



Underceiling Split System Air Conditioner Technical Data

ISU 141 (ECO)



Cooling Capacity
13.5kW

Heating Capacity
12.8kW

Underceiling Split Air Conditioner

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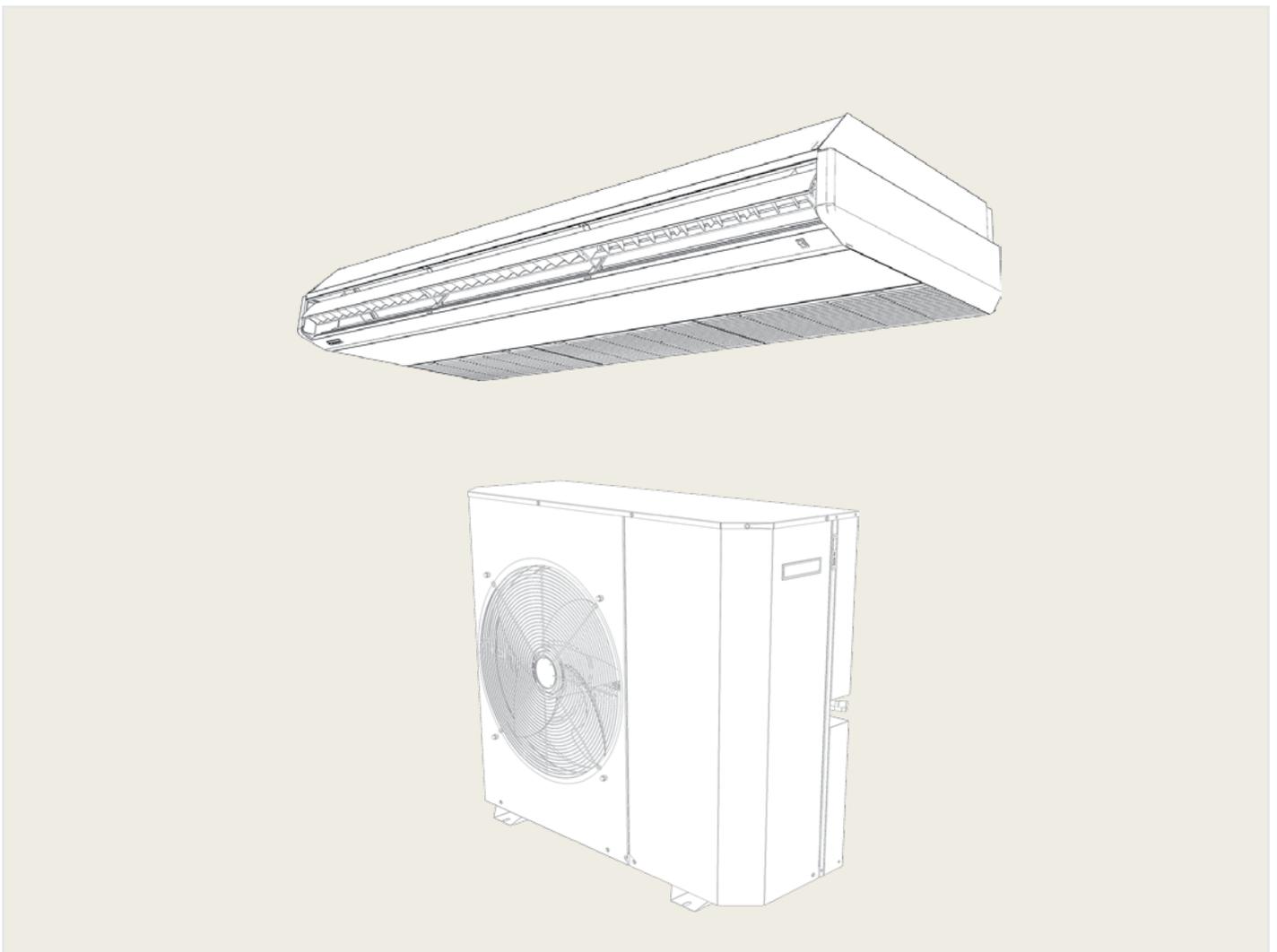
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Underceiling Split Air Conditioner

ISU 141KYX ECO



The ISU indoor unit, together with its associated OSA outdoor unit, provides a reverse cycle (heat pump) split system air conditioner designed and developed to comply with and exceed AS/NZS 3823. Each system efficiently delivers controlled indoor environments from -15°C to +52°C ambient conditions.



