

# ISD 139/159/196 KY-DL (c/w EC motor, SAT-2 Controller & Zone Control)

## Ducted Split System Indoor Units

## Installation & Maintenance

### GENERAL

These ISD\*KY-DL indoor units are designed to be coupled with the OSA\*RK outdoor units. The '-DL' indicates the unit is supplied complete with SAT-2 room temperature controller and zone control. Units must be installed in accordance with all national and local safety codes.

### Combinations

- One ISD 139KY with one OSA 139RKSH
- One ISD 139KY with one OSA 139RKTH
- One ISD 159KY with one OSA 159RKSH
- One ISD 159KY with one OSA 159RKTH
- One ISD 196KY with one OSA 196RKTV

### Options

1. Spring Mounting Kit
2. SAT-2 Accessories (refer overleaf)
3. Spigot Plate Adaptor
  - ISD 139KY: Ø400 mm (2 inlets)
  - ISD 159/196 KY: Ø450 mm (2 inlets)

### SAFETY DRAIN TRAY

The unit is supplied with an in-built safety drain tray to protect your ceiling against accidental damage.

### AIR FILTRATION

As air filtration requirements vary, filters are not supplied with the unit. Filters should ideally be installed on the return air side of the unit, no closer than 500mm from the back of the unit and easily accessible for cleaning. To maximise the efficiency of air flow, the return air filter should be twice the area of the ISD unit's return air spigot/s.

### SEPARABLE (Option)

Each model is made up of two parts, a fan section and a coil section (refer fig.1). To separate, undo the screws holding the two parts together. Disconnect the two sensor wires that run between the two parts at the control board. Remember to reconnect these two wires to the same place when re-assembling. Make sure the contact seals are tightly sealed all the way around when reassembling the two sides.

It may be desirable in some applications to keep the two separate parts of the unit apart and joined by ducting, eg over a ceiling joint. A pair of the optional Spigot Plate Adaptors are available to facilitate this option.

### INSTALLATION

#### Positioning & Mounting

Provide 500 mm minimum clearance to both ends of the unit.

If low noise is a critical factor in the installation, refer to Figure 7 for noise isolation recommendations.

It is recommended that the unit be mounted using the spring mounting system, supplied as an optional extra (Fig.2). This system minimises transfer of vibration into the building structure.

If a more rigid installation can be tolerated, then suspend the unit from four threaded rods (not supplied) attached to the ceiling. Four 'L' shaped brackets are supplied on the unit to facilitate this method. These brackets must first be unscrewed, reversed and resecured to enable rod attachment.

The unit has a built-in sloping drain tray, therefore mount it level.

