

# OSA 780 B

## Split System Outdoor Unit

## Installation & Maintenance

### GENERAL

**OSA 780 B** - A general designation for outdoor unit  
**OSA 780CB** - Outdoor unit, cooling only version  
**OSA 780RB** - Outdoor unit, reverse cycle version

The OSA 780 B outdoor unit is a twin system that provides the facility for capacity control (staging) or staggered starting.

Alternatively, the OSA outdoor unit can be connected to two indoor units of half capacity, controlled by a single thermostat. Four indoor units of one quarter capacity, i.e. two pairs connected in tandem, is also an option. In either case, refer to **temperzone** engineering for wiring details.

This OSA 780 B Outdoor Unit must be installed in accordance with all national and local safety codes.

### Combinations

One OSA 780 B with one ISD 780Q  
 One OSA 780 B with two ISD 390Q  
 One OSA 780 B with four ISD 180Q

### INSTALLATION

#### Positioning

Refer to dimension diagram below for minimum clearances. Fasten the unit down to a firm flat horizontal base using the four holes provided in the mounting rails.

When the unit is being installed on a roof it is recommended that the unit is installed on a substantial structure with vibration isolating springs beneath the unit. These springs are not supplied with the unit.

#### Drains

Four drain holes are provided in the base of the unit for the release of condensate and/or rain water. For a totally drip free installation mount the unit in a separate drain tray.

#### Coil Protection

Coil protection guards are available as an optional extra.

### OPTIONAL FAN SPEED CONTROLLER

Fit a head pressure fan speed controller where cooling is required in below 20°C ambient conditions for long periods of time. An electronic HP Fan Speed Controller (8 amp) is available from **temperzone**. One is required for each of the two systems.

### REFRIGERATION PIPING

#### General

The OSA 780 B is shipped with a holding charge of refrigerant. The matched indoor unit is shipped with a holding charge of nitrogen. OSA 780 B units have two flare and two brazed pipe connections.

#### Recommended Pipe Sizes

Suction pipe (x2) : 35 mm OD  
 Liquid pipe (x2) : 16 mm OD

Capacity losses for different pipe sizes are given overleaf.

#### Line Lengths

For line lengths in excess of 50 m, contact the manufacturer's nearest sales office for additional details on piping requirements. Maximum extended line length is 70 m/sys.

#### Height Separation Limits

Outdoor Unit above Indoor Unit : 18 m  
 Outdoor Unit below Indoor Unit : 12 m

#### Vertical Risers

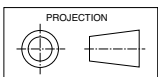
If the outdoor unit is to be installed above the indoor unit, then the suction riser should be trapped at the bottom of the vertical rise and then again at 5 m (maximum) intervals. This is to ensure oil return to the compressor. The trap to be a 'swan neck' curve in the pipe, with no change in the pipe size.

#### Piping

1. Use clean sealed refrigeration grade piping.
  2. Cut pipe with a pipe cutter ONLY.
  3. Use long radius bends (2x pipe dia.).
  4. Insulate the suction (gas) lines and seal all insulation joints.
  5. Filter dryers may be fitted in the liquid lines (bi-flow type on reverse cycle systems).
  6. Include a process point on the interconnecting pipework.
  7. Ensure open pipe ends are sealed until the final connection is made.
  8. Immediately before removing brazed pipe connection's seal, reduce holding charge between connection points and service valves to atmospheric pressure.
- Warning:** Failure to do so may cause injury.

