

# OSA 146 B

## Split System Outdoor Unit

## Installation & Maintenance

### GENERAL

**OSA 146 B** - A general designation for outdoor unit  
**OSA 146CB** - Outdoor unit, cooling only version  
**OSA 146RB** - Outdoor unit, reverse cycle version

The twin system OSA outdoor unit provides the facility for capacity control (staging) or staggered starting.

Alternatively, the OSA outdoor unit can be connected to two independently controlled indoor units of half capacity, thereby providing the ability to service two zones instead of just one. Two indoor units can also operate from a single (two-stage) thermostat - provided the units are wired carefully to the the wiring diagram's instructions.

This OSA 146 B Outdoor Unit must be installed in accordance with all national and local safety codes.

### Combinations

- One OSA 146 B with one ISD 146Q
- One OSA 146 B with two ISDL 71Q
- One OSA 146 B with two ISD 75Q
- One OSA 146 B with two GME 222
- One OSA 146 B with two ISK 73Q

### INSTALLATION

#### Positioning

Refer to dimension diagram below for minimum clearances. Position the unit so that prevailing winds do not blow onto the exhaust to slow the fan, and one unit does not exhaust toward the inlet of another unit.

Mount either free standing or on a wall using the optional mounting brackets available.

#### Free Standing :

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.

#### Wall Mounting Option:

Complete wall mounting instructions are supplied with the optional wall mounting kit.

### Drain

Install the unit with a positive fall to the rear to ensure condensate and/or rain water drains away freely through the drain holes provided. For a totally drip free installation mount the unit in a separate drain tray.

### 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 (4 amp) is available from **temperzone**.

### REFRIGERATION PIPING

#### General

The OSA 146 is shipped with a refrigerant charge sufficient for a 10 m line length (per system). The matched indoor unit is shipped with a holding charge of nitrogen. OSA 146 units have shut-off service valves and flare nut connections.

#### Recommended Pipe Sizes

- Suction pipe : 16 mm OD
- Liquid pipe : 10 mm OD

#### Line Lengths

For line lengths in excess of 30 m (per system), fit compressor crankcase heater/s to prevent liquid refrigerant condensing in the 'off' cycle. Refer also to *Oil Charge* overleaf. Maximum extended line length is 40 m (per system).

#### Height Separation Limits

##### Reverse Cycle Systems

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

##### Cooling Only Systems

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

#### Vertical Risers

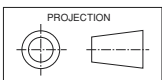
If the outdoor unit is to be installed above the indoor unit, then the suction riser should be trapped at the bottom of the vertical riser and then again at 5 m (maximum) intervals. This is to ensure oil return to the compressor. The trap to be a 'swan neck' curve in the pipe, with no change in the pipe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

## Dimensions (mm)

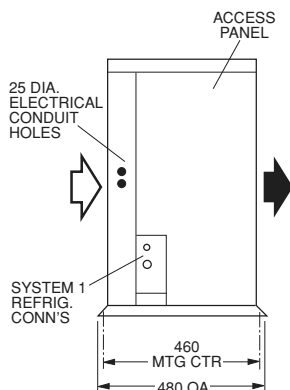
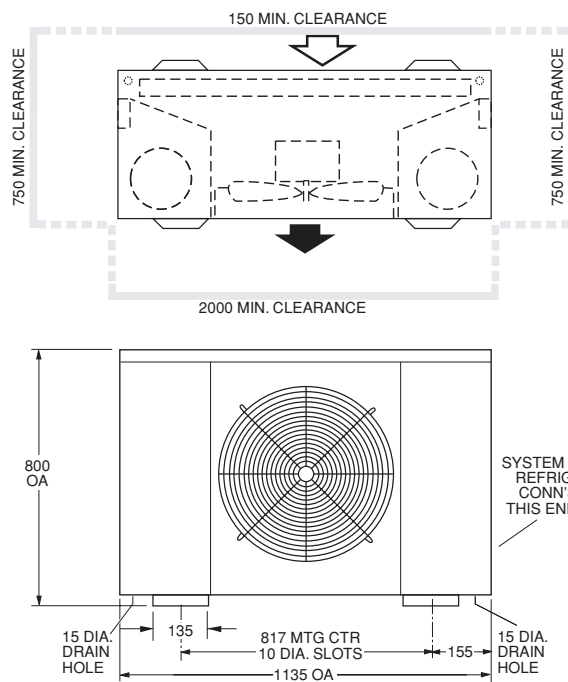
## OSA 146 B



Not to Scale

### Net Weight

- OSA 146CB 140 kg
- OSA 146RB 143 kg



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- Filter dryers may be fitted in the liquid lines (bi-flow type on reverse cycle systems).
- Include a process point in the interconnecting pipework.
- Ensure open pipe ends are sealed until the final connection is made.

