

# ISU 139/159 KYD (c/w EC Motor & SAT-2 Controller)

## Underceiling/Console Split System Indoor Units

## Installation & Maintenance

### GENERAL

The ISU Underceiling Indoor Units are designed to be coupled with the OSA outdoor units and controlled by the SAT-2 room temperature controller. Units must be installed in accordance with all national and local safety codes.

### Combinations

One ISU 139KYD with one OSA 139RKSH  
 One ISU 139KYD with one OSA 139RKTH  
 One ISU 159KYD with one OSA 159RKSH  
 One ISU 159KYD with one OSA 159RKTH

### UNPACKING UNITS

The OSA outdoor unit and ISU indoor unit are cartoned separately. Unpack each item carefully. Examine for transit damage.

### ISU UNIT

#### Components

The ISU carton includes:

1. ISU indoor unit.
2. SAT-2 Wall Control (shipped inside unit behind filter panel)
3. Condensate drain extension kit.
4. Right-angled suction pipe extension c/w lock nut and teflon seal.

### INSTALLATION

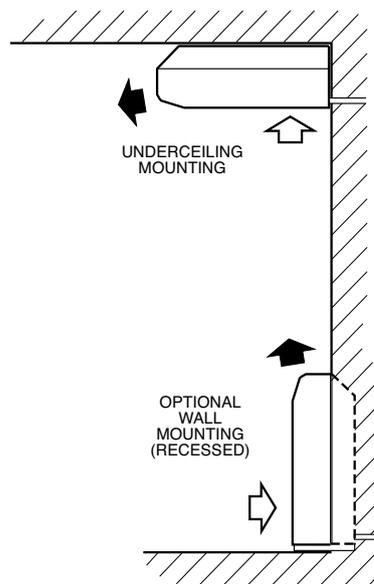
#### Positioning & Mounting

The ISU is designed to be installed :

- a. suspended horizontally beneath a level or sloping ceiling, or
- b. floor or wall mounted (i.e. vertically).

**Note:** For an extra low profile the unit can be recessed into the ceiling (or wall).

**Fig. 1 Mounting Options**



### Preparation

Prior to mounting the ISU the mounting brackets must be detached from each end of the unit.

1. Open the end filter panel and locate the screw securing the unit endcaps (refer figure 2).
2. Remove the endcap securing screw and retain.
3. Remove the endcap by first sliding it forward approx. 20 mm, then pull outwards away from end of the unit.
4. Release each mounting bracket from behind the two bolts securing them to the unit.
5. Remove the floor mounting base from the back of the ISU if when ceiling mounted it is required to fit flush to the wall.

### Underceiling Mounting

Locate the ISU near a wall to take full advantage of the long supply air throw and to hide the condensate drain pipe (and other connections) exiting at the rear of the unit.

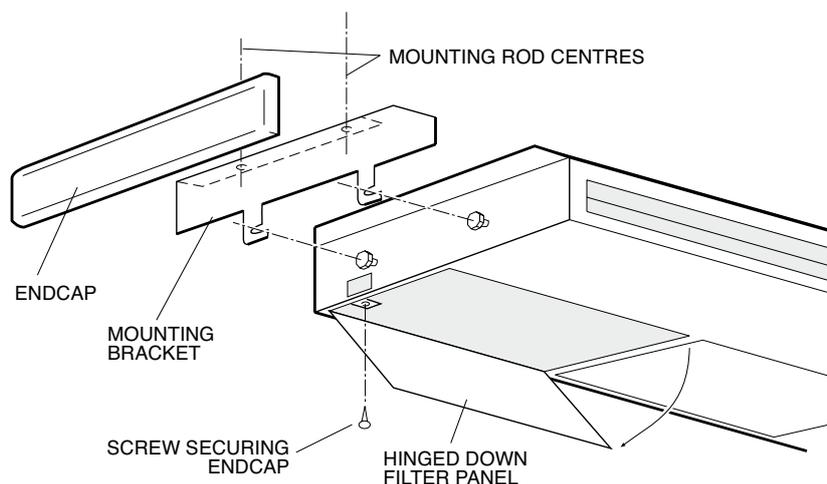
Refrigeration and wiring connections are via the top or the rear access holes. A right-angled suction pipe extension is supplied to facilitate top exit.