## Dimensions (mm)

## OSA 780 B

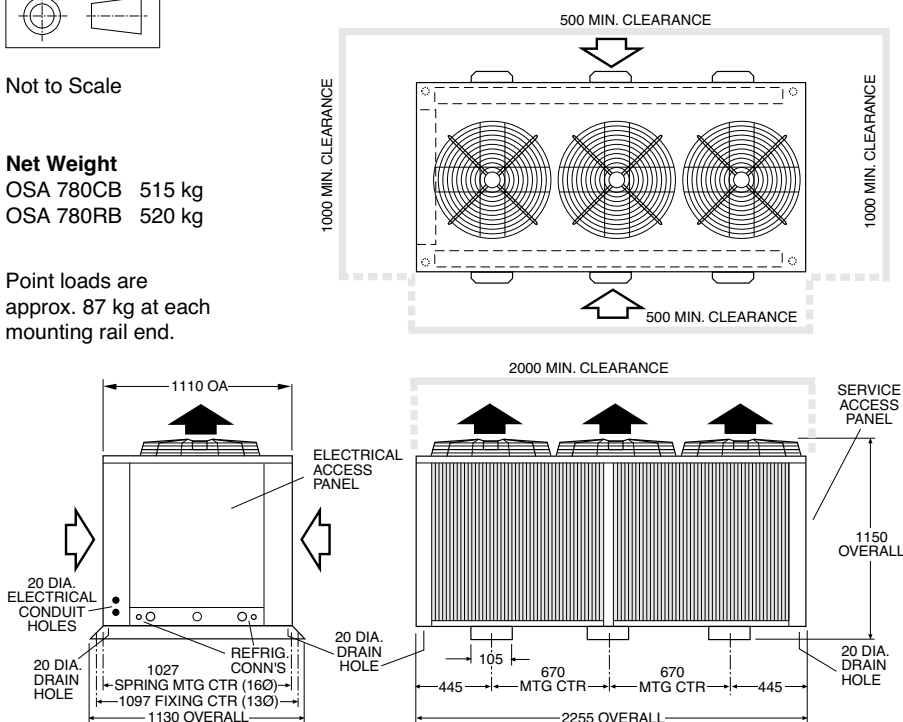


Not to Scale

### Net Weight

OSA 780CB 515 kg  
 OSA 780RB 520 kg

Point loads are approx. 87 kg at each mounting rail end.



### NOTE

The manufacturer reserves the right to change specifications at any time without notice or obligation. Certified dimensions available on request.

## Important

Do not connect System 1 to System 2.

## Charging

The unit is supplied with a 1 kg of holding charge of refrigerant HCFC-22 (R22) per system. Add 7.1 kg of HCFC-22 per system to complete the base charge, then add 105 g per metre of pipework between indoor and outdoor units.

### Procedure (per system):

1. Evacuate Indoor Unit and interconnecting pipework to a pressure of 500 microns and hold for 15 mins.
2. Add refrigerant via the Schraeder connection on the smaller of the Outdoor Unit's two service valves.
3. Open the service valves at the Outdoor Unit to allow refrigerant to flow throughout the system.
4. Leak check all brazed and fitted joints.

### IMPORTANT :

Step 9 of the 'Start Up Procedure' requires you to check that the superheat on the suction line (where it enters the Outdoor Unit) is between 3°C – 5°C on cooling cycle with an indoor air temperature in the range 21° – 27°C and outdoor air temperature in the range 24° – 35°C. If the conditions of the day do not allow this, use the heating cycle (on a reverse cycle unit) or other heat source to raise the indoor air temperature to about 24°C. Return to cooling cycle and blank off the outdoor coil to raise the head pressure to 240–280 psig (1750–1950 kPag). Alter charge up or down to establish correct superheat.

### WARNING:

This unit is designed for use ONLY with the refrigerant HCFC-22. The use of other refrigerants is NOT authorised or approved by the manufacturer and may cause operational problems such as poor performance and efficiency, loss of capacity, degradation of materials and refrigerant leaks. **The use of flammable or explosive materials as a refrigerant creates the additional risks of fire and explosion which may result in property damage, personal injury or death.**

### Oil Charge

For line lengths in excess of 30 m, Emcarate RL22CF polyol ester oil (or similar) should be added to the refrigerant at the rate of 30 ml/m of suction piping. **Note:** Do not use mineral oil.

### ELECTRICAL REQUIREMENTS

Electrical work must be done by a qualified electrician. The outdoor unit must be wired directly from a distribution board by means of a circuit breaker or H.R.C. fuse, and a mains isolator provided - preferably close to the Outdoor Unit.

**Note:** DO NOT USE REWIRABLE FUSES.

The OSA 780 B is provided with a 24V AC control circuit for a thermostat, on/off switch and/or time clock.

The control transformer 240V primary voltage is used for countries with 230-240V power supply. For countries with supply voltages 200-220V, change the primary voltage on the transformer to 208V.

*OSA 780RB only* - It is recommended electricians run a spare wire between Outdoor Unit and Indoor Unit(s) in case boost electric heat becomes a requirement. **Note:** Leave the wire unconnected until required.

