

Ducted Three Phase Inverter Packaged Air Conditioners

Technical Data OPA 296RKTF-P



Extra Long Life
Epoxy Coated Outdoor Coil

INVERTER



**Inverter Compressor
for variable capacity &
close temperature control**

**Plug Fan with High Efficiency
EC Motor and High External Static**

**Nominal Cooling Capacity
29.7 kW**

OPA 296RKTf-P – DUCTED INVERTER PACKAGED ROOF TOP AIR CONDITIONERS

GENERAL

The OPA 296 is a reverse cycle (heat pump) packaged roof top air conditioner designed and developed to comply with and exceed AS/NZS 3823 specified conditions. The system has been designed and tested to operate at 50°C ambient.

APPLICATIONS

These units have been specifically developed for air conditioning of commercial premises, e.g. banks, offices, motels, shops, food outlets and restaurants.

Suitable for applications using full or high proportions of fresh air (nb pre-heating on heating cycle may be required). Also suitable for VAV, close control and supply air temperature control.

Air Flow Selection

If the air returning to the indoor coil 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).

High humidity levels can occur in tropical or subtropical conditions, and/or when heavily moisture laden fresh air is introduced. Consideration must always be given to selecting an air flow and face velocity that avoids water carry-over problems.

Applications using full or high proportions of fresh air should be referred to your nearest **temperzone** sales office to confirm suitability for your application.

FEATURES

Refrigerant R410A. Each complete system uses refrigerant R410A which is deemed to have zero ozone depletion potential.

Economy. An economiser option is available to lower operating costs during the cooling cycle. Each unit has an inverter compressor which uses less energy than alternative types of compressor.

Efficient. Each unit incorporates an inverter scroll compressor which has a very high power factor and is very efficient at part load. Part load efficiency can be even further enhanced by indoor fan part load operation at low loads (75% airflow equates to 55% power use) using temperzone algorithms. Each plug fan incorporates a high efficiency electronically commutated (EC) motor (up to 90%; significantly better than belt drive centrifugal fans). Heat exchange coils incorporate inner grooved (rifled) tube for better heat transfer.

Performance. The inverter technology can provide close comfort control of the room temperature. Additional capacity above the nominal figure is automatically available if necessary. This is not 'time-limited', provided that the system keeps within its safe operating limits.

The OPA also uses a backward curved plug fan for fine tuning of the indoor air to match higher static pressure supply air requirements. These EC motor fans have a fully integrated speed control that enables soft starting. Fan speed can be stepped to your own requirements or continuously variable using a 0–10V DC control signal.

Electronic expansion valves (EEV) assist in optimising refrigerant flow. The system includes a digital temperature sensing head pressure control (via pressure transducers) which enables the system to compensate for outdoor ambient temperatures below 20°C on cooling cycle, and above 15°C on heating cycle.

Quiet. Each EC plug fan can vary from zero to full speed. This allows slow ramp up with no sudden noise change. The motor can be controlled to have the best air flow for the ducting and requirements as well as used for de-humidifying the space. A large aperture supply air spigot reduces exit velocities and therefore less noise down ductwork. Generous use of insulation also ensures a quiet unit.

Insulation. Closed cell foam insulation has been used in the indoor air section to ensure no particles are introduced into the air stream. The insulation is foil faced and meets fire test standards AS 1530.3 (1989) and BS 476 parts 6 & 7.

Durable. The cabinet is constructed from high grade galvanised steel - polyester powder coated (colour Grey) for all weather protection. External fasteners are stainless steel. The units include a polyester powder coated drain tray. Heat exchange coils comprise aluminium corrugated plate fins on mechanically expanded rifled copper tube. Both the indoor and outdoor air coil fins are epoxy coated for extra protection in corrosive environments, e.g. salt laden sea air. Fan motor bearings are sealed for life so as not to incur regular maintenance. Outdoor coil hail protection guards are supplied.

Lower Installation Cost. A large supply air spigot which lessens the need for duct transitions.

Low Maintenance. Commissioning and maintenance costs are reduced through use of a fan that requires no pulley and belt adjustments or changes like traditional fans.

Soft Starting. Inverter compressor and EC motors are soft starting therefore have none of the problems associated with high in-rush current.

Control Option. Fixed and stable air flows can be achieved through use of a differential pressure transducer and controller (supplied by others) to compensate for varying duct static pressures caused by dirty filters or modulating dampers. Commissioning is also made easier. The EC plug motor is controlled variably by a 0–10 volt DC signal supplied by, or via, the unit's UC6 Controller. This UC6 controller is BMS compatible with multi-unit control possible – either via digital and analogue signals or via Modbus. Refer to temperzone for other protocols available.

Self Diagnostics. The OPA's Unit Controller (UC6) has a 7 segment LED display to indicate faults and running conditions. Many operating status conditions (including history) can be determined, without gauges, simply by using the optional *UC6 Service Interface* graphical display.

