

# OSA 165

## Single Phase Split System Outdoor Unit

## Installation & Maintenance

### GENERAL

**OSA 165** - A general designation for outdoor unit  
**OSA 165C** - Outdoor unit, cooling only version  
**OSA 165R** - Outdoor unit, reverse cycle version

This OSA 165 Outdoor Unit must be installed in accordance with all national and local safety codes.

### 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 165 is shipped with a refrigerant charge sufficient for a 10 m line length. The matched indoor unit is shipped with a holding charge of nitrogen. OSA 165 units have one flare and one brazed pipe connection.

##### Recommended Pipe Sizes

Suction pipe : 22 mm OD  
 Liquid pipe : 13 mm OD

#### Line Lengths

For line lengths in excess of 30 m, fit a compressor crankcase heater to prevent liquid refrigerant condensing in the 'off' cycle. Refer also to *Oil Charge* overleaf. Maximum extended line length is 50 m.

#### 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

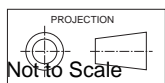
#### Vertical Risers

If the outdoor unit is to be installed above the indoor unit, then the gas riser should be trapped every 5 m 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) line and seal all insulation joints.
5. Filter dryers may be fitted in the liquid line (bi-flow type on reverse cycle systems).
6. Include a process point in the interconnecting pipework.
7. Ensure open pipe ends are sealed until the final connection is made.
8. **Caution:** To avoid damage to teflon seals, braze suction pipework to stub connection (supplied loose) **before** connecting to unit's valve.
9. Remove valve's dust cap and lubricate teflon seal with refrigeration oil prior to final assembly and connection.

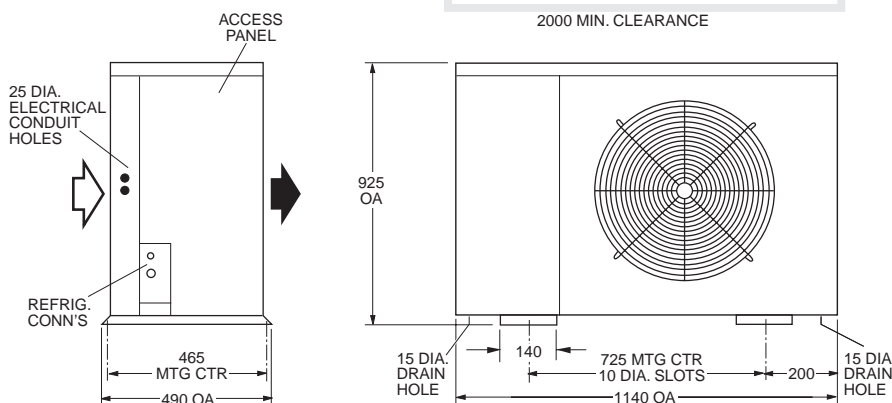
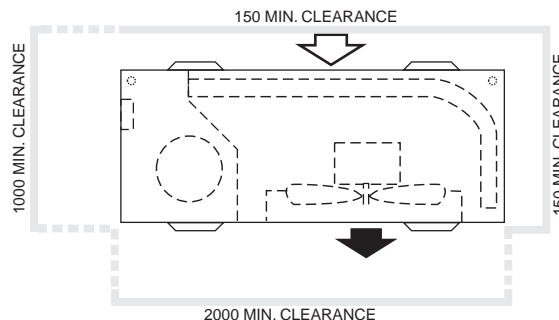
### Dimensions (mm)



#### Net Weight

OSA 165C 120 kg  
 OSA 165R 125 kg

### OSA 165



#### Charging

The unit is supplied with 4.6 kg of refrigerant HCFC-22 (R22) which is sufficient for up to 10 m of pipework between the indoor and outdoor units. Add 60 g of HCFC-22 per metre above 10 m.

#### Procedure:

1. Evacuate Indoor Unit and interconnecting pipework to a pressure of 500 microns and hold for 15 mins.
2. Add refrigerant, if needed, 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 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 1/2 fluid ounce per metre (13 ml/m) of suction piping.

**ELECTRICAL REQUIREMENTS**

**General**

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.

OSA 165R only - It is recommended electricians run two spare wires between Outdoor Unit and Indoor Unit 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.