Standard units are suitable for use with thermostats with either manual Heat/Cool selection or automatic changeover subject to the contact ratings of the thermostats.

A 24 hour power supply to the crankcase heaters is required, otherwise the warranty is void.

### SYSTEM CHECK TESTS

1. Leave the remote switch in the off position and close the mains isolating switch.  
A four hour delay period is required to allow the crankcase heaters to drive any liquid refrigerant out of the compressor oil.
2. Check that the shipping blocks beneath each compressor have been removed and that each compressor is secure on its mounts.
3. Check that all fan motors are free running.
4. Check that the thermostat is correctly wired to the unit and is set at the desired temperature.
5. Check that the air filters, if any, have been correctly installed.
6. Check any supply air diffuser dampers are open.

### START UP PROCEDURE

Check each system independently first before running complete system. Use the supplied Commissioning Sheet to help you complete the following procedure:

1. After the four hour delay period has expired switch on the unit.
2. Check the supply voltage.
3. Fit gauges and measure the suction and discharge pressures.
4. Check for correct rotation of the compressors. If rotation is incorrect a compressor will not pump, be noisy, and will draw minimal current. To correct motor rotation, change the phasing at the main power terminal.
5. Measure the current draw on each phase to the compressor motor and on each fan motor. Check all readings against the specified values - particularly the indoor fan amps if the

unit is installed in a free blow application.

6. Test the operation of the high pressure safety control by switching off the outdoor unit's fan.
7. Test the operation of the reversing valve by running the unit in both the heating and cooling mode (OSA 780RB only).
8. Check that the air flow over the outdoor unit's coil is adequate and that the fan is running smoothly.
9. Check the superheat - refer charging procedure.
10. Check the indoor unit's fan belt tension after 20 mins of operation and adjust if necessary (refer Commissioning Sheet).
11. Check the supply air flow at each outlet.
12. Check the tightness of all electrical connections and sign the check label.
13. Touch up any outdoor unit paintwork damage to prevent corrosion.

### MAINTENANCE

#### Weekly For First Four Weeks

1. Check indoor unit air filters (if fitted) and vacuum or wash clean as necessary.
2. Check condensate drain for free drainage.
3. Check compressor compartment for oil stains indicating refrigerant leaks.
4. Check tightness of electrical connections.

#### Three Monthly (or every 1200 hrs of operation)

Check the indoor unit's fan belt tension and adjust if necessary.

#### Six Monthly

1. Check the tightness of all fan and motor mountings.
2. Check tightness of all electrical connections.
3. Check that fan motors are free running.
4. Check suction and discharge operating pressures.
5. Replace indoor unit air filters (if fitted).
6. Check condensate drain for free drainage.

#### Yearly

1. Check all refrigerant piping for chafing and vibration.
2. Check the operation of electric heaters if fitted.
3. Check air supply at all diffusers.
4. Check for excessive noise and vibration and correct as necessary.
5. Check for insulation and duct damage and repair as necessary.
6. Remove lint and dust accumulation from outdoor coil fins.
7. Touch up any outdoor unit paintwork damage to prevent corrosion.

This pamphlet replaces the previous issue no. 2266 dated 06/03. Oil Charge.

