bracket	V5000/394-49	1
16	Castors (75mm)	SXX4339	4
17	Deflector	V6300/73	1
18	Front Breaker Cap (1566mm)	V5300/66B	2
	Front Breaker Cap (669mm)	V6300/67B	2
19	Cabinet Heater Element	ELE5132	1
20	Microprocessor	ELZ7641	1

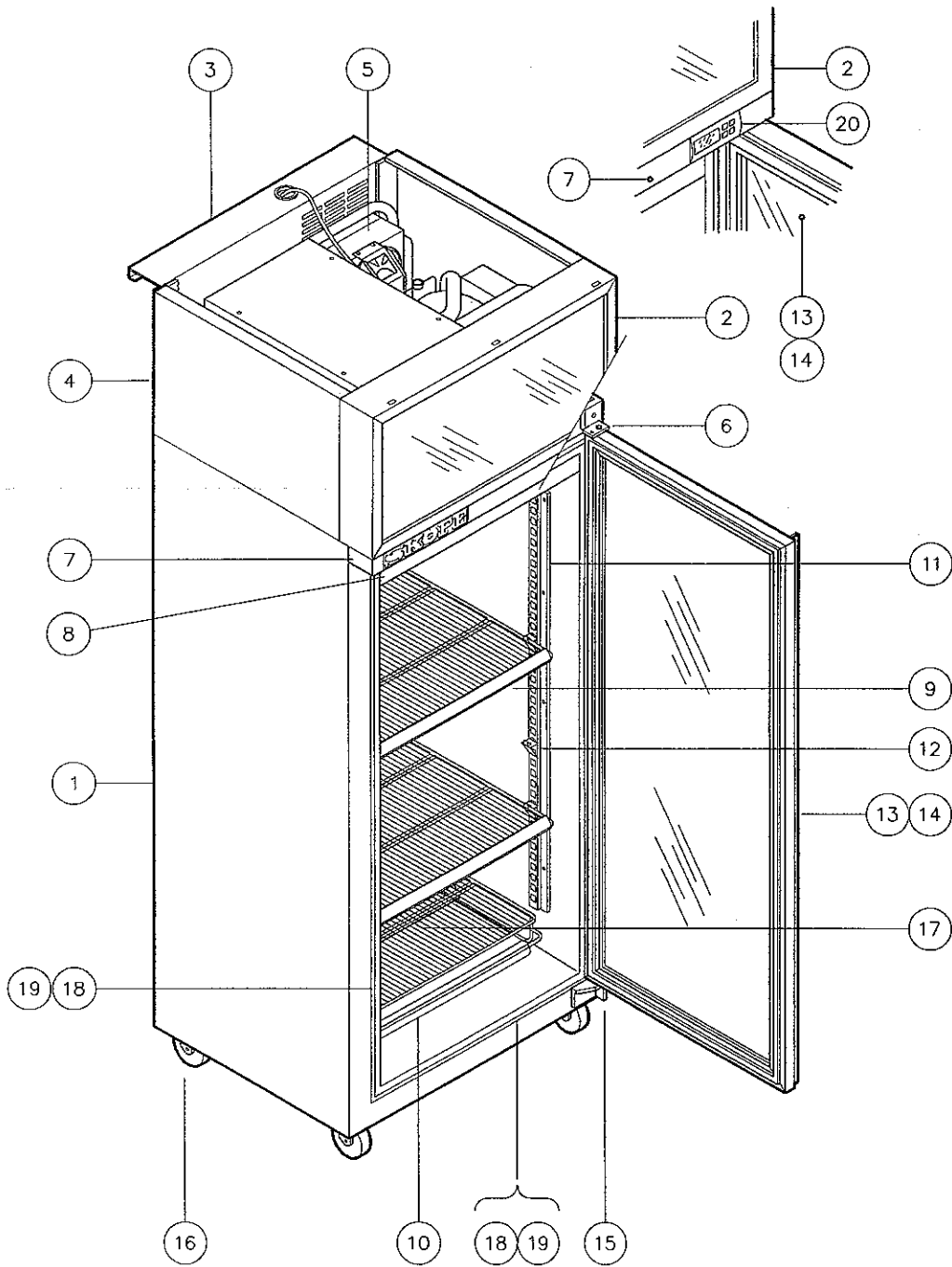


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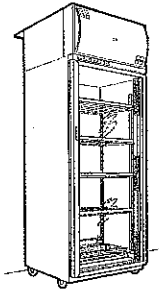
STANDARD PARTS IDENTIFICATION

CABINET ASSEMBLY

Early Models



SKOPE®



SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CABINET ASSEMBLY

Late Models

ITEM	DESCRIPTION	PART No.	QTY.
1	Cabinet with Ducts & Shelf Support Strips	V6301	1
2	Sign Unit Assembly Mk.3	V6000/680	1
	Sign Unit Assembly Mk.4	V6000/C19	
3	Sign Back	V6300/181-02	1
4	Sign Sides	V5000/182-02	2
5	Cyclone @ Unit SKF650E-D	V6338/375	1
	Cyclone @ Unit SKF650-D	V6358/375	1
6	R/H Top Hinge Assembly	V5301/388-99	1
	L/H Top Hinge Assembly	V5301/389-99	1
7	Control Panel Assembly	V6301/795-80	1
8	Interior Light Assembly	V6300/90-32	1
9	Shelf	V6300/162-99	4
	Shelf Ticket Strip	PLE6615-0540	4
10	Bottom Shelf	V6300/575-99	1
11	Shelf Support Strip	V5000/150	4
12	Shelf Bracket	V0973-99	16
13	R/H Glass Door (standard)	V6325/D01R	1
14	L/H Glass Door	V6325/D01L	
15	R/H Bottom Hinge Bracket	V5000/393-49	1
	L/H Bottom Hinge Bracket	V5000/394-49	1
16	Castors (75mm)	SXX4339	4
17	Deflector	V6300/73-32	1
18	Front Breaker Cap (1566mm)	V5300/66B	2
	Front Breaker Cap (669mm)	V6300/67B	2
19	Cabinet Heater Element	ELE5132	1
20	Microprocessor	ELZ7641	1

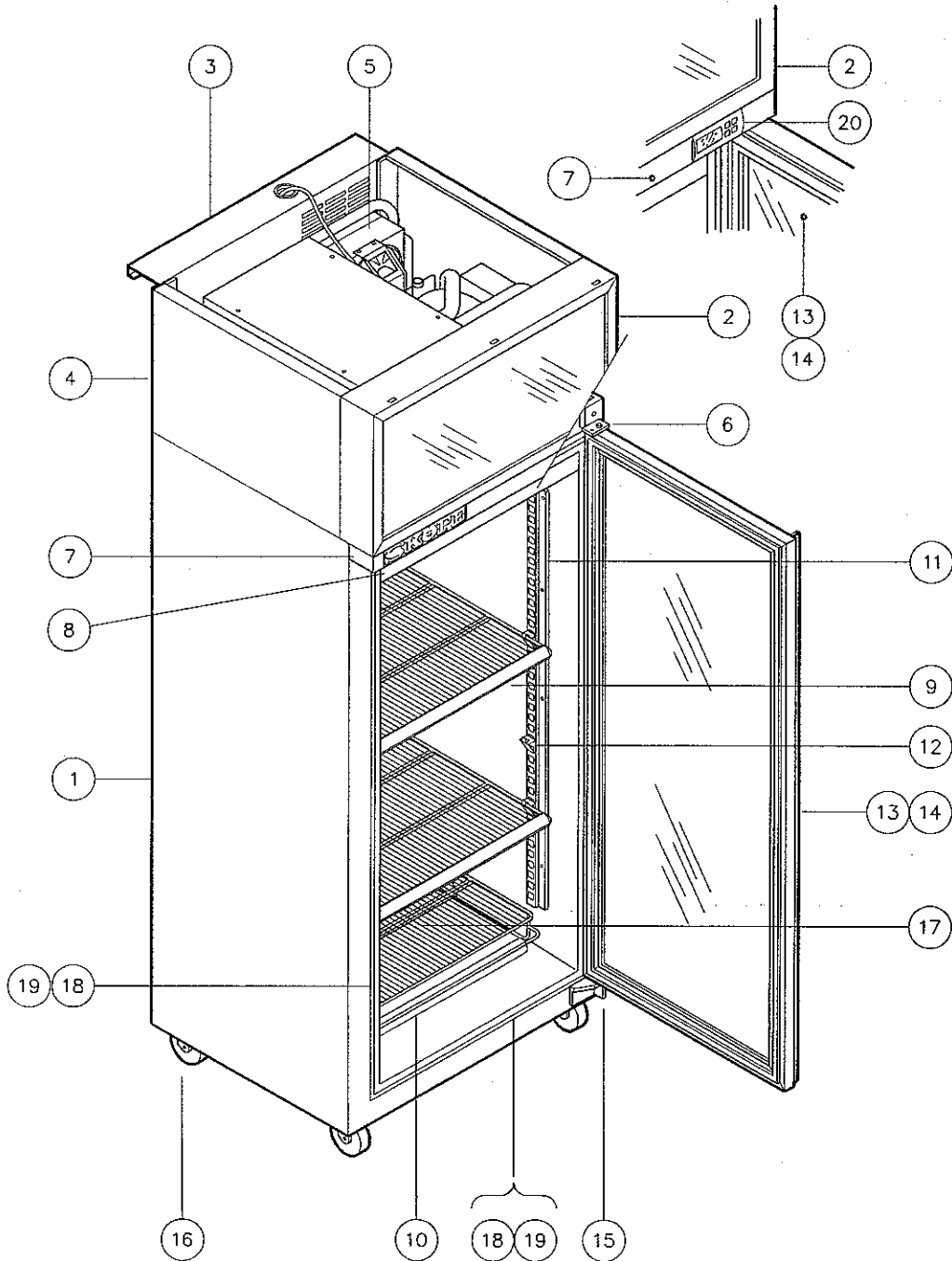


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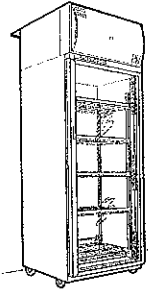
STANDARD PARTS IDENTIFICATION

CABINET ASSEMBLY

Late Models



SKOPE®



SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CABINET ASSEMBLY

Side Light Model

ITEM	DESCRIPTION	PART No.	QTY.
1	Cabinet with Ducts & Shelf Support Strips	V6360	1
2	Curved Sign Unit Assembly	V6000/S22	1
3	Sign Back	V6300/181-02	1
4	Sign Sides	V5000/182-02	2
5	Cyclone @ Unit SKF650E-D	V6338/375	1
	Cyclone @ Unit SKF650-D	V6358/375	1
6	R/H Top Hinge Assembly	V5301/388	1
	L/H Top Hinge Assembly	V5301/389	1
7	Control Panel Assembly	V6301/795-32	1
8	Side Light Assembly L/H	V5360/670L	1
	Side Light Assembly R/H	V5360/670R	1
9	Shelf	WRKV6300/162	5
	Shelf Ticket Strip	PLE6615-0540	6
10	Bottom Shelf	V6300/575-99	1
11	Shelf Support Strip	ALXV5000/150	4
12	Shelf Bracket	V0973-99	20
13	R/H Glass Door (standard)	V6325/D01R	1
14	L/H Glass Door	V6325/D01L	
15	R/H Bottom Hinge Bracket	V5000/393-32	1
	L/H Bottom Hinge Bracket	V5000/394-32	1
16	Castors (75mm)	SXX4339	4
17	Deflector	V6300/73-32	1
18	Front Breaker Cap (1566mm)	V5300/66B	2
	Front Breaker Cap (669mm)	V6300/67B	2
19	Cabinet Heater Element	ELE5132	1
20	Microprocessor	ELZ7641	1