If electric heat is to be installed then it is recommended it be powered by a separate 25 A fused supply line sourced via a two pole isolator on the Outdoor Unit.

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 heaters is required, otherwise the warranty is void.

**Low Startup Current Facility**

This unit is fitted with a Soft Starter for low startup amps. This starter will always attempt to start the unit with a 'soft' start, however some new compressors can be a bit stiff on their first start. To allow for this, the Soft Starter has a built-in direct on line (D.O.L.) ability. This will only ever work once. All subsequent starts will be 'soft' starts. The D.O.L. start ability can be reactivated by completely shutting off power to the unit.

Note: If the unit stalls for three consecutive soft starts, there will be a one hour delay during which time the relay in the starter box clicks every 30 seconds (to indicate 'waiting'). Most stalls are caused by poor power supply (less than 210V) and/or incorrectly sized cables.

Minimum supply cable: 6 mm<sup>2</sup> for up to 25 m  
10 mm<sup>2</sup> for over 25 m

**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 (if fitted) 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**

1. Switch on the unit.  
**Note:** If crankcase heater fitted, switch on the unit after the four hour delay period has expired.
2. Check the supply voltage, particularly at compressor start, does not drop below 210 volts. (Refer also to 'Low Startup Current Facility' above).
3. 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.
4. Fit gauges and measure the suction and discharge pressures.

5. Test the operation of the high pressure safety control by switching off the outdoor unit's fan.
6. Test the operation of the reversing valve by running the unit in both the heating and cooling mode (OSA 165R only).
7. Check that the air flow over the outdoor unit's coil is adequate and that the fan is running smoothly.
8. Check the superheat - refer charging procedure.
9. Check the supply air flow at each outlet.

**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.

**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 for correct operation of all electrical equipment, i.e. H.P. and L.P. safety controls, anti-rapid cycle timer, compressor contactor and de-ice control (OSA 165R only).
2. Check all refrigerant piping for chafing and vibration.
3. Check the operation of electric heaters if fitted.
4. Check air supply at all diffusers.
5. Check for excessive noise and vibration and correct as necessary.
6. Check for insulation and duct damage and repair as necessary.
7. Remove lint and dust accumulation from outdoor coil fins.
8. Touch up all outdoor unit paintwork damage to prevent corrosion.

This pamphlet replaces the previous issue no. 1849 dated 04/00. Piping; low startup current facility; wiring revision D.

**NOTE**

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

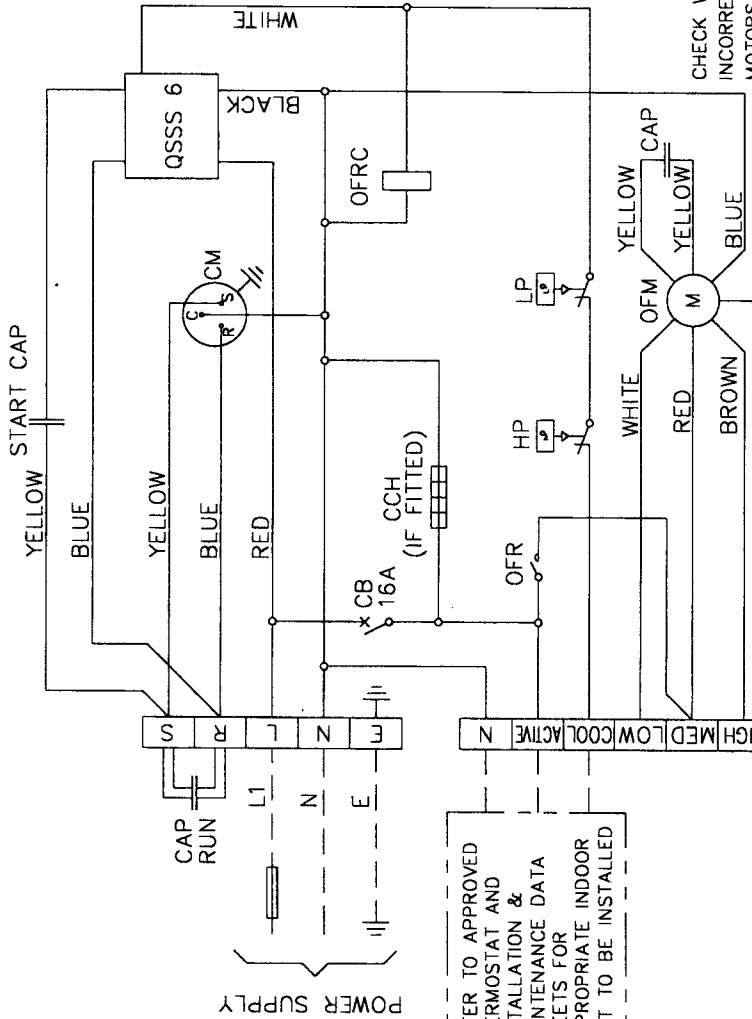
**Pipe Length Capacity Loss  
On Cooling Cycle Due to Pressure Drop**