OPTIONAL EQUIPMENT

1. **temperzone** TZT-100 Controller kit.
2. Filters (rated EU4).
3. UC6 Service Interface tool.
4. Economiser (factory fitted) - includes dampers, weatherhood.
5. Manually adjustable fresh air damper and weatherhood.
6. Electronic control systems - available by special arrangement.

SAFETY FEATURES

1. HP and loss of refrigerant protection.
2. Anti-rapid cycle timer and internal overload for compressor protection.
3. Circuit breaker control circuits.
4. Time-and-temperature controlled electronic de-ice which prevents icing up of the outdoor coil during heating cycle. Improved de-ice performance through t/z heating control algorithms.
5. Frost protection on cooling cycle.
6. Sensor fault indication.
7. Crankcase heater prevents liquid refrigerant condensing in the compressors during the 'off' cycle.
8. Compressor minimum run time to ensure oil return.
9. Phase rotation protection device.
10. 24V control circuit
11. Capacity modulation to avoid trips when operating at very high ambient temperatures.

COMPRESSOR

The high efficiency inverter scroll type compressor is hermetically sealed, quiet running and supported on rubber mounts to minimise vibration.

REFRIGERATION SYSTEM

Each OPA unit is factory charged with HFC-410A (R410A) refrigerant. Electronic expansion valves (EEVs) control the flow of refrigerant.

WIRING

The electrical supply required is: 3 phase 380-415 V a.c. 50 Hz with neutral and earth.

The compressor crankcase heater requires a 24 hour power supply. A control panel, with 24V control circuit, is located in the outdoor unit and is fully wired ready to accept the main power supply.

ECONOMISER OPTION

(Controls by others)

If the outdoor air heat content or wet bulb temperature (dry bulb not recommended) is below that of the return air, the fresh air damper opens and the return air damper closes to provide the first stage of cooling. Operating costs are reduced as free cooling is obtained. (Note: A spill air facility in the building may be necessary for when the return air damper is closed.) Fresh air dampers close to a minimum setting and return air dampers open before normal compressor operation resumes.

The manufacturer operates a quality management system that conforms to AS/NZS ISO 9001:2008.

Also available:
OPA 205–370 models (20–37 kW)

PERFORMANCE DATA

COOLING CAPACITY (kW)

Total = Total Capacity (kW) Sens. = Sensible Capacity (kW)
 E.A.T. = Entering Air Temperature ○ = Nominal Capacity (kW)
Note: Capacities are **gross** and do not include allowance for fan motor heat loss.

MODEL	INDOOR FAN AIR FLOW l/s	INDOOR COIL E.A.T.		OUTDOOR COIL ENTERING AIR TEMPERATURE °C D.B.											
		D.B. °C	W.B. °C	23		27		31		35		39		43	
				Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.
OPA 296RKTF-P	1700	21	15	29.2	23.1	28.8	23.0	28.0	22.6	26.7	21.9	24.9	20.7	22.7	19.1
		23	17	30.7	22.5	30.3	22.5	29.5	22.2	28.2	21.5	26.5	20.4	24.3	18.9
		27	19	32.3	25.8	31.9	25.8	31.1	25.5	29.7	24.7	28.0	23.5	25.8	21.9
		31	21	33.8	30.6	33.4	30.6	32.6	30.2	31.3	29.4	29.6	28.0	27.4	26.3

Indoor Air Flow Correction Factors @ nominal conditions

	Indoor Air Flow (%)			
	-20%	-10%	Rated	+10%
Total Capacity	0.95	0.975	1.0	1.025
Sensible Capacity	0.89	0.950	1.0	1.050

HEATING CAPACITY (kW)

G = Gross Heating Capacity kW, based on nominal air flow.
 N = Net Heating Capacity kW allowing for average defrost.
 ○ = Nominal Capacity (kW)