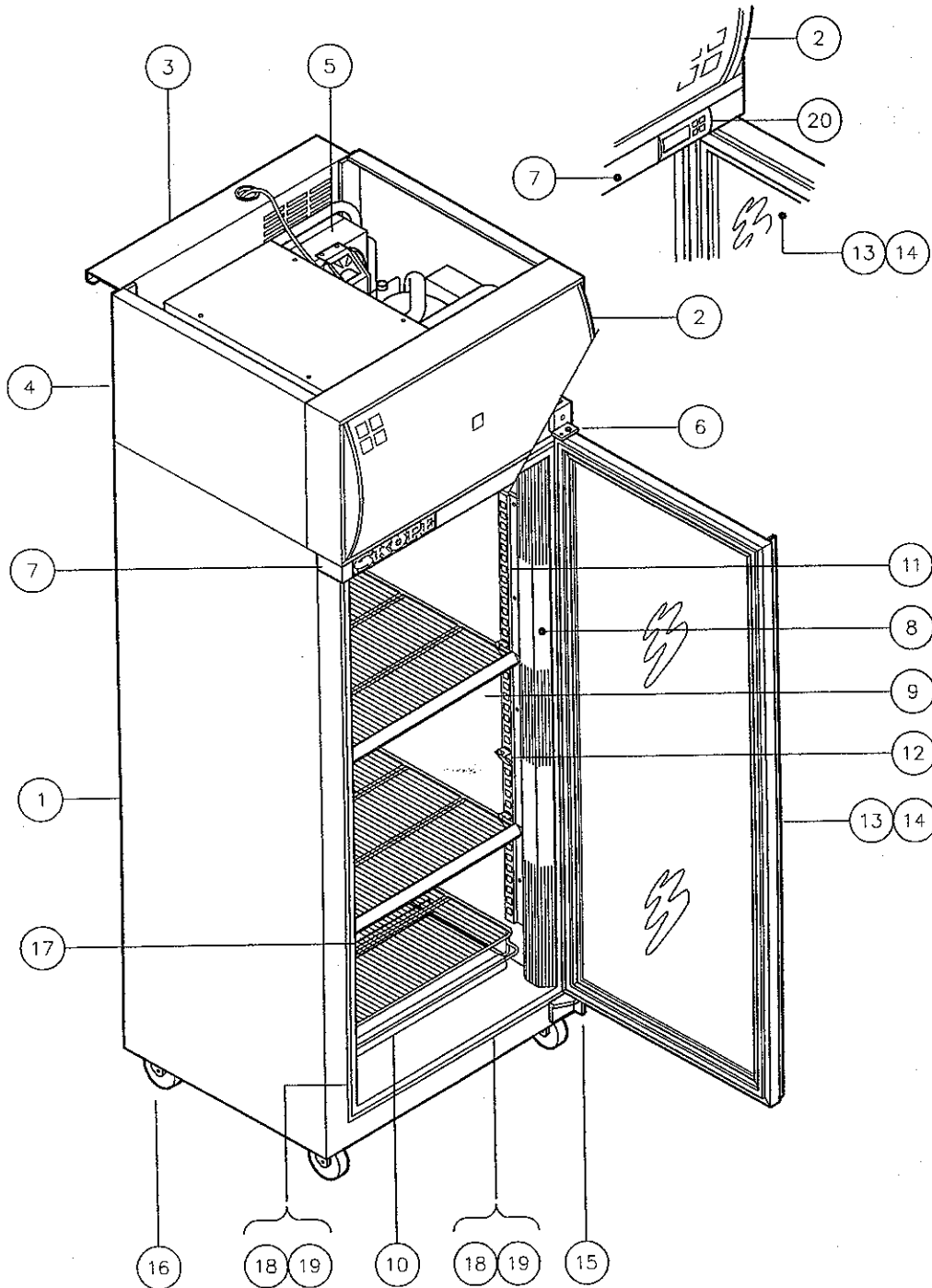


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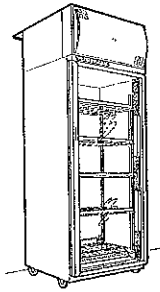
CABINET ASSEMBLY

Side Light Model



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

SIGN UNIT ASSEMBLY

Part No. V6000/370

Mk.2

ITEM	DESCRIPTION	PART No.	QTY.
1	Sign Top	V6000/371	1
2	Sign Wrapper	V6000/372	1
3	Sign Panel	V6000/189-38	1
4	Sign Reflector	V5000/174	1
5	Fluorescent Tube (L18W/10)	ELL5065	1
6	Lampholder (sprung)	ELZ1239	1
7	Lampholder (unsprung)	ELZ1240	1
8	Starter Holder	ELZ1269	1
9	Starter	ELZ2285	1
10	Fuse 2.5 A	ELZ1148	1
11	Ballast	ELZ1039	1
12	Sign Supply Flex (ENSTO)	V5000/409E	1
13	Sign Supply Flex (MOLEX)	V5000/409	1
	MOLEX Plug	PLM1124	1

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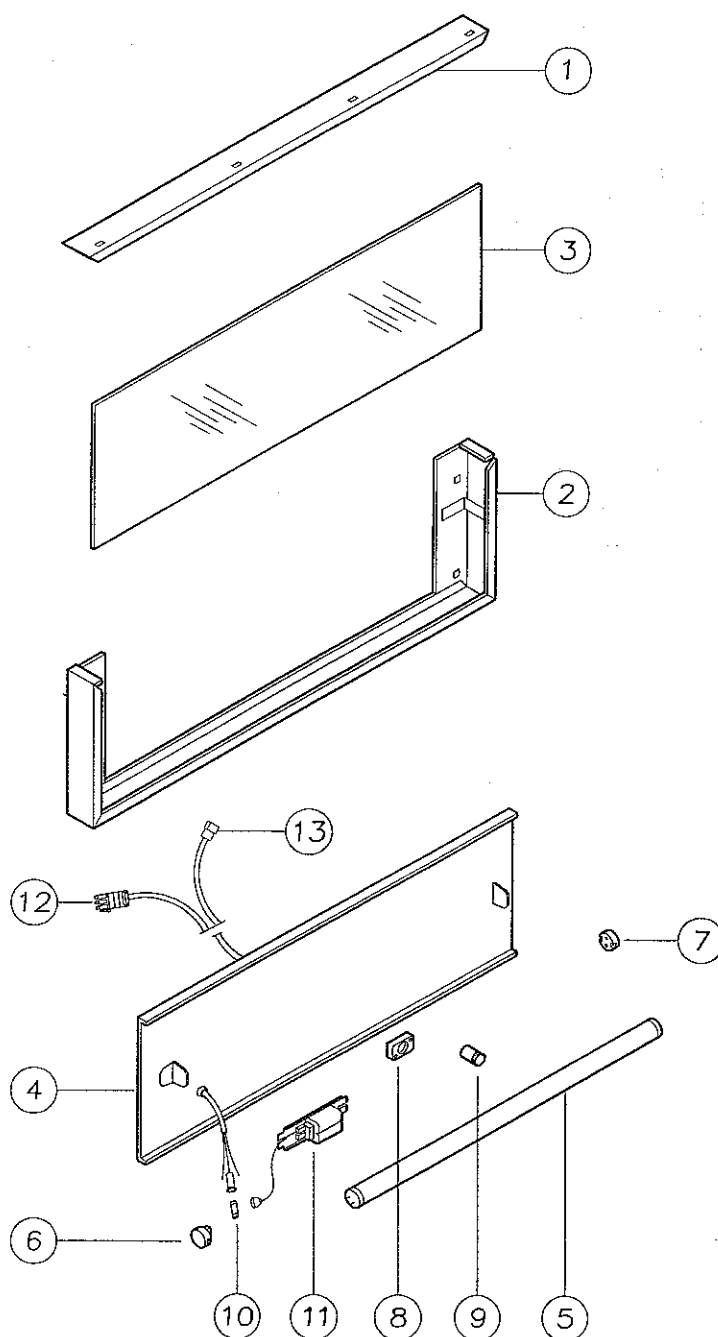
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SIGN UNIT ASSEMBLY

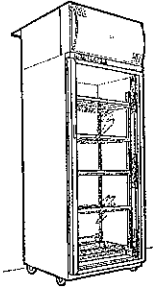
Part No. V6000/370

Mk.2



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

SIGN UNIT ASSEMBLY

Part No. V6000/680

Mk.3

ITEM	DESCRIPTION	PART No.	QTY.
1	Sign Wrapper	V6000/681	1
2	Sign Top	V6000/682	1
3	Sign Reflector	V6000/683	1
4	Sign Wiring Cover	V6000/684	1
5	Sign Panel	V6000/189	1
6	Fluorescent Tube (L18W/10)	ELL5065	1
7	Ballast	ELZ1238	1
8	Starter	ELZ2285	1
9	Fused Connector Block	ELZ6461S	1
10	Fuse Holder	ELZ6462	1
	3.0 Amp Ceramic Fuse	ELZ6467	2
11	Lampholder	ELZ6270	1
12	Lampholder / Starter Holder	ELZ6271	1
13	Sign Supply Flex (ENSTO)	V5000/934	1
	ENSTO Plug	ELZ6458	1

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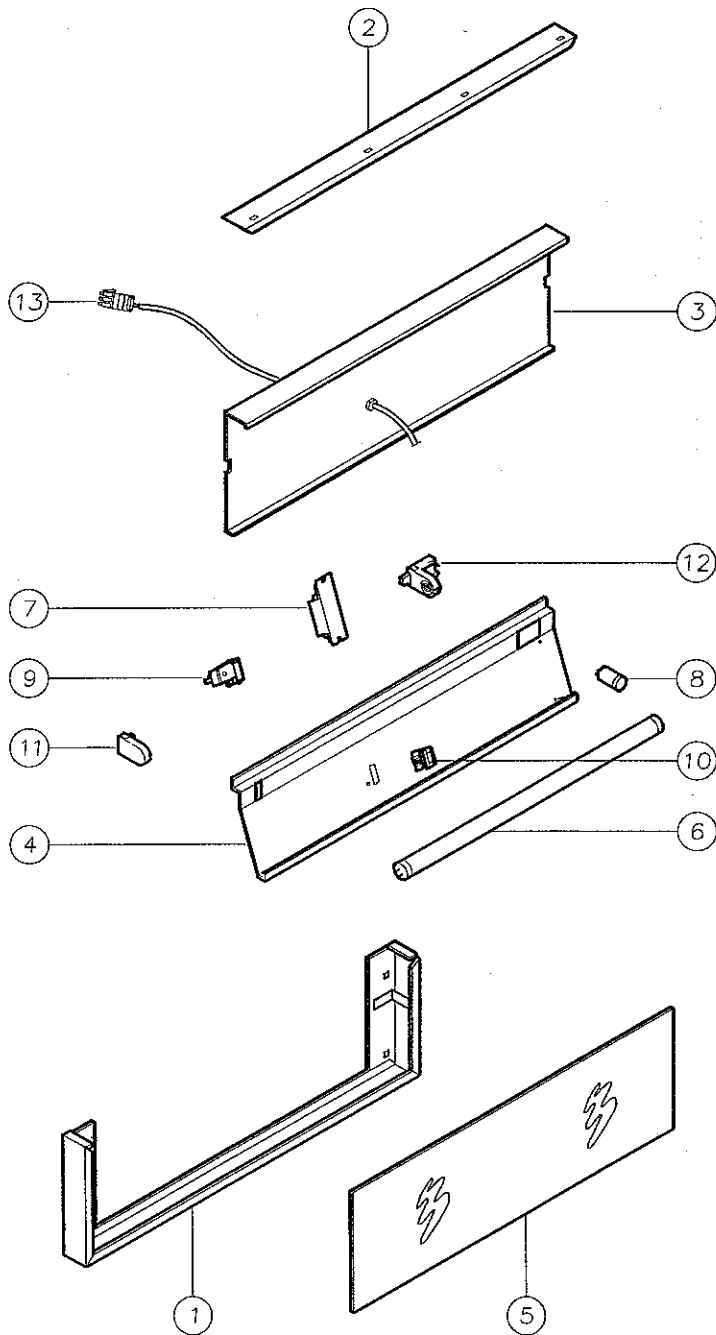
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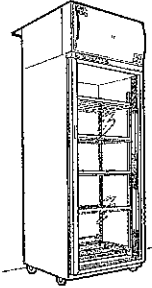
SIGN UNIT ASSEMBLY

Part No. V6000/680

Mk.3



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

SIGN UNIT ASSEMBLY

Part No. V6000/C19

Mk.4

ITEM	DESCRIPTION	PART No.	QTY.
1	Sign Box Right Hand End	V5000/C21	1
2	Sign Box Left Hand End	V5000/C22	1
3	Sign Reflector	V6000/C23	1
4	Top / Bottom Panel	V6000/C24	2
5	Sign Wiring Cover	V6000/C26	1
6	Sign Panel	V6000/189	1
7	Fluorescent Tube (L18W/10)	ELL5065	1
8	Ballast	ELZ1039	1
9	Starter	ELZ2285	1
10	Fused Connector Block	ELZ6461S	1
11	Fuse Holder	ELZ6462	1
	3.0 Amp Ceramic Fuse	ELZ6467	2
12	Lampholder	ELZ6270	1
13	Lampholder / Starter Holder	ELZ6271	1
14	Sign Supply Flex (ENSTO)	V5000/934	1
	ENSTO Plug	ELZ6458	1