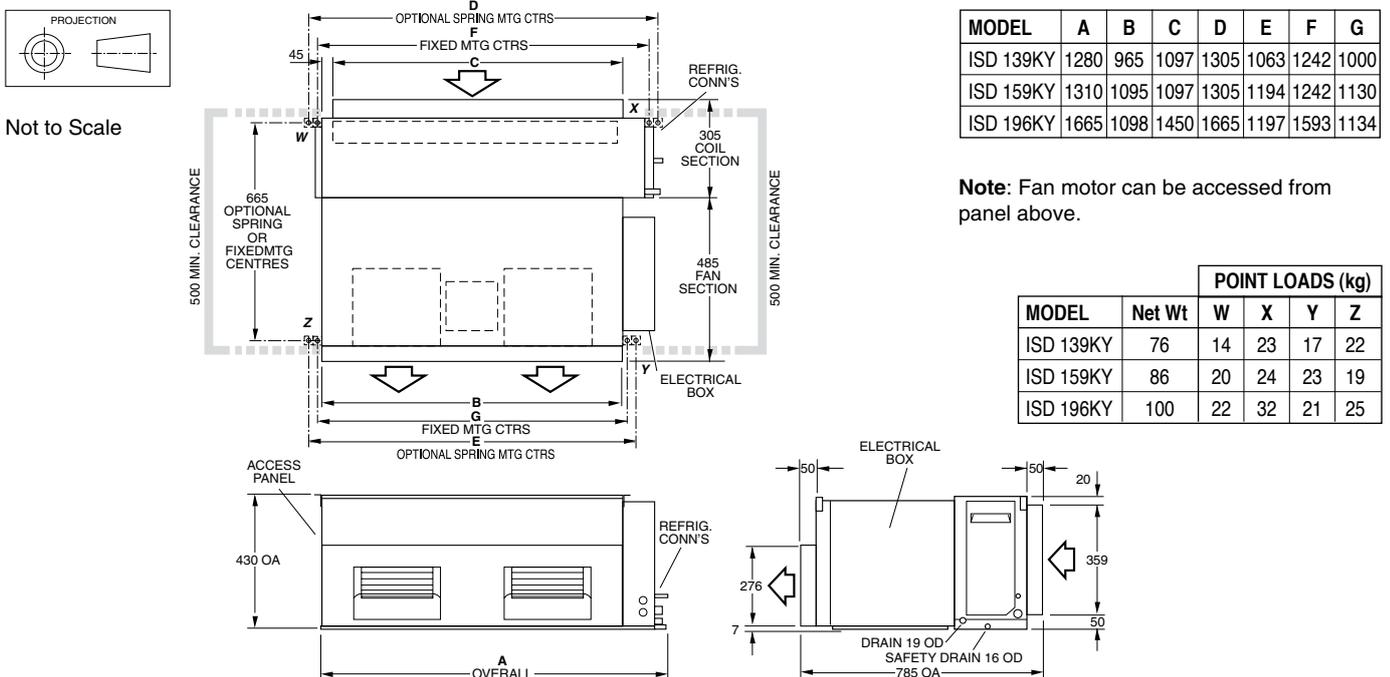
When finally positioned, tighten the lock nuts on the mounting rods from above and below the mounting flange to give a firm installation (see Fig. 3).

### Condensate Drains

The condensate drain should be trapped outside the unit cabinet. 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 tray. (Refer Fig.4).

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 ISD unit's drain tray.

Fig. 1 Dimensions (mm)



It is essential that the drainage system for the evaporator is checked by pouring water in the drain tray and seeing that it discharges at the end of the drain and does not overflow the drain tray.

Connect the safety drain tray drain pipe to a suitable drain line with an appropriate slope to allow free drainage. This drain line does not require trapping. Test the drain with water to ensure it clears safely.

## INDOOR-OUTDOOR UNIT

### CONNECTIONS

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

## REFRIGERATION PIPING

### Pipe Connection Sizes (mm OD) & Type

| Model     | Liquid          | Suction         |
|-----------|-----------------|-----------------|
| ISD 139KY | 10 (3/8") sweat | 19 (3/4") sweat |
| ISD 159KY | 13 (1/2") sweat | 22 (7/8") sweat |
| ISD 196KY | 13 (1/2") sweat | 22 (7/8") sweat |

The ISD is shipped from the factory with a pressurised holding charge of nitrogen. Immediately before removing any brazed pipe connection's seal, reduce the holding charge to atmospheric pressure.

**Warning:** Failure to do so may cause injury.

Refer to the Outdoor Unit 'Installation & Maintenance' pamphlet for evacuation procedure and piping requirements.

## 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.

In a free blow or low resistance application, beware of exceeding the fan motor's full load amp limit (refer Outdoor Unit's 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.

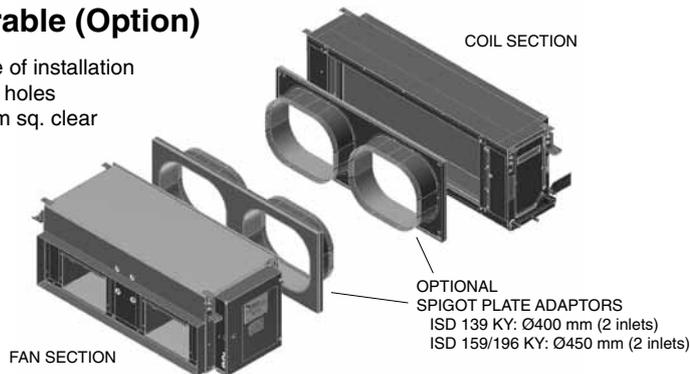
Once set, your fan speed range can then be set to: LOW, MED and HIGH (DIP1 switch 1 'OFF') across the selected range.