### Underceiling Installation

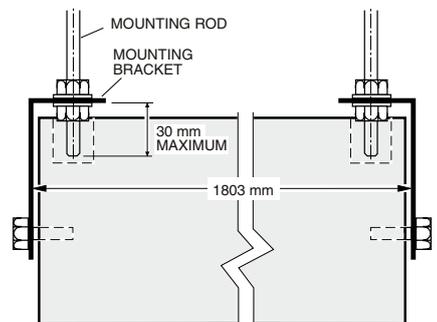
1. If an extra low profile installation is preferred, first cut the required ceiling aperture.
2. Install four M8 threaded hanging rods (not supplied) to protrude no more than 30 mm below the level of the mounting bracket flange (refer figure 3).

**Fig. 2 Mounting Bracket Detachment**

VIEWED FROM BELOW



**Fig. 3 Mounting Detail**



3. Thread on and tighten the lower washer and locknut sets (not supplied) to secure the left and right mounting brackets. **Note:** Mounting bracket flanges face inwards.
4. Adjust distance between mounting brackets to match dimensions in figure 3.

5. Lift the unit to the mounting brackets locating the two protruding bolts, at each end of the unit, securely into the two slots provided in each mounting bracket, then tighten bolts to secure the ISU unit.
6. Check that the secured ISU is installed level to facilitate condensate drainage.
7. Complete all refrigeration piping connections (refer 'Indoor-Outdoor Unit Connections').
8. Fit the insulated condensate drain extension, orientated so that the drain vent tube is at the highest point in the condensate line (refer instruction sheet supplied with Condensate Drain Extension kit).
9. After completing all piping connections replace the ISU unit's left and right endcaps as follows:
  - a. Place each endcap slightly forward of the appropriate end of the unit,
  - b. Compress the endcap at its centre and slide back hooking the endcaps hook under the 'U' shaped bracket on the unit and into position .
  - c. Secure each with the screws removed earlier from behind the filter panels.

#### Wall / Floor Installation

Vertically mounted, the refrigeration and wiring connections can be made through the back or base of the unit.

1. Measure and cut wall recess, if required.
2. Secure the mounting brackets to the wall using fastenings suitable for the wall construction and weight of the ISU unit. (Note: Mounting bracket flanges to face inwards.)
3. Refer to 'Underceiling Installation' instructions, steps 4 to 9 above, to complete vertically mounted installation.

#### INDOOR-OUTDOOR UNIT CONNECTIONS

Refer to the relevant OSA Outdoor Unit 'Installation & Maintenance' pamphlet for piping instructions. For wiring connections, refer to the Outdoor Unit wiring diagram in conjunction with the ISU wiring diagram on this pamphlet.

#### REFRIGERATION PIPING

The ISU Underceiling is shipped from the factory with a holding charge of dry nitrogen. Refer to the Outdoor Unit 'Installation & Maintenance' pamphlet for evacuation procedure.

ISU 139KYD refig. line connections are:

*Liquid:* 10 mm OD (3/8") flare nut

*Gas:* 19 mm OD (3/4") sweat

ISU 159KYD refig. line connections are:

*Liquid:* 13 mm OD (1/2") flare nut

*Gas:* 22 mm OD (7/8") sweat

#### Separation Limits

Maximum Pipe Length: Up to 30 m total

Indoor Unit above Outdoor Unit : 18 m

Outdoor Unit above Indoor Unit : 18 m

For line lengths in excess of the above, contact the manufacturer's nearest sales office for additional piping requirements.

#### CONDENSATE DRAIN

After the Condensate Drain Extension has been insulated and fitted internally, connect a 19 mm ID drain pipe (not supplied) to

the ISU's drain connection. Maintain a downwards slope of at least 1 in 50 (20 mm/m) along the drain line. No 'U' trap is necessary.

Insulation of the drain pipes is recommended especially in high humidity environments.

**Note:** The unit has a right angled drain tray to allow for wall or ceiling installation.

#### ELECTRICAL WIRING

The electrical supply required (via the Outdoor Unit) is specified on the Outdoor Unit's wiring diagram.