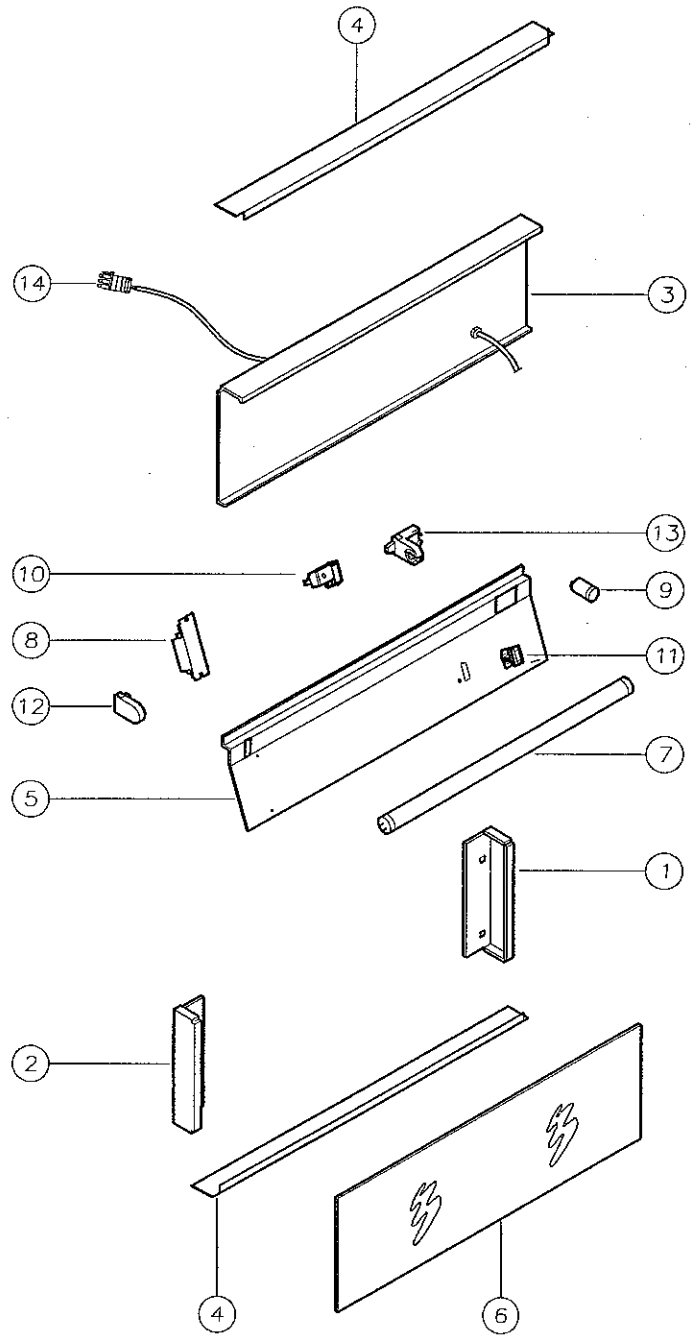
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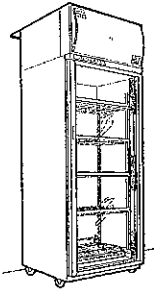
SIGN UNIT ASSEMBLY

Part No. V6000/C19

Mk.4



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CURVED SIGN UNIT ASSEMBLY

Part No. V6000/S22

ITEM	DESCRIPTION	PART No.	QTY.
1	Sign Box Right Hand End	V5000/C21	1
2	Sign Box Left Hand End	V5000/C22	1
3	Sign Reflector	V6000/C23	1
4	Top / Bottom Panel	V6000/C24	2
5	Sign Wiring Cover	V6000/C26	1
6	Sign Panel	V6000/189	1
7	L 18W/10 Fluorescent Tube	ELL5065	1
8	Ballast	ELZ1039	1
9	Starter	ELZ2285	1
10	Fused Connector Block	ELZ6461S	1
11	Fuse Holder	ELZ6462	1
	3.0 Amp Ceramic Fuse	ELZ6467	2
12	Lampholder	ELZ6270	1
13	Lampholder / Starter Holder	ELZ6271	1
14	Sign Supply Flex ('ENSTO')	V5000/934	1
	'ENSTO' Plug	ELZ6458	1

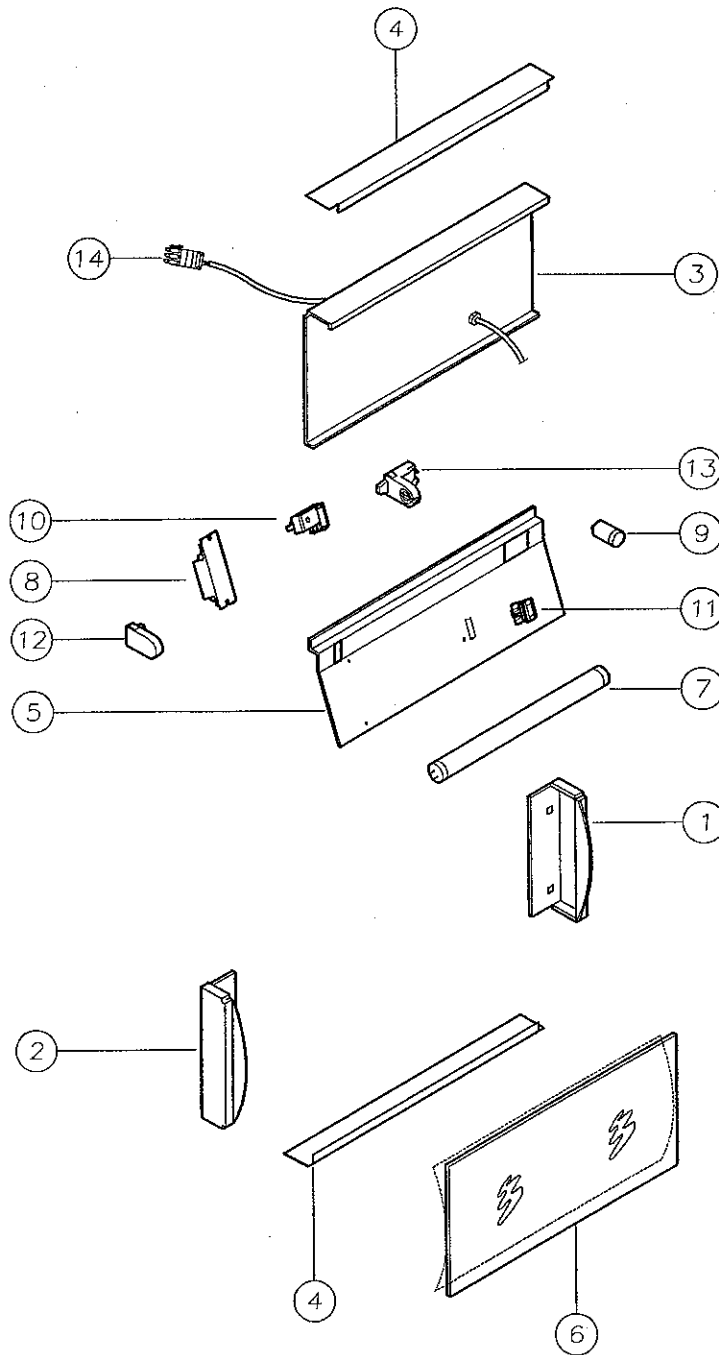


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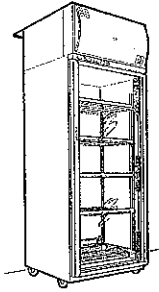
STANDARD PARTS IDENTIFICATION

CURVED SIGN UNIT ASSEMBLY

Part No. V6000/S22



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

INTERIOR LIGHT ASSEMBLY

Part No. V6300/90

ITEM	DESCRIPTION	PART No.	QTY.
1	Light Panel	V6300/81-32	1
2	Diffuser	PLY5391	1
3	Light Bracket	V6300/80-32	1
4	Lamp Holder	ELZ1038	2
5	Fluorescent Tube	ELL5069	1
6	Starter Holder	ELZ5485	1
7	Starter	ELZ2285	1
8	Ballast	ELZ1039	1
9	Tube Protector	PLM5154	1
10	End Caps	PLM5155	2

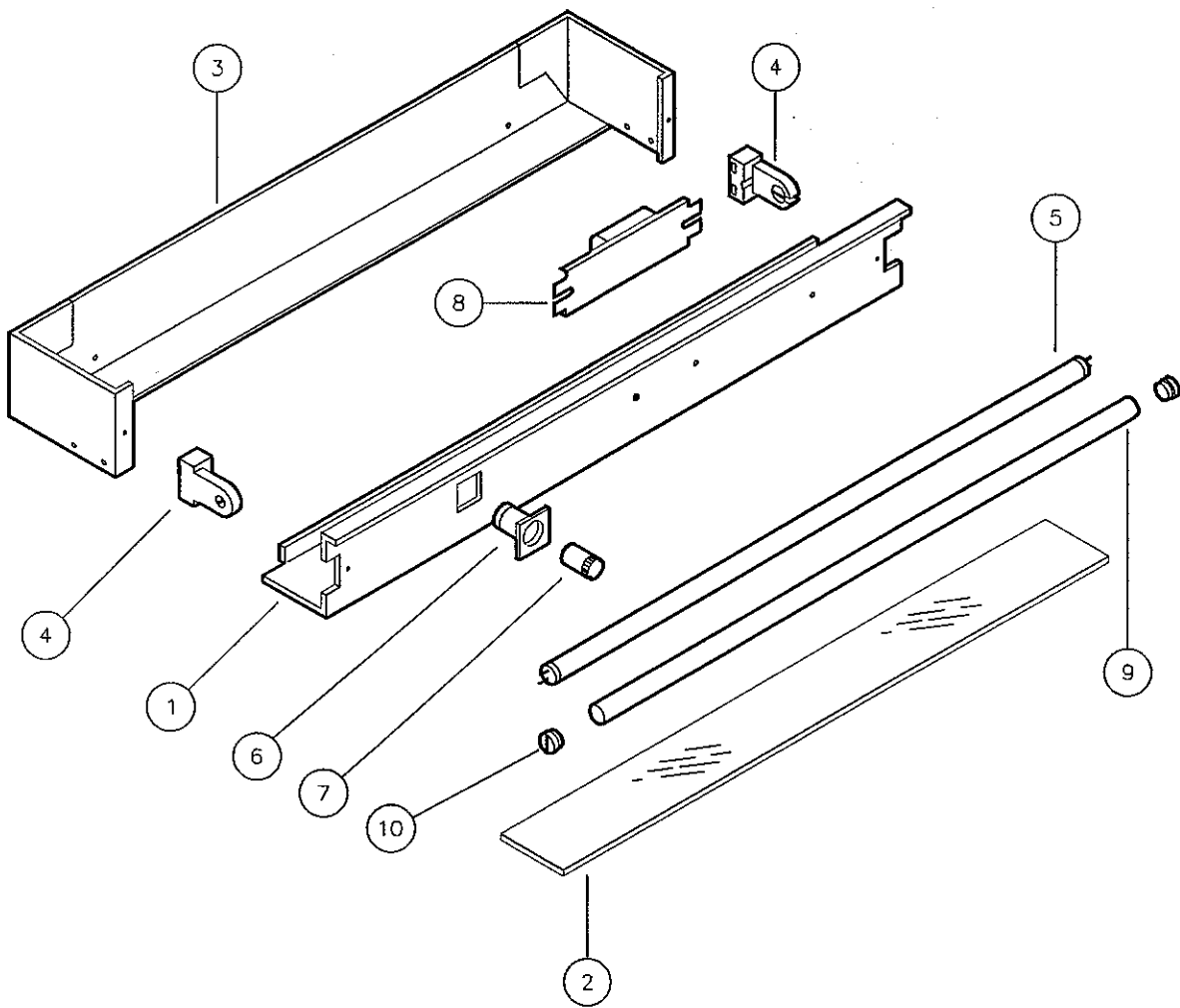


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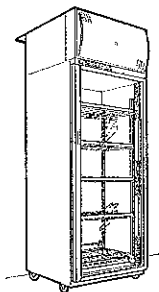
STANDARD PARTS IDENTIFICATION

INTERIOR LIGHT ASSEMBLY

Part No. V6300/90



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

GLASS DOOR ASSEMBLY

Part No. V6325/D01R(Right) or L(Left)

ITEM	DESCRIPTION	PART No.	QTY.
1	Glass and Frame	V6325/D02	1
2	Gasket	GKT4775	1
3	Thermal Break (long)	V5000/765	2
4	Thermal Break (short)	V6000/766	2
5	Torsion Bar	REF5014	1
	Torsion Bar Set (Items 5, 6 & 7)	REF4295	1
6	Bush	PLM5075	2
7	Capstan	TUR5100	1
8	Cotter Pin	FAS5076	1