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.

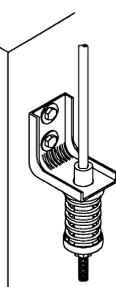
## Fig. 1 Separable (Option)

Separable for ease of installation through small man holes  
– minimum 550 mm sq. clear aperture

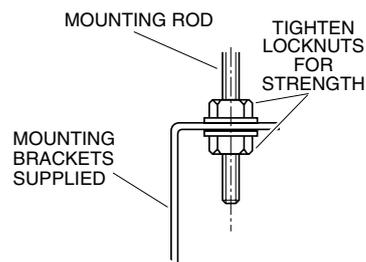


## Fig. 2 Spring Mounting

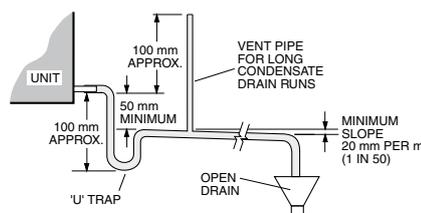
RECOMMENDED MOUNTING SYSTEM (OPTIONAL EXTRA)



## Fig. 3 Solid Mounting



## Fig. 4



## Condensate Drain

**Note:** The Safety Drain Tray does not require trapping.

## SAT-2 CONTROLLER

The following components are supplied in a box taped inside the return air spigot:

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. ISD indoor unit-to-OSA outdoor unit interconnecting lead; 12.5 m or 25 m; 7 core.
5. SAT-2 Zone Control PCB.
6. Zone Control 24V transformer.
7. Additional SAT-2 Wall Control plaque.
8. Infra red remote control.
9. Zone control leads to 24V dampers – 6 wire RJ-11 telephone type plugged cable (not supplied).

### Installation

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

1. Isolate the ISD unit from power supply, then remove electrical box cover.
2. Remove the SAT-2 box supplied taped inside the return air spigot.
3. Remove the Wall Control's interface lead from this 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 ISD 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.

### Zone Control

ISD\***KY-DL** units includes zone control functionality via a plug'n play board in the electrical box, allowing up to 4 zone dampers to be switched from the SAT-2 wall control. Standard 24 volt damper motors can be used with drive open/drive close or drive open/spring closed. Connection leads required are 6 wire, terminated with RJ-11 connector plugs (not supplied). If using 230/240V dampers motors, contact **temperzone** first for wiring changes required.

### COMMISSIONING

#### Indoor Unit

1. Check that the thermostat is correctly wired and set at the desired temperature.
2. Check that the air filter (if fitted) is clean.
3. Check that the fan runs freely without vibration.
4. Check condensate drain and safety drain tray for free drainage.

Refer to Outdoor Unit Installation Instructions in order to complete the start-up and commissioning procedure for the complete air conditioning system.

Demonstrate the SAT-2 Wall Control to the owner/user, after having first thoroughly familiarised yourself with the User's Operating Instructions. This page is to remain with the owner/user.

### MAINTENANCE

#### Weekly For First Four Weeks

1. Check air filter (if fitted); vacuum clean as necessary.
2. Check condensate drain for free drainage.

#### Monthly

Check air filter (if fitted); vacuum clean as necessary.

#### Six Monthly

1. Check condensate drain and safety drain tray for free drainage.
2. Check heat exchanger coil; vacuum or brush clean as necessary.
3. Check the tightness of the fan.
4. Check that fan motor is free running.
5. Check tightness of electrical connections.
6. Check air supply at diffuser outlets.