Underceiling Split Air Conditioner

ISU 141KYX ECO



Applications

These units have been specifically developed for air conditioning of light commercial premises, e.g. computer server rooms, petrol stations, night clubs, public spaces and shops.

Suitable for high sensible heat applications, e.g. computer server rooms, machinery rooms. Also suitable for 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.

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 establish the correct selection of units.

FEATURES

Refrigerant R410A

Each complete system uses refrigerant R410A which has a zero ozone depletion potential.

User Friendly

The air conditioning system is available with an optional SAT-3 Controller or TZT-100 Controller which is wired to the Indoor or Outdoor unit. These thermostats have been designed to maintain a high level of comfort for room occupants. Emphasis has been placed on providing controls that are easy to use – despite the sophisticated microprocessor system that runs it. Use of the Auto and Timer function settings allows you to “set it and forget it”.

Economy

The ISU/OSA ECO system has a variable capacity compressor which uses less energy overall than alternative types of compressor.

Efficient

Each indoor unit includes a high efficiency electronically commutated (EC) motor. Part load operation at low loads gives high energy efficiency (75% airflow equates to 55% power use) using temperzone algorithms. Each outdoor unit incorporates a high efficiency compressor. Heat exchange coils use inner grooved (rifled) tube for better heat transfer.

Performance

The variable capacity compressor technology can provide close comfort control of the room temperature.

A dynamically balanced forward curved fan with a multi-speed EC motor enables fine tuning of the indoor unit to match the 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. The system includes a temperature sensing head pressure control which enables the system to compensate for outdoor ambient temperatures below 20°C on cooling cycle, and above 15°C on heating cycle.

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Versatile

The slimline low profile styling allows the Indoor Unit to be suspended unobtrusively under the ceiling, where it does not use valuable office wall or floor space. Alternatively, if it is more convenient the unit can be mounted vertically as a console, e.g. under a window. It is relatively easy to fit to existing buildings or relocate.

Compact

The compact up-right design of the outdoor units requires only a 150 mm gap on the coil side where installation is against a wall. Their slimline cabinets are particularly practical where there is restricted space, e.g. side access pathways, balconies, narrow ledges, etc. The unit is free standing, but can be fitted on a wall using the optional wall mounting brackets.

Quiet

Each integral high efficiency EC motor 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 application requirements as well as used for de-humidifying the space.

The outdoor units' coil design permits low fan speeds and hence low noise levels. The compressor is isolated in a built-in, insulated compartment to minimise noise. The indoor unit is also insulated for noise attenuation.

Air Circulation

The air discharge louvre is motorised to distribute conditioned air high and low into the room. If preferred, however, the motor can be switched off and the louvre can be set at a fixed angle. Left and right air distribution is manually set to suit.

Accessible

The filter is easily accessible for regular cleaning via the indoor unit's hinge down/removable return air filter panel.

Durable

Both indoor and outdoor coil fins are epoxy coated for extra protection in corrosive environments, e.g. salt laden sea air. Each outdoor unit's cabinet is constructed from high grade galvanised steel - polyester powder coated (grey) for all weather protection (IP 44). External fasteners are marine grade steel. Heat exchange coils comprised of aluminium corrugated plate fins on mechanically expanded rifled copper tube. Each indoor unit's cabinet is constructed from high grade galvanised steel and includes a plastic drain tray for complete corrosion resistance and a galvanised steel safety drain tray. Outdoor coils are protected with louvred anti-hail guards.

Soft Starting

EC motors are soft starting therefore have none of the problems associated with high inrush current.

Insulation

Closed cell foam insulation has been used in the indoor units' cabinet 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.

Control Options

Commissioning is made easier when the EC motor to be controlled variably (within a restricted range) by a 0–10 volt DC signal that can be supplied either by a BMS system, or sophisticated controller. Standard three speed control is available via temperzone's optional SAT-3 or TZT-100 Controller.

The systems' UC8 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 Outdoor Unit Controller (UC8) has a LED display to indicate faults and running conditions. A non-specific fault indicator is included for interface to external systems via the optional relay board.