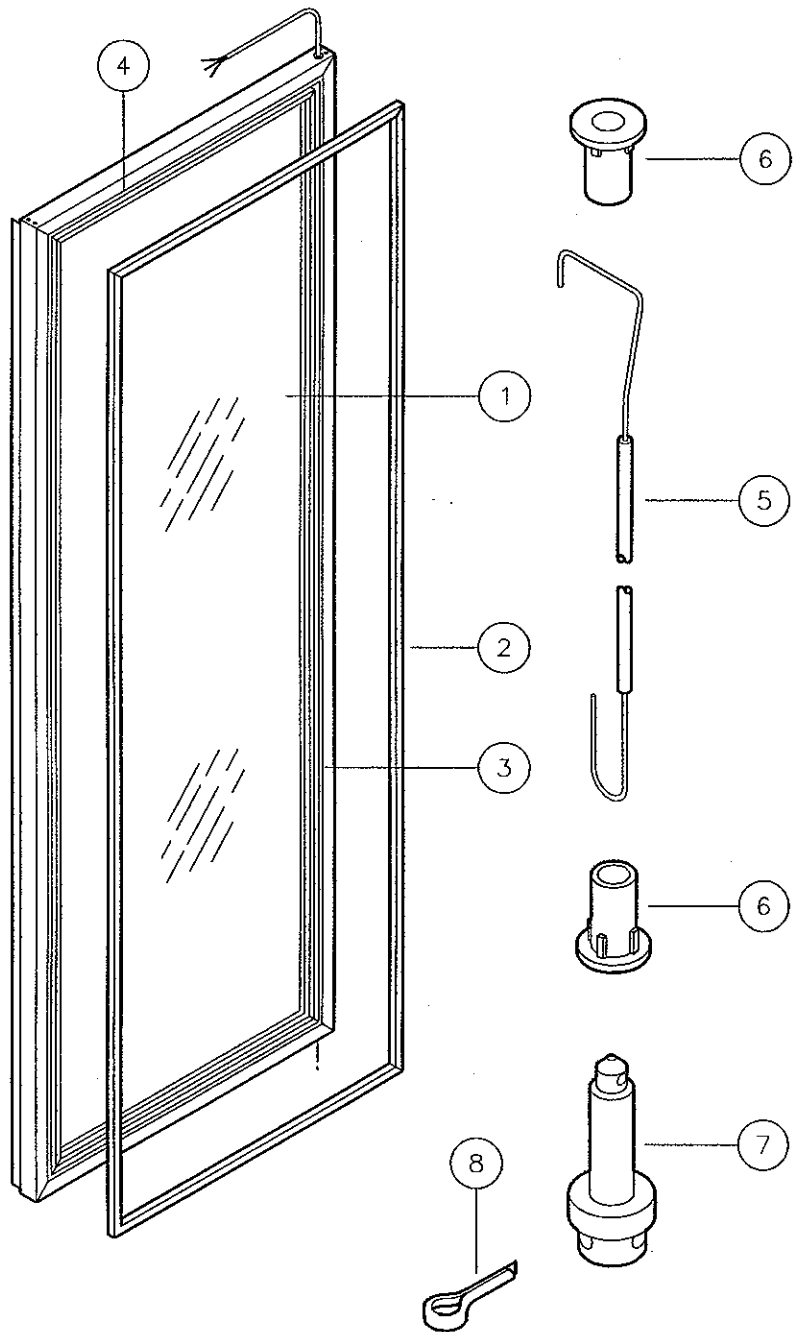


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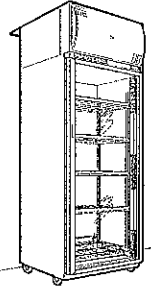
STANDARD PARTS IDENTIFICATION

GLASS DOOR ASSEMBLY

Part No. V6325/D01R(Right) or L(Left)



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

SKOPE CYCLONE ® UNIT

Part No. V6338/375

Model SKF650E-D

Kirby

ITEM	DESCRIPTION	PART No.	QTY.
1	Condenser Coil	CLS5291	1
2	Evaporator Coil	CLS5292	1
3	Compressor	CPR7316P	1
4	Drier	DRY6110	1
5	Defrost Element	ELE5293	3
6	Evaporator Fan Blade	FAN4100	1
7	Condenser Fan Blade	FAN5043	1
8	No.1 Orifice	REF3964	1
9	Heat Exchanger	REF5385	1
10	Sight Glass	REF7622	1
11	Expansion Valve	VAL7624	1
12	Compressor Valve	VAL3759	1
13	Motor Mount Bracket	V5000/235	1
14	Motor Mount Bracket (painted)	V5000/235-32	1
15	Sump Discharge Bracket	V5000/254	1
16	Compressor Base Foot	PLM6108	2
17	Condenser Motor Assembly	V5000/404E	1
18	Evaporator Motor Assembly	V5300/484	1
19	Sump Element Bracket	V5300/75-32	1
20	Sump Element	V6300/208	1
21	Refrige. Unit Base	V6300/210-51	1
22	Evap. Wrapper Ass'y (foamed)	V6300/221	1
23	Evaporator Cover (foamed)	V6300/225	1
24	Evaporator Brace	V6300/227-51	2
25	Evaporator Shroud	V6300/231-32	1
26	Condenser Shroud	V6300/232	1
27	Condenser Baffle	V6338/A62	1
28	Evaporator Tray Assembly	V6300/315	1
29	Thermal Cutout Assembly	V6300/492	1
30	Control Box Assembly	V6338/636X	1
31	Thermal Mass	V6338/784-32	1
32	Thermal Mass Bracket	V6338/B19	1
33	Flex Tie	PLM1036	1



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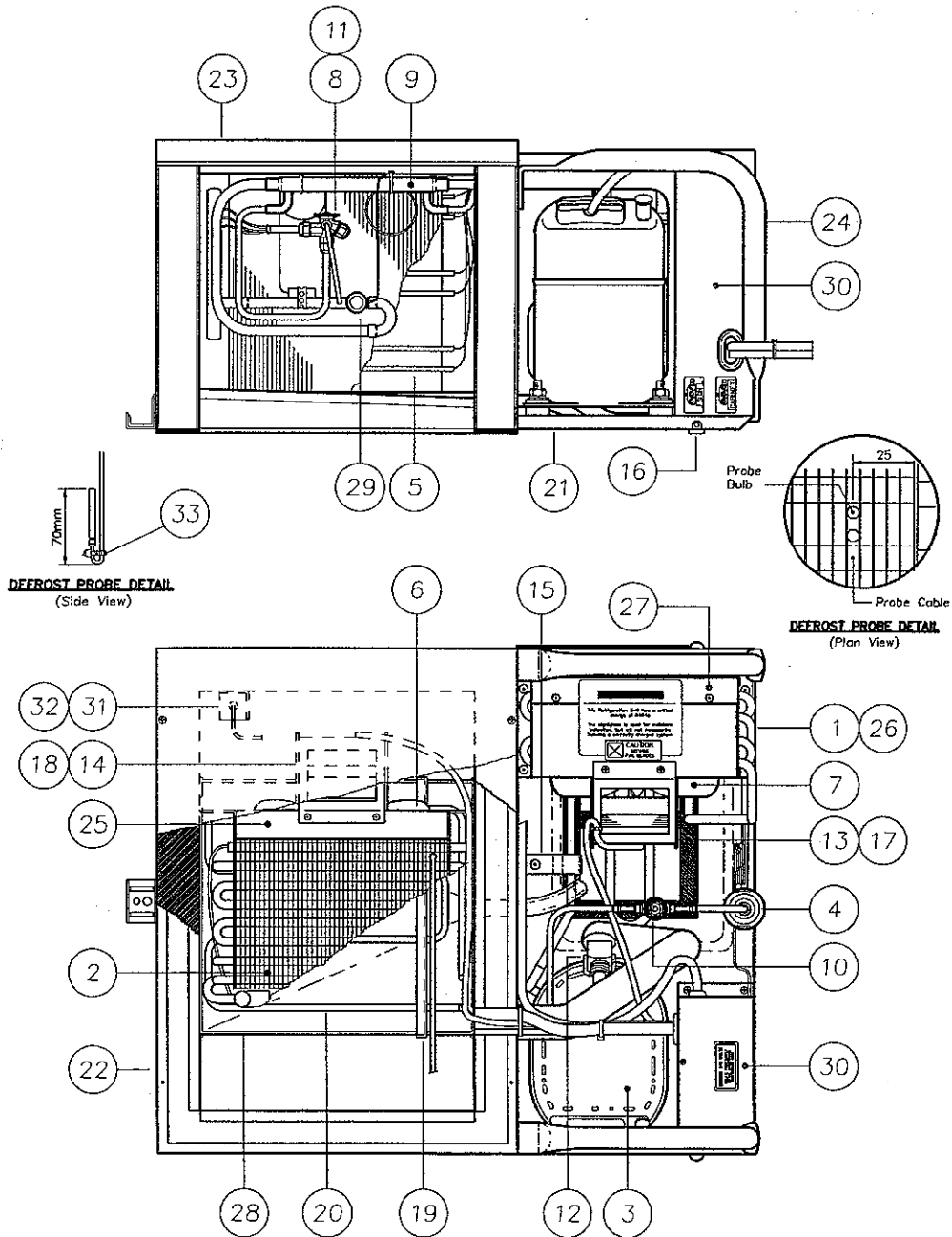
STANDARD PARTS IDENTIFICATION

SKOPE CYCLONE® UNIT

Part No. V6338/375

Model SKF650E-D

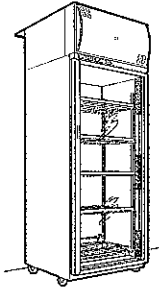
Kirby



DEFROST PROBE DETAIL
(Side View)

DEFROST PROBE DETAIL
(Plan View)

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SKF650 FREEZER



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STANDARD PARTS IDENTIFICATION

SKOPE CYCLONE® UNIT

Part No. V6358/375 Danfoss

Model SKF650-D

ITEM	DESCRIPTION	PART No.	QTY.
1	Condenser Coil	CLS5291	1
2	Evaporator Coil	CLS5292	1
3	Compressor (Danfoss SC18CL)	CPR77954	1
4	Drier (Danfoss DN032S)	DRY6110	1
5	Defrost Element	ELE5293	3
6	Evaporator Fan Blade	FAN4100	1
7	Condenser Fan Blade	FAN5043	1
8	Refrig. Unit Base Foot	PLM6108	2
9	No. 1 Orifice	REF3964	1
10	Heat Exchanger	REF5385	1
11	Sight Glass	REF7622	1
12	6 x 60 Inseal	RUE5120	2.5m
13	10 x 60 Inseal	RUE5364	3.5m
14	10 x 24 Inseal	RUE5874	0.19m
15	3 x 21 Inseal	RUE6617	0.37m
16	Shrader Valve	VAL2816	2
17	Expansion Valve	VAL7624	1
18	Retaining Bracket	V5000/226-99	1
19	Motor Mount	V5000/235	1
20	Motor Mount (painted)	V5000/235-32	1
21	Discharge Bracket	V5000/254	1
22	Condenser Motor Assembly	V5000/404E	1
23	Sump Element Brkt (painted)	V5300/75-32	1
24	Evaporator Motor Assembly	V5300/484	1
25	Sump Element Assembly	V6300/208	1
26	Refrigeration Unit Base	V6300/210-51	1
27	Evaporator Box Assembly	V6300/221	1
28	Evaporator Box Cover	V6300/225	1
29	Evaporator Brace (painted)	V6300/227-32	2
30	Evaporator Shroud (painted)	V6300/321-32	1
31	Condenser Shroud	V6300/232	1
32	Evaporator Tray Assembly	V6300/315	1
33	Thermal Cutout Assembly	V6300/492	1
34	Thermal Mass (painted)	V6301/784-32	1
35	Condenser Baffle	V6338/A62	1
36	Thermal Mass Bracket (painted)	V6338/B19-32	1
37	Control Box Assembly	V6358/636	1