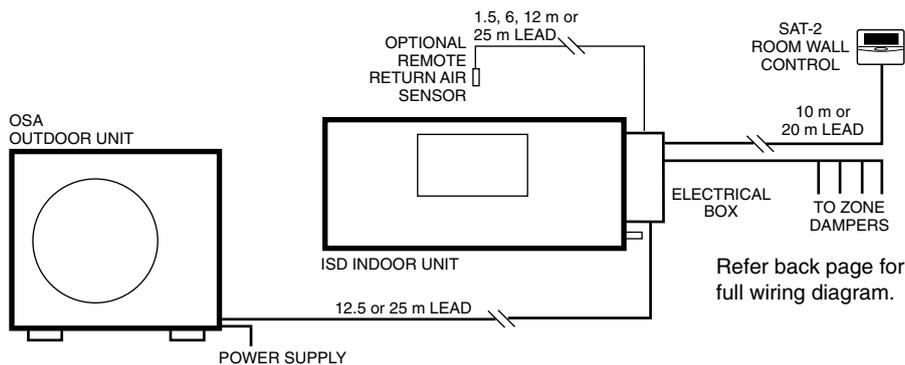
### WARNING

This unit is designed for use ONLY with the refrigerant HFC-410A (R410A). 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.**

This pamphlet replaces the previous issue no. 3946 dated 01/13. New separation + cs design, ISD 196 added, weights.

**Fig. 6 SAT-2 Control Wiring**

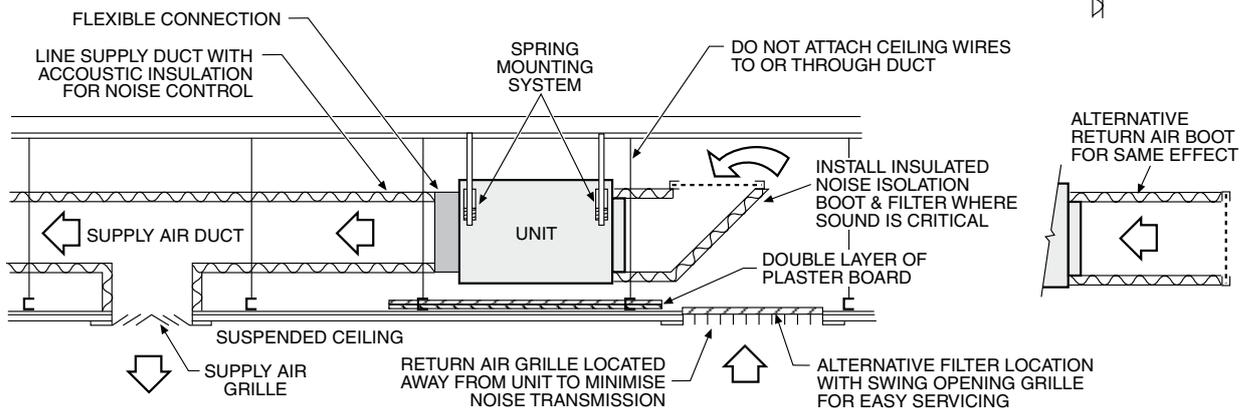
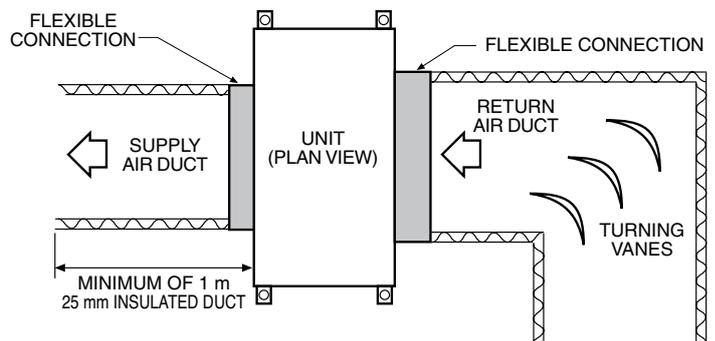