**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	22 mm
13	22	1.5 %	2.5 %	4 %	6 %	8 %	Long 90° Radius (2 x pipe dia.)	0.5 m

**TO THE ELECTRICIAN**

THIS UNIT REQUIRES A MINIMUM LINE VOLTAGE OF 210V AT STARTING LOAD MINIMUM SUPPLY CABLE 6mm<sup>2</sup> UP TO 25 METRES MINIMUM SUPPLY CABLE 10mm<sup>2</sup> ABOVE 25 METRES



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

**OUTDOOR FAN SPEED**  
**MED FOR AMBIENTS UP TO 36°**  
**HIGH FOR AMBIENTS ABOVE 35°**

CHECK WIRING BEFORE SWITCHING ON, INCORRECT CONNECTION WILL DAMAGE MOTORS

CLIENT WIRING  
 Interconnections between units by client. Double insulated multi-core cable.

OUTDOOR UNIT :- OSA 165 C

WITH INDOOR UNIT	GME 502	ISD 150
CAPACITIES - NOMINAL / AS1861.1(A)		
COOLING - kW	15.8	16.5
ELECTRICAL INPUT		
COOLING - kW	5.63	5.8
E.E.R./C.O.P. (COOLING)	9.6/2.8	9.7/2.84

ELECTRICAL

SUPPLY REQUIRED 1PH 210-252V ~ 50Hz INCLUDING VOLTAGE FLUCTUATION LIMITS

COMPRESSOR (1PH) RUN AMPS RATED CONDITIONS	A	24	25
COMPRESSOR (1PH) STARTING AMPS	A	39	39
COMPRESSOR CAPACITOR START	MFD	161/193	161/193
COMPRESSOR CAPACITOR RUN	MFD	50	50
INDOOR FAN MOTOR (1PH) FULL LOAD AMPS	A	0.7X2	5.7
INDOOR FAN MOTOR CAPACITOR	MFD	3.5	10
OUTDOOR FAN MOTOR (1PH) FULL LOAD AMPS	A	0.9	0.9
OUTDOOR FAN MOTOR CAPACITOR	MFD	6	6
RUNNING AMPS (TOTAL)		27	28.5
RECOMMENDED EXTERNAL FUSE SIZE	A	45	45

WEIGHT - NETT OSA 165 C 128kg

REFRIGERANT - HCFC (R22)

UNIT PRECHARGED (10 METRE LINE LENGTH) 4.6 kg

BASE CHARGE UNIT 4.0 kg PLUS 60 grams PER METRE LINE LENGTH

BASED ON Ø12.7 OD LIQUID LINE & Ø22 OD GAS LINE

ABB DESCRIPTION	ABB	DESCRIPTION
CAP	OFM	OUTDOOR FAN MOTOR
CM	OFR	OUTDOOR FAN RELAY
CCH	OFR	OUTDOOR FAN RELAY COIL
HP	QSSS	QUICK START SOFT STARTER
LP		LOW PRESSURE CONTROL

**OPTIONAL ELECTRIC BOOST HEAT**  
**RECOMMEND HEATING RUNS OFF OWN SUPPLY FUSE VIA 2 POLE ISOLATOR ON OUTDOOR UNIT**  
**CABLE SIZE MORE ECONOMIC**

