

# OPA 186RKTYGH (Digital c/w EC motor & UC7 Controller)

## Packaged Reverse Cycle R410A Air Cooled Air Conditioner

## Installation & Maintenance

### GENERAL

This OPA 186 unit must be installed in accordance with all national and local safety codes.

### OPTIONS (Field Fitted)

1. TZT-100 Room Temperature Controller
2. Signal Isolator (refer Indoor Fan Speed control options).

### INSTALLATION

#### Positioning

Refer to dimension diagram for minimum clearances. If multiple units are to be placed side-by-side then allow at least 2 m between coil faces.

#### Mounting

Fasten the unit down to a firm flat horizontal base using the four holes provided in the mounting rails.

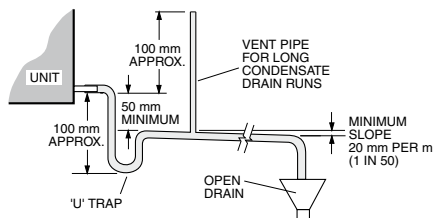
When the unit is being installed on a roof it is recommended that the unit is installed on a substantial structure with vibration isolating springs beneath the unit. These springs are not supplied with the unit.

Flexible duct connections are recommended between the supply and return ducts and the unit.

#### Condensate Drain

The condensate drain should be 'U' trapped outside the unit. The trap should have a vertical height of at least 50 mm. The drain should have a slope of at least 1 in 50 and must not be piped to a level above the unit drain pipe.

For long condensate pipe runs, fit a vent pipe near the drain trap. The top of the vent pipe must be at least 100 mm above the OPA unit's drain tray.



### REFRIGERATION SYSTEM

#### General

The refrigeration system has been charged with R410A refrigerant; refer wiring specification table for amount. Tapping points are provided to measure discharge and suction operating pressures. Beware of high system pressures; use correct gauges.

### Compressor

The compressor is digital scroll type. This has a variable capacity ability that enables closer control of room temperature.

The compressor lubricant is polyol ester oil (POE). Note, this oil absorbs moisture quickly if exposed to open air.

### 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 unit.

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

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.

The system is set up for the compressor to be controlled variably by:

1. TZT-100 Controller (via RS485 modbus),
2. 0-10V dc command via BMS modbus, or
3. 0-10V dc command via a client supplied external controller.

If option 1 is chosen, then disconnect or remove the Signal Input for Controller 0-10V.

If a TZT-100 Controller is used then variable capacity control is automatically included and no additional wiring is required.

**Note:** The TZT-100 Controller can automatically switch the indoor fan off during de-ice, if selected, therefore no additional wiring is required to achieve this result.

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

### INDOOR FAN SPEED

The indoor fan speed can be 'Stepped' or 'Continuously Variable'. The choice is made using Switch 1 of 'DIP1' on the EC Motor Controller. Switches 1 to 5 on 'DIP2' determine the minimum and maximum fan speeds.

The same 'Minimum rpm' and 'Maximum rpm' settings apply to 'Stepped' and 'Continuously Variable'.

The default settings for DIP1 and DIP2 are highlighted on the Wiring Schematic.

#### 1. Stepped (DIP1 switch 1 = OFF)

Connecting the 24V AC power from the unit's 'HOT 24V' terminal to one (and only one at a time) of the 'LOW 24V' / 'MED 24V' / 'HIGH 24V' terminals, selects the 'LOW' (Min. rpm), 'HIGH' (Max. rpm), or 'MED' (mid-way between) fan speed. The transitions between speeds are smooth.

#### 2. Continuously Variable (DIP1 switch 1=ON)

When using this method a temperzone Analog Signal Isolator (No. 201-000-129) must be fitted and connected as shown in the wiring schematic. 24V AC or DC power from the external (BMS) controller should be provided to the '24V' and '0V' input terminals of the Signal Isolator board.

A voltage below 2V DC applied across the '0V' and the '0-10V' input terminals (labelled 'From BMS Controller' in the wiring schematic) of the Signal Isolator will stop the indoor fan. A control voltage of slightly more than 2V will cause the fan to run at the 'Min. rpm' speed. A 10V DC signal will run the fan at the 'Max. rpm' speed. Control voltages between these two limits can be used to achieve any desired speed between 'Min.' and 'Max.' rpm.

