

OSA 410RA

Reverse Cycle Split System Outdoor Unit

Installation & Maintenance

GENERAL

The OSA 410RA is a tandem compressor (single circuit) system that provides the facility for capacity control (staging) or staggered starting.

This OSA 410RA Outdoor Unit must be installed in accordance with all national and local safety codes.

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.

Drainage

Four drain holes are provided in the base of the unit for the release of condensate and rain water. If a totally drip free installation is required then mount the unit in a separate drain tray.

Coil Protection

A coil protection guard is available as an optional extra.

REFRIGERATION PIPING

General

The OSA 410RA is shipped with a holding charge of refrigerant. The matched indoor unit is shipped with a holding charge of nitrogen. OSA 410RA units have one flare and one brazed pipe connection.

Recommended Pipe Sizes

Suction pipe : 35 mm OD
Liquid pipe : 16 mm OD

Line Lengths

Line lengths must not exceed 50 m under any circumstances. Refer also to *Oil Charge* overleaf.

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 (2 x pipe dia.).
4. Insulate the suction (gas) line and seal all insulation joints.
5. Bi-flow filter dryer may be fitted in the liquid line.
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.

Charging

The unit is supplied with a 1 kg holding charge of refrigerant HCFC-22 (R22). Add 7 kg of HCFC-22 to complete the base charge, then add 105 g per metre of pipework between indoor and outdoor units.

Procedure:

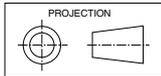
1. Evacuate Indoor Unit and interconnecting pipework to a pressure of 500 microns and hold for 15 mins.
2. Add refrigerant via the Schraeder connection on the smaller of the Outdoor Unit's two service valves.
3. Open the service valve at the Outdoor Unit to allow refrigerant to flow throughout the system.
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 or other heat source to raise the

Dimensions (mm)

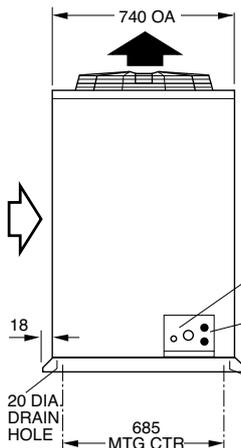
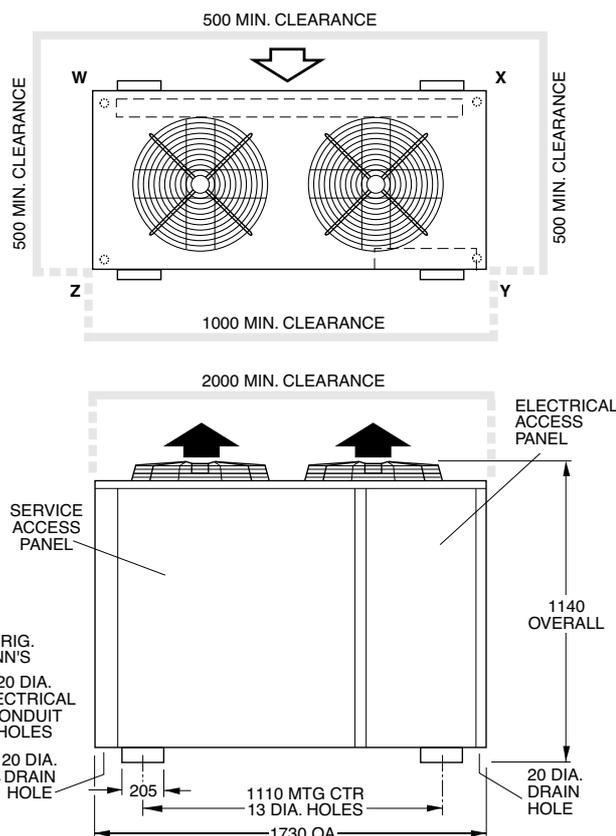
OSA 410RA



Not to Scale

Net Weight 287 kg

CORNER LOADS (kg)			
W	X	Y	Z
60	83	83	61



indoor air temperature to about 24°C 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 410RA is provided with a 24V AC control circuit for the 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.

It is recommended electricians run a spare wire between Outdoor Unit and Indoor Unit 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.

Capacity control, if required, is achieved by controlling the two compressors independently using a two stage thermostat. A staggered start of two compressors ensures a lower starting current.

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

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 heater to drive any liquid refrigerant out of the compressor oil.
2. Check that all fan motors are free running.
3. Check that the thermostat is correctly wired to the unit and is set at the desired temperature.
4. Check that the air filters, if any, have been correctly installed.
5. Check any supply air diffuser dampers are open.

START UP PROCEDURE

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.
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.