### Important

Do not connect System 1 to System 2.

### Charging

Each system is supplied with 2.2 kg of refrigerant HCFC-22 (R22) which is sufficient for a system with up to 10 m of pipework between the indoor and outdoor units. Add 40 g of HCFC-22 per metre over 10 m.

*Procedure (per system):*

- Evacuate Indoor Unit and interconnecting pipework to a pressure of 500 microns and hold for 15 mins.
- Add refrigerant, if needed, via the Schraeder connection on smaller of the Outdoor Unit's two service valves.
- Open the service valve at the Outdoor Unit to allow refrigerant to flow throughout the system.
- Leak check all flared joints.

### IMPORTANT:

Step 8 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, Suniso 4GS oil (or similar) should be added to the refrigerant at the rate of 1/3 fluid ounce per metre (10 ml/m) of suction piping.

### 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 2 pole mains isolator provided - preferably close to the Outdoor Unit.

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

*OSA 146RB only* - It is recommended electricians run two spare wires between Outdoor Unit and Indoor Unit(s) in case one, or both, of the following options becomes a requirement. **Note:** Leave the wires unconnected until required.  
*Option 1* - Indoor Fan Off During De-Ice  
*Option 2* - Electric Boost Heat.  
 Refer indoor unit's wiring diagram.

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.

Refer to separate pamphlet for approved thermostats, or contact the manufacturer's nearest sales office.

If a compressor crankcase heater is fitted, then a 24 hour power supply to the crankcase heater is required, otherwise the warranty is void.

### SYSTEM CHECK TESTS

- 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 heater/s (if fitted) to drive any liquid refrigerant out of the compressor oil.
- Check that all fan motors are free running.
- Check that the thermostat is correctly wired to the unit and is set at the desired temperature.
- Check that the air filters, if any, have been correctly installed.
- 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:

- Switch on the unit.  
**Note:** If crankcase heater fitted, switch on the unit after the four hour delay period has expired.
- Check the supply voltage.
- Measure the current draw on 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.

- Fit gauges and measure the suction and discharge pressures.
- Test the operation of the high pressure safety control by switching off the outdoor unit's fan.
- Test the operation of the reversing valve by running the unit in both the heating and cooling mode (OSA 146RB only).
- Check that the air flow over the outdoor unit's coil is adequate and that the fan is running smoothly.
- Check the superheat - refer charging procedure.
- Check the supply air flow at each outlet.
- Touch up any outdoor unit paintwork damage to prevent corrosion.

### MAINTENANCE

#### Weekly For First Four Weeks

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

#### Six Monthly

- Check the tightness of all fan and motor mountings.
- Check the tightness of electrical connections.
- Check that fan motors are free running.
- Check suction and discharge operating pressures.
- Replace indoor unit air filters (if fitted).
- Check condensate drains for free drainage.

#### Yearly

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

### NOTE

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

This pamphlet replaces the previous issue no. 1917 dated 10/00.  
Start up, wiring rev. B.