## Pipe Length Capacity Loss On Cooling Cycle Due to Pressure Drop

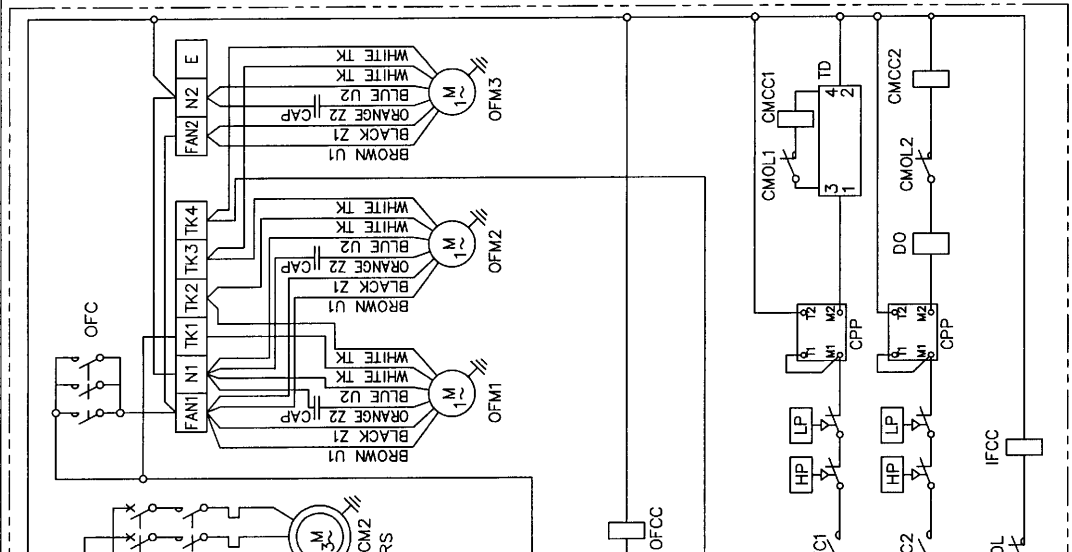
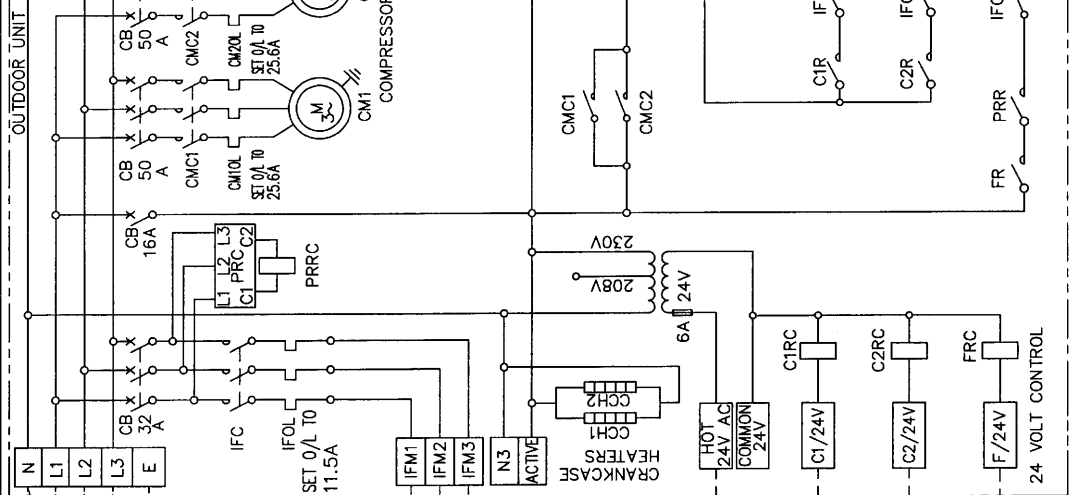
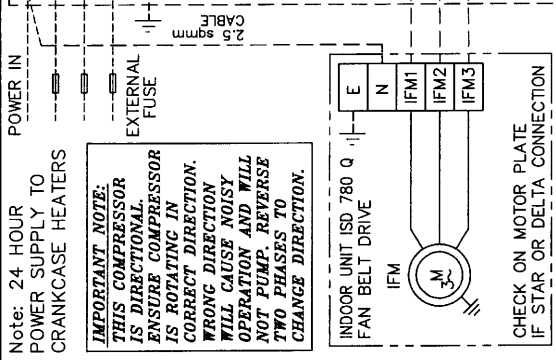
**Note :** Loss percentages are approximations only, due to piping variations. No allowance made for vertical piping.

Pipe Size (mm)		Equivalent Line Pipe Length (m)			
Liquid	Suction	10	20	30	40
16	35	1 %	2 %	3 %	4 %
16	41	-	1 %	2 %	3 %

Additional Pipe Length to allow per Bend		
Suction Pipe Size OD	35 mm	41 mm
Long 90° Radius (2 x pipe dia.)	0.76 m	0.80 m

Note: 24 HOUR POWER SUPPLY TO CRANKCASE HEATERS

**IMPORTANT NOTE:**  
 THIS COMPRESSOR IS DIRECTIONAL. ENSURE COMPRESSOR IS ROTATING IN CORRECT DIRECTION. WRONG DIRECTION WILL CAUSE NOISY OPERATION AND WILL NOT PUMP. REVERSE TWO PHASES TO CHANGE DIRECTION.