Electrical work must be carried out by a qualified electrician in accordance with local supply authority regulations and the wiring diagram.

**Note:** The SAT-2 Controller automatically switches the indoor fan off during de-ice, therefore no additional wiring is required to achieve this result.

#### INDOOR FAN SPEED

The fan speed (RPM) range is adjustable using DIP2 Switches 1 to 5 on the EC Motor Controller board located in the electrical box – refer wiring diagram. The default setting is highlighted.

Once set, your fan speed range can then be set to: LOW, MED and HIGH (DIP1 switch 1 'OFF') across the selected range.

#### SAT-2 CONTROLLER

The following components are supplied loose inside the ISU electrical box:

1. SAT-2 Wall Control plaque, including wall mounting plate.
2. 10 m interface lead (electrical box-to-plaque).
3. User's Operating Instructions booklet.
4. Lithium CR2032 battery (3V).

Optional

1. Remote return air sensor (in box).
2. Remote return air temperature sensor lead; 1.5, 6, 12 or 25 m.
3. 20 m extended interface lead (electrical box-to-plaque).
4. ISU/ISD indoor unit-to-OSA outdoor unit interconnecting lead; 12.5 m or 25 m; 7 core.
5. Infra red remote control.
6. Additional SAT-2 Wall Control plaque.

#### Installation

The SAT-2 Controller PCB is supplied pre-installed in the ISU unit's electrical box.

1. Isolate the ISU unit from power supply, then remove electrical box cover.
2. Remove the items supplied loose in the electrical box.
3. Remove the Wall Control's interface lead from its box and connect the bare wired end of the interface lead to the terminal block on the SAT-2 Controller board (refer wiring diagram). Trace the remaining length of the lead to the Wall Control's intended location.
4. Remove the Wall Control's backing plate by using a small screw driver to remove the single screw at the bottom edge of the plaque.

5. Install the Lithium battery, supplied loose, positive (+) side up in the Wall Control's battery holder.
6. Check the wall where the Wall Control plaque is to be located is flat before fastening the wall mounting plate. Alternatively, the mounting plate can be screwed to a standard wall socket mounted horizontally.
 

**Note:** Use low profile (mush) headed screws to prevent contact with the PCB board. Fixing the plate to a distorted surface may damage the control.
7. Drill hole in wall to allow cable entry.
8. Connect the interface lead's lugs to the Wall Control board as per the wiring diagram overleaf.
9. Ensure the interface lead is run separately and away from main power supply wires, including the interconnecting cable. When installing cabling, trim any excess length to suit your location.
10. Fill around the interface lead with foam or cover hole with PVC tape to prevent draft from wall cavity affecting control operation. Do not use aluminium duct tape.
11. Secure the Wall Control body to the mounting plate by replacing the locking screw removed earlier.
12. Replace the ISU electrical box cover.

#### Remote Air Temperature Sensor/s (option)

The air temperature sensor is by default located in the Wall plaque. Optional remote air temperature sensors are available so that the measurement of the room temperature can be taken away from the wall plaque, eg. elsewhere in the room or in the return air duct.

Remote sensor's can be plugged directly into the Controller board (PCB). This board accepts up to four sensors which are designated as 'zones' one to four. The first return air sensor will automatically replace the Wall Control sensor and should be located in the same room as the Wall Control. The Controller will always use the average of the zones selected. Refer to the separate installation instructions supplied with the PCB for further details.

Ensure all remote sensor wires are run separately and away from main power supply wires, including the interconnecting cable.

#### COMMISSIONING

Indoor Unit

1. Check that the thermostat is correctly wired and set at the desired temperature.
2. Check that the air filter is clean.
3. Check that the fan runs freely without vibration.
4. Check condensate drain for free drainage.
5. Refer to Outdoor Unit Installation & Maintenance instructions and Wall Thermostat User's Operating Instructions to complete the start-up and commissioning procedure for the complete air conditioning system.
6. Run the motorised louvre to check up/down air distribution. Use the switch to set up/down louvre in **fixed** position, if required. Do not try to set up/down louvre manually.