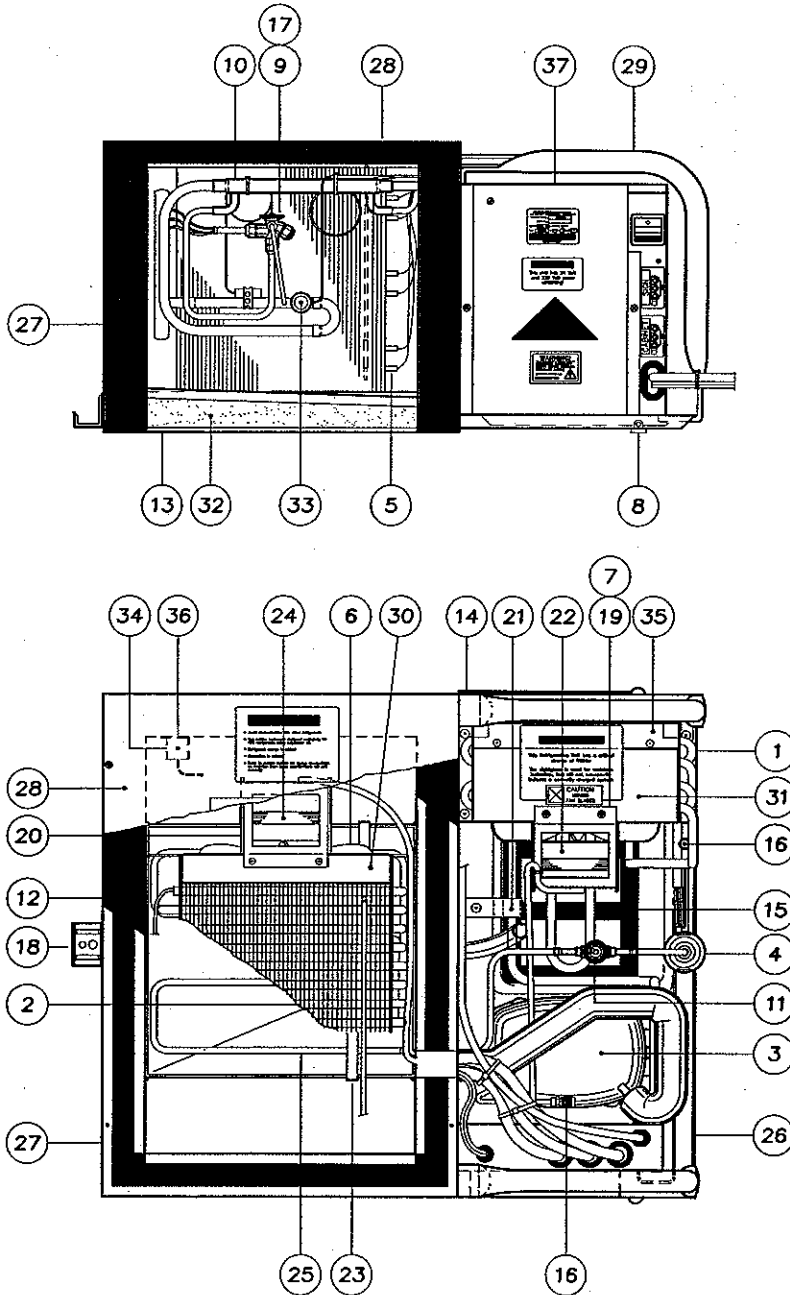
STANDARD PARTS IDENTIFICATION

SKOPE CYCLONE® UNIT

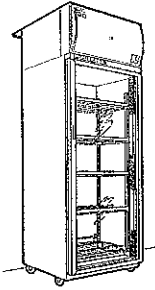
Part No. V6358/375

Model SKF650-D

Danfoss



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CONTROL BOX ASSEMBLY

Part No. V6338/636X

Model SKF650E-D

Kirby

ITEM	DESCRIPTION	PART No.	QTY.
1	4 Metre Mains Flex	V5000/398	1
2	ENSTO Sign Supply Loom	V5301/458E	1
3	Run Capacitor (white body)	V6301/A37	1
4	Control Box Cover	V6301/323	1
5	Controller Din Rail	V6301/550	1
6	Control Box to Compressor Flex	V6338/A30	1
7	Capacitor Bracket	V6338/A61	1
8	Control Box Base	V6338/241	1
9	Start Capacitor (black body)	ELC1997NC	1
10	Control Box Relay	ELR1996NC	1
11	Latching Relay	ELR6183	1
12	Pressure Switch	ELS7058	1
13	4 Way Terminal Block	ELZ1241	1
14	7 Way Terminal Block	ELZ1994	1
15	Probe Terminal Block	ELZ6952	1
16	Controller Module (RDPW2)	ELZ7642	1
17	Module Connector Cable	ELZ7643	1
18	Ambient Probe	ELZ7644	1
19	Defrost Probe	ELZ7644	1
20	Cord Grip	PLM6584	1
21	ENSTO Receptacle Adaptor	PLM6670	2
22	RFI Capacitor (when fitted)	ELC8068	1



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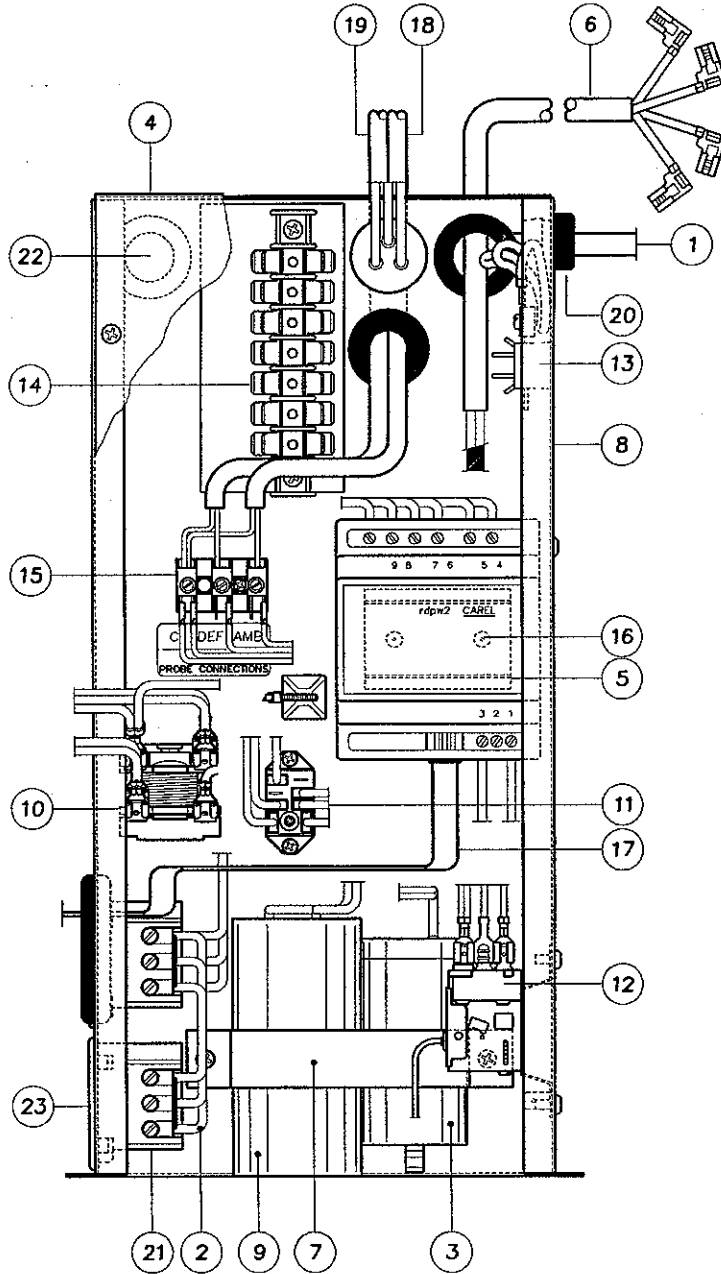
STANDARD PARTS IDENTIFICATION

CONTROL BOX ASSEMBLY

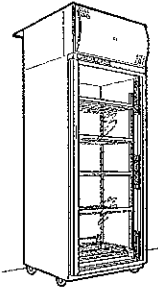
Part No. V6338/636X

Model SKF650E-D

Kirby



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SKF650 FREEZER

STANDARD PARTS IDENTIFICATION

CONTROL BOX ASSEMBLY

Part No. V6358/636

Model SKF650-D

Danfoss

ITEM	DESCRIPTION	PART No.	QTY.
1	Controller Din Rail	V6301/550	1
2	Control Box Base	V6358/241	1
3	Control Box Cover	V6358/323	1
4	4 Metre Mains Flex	V6358/398	1
5	ENSTO Sign Supply Loom	V6358/458E	1
6	Compressor Flex	V6358/A30	1
7	Capacitor Bracket	V6358/A61	1
8	Relay Bracket	V6358/A88	1
9	Run Capacitor (silver body)	ELC8034NC	1
10	Start Capacitor (black body)	ELC8035NC	1
11	Latching Relay	ELR6183	1
12	Start Relay (with brkt & fastenings)	ELR8036NC	1
13	2 Pole Isolating Switch (white)	ELS6732WH	1
14	Pressure Switch	ELS7058	1
15	4 Way Terminal Block	ELZ1241	1
16	7 Way Terminal Block	ELZ1994	1
17	Probe Terminal Block	ELZ6952	1
18	CAREL Module (RDPW2)	ELZ7642	1
19	Module Connector Cable	ELZ7643	1
20	Ambient Probe	ELZ7644	1
21	Defrost Probe	ELZ7644	1
22	Cord Grip	PLM6584	1
23	ENSTO Receptacle Adaptor	PLM6670	1
24	RFI Capacitor (when fitted)	ELC8068	1



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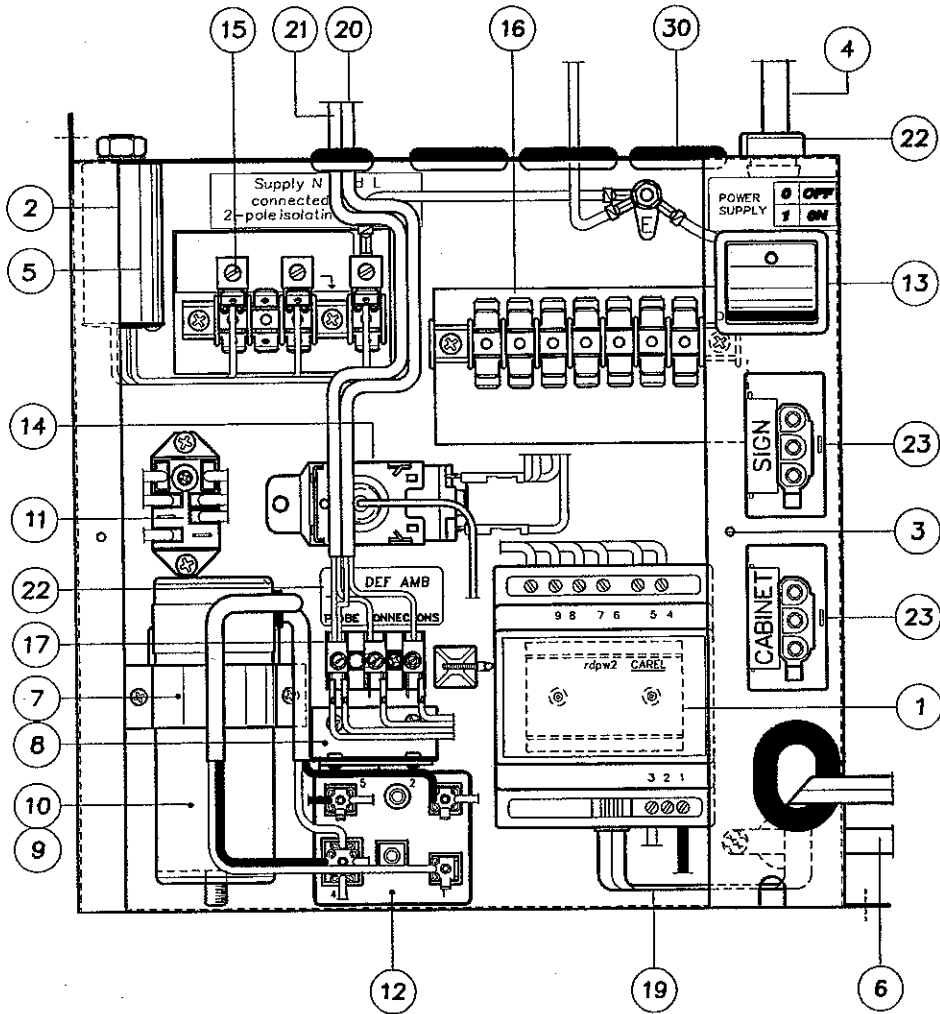
STANDARD PARTS IDENTIFICATION

CONTROL BOX ASSEMBLY

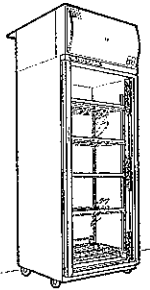
Part No. V6358/636

Model SKF650-D

Danfoss



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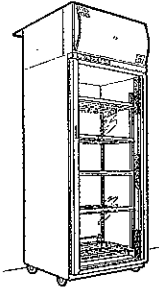
WIRING DIAGRAM

HORIZONTAL LIGHT MODEL

Kirby - SKF650E-D

KEY TO COMPONENTS	
1	Sign Unit
2	20 Watt Ballast (2)
3	20 Watt Fluorescent Tube
4	Fluorescent Starter (2)
5	Mains Flex
6	SKOPE Cyclone® Unit
7	Main Terminal Block
8	7 Way Terminal Block
9	Evaporator Fan Assembly
10	Condenser Fan Motor
11	Sign Supply Loom (ENSTO)
12	Defrost Elements (3)
13	Sump Element
14	CAREL Controller Module (RDPW2)
15	Module Connector Cable
16	Ambient Probe
17	Defrost Probe
18	Compressor Over-load
19	Compressor (Kirby AJ26LZ)
20	Thermal Cutout
21	Start Relay
22	Start Capacitor (black body)
23	Run Capacitor (white body)
24	Latching Relay
25	Pressure Switch
26	Control Box
27	Terminal Blocks
28	Heated Door Assembly
29	Interior Light Assembly
30	15 Watt Fluorescent Tube
31	2.5 Amp. Fuse (2)
32	Cabinet Heater Wire
33	Control Panel
34	Door Frame Element
35	Glass Film Element
36	CAREL Microprocessor (IR32POLBRO)
37	Probe Connector
38	RFI Suppression Capacitor (when fitted)

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WIRING DIAGRAM

HORIZONTAL LIGHT MODEL

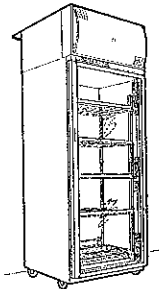
Danfoss - SKF650-D

KEY TO COMPONENTS

1	Sign Unit
2	20 Watt Ballast (2)
3	20 Watt Fluorescent Tube
4	Fluorescent Starter (2)
5	Mains Flex
6	SKOPE Cyclone® Unit
7	Main Terminal Block
8	7-way Terminal Block
9	Evaporator Fan Assembly
10	Condenser Fan Motor
11	Sign Supply Loom
12	Defrost Elements (3)
13	Sump Element
14	CAREL Controller Module (rdpw2)
15	Module Supply Cable
16	Thermostat Probe
17	Defrost Probe
18	Compressor Over-load
19	Compressor (Danfoss SC18CL)
20	Thermal Cutout
21	Start Relay
22	Start Capacitor (black body)
23	Start Capacitor (silver body)
24	Latching Relay
25	Pressure Switch
26	Control Box
27	Terminal Blocks
28	Heated Door Assembly
29	Interior Light Assembly
30	15 Watt Fluorescent Tube
31	2.5 Amp. Fuse (2)
32	Cabinet Heater Wire
33	Control Panel
34	Door Frame Element
35	Glass Film Element
36	CAREL Microprocessor (IR32POLBRO)
37	Probe Connector
38	Isolating Switch
39	RFI Suppression Capacitor (when fitted)