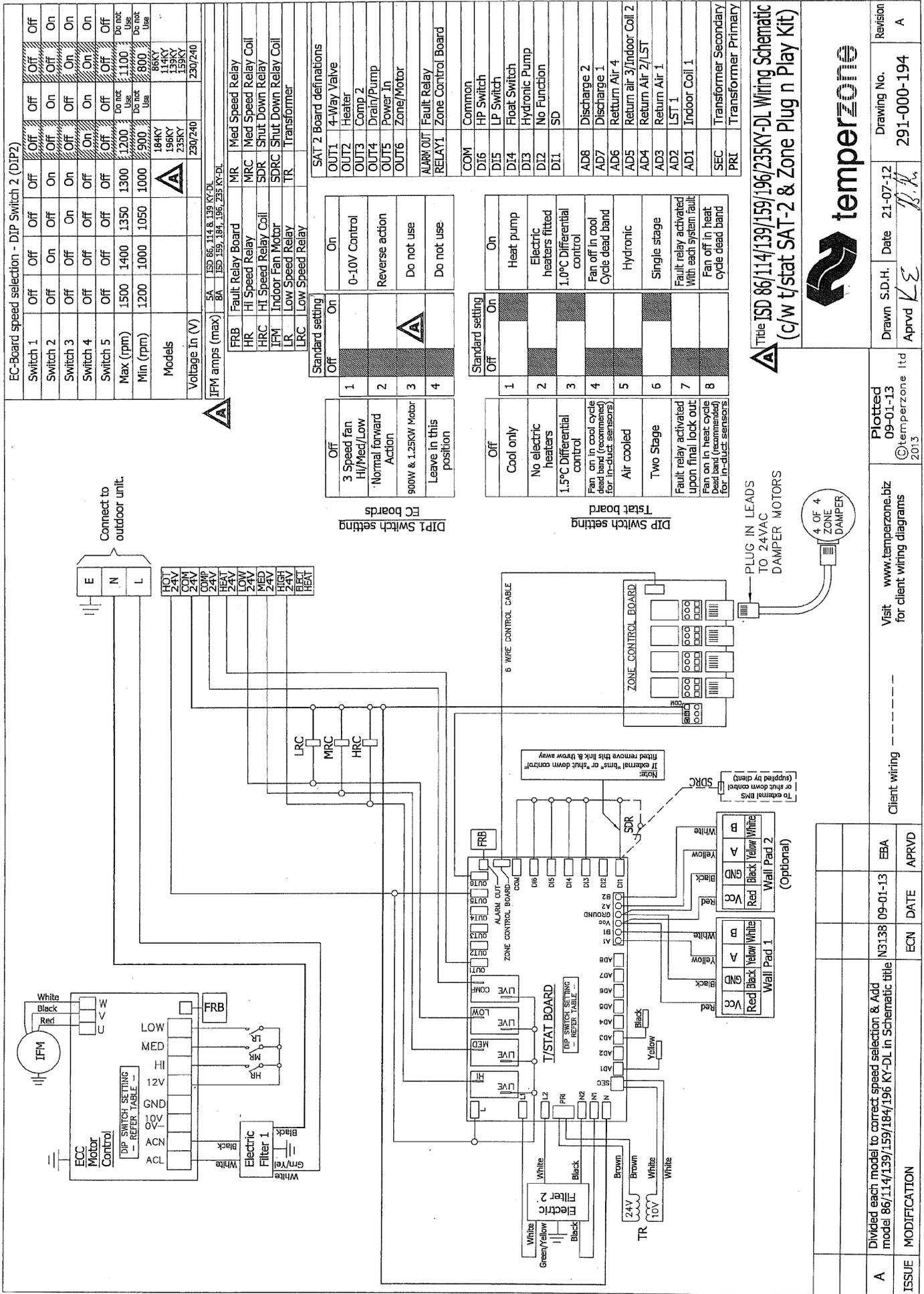
**Fig. 7 Application Considerations**

### Recommendations for Noise Isolation

#### - particularly for high static installations:

1. Avoid installing units, with non-ducted return air, directly above spaces where noise is critical.
2. Use flexible connections between unit and rigid ducting.
3. Use generously sized acoustically lined ducts.
4. If generous duct size is not possible, use turning vanes on bends to reduce air turbulence (regenerated noise).
5. Use 90° bends in ducting to significantly assist in noise reduction.