**Do not use switch combinations marked with 'DO NOT USE' in the Speed Selection table.**

If the air returning to the indoor unit is regularly expected to be above 50%RH, then the coil face velocity should be limited to be 2.5 m/s or less (refer Air Handling graph in Technical Data pamphlet).

High humidity levels can occur in tropical or subtropical conditions, and/or when heavily moisture laden fresh air is introduced. Select a fan speed that avoids water carry-over problems.

### 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. Bypass the crankcase heater thermostat (CCHT) for this period only.
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. Switch on the unit after the four hour delay period for the crankcase heater has expired. Ensure the crankcase heater thermostat has been reconnected.

2. Check for correct rotation of the compressor. If rotation is incorrect the compressor will not pump, be noisy, and will draw minimal current. To correct motor rotation, change the phasing at the main power terminal.
3. Check the supply voltage.
4. 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.
5. Fit R410A compatible gauges and measure the suction and discharge pressures.
6. Test the operation of the high pressure safety control by switching off the outdoor air fan.
7. Test the operation of the reversing valve by running the unit in both the heating and cooling mode.
8. Check that the motors are running smoothly.
9. Check the supply air flow at each outlet.
10. Touch up any outdoor unit paintwork damage to prevent corrosion.

### UNIT CONTROLLER (UC7)

The Unit Controller provides system protection functions such as coil frost protection, de-icing, high head pressure and low suction pressure cut-out.

It also protects against rapid cycling of the compressor(s) and loss of refrigerant.

Various methods of head pressure control (or limiting) are employed in temperzone units. The particular method used varies from model to model, but is also handled by the Unit Controller. In combination, these features deliver optimised performance across a wide operating temperature range.

As a result of the UC's control of these inter-related functions, the outdoor fans may take some time to start rotating after each compressor start. They may also run on when the compressor stops. The fans will stop during a de-ice cycle. The speed will vary either smoothly, or in steps, in order to protect against excessively low or high head pressure.

Refer to UC7 Controller label on the unit or [www.temperzone.biz](http://www.temperzone.biz) for operation & fault diagnostics information.

### MAINTENANCE

#### Weekly For First Four Weeks

1. Check indoor 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 suction and discharge operating pressures.
4. Replace indoor unit air filters (if fitted).
5. Check condensate drain for free drainage.

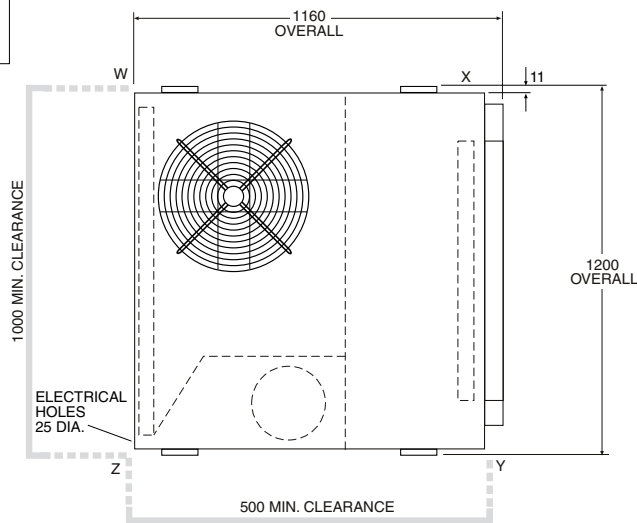
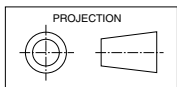
#### Yearly

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.