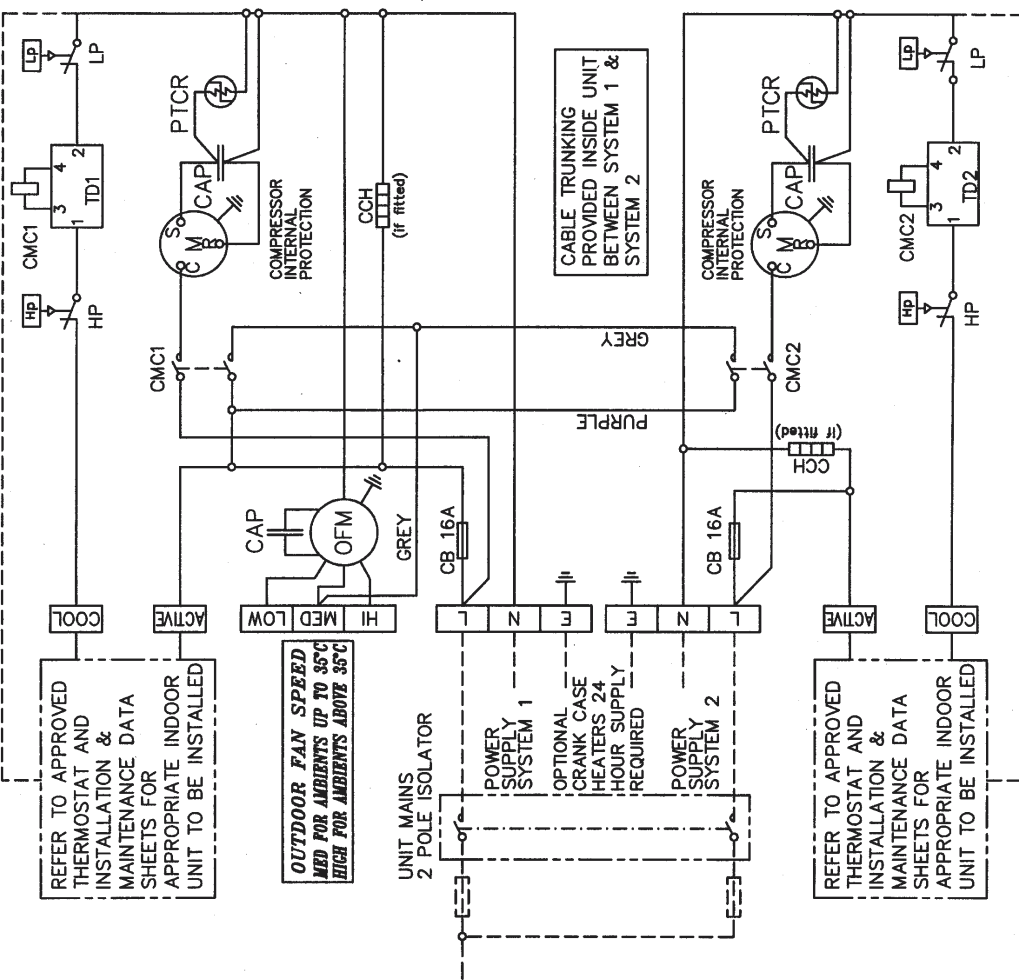
## Pipe Length Capacity Loss On Cooling Cycle Due to Pressure Drop

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

Pipe Size (mm)		Equivalent Line Pipe Length (m)					Additional Pipe Length to allow per Bend		
Liquid	Suction	5	10	15	20	30	Suction Pipe Size OD	16 mm	19 mm
10	16	2 %	4 %	6.5 %	9 %	13 %	Long 90° Radius (2 x pipe dia.)	0.3 m	0.4 m
10	19	-	-	3 %	4 %	6 %			

**IMPORTANT!!**

SYSTEM No1 MUST HAVE A POWER SUPPLY FOR SYSTEM No2 TO OPERATE. POWER SUPPLY FOR BOTH SYSTEMS TO BE OFF SAME SUPPLY PHASE & 2 POLE ISOLATOR TO BE PROVIDED TO ISOLATE BOTH SYSTEMS. WHEN USING ONE T/STAT FOR BOTH SYSTEMS, CONNECT THERMOSTAT TO SYSTEM 1 AND LINK "COOL" TO SYSTEM 2. FOR SINGLE INDOOR UNIT CONNECT TO "ACTIVE" OF POWER SUPPLY SYSTEM 1. DO NOT CONNECT "ACTIVE" OF POWER SUPPLY SYSTEM 2.