EC-board speed selection - DIP Switch 2 (DIP2)

|                |      |      |      |      |      |      |            |            |            |
|----------------|------|------|------|------|------|------|------------|------------|------------|
| Switch 1       | Off        | Off        | Off        |
| Switch 2       | Off  | On   | Off  | On   | Off  | Off  | On         | Off        | On         |
| Switch 3       | Off  | Off  | On   | On   | Off  | Off  | On         | Off        | On         |
| Switch 4       | Off  | Off  | Off  | Off  | Off  | Off  | On         | Off        | On         |
| Switch 5       | Off        | Off        | Off        |
| Max (rpm)      | 1500 | 1400 | 1350 | 1300 | 1200 | 1100 | Do not use | Do not use | Do not use |
| Min (rpm)      | 1200 | 1000 | 1050 | 1000 | 900  | 800  | Do not use | Do not use | Do not use |
| Models         |      |      |      |      |      |      |            | 184KY      | 114KY      |
|                |      |      |      |      |      |      |            | 196KY      | 139KY      |
|                |      |      |      |      |      |      |            | 235KY      | 159KY      |
| Voltage In (V) |      |      |      |      |      |      |            | 230/240    | 230/240    |

|                |    |                              |
|----------------|----|------------------------------|
| IFM amps (max) | 5A | ISD 86, 114 & 139 KY-DL      |
|                | 8A | ISD 159, 184, 196, 235 KY-DL |

|     |                     |      |                      |
|-----|---------------------|------|----------------------|
| FRB | Fault Relay Board   | MRC  | Med Speed Relay      |
| HR  | Hi Speed Relay      | MRC  | Med Speed Relay Coil |
| HRC | Hi Speed Relay Coil | SDR  | Shut Down Relay      |
| IFM | Indoor Fan Motor    | SDRC | Shut Down Relay Coil |
| LR  | Low Speed Relay     | TR   | Transformer          |
| LRC | Low Speed Relay     |      |                      |

|                  |                               |    |
|------------------|-------------------------------|----|
| Standard setting | Off                           | On |
| 1                | 3 Speed fan Hi/Med/Low Action | On |
| 2                | *Normal forward Action        | On |
| 3                | 900W & 1.25KW Motor           | On |
| 4                | Leave in this position        | On |

|                         |                    |
|-------------------------|--------------------|
| SAT 2 Board definitions |                    |
| OUT1                    | 4-Way Valve        |
| OUT2                    | Heater             |
| OUT3                    | Comp 2             |
| OUT4                    | Drain/Pump         |
| OUT5                    | Power In           |
| OUT6                    | Zone/Motor         |
| ALARM OUT               | Fault Relay        |
| RELAY1                  | Zone Control Board |

|                  |  |    |
|------------------|--|----|
| Standard setting | Off  | On |
| 1                | Cool only  | On |
| 2                | No electric heaters  | On |
| 3                | 1.5°C Differential control                                       | On |
| 4                | Fan on in cool cycle dead band (recommended for in-duct sensors) | On |
| 5                | Air cooled   | On |
| 6                | Two Stage  | On |
| 7                | Fault relay activated upon final lock out                        | On |
| 8                | Fan on in heat cycle dead band (recommended for in-duct sensors) | On |

|     |                            |
|-----|----------------------------|
| COM | Common                     |
| D16 | HP Switch                  |
| D15 | LP Switch                  |
| D14 | Float Switch               |
| D13 | Hydronic Pump              |
| D12 | No Function                |
| D11 | 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        |

**▲** Title ISD 86/114/139/159/196/235KY-DL Wiring Schematic (c/w t/stat SAT-2 & Zone Plug n Play Kit)



|   |              |  |     |       |      |          |     |
|---|--------------|--|-----|-------|------|----------|-----|
| ISSUE   | A            | Divided each model to correct speed selection & Add model 86/114/139/159/196/235KY-DL in Schematic title | ECN | N3138 | DATE | 09-01-13 | EBA |
|   | MODIFICATION |  |     |       |      |          |     |
| Client wiring -----   |              |  |     |       |      |          |     |
| Visit <a href="http://www.temperzone.biz">www.temperzone.biz</a> for client wiring diagrams |              |  |     |       |      |          |     |
| Plotted 09-01-13 ©temperzone ltd 2013   |              |  |     |       |      |          |     |
| Drawn S.D.H. Date 21-07-12  |              |  |     |       |      |          |     |
| Aprvd <i>K.E.</i> <i>P.H.</i>   |              |  |     |       |      |          |     |
| Drawing No. 291-000-194   |              |  |     |       |      |          |     |
| Revision A  |              |  |     |       |      |          |     |

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