## Dimensions (mm)

## OPA 186RKTYGH

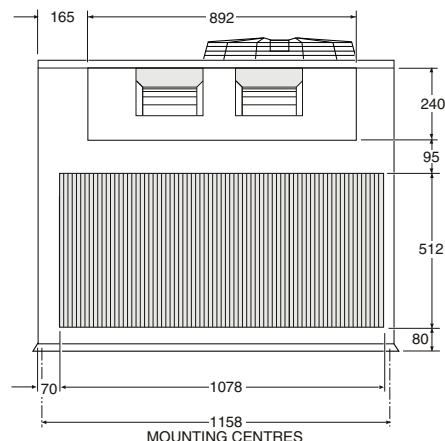
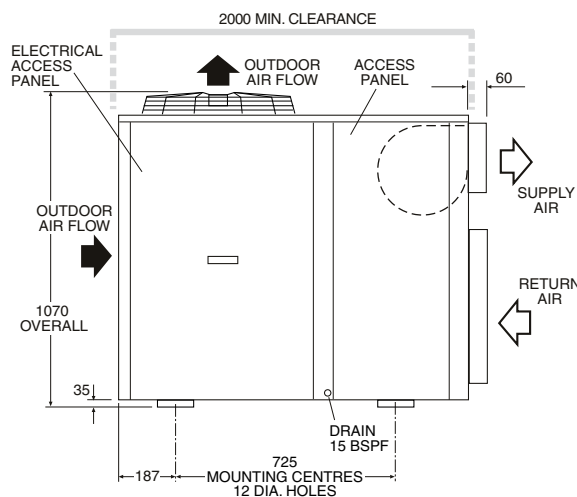
Not to Scale



POINT LOADS (kg)				WEIGHT (kg)
W	X	Y	Z	
46	56	75	64	241

#### NOTE

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



Capacities - Net to AS/NZS 3823	OPA186RKTYGH
Cooling -	kW 18.20
Heating - Reverse Cycle	kW 16.20
Electrical Input	
Cooling -	kW 5.57
Heating - Reverse Cycle	kW 4.70
F.E.R. (Cooling)	kW/kW 3.17
A.E.E.R. (Cooling)	kW/kW 3.17
Electrical	
Supply required 3Ph 342-436V ~ 50Hz Including voltage fluctuation limits	
Compressor type : Scroll	
Compressor (3Ph) run amps rated conditions	A/Ph 7.4
Oil type : Polyolester (P.O.E.)	
Indoor fan motor (1Ph)	kW 0.9
Indoor fan motor (1Ph) Full load amps	A 5
Outdoor fan motor (1Ph) Full load amps	A 3.0 x 1
Outdoor motor capacitor (Built in fan motor)	MFD 12
Running amps (Total)	A/Ph 14.6/10.3/10.3
Max running amps (Total)	A 24
Control circuit breaker	A 10
24VCB 24 volt circuit breaker	A 2
Unit Weight - Nett	Kg 241
Base charge unit	Kg 5.2

CAP Capacitor	HR Heating Relay	OFK Outdoor Fan Klixon
Control Circuit Breaker	HRC Heating Relay Coil	OFM Outdoor Fan Motor
CCB CrankCase Heater	HFR High 1/D Fan Relay	PRC Phase Rotation Control
CMC Compressor Motor	HRC High 1/D Fan Relay Coil	PRR Phase Rotation Relay
Compressor Contactor	MV Modulating Valve	PRC Phase Rotation Relay Coil
CMCC Compressor Contactor Coil	MFC Med 1/D Fan Relay	PRC Reverse Cycle Valve
CR Compressor Relay 24V Control	MFR Med 1/D Fan Relay Coil	TFC Triac Fan Controller
CR Compressor Relay Coil 24V	LFR Low 1/D Fan Relay	TR Transformer
FRB Fault Relay Board	LRC Low 1/D Fan Relay Coil	UC7 Unit Controller 7
HP High Pressure Control	LP Low Pressure Control	