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WIRING DIAGRAM

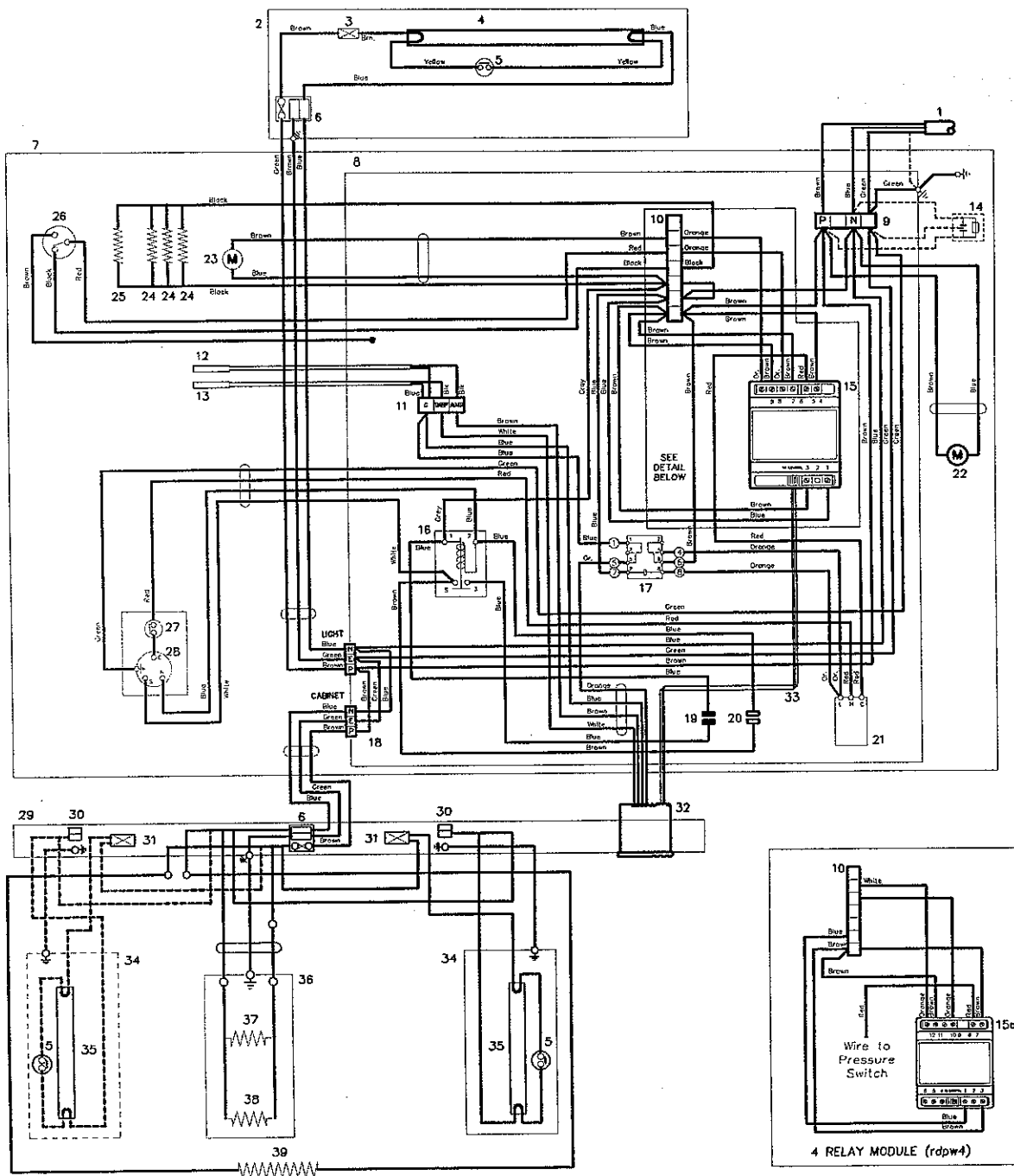
SIDE LIGHT MODEL - Kirby

KEY TO COMPONENTS	
1	Mains Flex
2	Sign Unit
3	20 Watt Ballast
4	20 Watt Fluorescent Tube
5	Fluorescent Starter
6	3 Amp Fused Terminal Block
7	SKOPE Cyclo [®] Unit
8	Control Box
9	Main Terminal Block
10	7-way Terminal Block
11	Probe Connector Block
12	Ambient Probe
13	Defrost Probe
14	RFI Suppression Capacitor (when fitted)
15	CAREL Controller Module (rdpw2)
15a	CAREL Controller Module (rdpw4)
16	Start Relay
17	Latching Relay
18	Sign Supply Loom
19	Start Capacitor (black body)
20	Run Capacitor (silver body)
21	Pressure Switch
22	Condenser Fan Motor
23	Evaporator Fan Motor
24	Defrost Elements (3)
25	Sump Element
26	Thermal Cutout
27	Compressor Over-load
28	Compressor (Kirby AJ26LZ)
29	Control Panel
30	Connector Block
31	40 Watt Ballast
32	CAREL Microprocessor (IR32POLBRO)
33	Module Supply Cable
34	Side Light
35	4 ft Fluorescent Tube
36	Heated Door Assembly
37	Glass Film Element
38	Door Frame Element
39	Cabinet Heater Wire

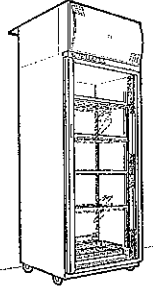
WIRING DIAGRAM

SIDE LIGHT MODEL

Kirby - SKF650E-D



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WIRING DIAGRAM

SIDE LIGHT MODEL - Danfoss

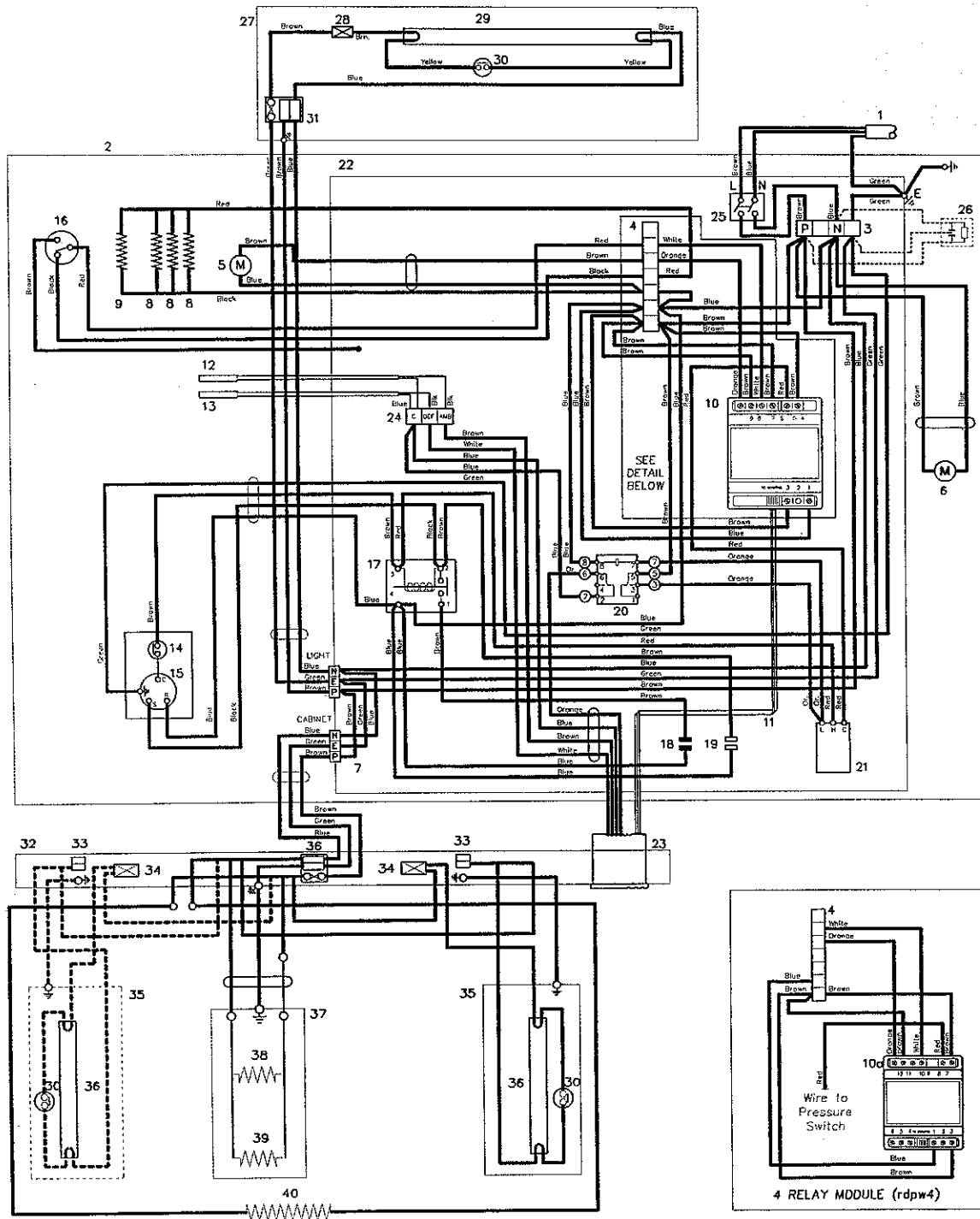
KEY TO COMPONENTS

1	Mains Flex
2	SKOPE Cyclone® Unit
3	Main Terminal Block
4	7-way Terminal Block
5	Evaporator Fan Motor
6	Condenser Fan Motor
7	Sign Supply Loom
8	Defrost Elements (3)
9	Sump Element
10	CAREL Controller Module (rdpw2)
10a	CAREL Controller Module (rdpw4)
11	Module Supply Cable
12	Ambient Probe
13	Defrost Probe
14	Compressor Over-load
15	Compressor (Kirby AJ26LZ)
16	Thermal Cutout
17	Start Relay
18	Start Capacitor (black body)
19	Run Capacitor (silver body)
20	Latching Relay
21	Pressure Switch
22	Control Box
23	CAREL Microprocessor (IR32POLBRO)
24	Probe Connector Block
25	Isolating Switch
26	RFI Suppression Capacitor (when fitted)
27	Sign Unit
28	20 Watt Ballast
29	20 Watt Fluorescent Tube
30	Fluorescent Starter
31	3 Amp Fused Terminal Block
32	Control Panel
33	Connector Block
34	40 Watt Ballast
35	Side Light
36	4 ft Fluorescent Tube
37	Heated Door Assembly
38	Glass Film Element
39	Door Frame Element
40	Cabinet Heater Wire

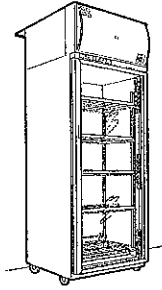
WIRING DIAGRAM

SIDE LIGHT MODEL

Danfoss - SKF650-D



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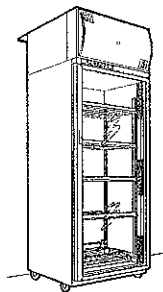
WIRING DIAGRAM

NOTES :



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SKF650 FREEZER

Note !

The Back Duct Kit must be installed when the standard sign panels are not being used.

Note !

For effective use of the Back Duct Kit on SKF650 R502 Freezers, the condenser baffle should also be installed (part No.: V6338/A62)



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OPTIONAL FEATURES

CABINET (see page 8.2 for part Numbers)

Sign Replacement Panel

This panel is designed to replace the illuminated sign in situations where a sign is not required. It simply clips into the same position as the illuminated sign. The sign replacement panel is available on new freezers, ex factory and may also be retrofitted. There are two versions of sign replacement panel available for the SKOPE SKF650 to suit either the solid or glass doors.

Solid Door

For use in non merchandising applications and energy conservation. Due to the thicker construction, the sign, control panel and hinging systems would all require replacement. Internal and external finishes of the door must be specified when ordering.

Back Duct Kit

The Back Duct Kit is to be installed when the standard sign panels are not being used. It eliminates the need for the sign and the sign back panels.

Installing the Back Duct Kit ensures the condenser picks up fresh air, and a 100mm gap is observed at the back of the cabinet.

The Back Duct is supplied in a kitset form, which requires hand forming and some assembly (see page 8.9).

Shelves

Novelty Baskets - To facilitate the loading and display of such items as icecreams.

Chicken Baskets - Used for storing awkward items such as frozen chickens.