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OPTIONAL EQUIPMENT

Outdoor Unit:

1. Wall mounting brackets (NZ only).
2. Anti-vibration mounts (rubber)
3. Drain connection - right angle
4. Fault relay board (201-000-105)
5. Soft Starter for lowering starting current.

Indoor Unit:

temperzone SAT-3 Controller or TZT-100 Controller.

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 switch prevents icing up of the outdoor coil during heating cycle.
5. Frost protection on cooling cycle.
6. Sensor fault indication.
7. Compressor minimum run time to ensure oil return.
8. 12V control circuit.

COMPRESSOR

Each high efficiency variable capacity compressor is hermetically sealed and supported on rubber mounts to minimise vibration. Digital compressors have proven very reliable because of their design simplicity; electrical harmonic noise is very low.

REFRIGERATION PIPING

Maximum line length is 60m.

Max. height separations between units are:

Outdoor unit **above** indoor unit: 20m

Outdoor unit **below** indoor unit: 20m.

Each OSA unit is shipped from the factory with a charge of HFC-410A (R410A) refrigerant sufficient for a 10m line length. Liquid and suction service valves are provided. The matched indoor unit is shipped with a holding charge of nitrogen. Both units have brazed pipe connections.

WIRING

The electrical supply required (including voltage fluctuation limits) is:

OSA 141RKSG:

1 phase 230 V a.c. 50 Hz with neutral and earth.

OSA 141RKTG:

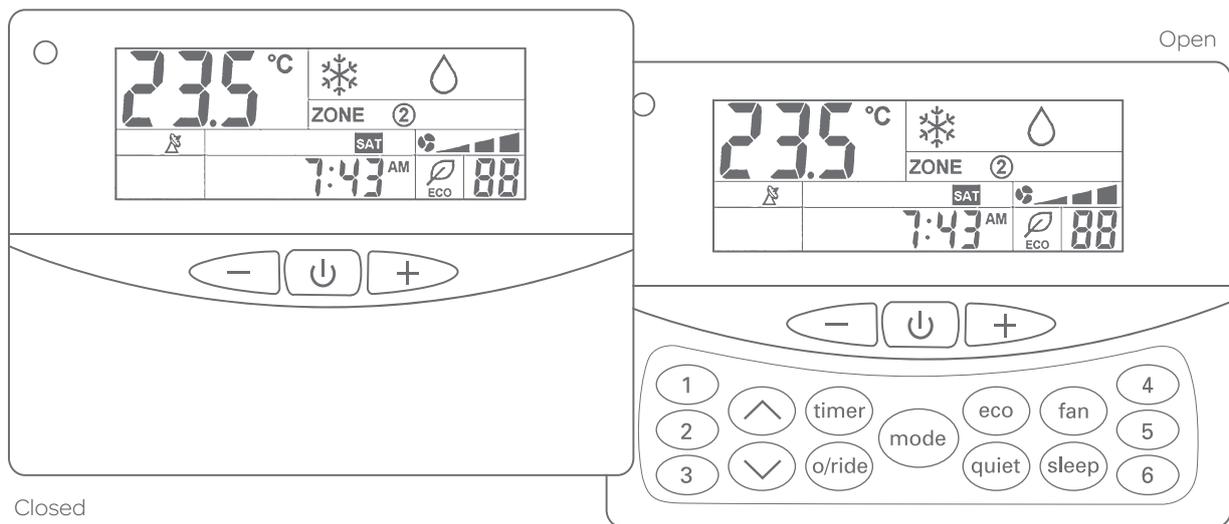
3 phase 400 V a.c. 50 Hz with neutral and earth.

A control panel, located in each outdoor unit, is fully wired ready to accept the main power supply. Each system complies with the requirements of the Regulatory Compliance Mark (RCM) for electrical safety (AS/NZS 60335.2.40) and EMC (AS/NZS CISPR.14).

Power to the single phase indoor unit is via the outdoor unit.

Provision has been made for compliance with DRED, ie demand response enabling device standard AS/NZS 4755.3.1.