Title: OSA 165 C WIRING SCHEMATIC

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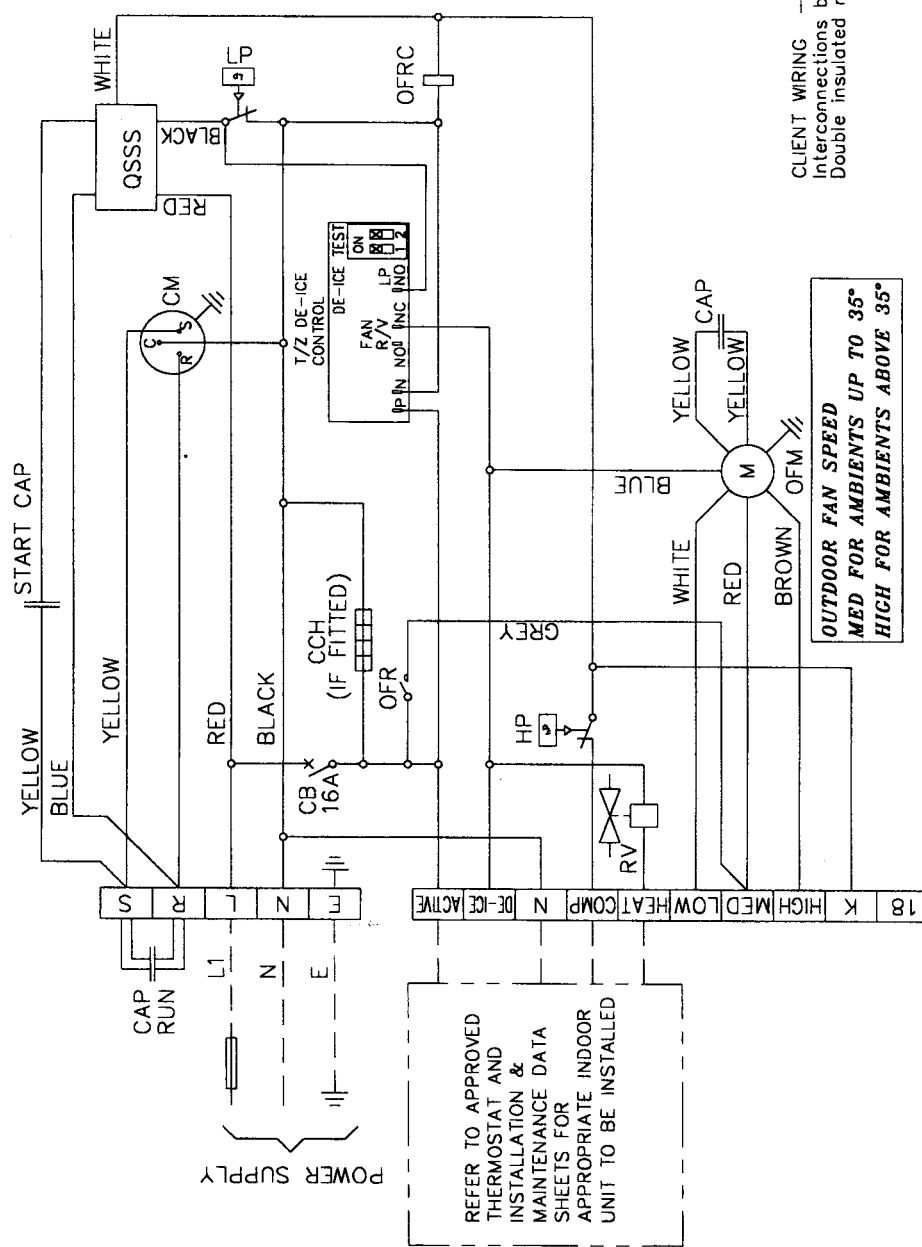
Drawn D.J.H.	Date 01-02-00	Revision
Scale	011-934-001	D

ISSUE	MODIFICATION	ECN	DATE	APRVD	DRG SIZE	No.	Mat.	FINISH	ASSY No.
D	CCH ADDED								
C	STARTING VOLTAGE NOTE ADDED FROM OSSS 6	772	14-03-01	D. J.H.					
B	OFR NOW CONNECTED TO TERMINAL "R"	733	16-06-00	D. J.H.					
A	COMP. START CAP. WAS 300 NOW 161/93	715	20-04-00	D. J.H.					