REFER TO APPROVED THERMOSTAT AND INSTALLATION & MAINTENANCE DATA SHEETS FOR APPROPRIATE INDOOR UNIT TO BE INSTALLED

OUTDOOR FAN SPEED MED FOR AMBIENTS UP TO 35°C HIGH FOR AMBIENTS ABOVE 35°C

CABLE TRUNKING PROVIDED INSIDE UNIT BETWEEN SYSTEM 1 & SYSTEM 2

REFER TO APPROVED THERMOSTAT AND INSTALLATION & MAINTENANCE DATA SHEETS FOR APPROPRIATE INDOOR UNIT TO BE INSTALLED

PERFORMANCE DATA IS FOR EACH SYSTEM

OUTDOOR UNIT :- OSA 146CB	ISDL710	ISD750	ISD1460B	ISK73Q	GME222	GME152 x2	ISL450 x2
WITH INDOOR UNIT							
CAPACITIES - NET AS/NZS 3823							
COOLING - kW	7.3	7.5	13.805	7.0	7.0	3.5 x2	3.85 x2
ELECTRICAL INPUT							
COOLING - kW	2.5	2.6	5.2	2.02	2.4	1.2 x2	1.25 x2
E.E.R. (COOLING)	2.92	2.88	2.899	3.47	2.92	2.92	2.92
ELECTRICAL SUPPLY REQUIRED 1PH 200-252V ~ 50Hz INCLUDING VOLTAGE FLUCTUATION LIMITS							
COMPRESSOR (IPH) RUN AMPS RATED CONDITIONS	A	9.6	9.7	10.8	10.5	10.8	10.8
COMPRESSOR (IPH) STARTING AMPS	A						
COMPRESSOR CAPACITOR	MFD						
INDOOR FAN MOTOR (IPH) FULL LOAD AMPS	A	1.4	3.5	5.7	0.5	0.6	0.45 x2
INDOOR FAN MOTOR CAPACITOR	MFD	3.5	5	10	5	2&3.5	3.5
OUTDOOR FAN MOTOR (IPH) FULL LOAD AMPS	A						
OUTDOOR FAN MOTOR CAPACITOR	MFD						
RUNNING AMPS TOTAL x 2 SYSTEMS (except 146)		12.5 x2	12.2 x2	27.3	11.5 x2	12 x2	13 x2
RECOMMENDED EXTERNAL FUSE SIZE x 2 SYSTEMS	A	25 x2	25 x2	25 x2	25 x2	25 x2	25 x2
WEIGHT - NETT OSA 146CB							
REFRIGERANT - HCFC (R22)							
EACH SYSTEM PRECHARGED (10 METRE LINE LENGTH)							
BASE CHARGE OF EACH SYSTEM							
BASED ON #9.5 mm OD LIQUID LINE & #16 mm OD GAS LINE							

CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANK CASE HEATER
CM	COMPRESSOR MOTOR
CMC1	COMPRESSOR CONTACTOR SYS 1
CMC2	COMPRESSOR CONTACTOR SYS 2
HP	HI PRESSURE CONTROL
LP	LOW PRESSURE CONTROL
OFM	OUTDOOR FAN MOTOR
PTCR	START ASSIST THERMISTER
TD1	COMPRESSOR 1 TIME DELAY 5 MINS.
TD2	COMPRESSOR 2 TIME DELAY 6 MINS.

CHECK WIRING BEFORE SWITCHING ON, CLIENT WIRING INTERCONNECTIONS BETWEEN UNITS BY CLIENT DOUBLE INSULATED MULTI-CORE CABLE MOTORS