Castors

There are three kinds of optional castors:

Lockable - Fitted with foot operated wheel lock.

Adjustable - Height adjustable and non-lockable.

Adjustable - Lockable - Height adjustable with foot operated wheel lock.

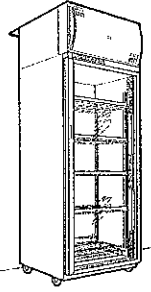
Ventilated Kick Panel

To be used when the bottom of the cabinet is to be built in. It allows ventilation to the SKOPE Cyclone® unit.

Passivated Cyclone® Unit

SKOPE Cyclone® units with passivated refrigeration pipework to avoid corrosion.

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SKF650 FREEZER

OPTIONAL FEATURES

PARTS IDENTIFICATION

ITEM	DESCRIPTION	PART No.
1	Plain Fascia Panel: Glass Doors	V6000/373
	Solid Doors	V6500/295
2	Control Panel	V6801/795-80
3	R/H Solid Door	V6500D
	L/H Solid Door	V6501D
4	High Performance Glass Door (32°C ambient / 85% RH)	
	R/H Door	V6325/740R
	L/H Door	V6325/740L
5	R/H Top Hinge Assembly	V7301/388-99
	L/H Top Hinge Assembly	V7301/389-99
6	R/H Bottom Hinge Bracket	V7000/270-49
	L/H Bottom Hinge Bracket	V7000/271-49
7	Novelty Basket (ice-cream)	V6300/562-99
8	Chicken Basket	V6300/564-99
9	Lockable Castor	SXX4539
	Swivel Castor	SXX4339
10	Adjustable Foot *	V5000/314
11	Adjustable Swivel Castor *	SXX6181
	Adjustable Locking Castor *	SXX6182
12	Castor Plate *	SXX6180
13	Solid Door Bottom Stay	V7000/44
14	Ventilated Kick Panel Kit	V6000/127
15	Passivated Cyclone Unit	V6338/375P

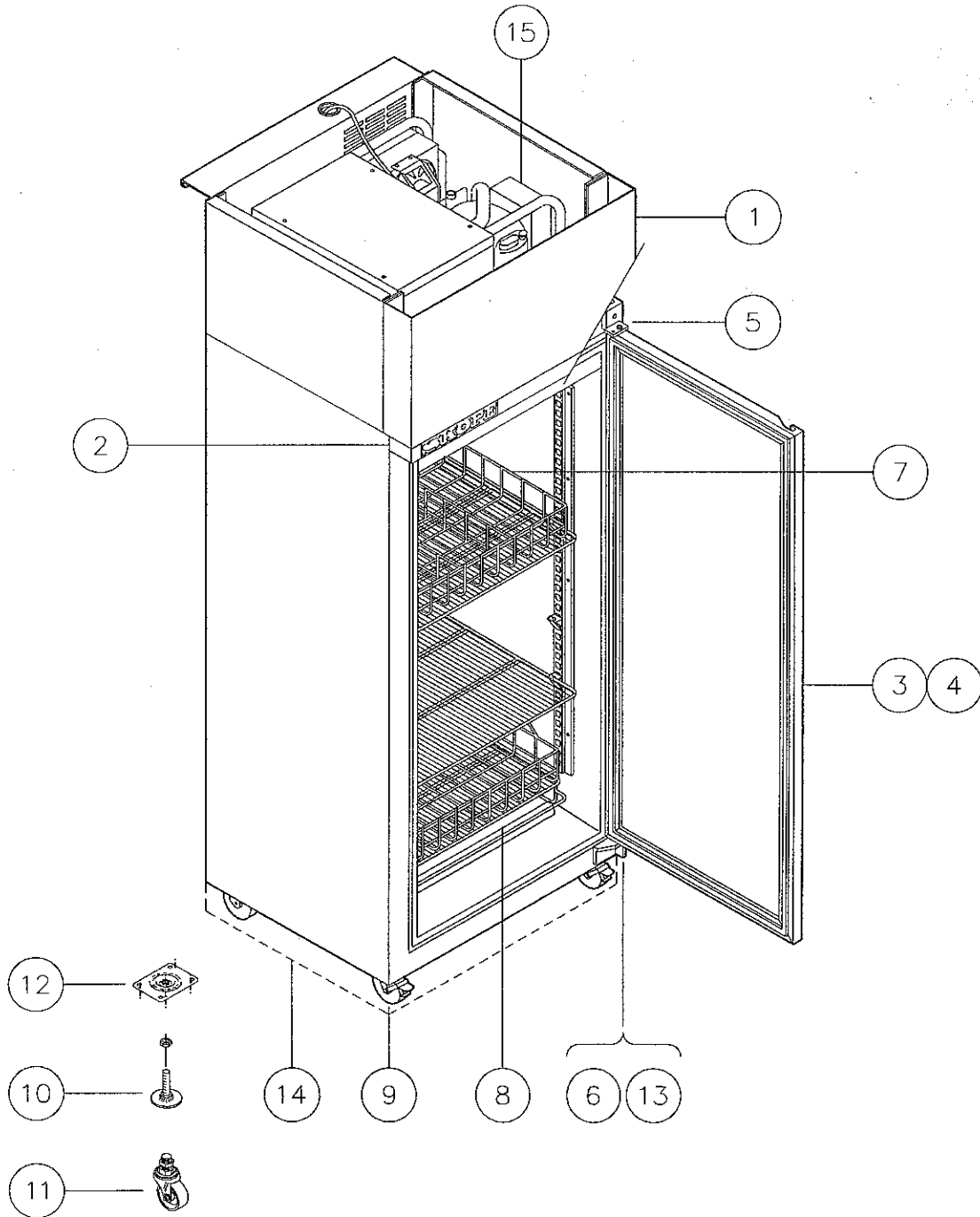
* Castor Plate is required for mounting of Adjustable Foot and Adjustable Castors.



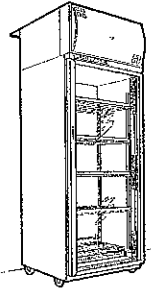
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OPTIONAL FEATURES

PARTS IDENTIFICATION



SKOPE®



SKF650 FREEZER

OPTIONAL FEATURES

SOLID DOOR ASSEMBLY

Mk.1 & Mk.2 · Full length Handle		
ITEM	DESCRIPTION	PART No.
1	Magnetic Gasket	GKT4888
2	Torsion Bar Set (Items 2,3 & 4)	REF5014
3	Bush	PLM3289
4	Capstan	REF1446
5	Captive Plate	REF1447
6	Solid Door Foamed	V6502D
7	Capstan Pin	REF1448
8	Solid Door Top Stay	V7000/45

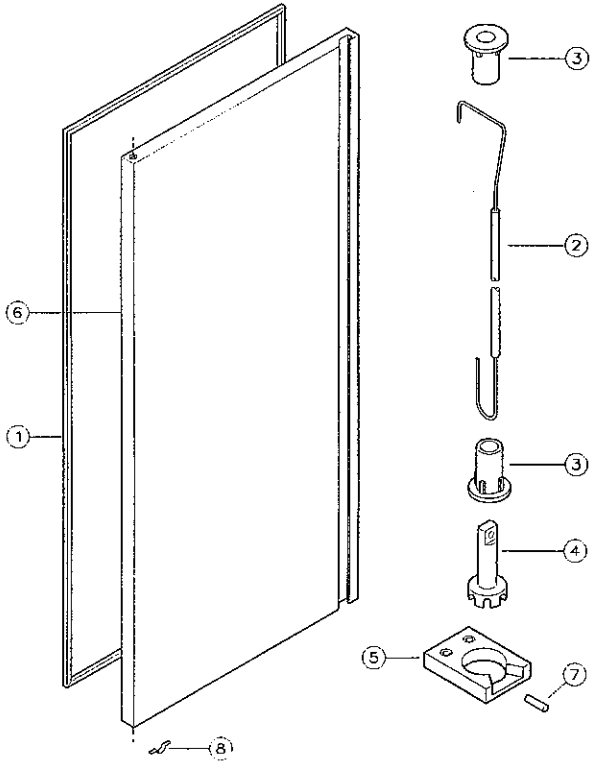
Mk.3 · Partial Handle		
ITEM	DESCRIPTION	PART No.
1	Solid Door Foamed Includes handle & gasket retainers	V6500/D42
2	Magnetic Gasket	GKT7883
3	Plastic Handle	PLM7823
4	Hinge Mechanism Includes spring & fastenings	HIN5780
5	Mount Bush	C1300/D56



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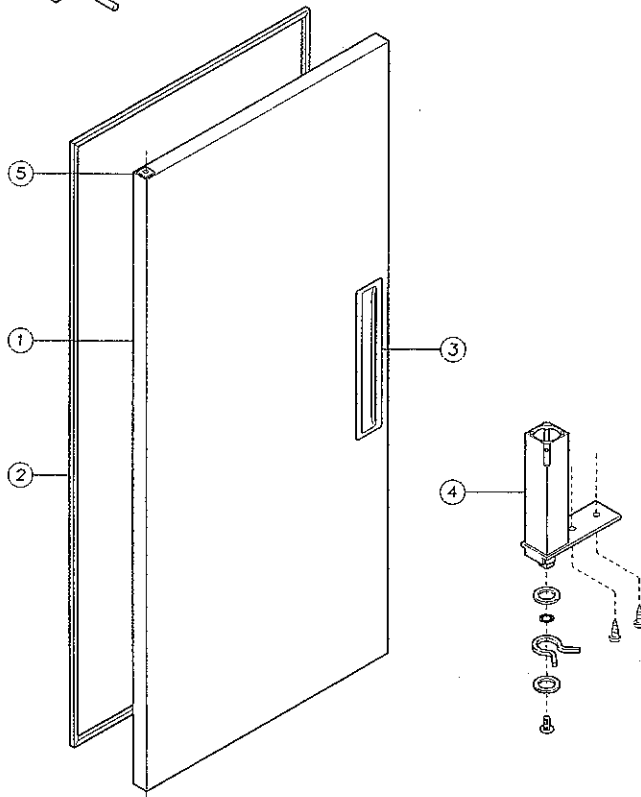
OPTIONAL FEATURES

SOLID DOOR ASSEMBLY

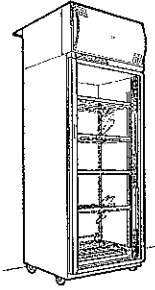


Mk.1 & Mk.2
Full Length Handle

Mk.3
Partial Handle



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SKF650 FREEZER

OPTIONAL FEATURES

HIGH PERFORMANCE DOOR ASS'Y

V6325/740 L (left or R (right))

ITEM	DESCRIPTION	PART No.	QTY.
1	Glass and Frame	V6325/740L or R	1
2	Gasket	GKT4775	1
3	Thermal Break (long)	V5000/765	2
4	Thermal Break (short)	V6000/766	2
5	Torsion Bar	REF5014	1
	Torsion Bar Set (Items 5, 6 & 7)	REF4295	1
6	Bush	PLM5075	2
7	Capstan	TUR5100	1
8	Cotter Pin	FAS5076	1

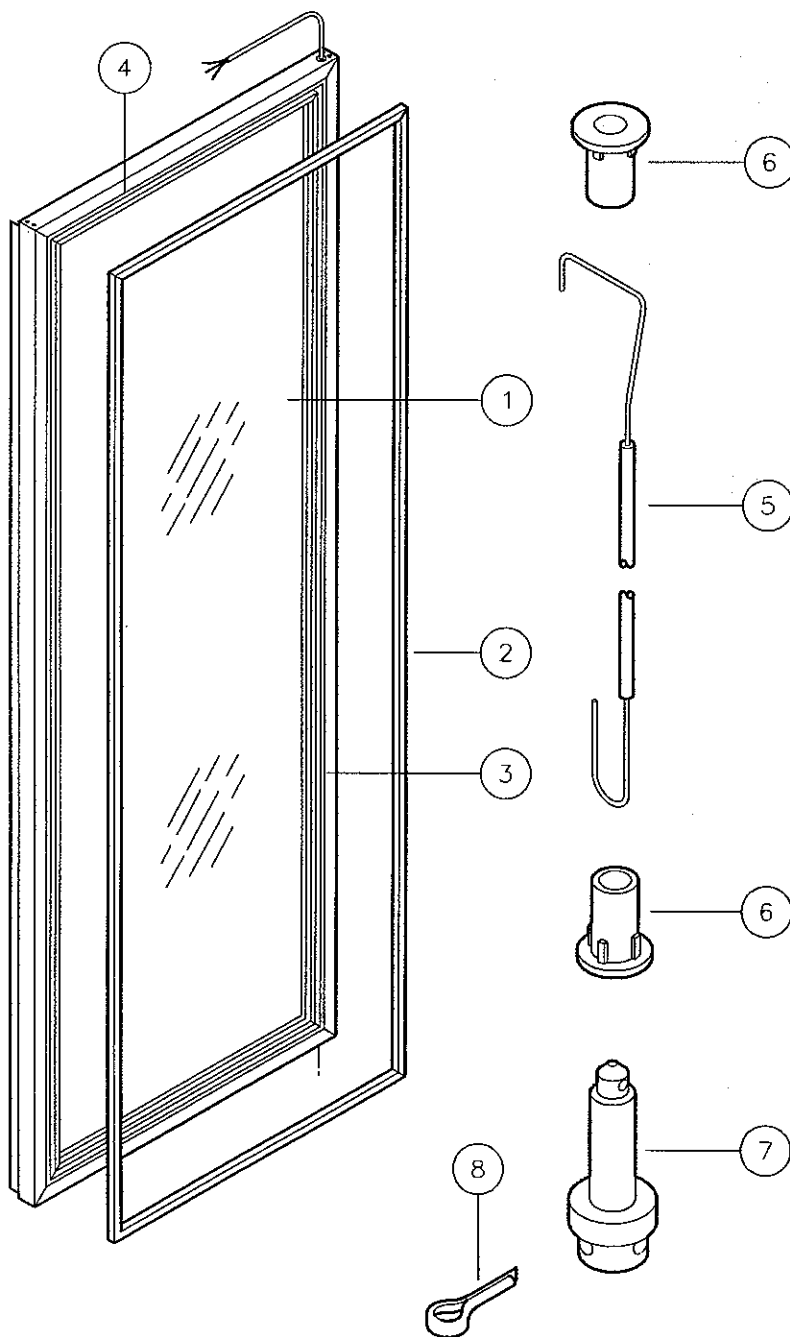


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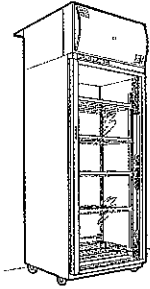
OPTIONAL FEATURES