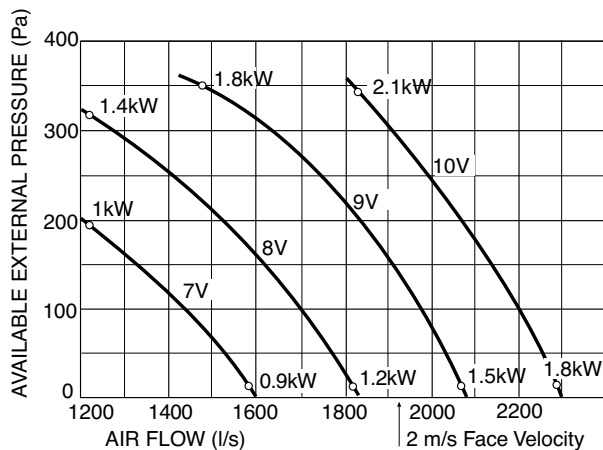
Reverse Cycle Systems

MODEL	INDOOR ENTERING AIR TEMP. °C D.B.	OUTDOOR COIL ENTERING AIR TEMPERATURE (E.A.T.) °C D.B.															
		-5		-3		-1		1		3		5		7		9	
		G	N	G	N	G	N	G	N	G	N	G	N	G	N	G	N
OPA 296RKTF-P	15	19.8	18.9	20.9	18.7	22.0	18.9	23.1	20.1	24.3	24.3	25.4	25.4	26.5	26.5	27.7	27.7
	20	19.5	18.7	20.6	18.4	21.7	18.7	22.9	22.9	24.0	24.0	25.1	25.1	26.2	26.2	27.4	27.4
	25	18.9	18.2	20.0	18.0	21.1	18.2	22.2	22.2	23.4	23.4	24.5	24.5	25.6	25.6	26.7	26.7

AIR HANDLING

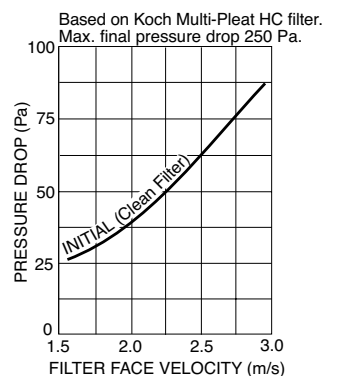
Note: Airflows are for a dry coil. Reduce airflow by 5% in high moisture removal conditions. In a free blow or low resistance application, beware of exceeding indoor fan motor's full load amp limit (refer back page). As filters are optional, the fan air flows given are for units installed without filters.

OPA 296 c/w Plug fan



OPTIONAL FILTERS

- Pressure Drop



PERFORMANCE DATA

SOUND LEVELS

RADIATED

Sound Power Levels (SWL)

Measured in decibels re 1 picowatt, at nominal airflow.

MODEL	OUTDOOR FAN SPEED	SWL dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1 k	2 k	4 k
			SOUND POWER LEVELS (SWL) dB					
OPA 296	HIGH	81	82	79	79	76	71	64

Sound Pressure Levels (SPL)

Measured in decibels re 20 µPa, at nominal airflow.

MODEL	OUTDOOR FAN SPEED	SPL @ 3 m dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1 k	2 k	4 k
			SOUND PRESSURE LEVELS (SPL) dB					
OPA 296	HIGH	65	66	63	63	60	55	48

Sound Power Levels (SWL)

Test Conditions: BS 848 PT2 1985. Installation Type A (free inlet and outlet). Direct method of measurement (reverberant room). Measured in decibels re 1 picowatt.

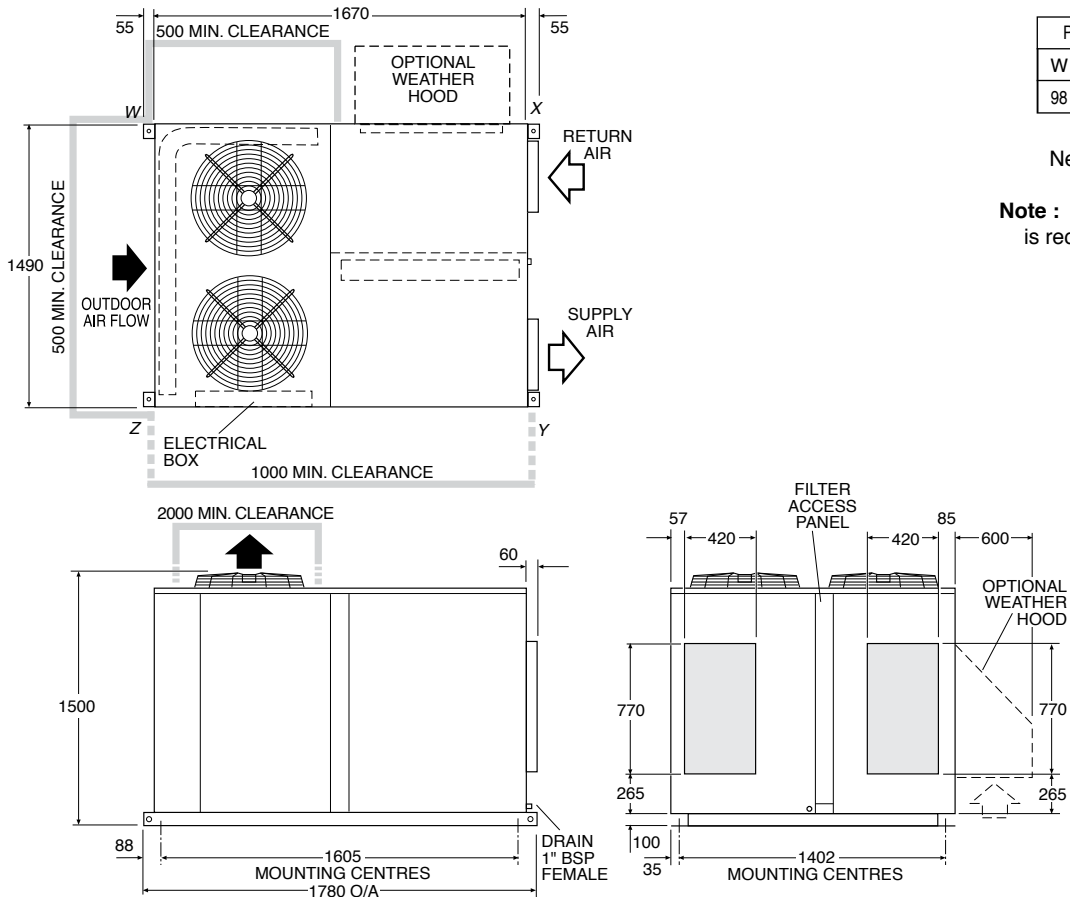
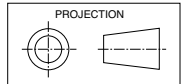
SUPPLY AIR OUTLET