Underceiling Split Air Conditioner SAT-3 Controller (Optional)



FEATURES SUMMARY

- Cool / Dry / Fan modes.
- Heat / Auto modes
- Auto / High / Medium / Low fan speed selection (customisable).
- Temperature setting range from 16°C – 30°C.
- Room temperature display.
- Real time clock.
- **7 day timer** – up to four start and/or stops per day
- Override countdown run timer, up to 4 hours..
- Continuous or Intermittent selection of fan run-on in dead zone.
- Backlit screen for ease of reading; changes colour for each mode.
- Soft touch tab keys
- Battery backup (Lithium).
- **Sleep function** – improves night time comfort and saves energy.
- **Eco mode** – for economical operation.
- **Quiet mode** – for outdoor unit.
- Low voltage control cable.
- Connects to either indoor unit or outdoor unit.
- **Colour:** white and light grey.

Optional:

Remote return air sensor

Note: Not backwards compatible with units using SAT-2.

TZT-100:

Refer www.temperzone.biz for information.

Underceiling Split Air Conditioner ECO Performance Data



COOLING CAPACITY (KW)

Total = Total Capacity (kW).
Sens. = Sensible Capacity (kW).
E.A.T. = Entering Air Temperature.
○ = Nominal Capacity (kW).

Refer below for Indoor Air Flow Correction factors

Note: Capacities are **gross** and do not include allowance for fan motor heat loss. Capacities are for close coupled systems. Interconnecting pipework will reduce capacity.

Models	Indoor Fan		Indoor coil E.A.T.		Outdoor coil entering air temperature °C D.B.											
	Speed	Air l/s	D.B. °C	W.B. °C	23		27		31		35		39		43	
					Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.
ISU 141 OSA 141G	High	700	21	15	13.3	10.3	13.2	10.3	12.7	10.0	12.2	9.7	11.4	9.2	10.4	8.5
			23	17	14.0	10.0	13.8	10.0	13.5	9.9	12.9	9.5	12.1	9.1	11.1	8.4
			27	19	14.7	11.5	14.5	11.5	14.2	11.3	13.5	11.0	12.8	10.4	11.8	9.8
			31	21	15.5	13.6	15.3	13.6	14.9	13.4	14.3	13.0	13.5	12.5	12.5	11.7

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).

Models	Indoor Entering Air Temp. °C		Outdoor coil entering air temperature °C D.B.															
	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.
ISD 141 OSA 141G	15		9.6	9.1	10.2	9.0	10.7	9.1	11.3	9.7	11.8	10.8	12.4	12.4	12.9	12.9	13.5	13.5
	20		9.5	9.0	10.1	8.9	10.6	9.0	11.2	9.6	11.7	10.7	12.3	12.3	12.8	12.8	13.4	13.4
	25		9.2	8.7	9.7	8.6	10.3	8.8	10.9	9.3	11.4	10.5	12.0	12.0	12.5	12.5	13.1	13.1

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

Underceiling Split Air Conditioner ECO Performance Data



SOUND LEVELS

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.

INDOOR UNIT - SUPPLY AIR OUTLET

Models	FAN SPEED	SWL dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1k	2k	4k
			SOUND POWER LEVELS (SWL) dB					
ISU 141	LOW (6.5V)	61	59	59	61	55	50	44
	MED (8.0V)	66	63	64	66	61	55	49
	HIGH (9.5V)	73	67	68	71	70	61	54

SOUND PRESSURE LEVELS (SPL) WITHIN A ROOM

Deduct the room absorption effect below from the Sound Power Levels (SWL) above to obtain Sound Pressure Levels within a room.

Note: Occupant at least 1.5 m from sound source.

Room type	OCTAVE BAND FREQUENCY Hz					
	125	250	500	1k	2k	4k
	ROOM ABSORPTION EFFECT					
Soft	4	8	11	11	11	11
Medium	3	7	8	9	9	9
Hard	0	1	3	4	4	5

OUTDOOR UNIT

Models	FAN SPEED	SWL dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1K	2K	4K
			SOUND POWER LEVELS (SPL) dB					
OSA 141 G	LOW	72	81	71	72	61	58	56
	MED	73	81	72	73	63	59	56
	HIGH	74	81	74	73	67	61	57