OUTDOOR UNIT CONTROLLER (OUC)

The Outdoor Unit Controller (OUC) includes a temperature sensing head pressure control which enables the system to run efficiently on cooling cycle at outdoor ambient temperatures below 20°C, and heating cycle above 15°C. The OUC also has features which protect against icing or overheating of coils, rapid cycling of the compressor and loss of refrigerant charge.

If the outdoor unit fans take some time to begin rotating when the system is powered on, or they don't appear to be rotating appropriately while the compressor is

running, consult the OUC label on the electrical box. If necessary, refer to **temperzone** for further diagnostic information.

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 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 that the aluminium HPC fascia panel (heatsink) has not become coated in dust, oil or any other contaminant limiting its ability to dissipate the heat. Wipe clean where necessary.
2. Check that all electrical connections to the HPC are secure.
3. Check all refrigerant piping for chafing and vibration.
4. Check the operation of electric heaters if fitted.
5. Check air supply at all diffusers.
6. Check for excessive noise and vibration and correct as necessary.
7. Check for insulation and duct damage and repair as necessary.
8. Remove lint and dust accumulation from outdoor coil fins.
9. Touch up all 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. 2423 dated 11/04. 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)				Additional Pipe Length to allow per Bend	
Liquid	Suction	10	20	30	40	Suction Pipe Size OD	35 mm
16	35	1 %	2 %	3 %	4 %	Long 90° Radius (i.e. 2 x pipe dia.)	0.76 m

OUTDOOR UNIT: -- OSA 410RA	ISD 3900
WITH INDOOR UNIT	
CAPACITIES -- NET to AS/NZS 3823	
COOLING --	kW 38.6
HEATING -- REVERSE CYCLE	kW 41
ELECTRICAL INPUT	
COOLING --	kW 14.4
HEATING -- REVERSE CYCLE	kW 13
E.E.R. (COOLING)	kW/kW 2.681
ELECTRICAL	
SUPPLY REQUIRED 3ph 342-436V ~ 50Hz	
INCLUDING VOLTAGE FLUCTUATION LIMITS	
COMPRESSOR (3PH) RUN AMPS RATED CONDITIONS A/Ph	10 x2
COMPRESSOR (3PH) STARTING AMPS A/Ph	15/COMP
INDOOR FAN MOTOR (1Ph) FULL LOAD AMPS A	6.3 x2
INDOOR FAN MOTOR CAPACITOR MFD	22.5
OUTDOOR FAN MOTOR (1Ph) FULL LOAD AMPS A	1.7 x2
OUTDOOR MOTOR CAPACITOR MFD	B x2
RUNNING AMPS (TOTAL) A	24/24/22
RECOMMENDED EXTERNAL FUSE SIZE A/Ph	50
ELECTRIC HEAT OPTION, ISD 410Q: 9kW TOTAL A/Ph	13.1
RECOMMENDED EXTERNAL FUSE SIZE WITH ELECTRIC HEAT OPTION A/Ph	60
WEIGHT--NET OSA 410RA	287 kg
REFRIGERANT -- HCFC (R22)	
UNIT HOLDING CHARGE 1.0 kg	
BASE CHARGE UNIT 8 kg PLUS 105 grams PER METRE LINE LENGTH	
BASED ON LIQUID LINE Ø16 mm & GAS LINE Ø35 mm	

CAP	CAPACITOR	HRC	HEATING RELAY COIL
CB	CIRCUIT BREAKER	HP	HI PRESSURE SWITCH
CCH	CRANK CASE HEATER	IFC	INDOOR FAN CONTACTOR
CM	COMPRESSOR MOTOR	IFCC	INDOOR FAN CONTACTOR COIL
CMC	COMPRESSOR CONTACTOR	IFM	INDOOR FAN MOTOR
CMCC	COMPRESSOR CONTACTOR COIL	LP	LOW PRESSURE SWITCH
CMOL	COMPRESSOR OVERLOAD	OFM	OUTDOOR FAN MOTOR
CIR	COMPRESSOR 1 RELAY 24 V CONTROL	OUC	OUTDOOR UNIT CONTROLLER
C2R	COMPRESSOR 2 RELAY 24 V CONTROL	PRC	PHASE ROTATION RELAY
C2RC	COMPRESSOR 2 RELAY COIL 24V	PRRC	PHASE ROTATION RELAY COIL
DO	TIME DELAY 30 SEC. DELAY ON MAKE	RCV	REVERSE CYCLE VALVE
F	INDOOR FAN CONTROL		
FR	INDOOR FAN CONTROL RELAY		
FRC	INDOOR FAN CONTROL RELAY COIL		
HR	HEATING RELAY	TK	CIRCUIT FOR OVERLOAD IN OUTDOOR FAN MOTOR

Consult Outdoor Unit Controller label for further details, or refer to Temperzone for fault diagnosis information.