7. With the motorised louvre switched off, manually adjust the left/right louvre to throw the air in the required direction.
8. Demonstrate the SAT-2 Wall Thermostat to the owner/user, after having first thoroughly familiarised yourself with the User's Operating Instructions. These instructions to remain with the owner/user.

**MAINTENANCE**

**Weekly For First Four Weeks**

1. Check air filter; vacuum clean as necessary.
2. Check condensate drains for free drainage.

**Monthly**

Check air filter; vacuum clean as necessary.

**Six Monthly**

1. Check condensate drain for free drainage.
2. Check the tightness of the fan.

3. Check that fan motor is free running.
4. Check tightness of electrical connections.
5. Check air supply at louvre.

**WARNING**

This unit is designed for use ONLY with the refrigerant HCFC-410A. 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.**

**NOTE**

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

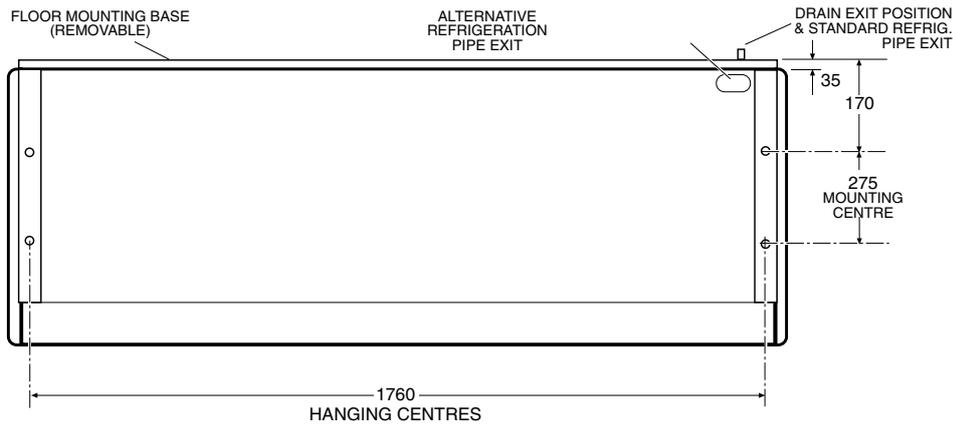
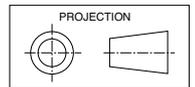
This pamphlet replaces the previous issue no.s 3768 dated 03/13.  
Condensate drain ext kit ref.

**DIMENSIONS (mm)**

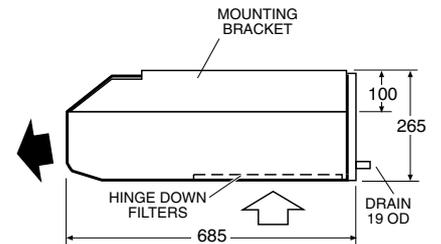
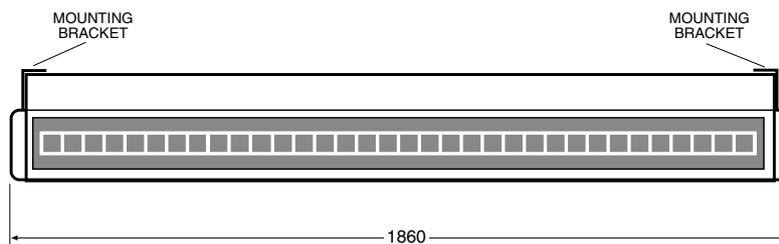
**Fig. 5 ISU 139, 159 KYD**

Not to Scale

**Indoor Units**



**Net Weight:**  
ISU 139 81 kg  
ISU 159 81 kg



EC-BOARD SPEED SELECTION - DIP SWITCH 2 (DIP2)