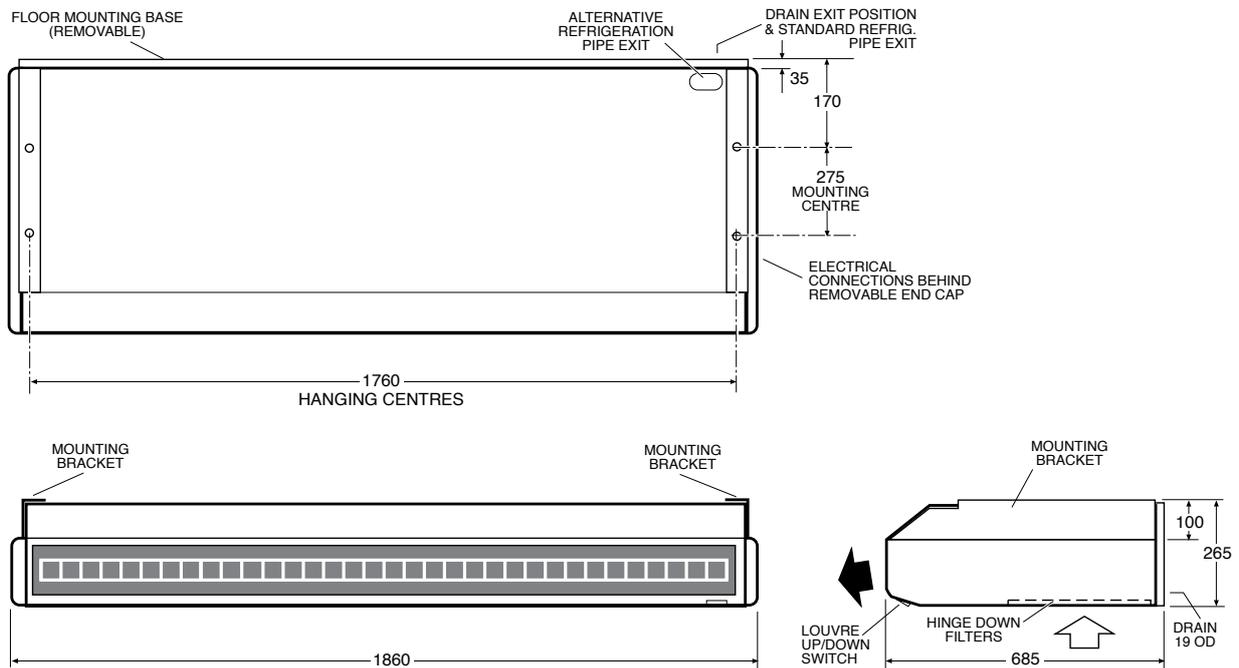
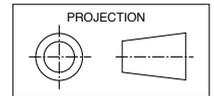
Sound Pressure Level (SPL) in decibels re 20 μ Pa

Models	FAN SPEED	SPL @ 3 m dB(A)	SOUND PRESSURE LEVELS (SPL) dB					
			125	250	500	1K	2K	4K
OSA 141 G	LOW	56	65	55	56	45	42	40
	MED	57	65	56	57	47	43	40
	HIGH	58	65	58	57	51	45	41

Underceiling Split Air Conditioner Dimensions (mm)



ISU INDOOR UNIT



Note:

1. Weight distribution 40 kg at each end.
2. Allow 500mm min. clearance to electrical connections.
3. Fan motors can be accessed from top or bottom panels.

