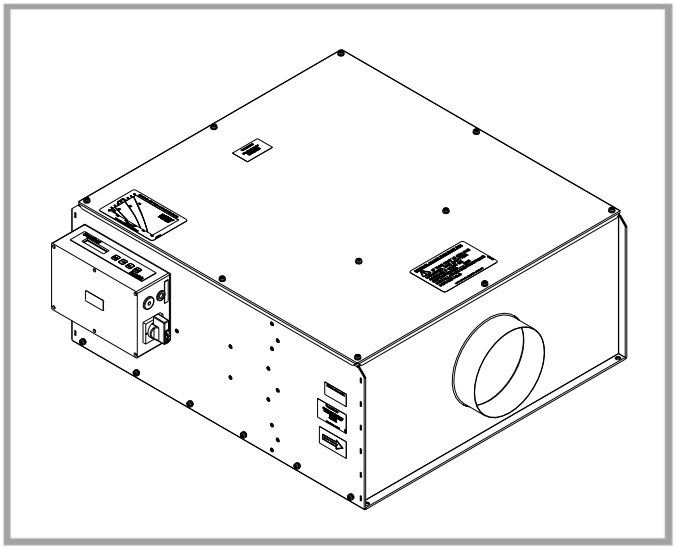
Twin
Box Fan Range



Stock Ref.No

B100T	B100 Twin Box Fan
B125T	B125 Twin Box Fan
B150T	B150 Twin Box Fan
B200T	B200 Twin Box Fan
B250T	B250 Twin Box Fan
B315T	B315 Twin Box Fan
B400T	B400 Twin Box Fan
B500T	B500 Twin Box Fan

Breathing Buildings

READ IN CONJUNCTION WITH ILLUSTRATIONS
PLEASE SAVE THESE INSTRUCTIONS

INDEX

IMPORTANT

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE COMMENCING INSTALLATION AND LEAVE THEM WITH THE END USER.

1. THESE UNITS MUST BE SITED AND CONNECTED IN ACCORDANCE WITH CURRENT IEE REGULATIONS, BS7671 (UK) OR THE APPROPRIATE STANDARDS IN YOUR COUNTRY.

2. INSTALLATION SHOULD BE BY A QUALIFIED ELECTRICIAN AND INSTALLER.

3. ALL REGULATIONS AND REQUIREMENTS MUST BE STRICTLY FOLLOWED TO PREVENT HAZARDS TO LIFE AND PROPERTY, BOTH DURING AND AFTER INSTALLATION, AND DURING ANY SUBSEQUENT SERVICING AND MAINTENANCE.

4. THESE UNITS MUST BE EARTHED.

5. SITE AWAY FROM DIRECT SOURCES OF HEAT, AMBIENT TEMPERATURE RANGE -10 TO 40ºC.

6. WHEN INSTALLING UNIT, TAKE CARE NOT TO DAMAGE ELECTRICAL OR OTHER HIDDEN UTILITIES.

7. CHECK THE DETAILS ON THE RATING LABEL FOR CORRECT VOLTAGE AND ELECTRICAL RATING.

8. THE INSTALLER IS RESPONSIBLE FOR THE INSTALLATION AND ELECTRICAL CONNECTION OF THE SYSTEM ON SITE. IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THAT THE EQUIPMENT IS SAFELY AND SECURELY INSTALLED AND LEFT ONLY WHEN MECHANICALLY AND ELECTRICALLY SAFE. SEE ALSO SECTION 7.

9. DUE TO THE WEIGHT OF SOME UNITS, IT IS RECOMMENDED THAT 2 PERSONS ARE INVOLVED IN THE INSTALLATION. AT ALL TIMES, INSTALLATION PRACTICES MUST COMPLY WITH RELEVANT HEALTH AND SAFETY LEGISLATION.

10. AIR HANDLING UNITS ARE DESIGNED AND SPECIFIED FOR USE WITH BREATHING BUILDINGS CONTROLS, DAMPERS, GRILLES AND ACCESSORIES.

11. THESE UNITS ARE SUITABLE FOR OUTDOOR INSTALLATION WHEN THE SUPPLIED CONTROLLER COVER IS FITTED.

12. ENSURE THAT THE UNIT IS INSTALLED FLAT AND LEVEL IN ALL PLANES PRIOR TO OPERATION.

1. General Description:

The system is designed to offer a controllable demand ventilation system in public, commercial and residential buildings through the use of low energy fan motors and intelligent sensors. Part L of the Building Regulations actively encourages the use of speed control in fans. The Air Handling Units react automatically to changes in demand by matching the airflow. This saves energy and ensures optimum performance at minimum running cost.