Plotted: 15-03-01  
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DO NOT SCALE - ASK

**TO THE ELECTRICIAN**  
 THIS UNIT REQUIRES A MINIMUM  
 LINE VOLTAGE OF 210V AT STARTING LOAD  
 MINIMUM SUPPLY CABLE 6mm<sup>2</sup> UP TO 25 METRES  
 MINIMUM SUPPLY CABLE 10mm<sup>2</sup> ABOVE 25 METRES



OUTDOOR UNIT :- OSA 165 R	GME 502	ISD 150
WITH INDOOR UNIT		
CAPACITIES - NOMINAL/ AS1861.1(A)		
COOLING -	kW	15.8
HEATING - REVERSE CYCLE	kW	16.5
ELECTRICAL INPUT		
COOLING -	kW	5.63
HEATING - REVERSE CYCLE	kW	5.3
E.E.R./C.O.P. (COOLING)	kW	9.6/2.8
E.E.R./C.O.P. (HEATING)	kW	9.7/2.84

ELECTRICAL		
SUPPLY REQUIRED 1PH 210-252V ~ 50Hz INCLUDING VOLTAGE FLUCTUATION LIMITS		
COMPRESSOR (1PH) RUN AMPS RATED CONDITIONS	A	24
COMPRESSOR (1PH) STARTING AMPS	A	39
COMPRESSOR CAPACITOR START	MFD	161/193
COMPRESSOR CAPACITOR RUN	MFD	50
INDOOR FAN MOTOR (1PH) FULL LOAD AMPS	A	0.7X2
INDOOR FAN MOTOR CAPACITOR	MFD	3.5
OUTDOOR FAN MOTOR (1PH) FULL LOAD AMPS	A	0.9
OUTDOOR FAN MOTOR CAPACITOR	MFD	6
RUNNING AMPS (TOTAL)		27
RECOMMENDED EXTERNAL FUSE SIZE	A	45
WEIGHT - NETT	OSA 165 R	129kg
REFRIGERANT - HCFC (R22)		
UNIT PRECHARGED (10 METRE LINE LENGTH) 4.6 kg		
BASE CHARGE UNIT 4.0 kg PLUS 60 grams PER METRE LINE LENGTH		
BASED ON Ø12.7 OD LIQUID LINE & Ø22 OD GAS LINE		

ABB	DESCRIPTION	ABB	DESCRIPTION
CAP	CAPACITOR	OFM	OUTDOOR FAN MOTOR
CM	COMPRESSOR MOTOR	OFR	OUTDOOR FAN RELAY
CCH	CRANKCASE HEATER	OFRC	OUTDOOR FAN RELAY COIL
HP	HI PRESSURE CONTROL	QSSS	QUICK START SOFT STARTER
LP	LOW PRESSURE CONTROL	RV	REVERSING VALVE

**NOTE: TESTING OF DE-ICE SWITCH DIP SWITCH 1 OFF TO ALLOW REPEATED DE-ICE CYCLES WITHOUT A 30 MINUTE DELAY. SWITCH DIP SWITCH 2 OFF TO FORCE A DE-ICE CYCLE. ALWAYS RETURN BOTH SWITCHES TO ON POSITION FOR NORMAL OPERATION.**

**OPTIONAL ELECTRIC BOOST HEAT**  
**RECOMMEND HEATING RUNS OFF OWN SUPPLY FUSE VIA 2 POLE ISOLATOR ON OUTDOOR UNIT**  
**CABLE SIZE MORE ECONOMIC**  
 CHECK WIRING BEFORE SWITCHING ON.  
 INCORRECT CONNECTION WILL DAMAGE MOTORS

Programmed by	
PLOTTED	
15-03-01	
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Scale	0.5
Date	01-02-00
Drawn D.J.H.	
Drawing No.	011-933-001
Revision	D

ISSUE	MODIFICATION	ECN	DATE	APPRVD	DRG SIZE	No.	DESCRIPTION	Mat'l	FINISH	ASSY No.
D	CCH ADDED		772/14-03-00	D.J.H.						
C	STARTING VOLTAGE NOTE ADDED		772/14-03-00	D.J.H.						
B	OFRC NOW CONNECTED TO TERMINAL "R"		715/20-04-00	D.J.H.						
A	COMP. START CAP. WAS 300 NOW 161/193		29-03-00	D.J.H.						

Title  
**OSA 165 R**  
**WIRING SCHEMATIC**