Drawings are NOT TO SCALE

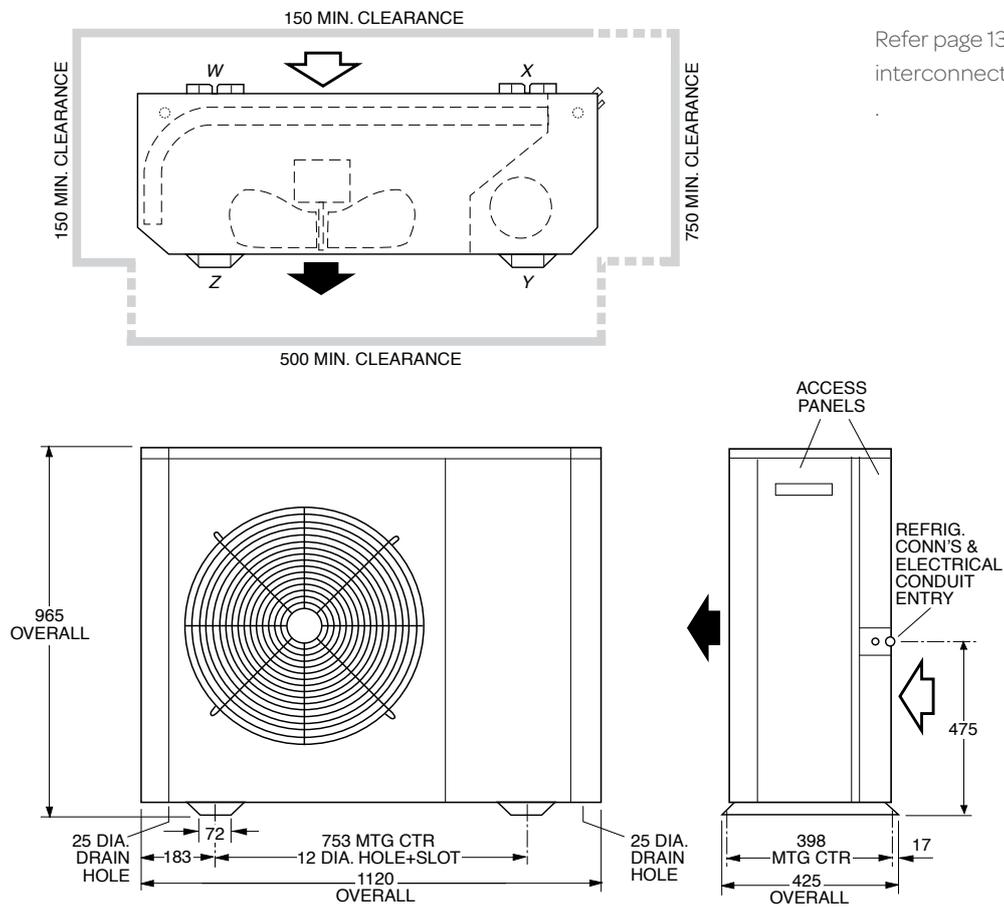
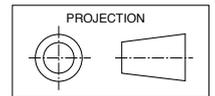
Materials and specifications are subject to change without notice due to the manufacturer's ongoing research and development programme.

Underceiling Split Air Conditioner Dimensions (mm)



OSA OUTDOOR UNIT

POINT LOADS (kg)			
W	X	Y	Z
16	38	50	24



Refer page 13 for recommended interconnecting pipe sizes

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Underceiling Split Air Conditioner ECO Specifications



System	
Indoor Unit	ISU 141KYX
Outdoor Unit	OSA 141G
Nominal Cooling Capacity * ¹ kW	5.4-13.5
Net Cooling Capacity (MEPS) * ¹ kW	13.2
EER / AEER (cooling)	3.25 / 3.23
Heating Capacity * ² kW	5.1-12.8
COP / ACOP (heating)	3.58 / 3.56
Air Flow* ³ l/s	700
Sound Levels * ⁴	
Indoor Unit (L/M/H) (SPL)	51 / 56 / 62
Outdoor Unit (SPL)	58
Power Source * ⁵	1 phase or 3 phase
Compressor type	digital
Indoor fan type	EC forward curved centrifugal
Indoor Fan Max. Current A	1.4 (x2)
Running Amps (Total)	
OSA* ⁶ RKSG (1Ø) A	18.4
OSA* ⁶ RKTG (3Ø) A	8.0 / 5.5 / 5.5
Refrigerant	R410A
Maximum Vertical Separation m	20
Maximum Line Length m	60
Pipe Sizes (Suction/Liquid) mm OD	16* ⁶ / 9.5
Operating Range (outdoor ambient)	
Cooling	-10°C to 52°C
Heating	-15°C to 25°C
Finish	
Outdoor Unit	grey polyester powder coat
Weight (net/shipping) kg	
Indoor Unit	79 / 103
Outdoor Unit	128 / 134

Notes:

*¹ Nominal Cooling Capacity (gross) 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.

*² Heating Capacity 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.

*⁴ Sound Levels are measured at nominal cooling capacity conditions stated above. SPL measured at 1.5m from indoor unit in a soft room; 3m from outdoor unit on High fan speed.

*⁵ Voltage range: Single phase systems 220-240 V;
Three phase systems 380-415 V

*⁶ Use 19 mm size suction pipe above 20m line length.

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