OUTDOOR UNIT: - OSA 780 C  
 WITH INDOOR UNIT

CAPACITIES - NET to AS/NZS 3823

COOLING - kW 74.2

ELECTRICAL INPUT @ 3Ph 400V ~ 50Hz kW 27.6

COOLING - kW/kw 2.688

E.E.R. (COOLING) kW/kw 2.688

ELECTRICAL SUPPLY REQUIRED 3Ph 342-436V ~ 50HZ INCLUDING VOLTAGE FLUCTUATION LIMITS

COMPRESSOR (3Ph) RUN AMPS RATED CONDITIONS A/Ph 19 x2

INDOOR FAN MOTOR FULL LOAD AMPS A/Ph 11.5

INDOOR FAN MOTOR kW/MOTOR 5.5

OUTDOOR FAN MOTOR (1Ph) FULL LOAD AMPS A 3.3 x3

OUTDOOR FAN MOTOR CAPACITOR MFD 12

RUNNING AMPS (TOTAL) A/Ph 45/51/53

RECOMMENDED EXTERNAL FUSE SIZE A/Ph 100

WEIGHT-NETT INDOOR UNIT kg 500

WEIGHT-NETT OUTDOOR UNIT kg 349

REFRIGERANT - HCFC (R22) NOMINAL EACH SYSTEM HAS HOLDING CHARGE 1.0kg

BASE CHARGE PER SYSTEM 8.1 Kg PLUS 105 grams PER METRE LINE LENGTH BASED ON #16mm OD LIQUID LINES & #35mm OD GAS LINES

CB	CIRCUIT BREAKER	IFC	INDOOR FAN CONTACTOR
CCH	CRANKCASE HEATER	IFCC	INDOOR FAN CONTACTOR COIL
CM	COMPRESSOR MOTOR	IFM	INDOOR FAN MOTOR
CMC	COMPRESSOR CONTACTOR	IFOL	INDOOR FAN OVERLOAD
CMCC	COMPRESSOR CONTACTOR COIL	LP	LOW PRESSURE SWITCH
CMOL	COMPRESSOR OVERLOAD	OFC	OUTDOOR FAN CONTACTOR
CPP	COMPRESSOR PROTECTION PACK	OFCC	OUTDOOR FAN CONTACTOR COIL
CIR	COOLING 1 RELAY 24V CONTROL	OFM	OUTDOOR FAN MOTOR
C1RC	COOLING 1 RELAY COIL 24V	PRC	PHASE ROTATION CONTROL
C2R	COOLING 2 RELAY 24V CONTROL	PRR	PHASE ROTATION RELAY
C2RC	COOLING 2 RELAY COIL 24V	PRRC	PHASE ROTATION RELAY COIL
DO	TIME DELAY 6.0 MIN. DELAY ON MAKE	TD	TIME DELAY 5.0 MIN. DELAY ON BREAK
FR	INDOOR FAN RELAY 24V CONTROL		
FRC	INDOOR FAN RELAY COIL 24V		
HP	HI PRESSURE SWITCH	TK	CIRCUIT FOR OVERLOAD IN OUTDOOR FAN MOTOR

NOTE:  
 CONTROL TRANSFORMER 240V PRIMARY VOLTAGE IS USED FOR COUNTRIES WITH 230V TO 240V POWER SUPPLY. FOR COUNTRIES WITH SUPPLY VOLTAGE OF 200V TO 220V CHANGE PRIMARY VOLTAGE TO 208V ON TRANSFORMER.

NOTE: CHECK WIRING BEFORE SWITCHING ON, INCORRECT CONNECTION WILL DAMAGE MOTORS. CLIENT WIRING Interconnections between units by client. Double insulated multi-core cable.

Title OSA 780 C  
 WIRING SCHEMATIC

Drawn P.W-M	Date 08-03-02	Revision No. 327-754-006
Scale		A


ISSUE	MODIFICATION	ECN	DATE	APRVD	DRG SIZE	No.	DESCRIPTION	Mat.I	FINISH	ASSY No.
A	CHANGED TO NEW AS/NZS 3823 STANDARD. PHASE WIRE COLOURS REMOVED.	930	05-06-03	D.A.B.						