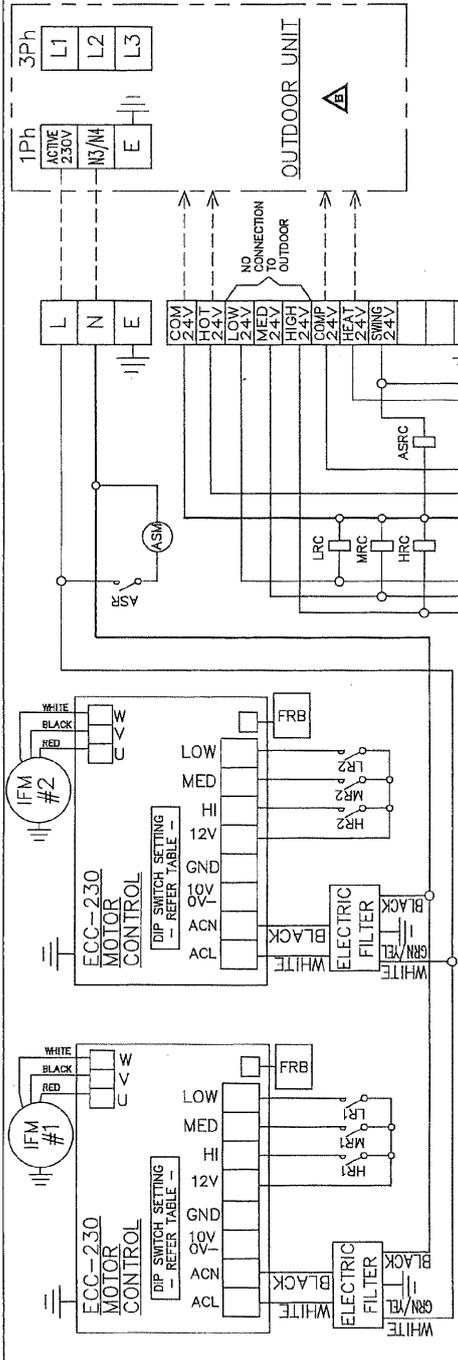
SWITCH 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SWITCH 2	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SWITCH 3	OFF	OFF	ON	OFF	ON	OFF	ON	ON
SWITCH 4	OFF	OFF	OFF	ON	OFF	ON	ON	ON
SWITCH 5	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Max (rpm)	1500	1400	1350	1300	1200	DO NOT USE	1100	DO NOT USE
Min (rpm)	1200	1000	1050	1000	900	DO NOT USE	800	DO NOT USE

MODEL	ISU	139KY-D	159KY-D
VOLTAGE IN	V	230/240	230/240
IFM_AMPS(MAX)	A/Ph	1.9	1.9

ASM	AIR SWING MOTOR	LR	LOW SPEED RELAY
ASR	AIR SWING RELAY	LRC	LOW SPEED RELAY COIL
ASRC	AIR SWING RELAY COIL	MR	MED SPEED RELAY
FRB	FAULT RELAY BOARD	MRC	MED SPEED RELAY COIL
HR	HI SPEED RELAY	SDR	SHUT DOWN RELAY
HRC	HI SPEED RELAY COIL	SDRC	SHUT DOWN RELAY COIL
IFM	INDOOR FAN MOTOR		

STANDARD SETTING	OFF	ON
1	3 SPEED FAN HI/MED/LOW	ON
2	NORMAL FORWARD ACTION	
3	POWER LIMIT 300W	
4	LEAVE IN THIS POSITION	
STANDARD SETTING	OFF	ON
1	COOL ONLY	ON
2	NO ELECTRIC HEATERS	
3	1.5°C DIFFERENTIAL CONTROL	
4	FAN ON IN COOL CYCLE (DEAD BAND RECOMMENDED FOR IN-DUCT SENSORS)	
5	AIR COOLED	
6	TWO STAGE	
7	FAULT RELAY ACTIVATED UPON FINAL LOCK OUT	
8	FAN ON IN HEAT CYCLE (DEAD BAND RECOMMENDED FOR IN-DUCT SENSORS)	

SAT 2 BOARD DEFINITIONS	
OUT1	4-WAY VALVE
OUT2	HEATER
OUT3	SWING/COMP2
OUT4	DRAIN/PUMP
OUT5	POWER IN
OUT6	ZONE/MOTOR
ALARM OUT	FAULT RELAY
RELAY1	ZONE CONTROL BOARD
COM	COMMON
DI6	HP SWITCH
DI5	LP SWITCH
DI4	FLOAT SWITCH
DI3	HYDRONIC PUMP
DI2	NO FUNCTION
DI1	SD
AD8	DISCHARGE 2
AD7	DISCHARGE 1
AD6	RETURN AIR 4
AD5	RETURN AIR 3/INDOOR COIL 2
AD4	RETURN AIR 2/LST
AD3	RETURN AIR 1
AD2	LST 1
AD1	INDOOR COIL 1
SEC	TRANSFORMER SECONDARY
PRI	TRANSFORMER PRIMARY