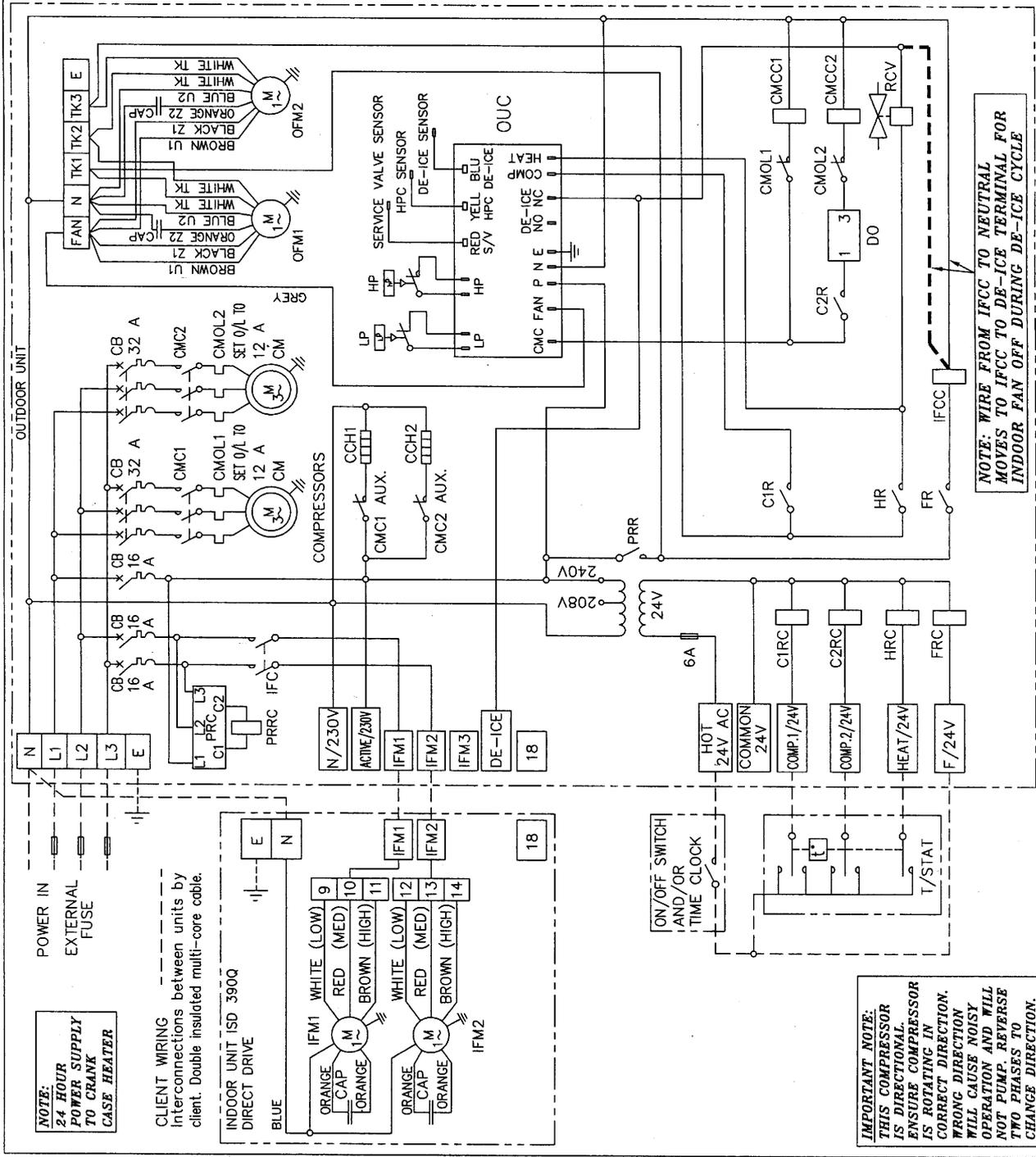
Sensor Locations
 Red to service valve pipe pocket.
 Yellow to coil return bend pocket.
 Blue to bottom of coil in fins.

NOTE: CHECK WIRING BEFORE SWITCHING ON, INCORRECT CONNECTION WILL DAMAGE MOTORS.

Title	OSA 410RA (OUC) WIRING SCHEMATIC		
Drawn	P.W-M	Date	20-09-04
Scale	462d	Revision	426-654-002



Issue	MODIFICATION	EC/N	DATE	APPRD
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NOTE: WIRE FROM IFCC TO NEUTRAL MOVES TO IFCC TO DE-ICE TERMINAL FOR INDOOR FAN OFF DURING DE-ICE CYCLE

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

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