PLOTTED 06-05-03  
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OUTDOOR UNIT: — OSA 780 R		ISD 780	
WITH INDOOR UNIT			
CAPACITIES — NET to AS/NZS 3823			
COOLING —	REVERSE CYCLE	kW 74.2	
HEATING —	REVERSE CYCLE	kW 78	
ELECTRICAL INPUT @ 3Ph 400V ~ 50Hz			
COOLING —		kW 27.6	
HEATING —	REVERSE CYCLE	kW 24.6	
E.E.R. (COOLING)		kW/kW 2.688	
ELECTRICAL			
SUPPLY REQUIRED 3Ph 342-436V ~ 50Hz			
INCLUDING VOLTAGE FLUCTUATION LIMITS			
COMPRESSOR (3Ph) RUN AMPS RATED CONDITIONS A/Ph	19 x2		
INDOOR FAN MOTOR FULL LOAD AMPS	A/Ph 11.5		
INDOOR FAN MOTOR	kW/MOTOR 5.5		
OUTDOOR FAN MOTOR (1Ph) FULL LOAD AMPS A	3.3 x3		
OUTDOOR FAN MOTOR CAPACITOR	MFD 12		
RUNNING AMPS (TOTAL)	A/Ph 45.75/53		
RECOMMENDED EXTERNAL FUSE SIZE	A/Ph 100		
RECOMMENDED EXTERNAL FUSE WITH OPTIONAL ELECTRIC HEAT R/W PER PHASE TOTAL 18kW 110A			
WEIGHT—NETT OUTDOOR UNIT	kg 520		
WEIGHT—NETT INDOOR UNIT	kg 349		
REFRIGERANT — HCFC (R22)			
EACH SYSTEM HAS HOLDING CHARGE 1.0kg			
BASE CHARGE PER SYSTEM 8.1 kg PLUS 105 grams PER METRE LINE LENGTH			
BASED ON Ø16mm OD LIQUID LINES & Ø35mm OD GAS LINES			
BR	BRIDGE RELAY	HRC HEATING RELAY COIL 24V	
BR	BRIDGE RELAY COIL	HP HI PRESSURE SWITCH	
CB	CIRCUIT BREAKER	IFC INDOOR FAN CONTACTOR	
CCH	CRANKCASE HEATER	IFCC INDOOR FAN CONTACTOR COIL	
CM	COMPRESSOR MOTOR	IFM INDOOR FAN MOTOR	
CMC	COMPRESSOR CONTACTOR	IFOL INDOOR FAN OVERLOAD	
CMCC	COMPRESSOR CONTACTOR COIL	LP LOW PRESSURE SWITCH	
CMOL	COMPRESSOR OVERLOAD	LPR LOW PRESSURE RELAY	
CPP	COMPRESSOR PROTECTION PACK	LPRC LOW PRESSURE RELAY COIL	
CIR	COOLING 1 RELAY 24V CONTROL	OFC OUTDOOR FAN CONTACTOR	
CIRC	COOLING 1 RELAY COIL 24V	OFCC OUTDOOR FAN CONTACTOR COIL	
C2R	COOLING 2 RELAY 24V CONTROL	OFM OUTDOOR FAN MOTOR	
C2RC	COOLING 2 RELAY COIL 24V	PRC PHASE ROTATION CONTROL	
DIC	DE-ICE CONTACTOR	PRR PHASE ROTATION RELAY	
DICC	DE-ICE CONTACTOR COIL	PRC PHASE ROTATION RELAY COIL	
DIFC	DE-ICE INDOOR FAN CONTACTOR	RCV REVERSE CYCLE VALVE	
DO	TIME DELAY 6.0 MIN. DELAY ON MAKE	TD TIME DELAY 5.0 MIN. DELAY ON BREAK	
FR	INDOOR FAN RELAY 24V CONTROL	TK	CIRCUIT FOR OVERLOAD IN OUTDOOR FAN MOTOR
FRC	INDOOR FAN RELAY COIL 24V		
HR	HEATING RELAY 24V CONTROL		