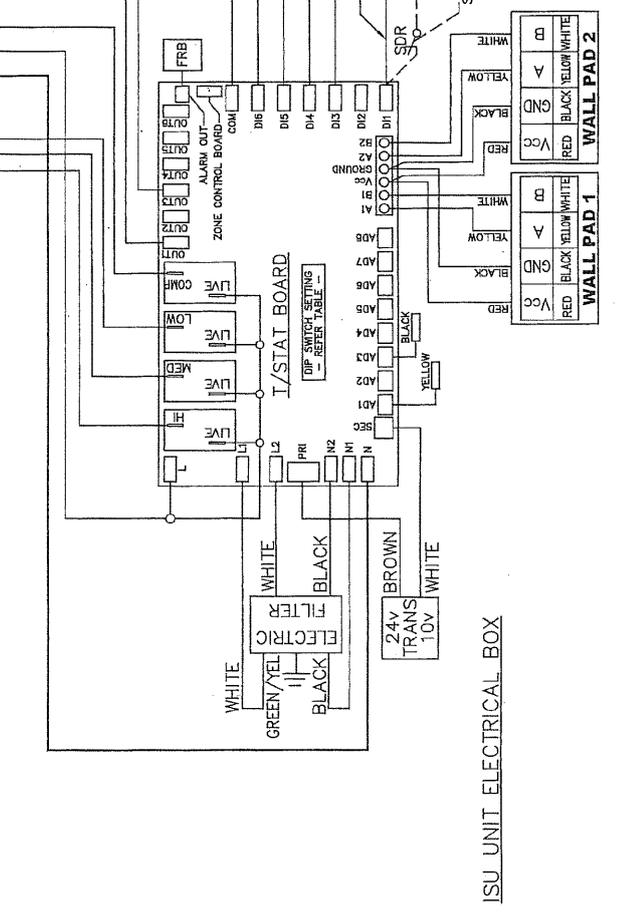
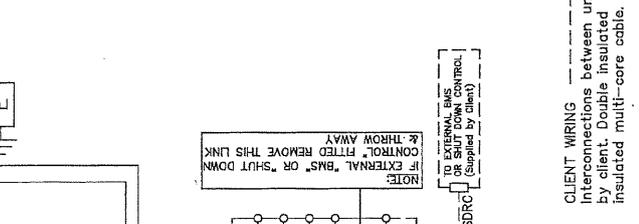


DIP1 SWITCH SETTING

OFF	ON	
1	3 SPEED FAN HI/MED/LOW	ON
2	NORMAL FORWARD ACTION	
3	POWER LIMIT 300W	
4	LEAVE IN THIS POSITION	

DIPSWITCH SETTING

OFF	ON	
1	COOL ONLY	ON
2	NO ELECTRIC HEATERS	
3	1.5°C DIFFERENTIAL CONTROL	
4	FAN ON IN COOL CYCLE (DEAD BAND RECOMMENDED FOR IN-DUCT SENSORS)	
5	AIR COOLED	
6	TWO STAGE	
7	FAULT RELAY ACTIVATED UPON FINAL LOCK OUT	
8	FAN ON IN HEAT CYCLE (DEAD BAND RECOMMENDED FOR IN-DUCT SENSORS)	



Title ISU 139KY-D & 159KY-D  
WIRING SCHEMATIC (T/STAT SAT-2)

Drawn AC	Date 19-05-11	Revision
Scale	524-204-602	B

Programmed by		ASSY No.		
		FINISH		
		Mat'l		
		DESCRIPTION		
		No.		
		DRG SIZE		
		APRVD		
		DATE		
		EC/N		
		MODIFICATION		
B	SHOW CONNECTION TO HEAT & COMP TO OSA	N3191	27-03-13	D.P.V
A	CORRECT NO'S ON DIP SWITCH SETTINGS	N2973	25-01-12	R.A.S