MODEL	INDOOR FAN SPEED	SWL dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1 k	2 k	4 k
			SOUND POWER LEVELS (SWL) dB					
OPA 296-P	LOW (6V)	68	73	66	67	61	59	53
	HIGH (9V)	81	73	86	79	73	72	67

DIMENSIONS (mm)

Fig. 1 Horizontal Supply & Return Air OPA 296RKTFH-P (c/w Plug fan)

Not to Scale



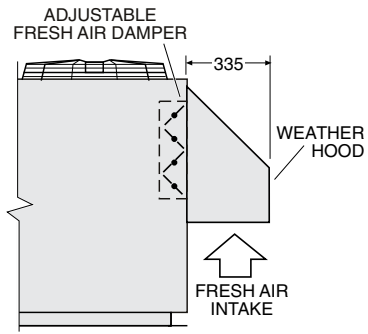
POINT LOADS (kg)			
W	X	Y	Z
98	113	113	166

Net Weight 490 kg

Note : A 2 m clearance is required above the exhaust air fans

DIMENSIONS (mm)

Fig. 3 Fresh Air Damper Option



NOTE

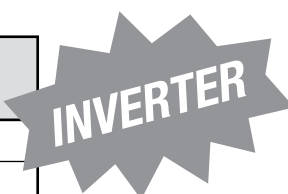
The manufacturer reserves the right to make changes in specifications at any time without notice or obligation. Certified data is available on request.

NOMENCLATURE

e.g.	O	P	A	2	9	6	R	K	T	F	H	-P
	Series			Size			Type					
	O - Outdoor P - Packaged A - Air Cooled			Divide by 10 to get approx. nominal Capacity in kilowatts			R - Reverse cycle K - Refrigerant R410A T - Three phase power supply F - Inverter compressor H - Horizontal discharge supply air fan U - Downward discharge supply air fan P - Plug fan c/w EC motor					

SPECIFICATIONS

Model	OPA 296RKTf-P	
Nominal Cooling Capacity *1	kW	29.7
Net Cooling Capacity	kW	29.18 (13 ~ 32)
Heating Capacity *2	kW	28.11 (12 ~ 32)
EER / AEER (Cooling)		3.22 / 3.20
COP (Heating)		3.17 / 3.15
Compressor type		DC inverter
Indoor air fan type		backward curved plug
Indoor air fan motor		EC
Air Flow *3	l/s	1700
Power Source		3 phase 400-415 V a.c. 50 Hz
Indoor Fan Full Load Amps	A/ph.	4.3
Running Amps (Total System)	A/ph.	14 / 16 / 13
Max. Running Amps (Total Sys.)	A/ph.	22 / 23 / 21
Finish (outdoor unit)		Grey polyester powder coat
Net Weight	kg	490
Shipping Weight (approx.)	kg	538



Notes:

*1 Nominal Cooling Capacity at AS/NZS 3823 conditions:

Indoor Entering Air Temperature 27°C D.B., 19°C W.B.;
Outdoor Entering Air Temperature 35°C D.B.

Net Cooling Capacity at AS/NZS 3823 includes an allowance for indoor fan motor heat loss.

*2 Heating Capacity (reverse cycle units only) at AS/NZS 3823 conditions:

Indoor Entering Air Temperature 21°C D.B.;
Outdoor Entering Air Temperature 7°C D.B., 6°C W.B.

*3 Supply air flow at Nominal Cooling Capacity conditions stated above.

The manufacturer operates a quality management system that conforms to AS/NZS ISO 9001:2008.

NOTE

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