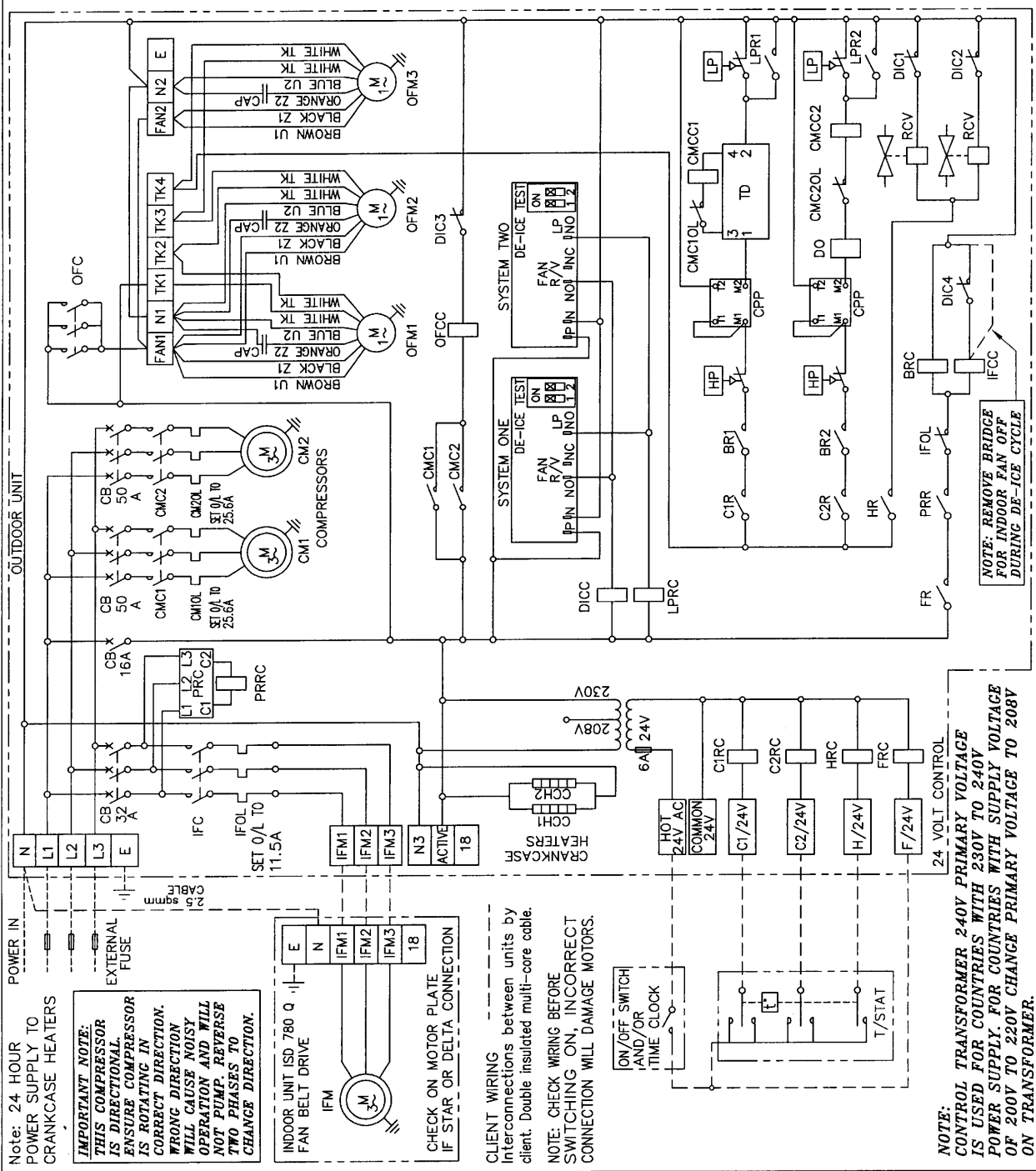
NOTE: TESTING OF DE-ICE SWITCH POSITION ON SWITCH DIP SWITCH 1 OFF TO ALLOW REPEATED DE-ICE CYCLES WITHOUT A 38 MINUTE DELAY. SWITCH DIP SWITCH 2 OFF TO FORCE A DE-ICE CYCLE. ALWAYS RETURN BOTH SWITCHES TO 'ON' POSITION FOR NORMAL OPERATION.

Title: OSA 780 R  
 WIRING SCHEMATIC



temperzone

Drawn P.W-M	Date 08-03-02	Revision
Scale	As'd	326-754-006
		A



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