Programmed by

Title OSA 146 CB WIRING SCHEMATIC

temperzone

Plotted 19-05-03

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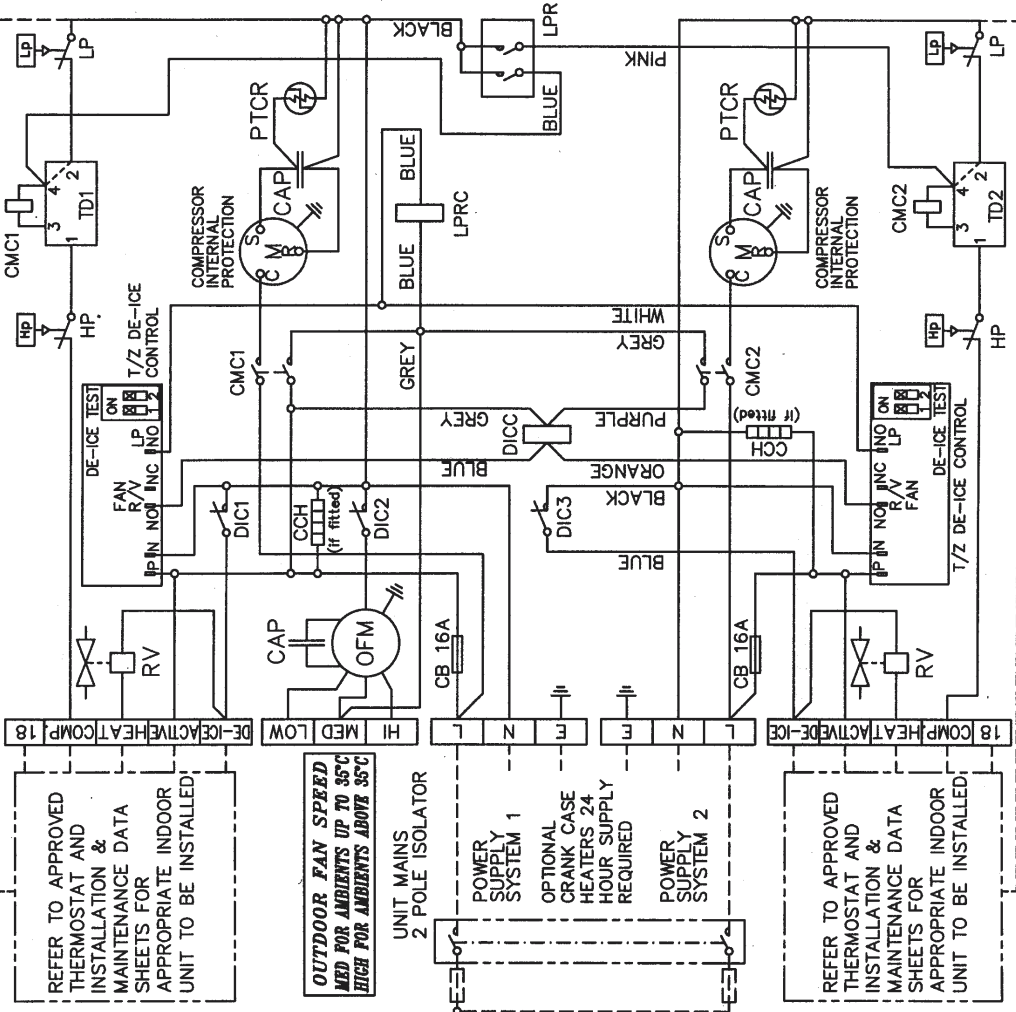
Drawn P.W-M Date 12-06-00 Drawing No. 327-334-002 Revision B

Scale

ISSUE	MODIFICATION	ECN	DATE	APRVD	DRC	SIZE	No.	Mat'l	FINISH	ASSY
B	CHANGED TO NEW NET AS/NZS 3823 STANDARD. CCH OPTION ADDED. 9.30(02-05-03) D.A.B									
A	PTCR NEUTRAL TO MAIN TERMINAL N		21-05-00	P.W-M						

**IMPORTANT!!**

SYSTEM No1 MUST HAVE A POWER SUPPLY FOR SYSTEM No2 TO OPERATE. POWER SUPPLY FOR BOTH SYSTEMS TO BE OFF SAME SUPPLY PHASE & 2 POLE ISOLATOR TO BE PROVIDED TO ISOLATE BOTH SYSTEMS. WHEN USING ONE T/STAT FOR BOTH SYSTEMS, CONNECT THERMOSTAT TO SYSTEM 1 AND LINK "COMP." & "HEAT" TO SYSTEM 2. FOR SINGLE INDOOR UNIT CONNECT TO "ACTIVE" OF POWER SUPPLY SYSTEM 1. DO NOT CONNECT "ACTIVE" OF POWER SUPPLY SYSTEM 2.



REFER TO APPROVED THERMOSTAT AND INSTALLATION & MAINTENANCE DATA SHEETS FOR APPROPRIATE INDOOR UNIT TO BE INSTALLED.

**OUTDOOR FAN SPEED**  
MED FOR AMBIENTS UP TO 35°C  
HIGH FOR AMBIENTS ABOVE 35°C

REFER TO APPROVED THERMOSTAT AND INSTALLATION & MAINTENANCE DATA SHEETS FOR APPROPRIATE INDOOR UNIT TO BE INSTALLED.