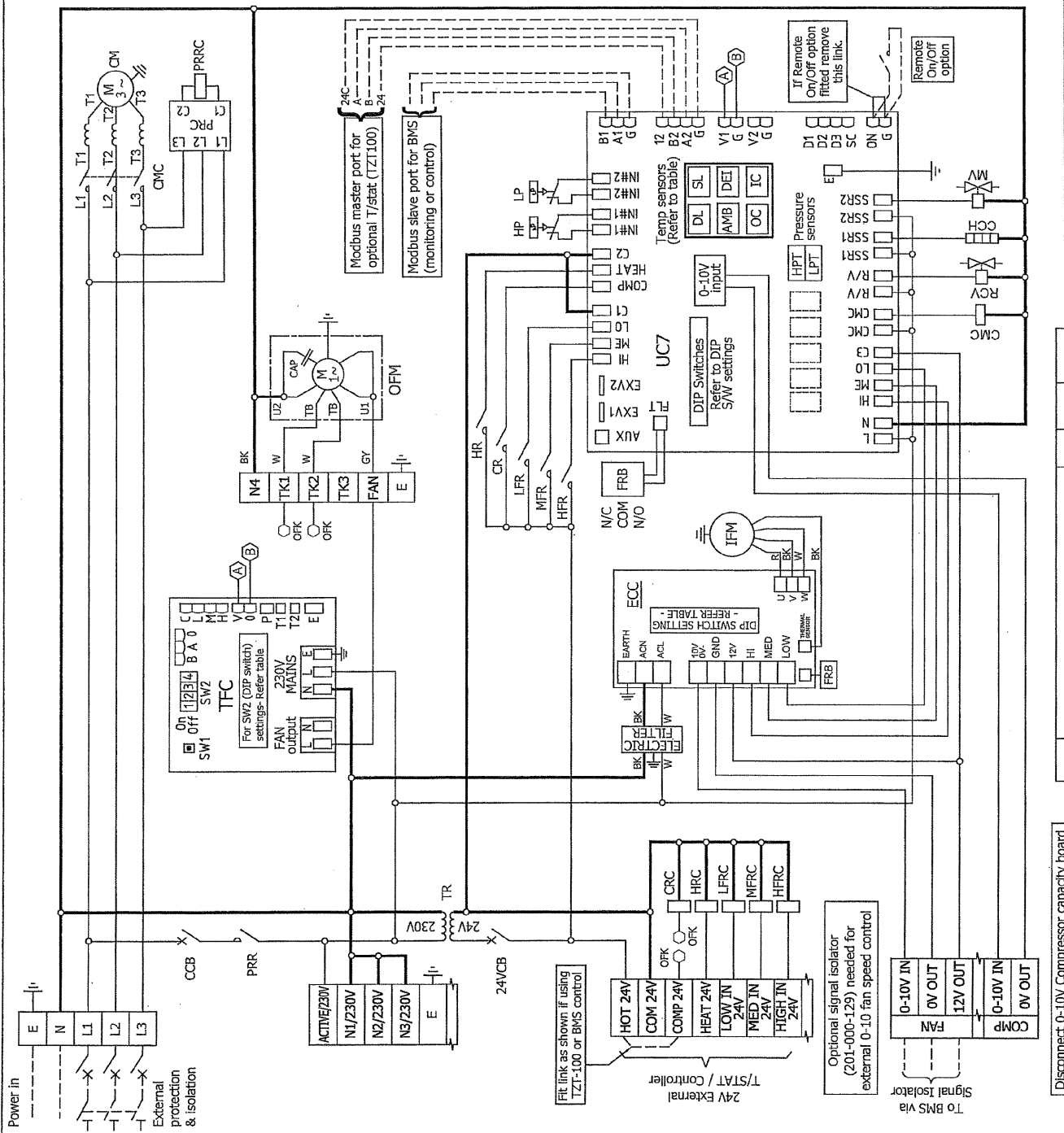
EC Board Switch Setting - DIP Switch 1 (DIP1)		
OFF	ON	
3 SPEED FAN HI/MED/LOW	ON	
NORMAL FORWARD ACTION	ON	
POWER LIMIT 1800W	ON	
LEAVE IN THIS POSITION	ON	
EC Board speed selection (0.9-1.25KW) - DIP switch 2 (DIP2)		
Switch 1	Off	Off
Switch 2	Off	Off
Switch 3	On	Off
Switch 4	Off	On
Switch 5	Off	On
Max (rpm)	1350	1300
Min (rpm)	1050	1000
Temperature Sensor		
Sensor	Color	
DL	Discharge	Red
IC	1/D Coil	Yellow
AMB	Ambient	Black
DEI	Deice	Blue
OC	O/D Coil	Yellow

UC7 Dip switch settings	
DIP switch	On/Off +
2,4	On
1,3,5,6,7,8,9	Off
TFC SW2 (DIP S/W) settings	
DIP	On/Off
1,2,3 & 4	Off

Title  
**OPA 186RKTYGH**  
**C/W UC7 WIRING SCHEMATIC**



Drawn	A.F.C.	Design	25-10-12	Drawing No.	291-000-309	Revision	A
Plot date	25-10-12	Tempzone Ltd		Aprvd			



Client wiring	ECN	DATE	APRVD
ISSUE	MODIFICATION		
Visit: <a href="http://www.temperzone.biz">www.temperzone.biz</a> for client wiring diagrams			

Disconnect 0-10V Compressor capacity board when connecting T2 T-100 Thermostat