HIGH PERFORMANCE DOOR ASS'Y

V6325/740 L (left) or R (right)



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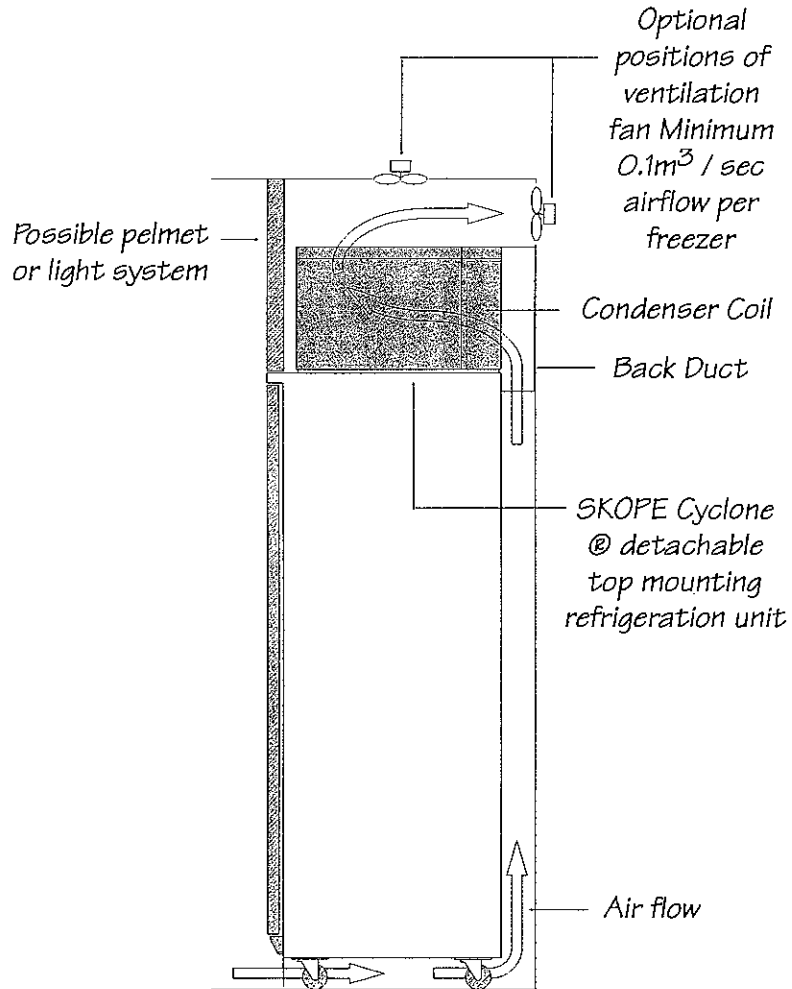
SKF650 FREEZER

OPTIONAL FEATURES

BACK DUCT KIT

V6338/A93

ITEM	DESCRIPTION	PART No.
1	Duct Kit Panel	V6300/A94
2	Duct Kit left hand End	V6300/A95
3	Duct Kit right hand End	V6300/A96
4	Inseal Foam Tape	275 x 25 x 6mm
5	Inseal Foam Tape	60 x 25 x 6mm
6	Screws (14)	6 x 3/8" pozi

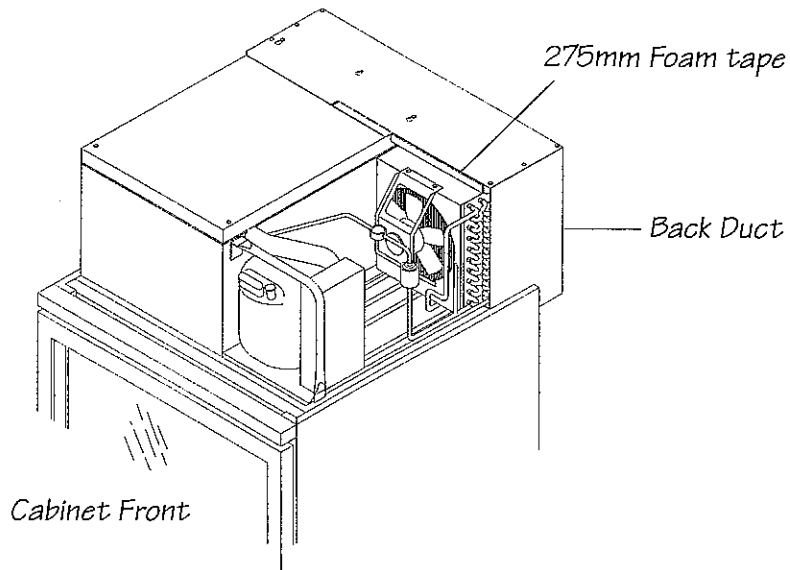
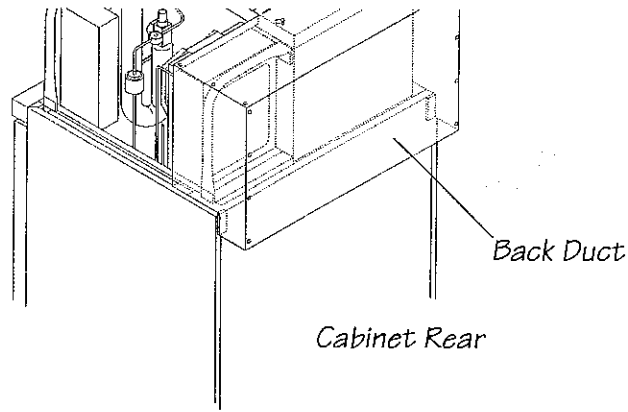
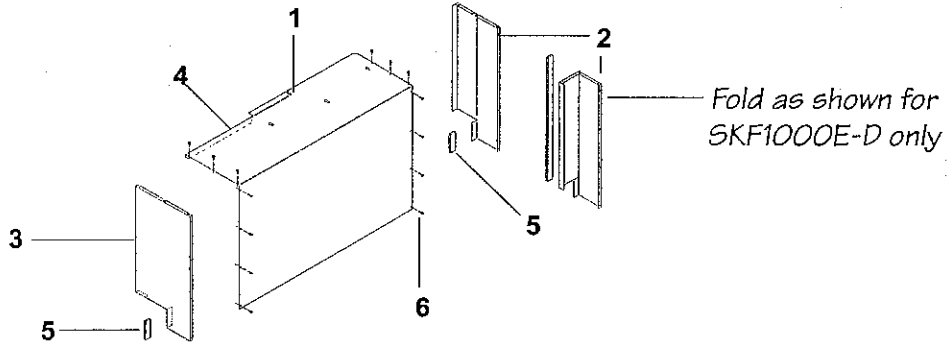


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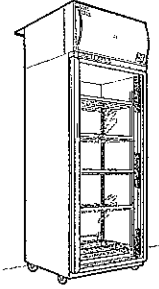
OPTIONAL FEATURES

BACK DUCT KIT

V6338/A93



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SKF650 FREEZER

OPTIONAL FEATURES

ADJUSTABLE KICK PANEL

Adjustable Castor Kick Panel Kit		
Part No. V6000/127S		
ITEM	DESCRIPTION	PART No.
1	Fixed Kick Panel	V6000/A54S
2	Adjustable Kick Panel	V6000/A56S
3	Fixed Side Panel	V5000/A57
4	Adjustable Side Panel	V5000/A60
5	Side Panel Fixing Bracket	V5000/A58

Adjustable Foot Kick Panel Kit		
Part No. V6000/128S		
ITEM	DESCRIPTION	PART No.
1	Fixed Kick Panel	V6000/A54S
2	Adjustable Kick Panel	V6000/A55S
3	Fixed Side Panel	V5000/A57
4	Adjustable Side Panel	V5000/A59
5	Side Panel Fixing Bracket	V5000/A58

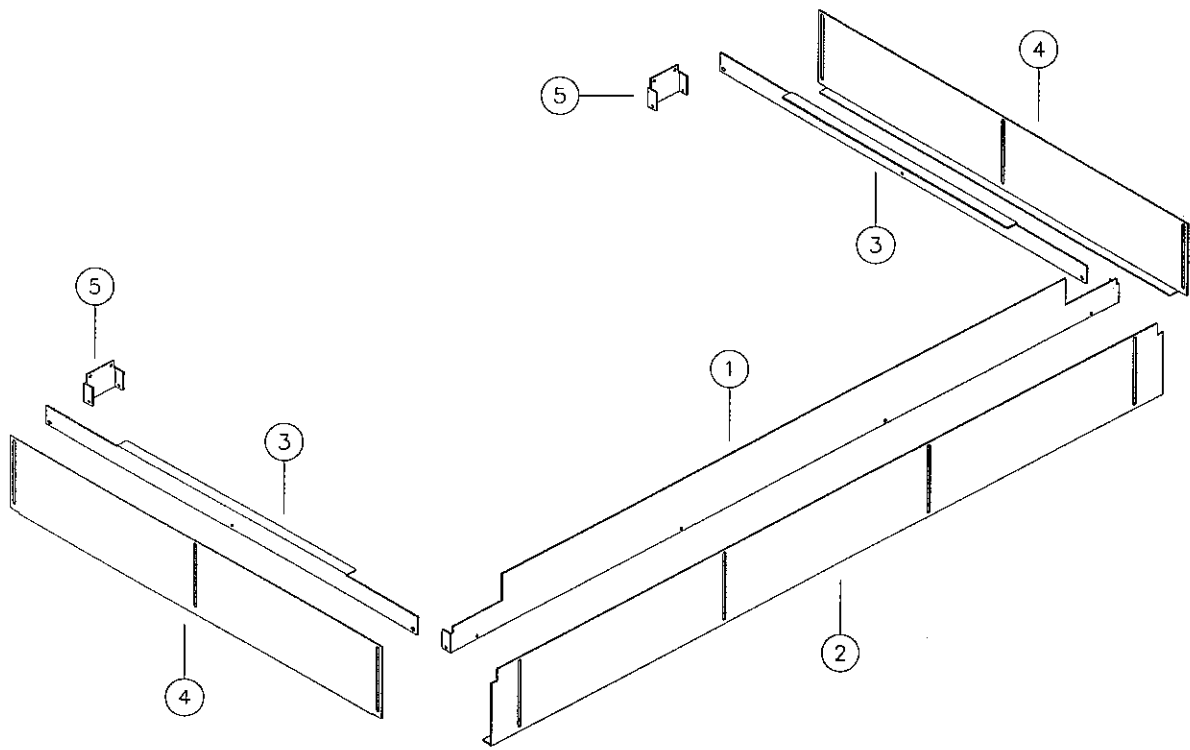
Note: Diagram shows Kick Panel for Adjustable Castor.



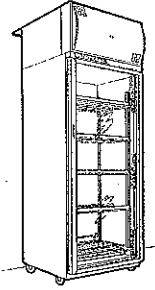
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OPTIONAL FEATURES

ADJUSTABLE KICK PANEL



SKOPE®



SKF650 FREEZER

SPARES ORDERING PROCEDURE

The preceding drawings cover all major parts of the SKOPE SKF650 freezers and should provide ready identification of any part required for replacement.

When requesting cabinet parts, where ever possible, please quote part number, machine serial number, model, colour and a description of the parts required.

If the SKOPE Cyclone® unit parts are required, quote cyclone unit serial number also.

The terms **left hand** and **right hand** are applied from the perspective of a person standing in front of the cabinet.

A **right hand** door has the hinge on the right hand side, opposite side for **left hand** doors.

When ordering sign panels, give a description of the art work required. e.g. *FROZEN FOOD*



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