PERFORMANCE DATA IS FOR EACH SYSTEM

OUTDOOR UNIT :- OSA 146RB	ISDL71Q	ISD75G	ISD146GB	GME192 x2	ISD45R x2		
WITH INDOOR UNIT							
CAPACITIES - NET TO AS/NZS 3823							
COOLING -	KW	7.3	7.5	13.805	7.0	3.50 x2	3.85 x2
HEATING - REVERSE CYCLE	KW	7.0	7.2	14.0	7.3	3.5 x2	3.5 x2
ELECTRICAL INPUT							
COOLING -	KW	2.50	2.60	5.25	2.40	1.20 x2	1.25 x2
HEATING - REVERSE CYCLE	KW	2.0	2.3	4.0	2.2	2.2	2.2
E.E.R. (COOLING)	KW/KW	2.920	2.880	2.899	2.920	2.920	2.920
ELECTRICAL							
SUPPLY REQUIRED 1PH 200-252V ~ 50HZ INCLUDING VOLTAGE FLUCTUATION LIMITS							
COMPRESSOR (IPH) RUN AMPS RATED CONDITIONS	A	9.6	9.7	10.8	10.8	10.8	10.8
COMPRESSOR (IPH) STARTING AMPS	A			40			
COMPRESSOR CAPACITOR	MFD			45			
INDOOR FAN MOTOR (IPH) FULL LOAD AMPS	A	1.4	3.5	5.7	0.6	0.45 x2	0.7 x2
INDOOR FAN MOTOR CAPACITOR	MFD	3.5	5	10	2&3.5	3.5	3.5
OUTDOOR FAN MOTOR (IPH) FULL LOAD AMPS	A			0.9			
OUTDOOR FAN MOTOR CAPACITOR	MFD			6			
RUNNING AMPS TOTAL x 2 SYSTEMS (except 146)		12.5 x2	12.2 x2	27.3	12 x2	13 x2	14 x2
RECOMMENDED EXTERNAL FUSE SIZE x 2 SYSTEMS	A	25 x2	25 x2	25 x2	25 x2	25 x2	25 x2
ELECTRIC HEAT OPTION	KW	2 x2	2 x2	1.5 x2	-	-	1.5 x4
RECOMMENDED EXTERNAL FUSE SIZE WITH OPTIONAL	A	32 x2	32 x2	32 x2	-	-	32 x2
ELECTRIC HEAT x 2 SYSTEMS	A			142 kg			
WEIGHT - NETT				142 kg			
REFRIGERANT - HCFC (R22)				2.2 kg			
EACH SYSTEM PRECHARGED (10 METRE LINE LENGTH)				2.2 kg			
BASE CHARGE OF EACH SYSTEM 1.8 kg PLUS 40 grams PER METRE LINE LENGTH, BASED ON Ø9.5 mm ØØ LIQUID LINE & Ø16 mm ØØ GAS LINE							

CAP	CAPACITOR	LP	LOW PRESSURE CONTROL
CB	CIRCUIT BREAKER	LPR	LOW PRESSURE RELAY
CCH	CRANK CASE HEATER	LPRC	LOW PRESSURE RELAY COIL
CM	COMPRESSOR MOTOR	OFM	OUTDOOR FAN MOTOR
CMC1	COMPRESSOR CONTACTOR SYS 1	PTCR	START ASSIST THERMISTER
CMC2	COMPRESSOR CONTACTOR SYS 2	RV	REVERSING VALVE
DIC	DE-ICE RELAY	TD1	COMPRESSOR 1 TIME DELAY 5 MINS.
DICC	DE-ICE CONTACTOR COIL	TD2	COMPRESSOR 2 TIME DELAY 6 MINS.
HP	HI PRESSURE CONTROL		

**NOTE: TESTING OF DE-ICE**  
SWITCH DIP SWITCH 1 OFF TO ALLOW REPEATED DE-ICE CYCLES WITHOUT A 33 MINUTE DELAY. SWITCH DIP SWITCH 2 OFF TO FORCE A DE-ICE CYCLE. ALWAYS RETURN BOTH SWITCHES TO 'ON' POSITION FOR NORMAL OPERATION.

CHECK WIRING BEFORE SWITCHING ON. CLIENT WIRING INCORRECT CONNECTION WILL DAMAGE MOTORS

OSA 146 RB  
WIRING SCHEMATIC

temperzone

PLOTTED 19-05-03  
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Drawn P.W-M Date 12-06-00 Drawing No. 326-334-002 Revision B

Scale 1:1

ISSUE	MODIFICATION	ECN	DATE	APRVD	DRG SIZE	No.	DESCRIPTION
B	CHANGED TO NEW NET AS/NZS 3823 STANDARD. CCH OPTION ADDED. IS 730 DATA REMOVED. 9.50 (02-05-03) D.A.B						
A	LPR WAS TD2 NOW TD4 PTCR NEUTRAL TO MAIN TERMINAL N		21-09-00	P.W-M			