This eco-friendly system is based on the use of highly efficient brushless dc fan motors, allowing improved control functionality over and above equivalent ac units. A controller unit allows for control interfacing between the system user, the fan(s), switches, sensors and dampers. The control unit is universal and allows several different fan system configurations.

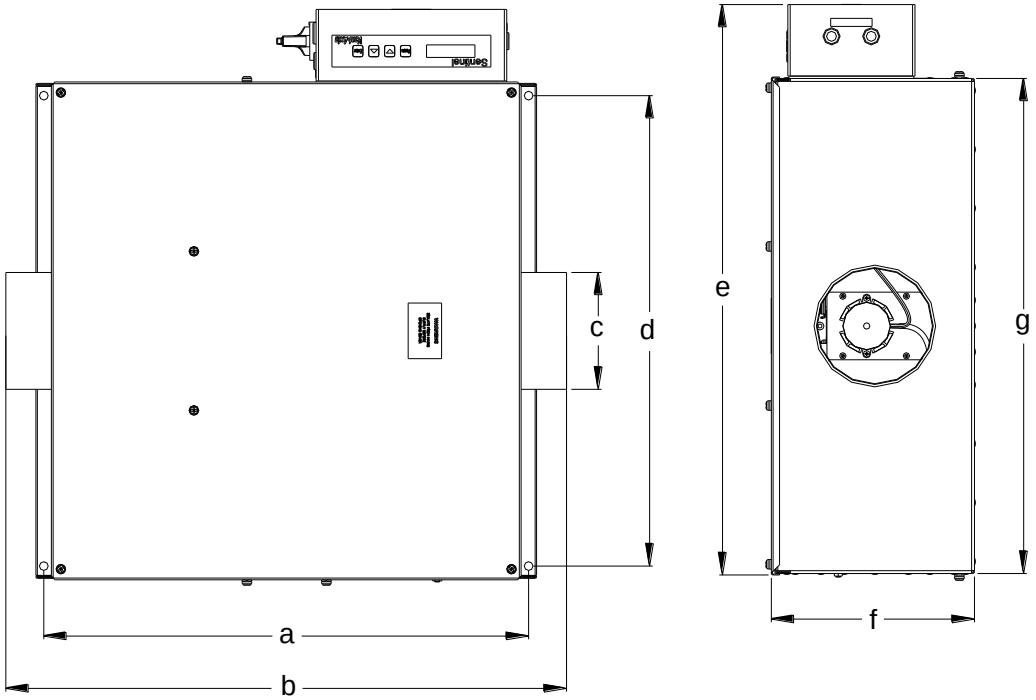
The System is typically an air extract unit, controlling and maintaining indoor air quality. However, an extract unit may also be used with another unit running on intake in a master-slave control situation. Other such combinations allow the use of a heater battery in the air intake or a heat recovery unit.

The model available for Twin unit is a hierarchical system, with fan change-over occurring every 6 hours of running. With the hierarchy system, the fan speed can either change MIN (trickle) to MAX (boost) (or off to MIN) as a result of a simple switched input (time, thermostat, % relative humidity level, etc.) or fan speed can change proportionately as a result of carbon dioxide, temperature or humidity sensor measurement, either within the duct airflow or within a special environment. Most sensors and switches are 24V dc SELV

With a hierarchy system, several control modes are possible, as follows:

- MIN-MAX mode
- Local/Remote mode (inc BMS operation)
- Proportional Control mode
- Slave mode

2 Sizes and Weights:



Duct Diameter C mm	Standard Hierarchy Model	Dimensions in mm (α)						Weight Kg	FLC Amps	Rating kW
		a	b	d	e	f	g			
100	100T	610	705	591	717	256	622	26	0.69	0.10
125	125T	610	705	591	717	256	622	26	0.72	0.10
150	150T	610	705	591	717	256	622	26	0.71	0.10
200	200T	801	896	703	830	343	734	39	1.40	0.20
250	250T	925	1020	798	925	354	829	48	1.40	0.20
315	315T	1255	1353	1145	1272	536	1176	88	1.40	0.20
400	400T	1255	1353	1145	1272	536	1176	90	2.86	0.50
500	500T	1492	1590	1533	1661	675	1564	175	1.50	0.95

(α) sizes do not include fixing brackets

3. Controls and Accessories:

		Control Type	Vent-Axia Part No.	Operation
1	Air Quality Sensor (AQS)	Switch	432953	• Measures VOC level (adjustable) • Run-on timer adjustable 1-25 min
2	PIR	Switch	433162	• Person detection • Adjustable run-on timer 5-25min.
3	Humidity Switch	Switch	432949	• Humidity sensing level adjustable 65-90%
4	Ambient Response Humidistat	Switch	432945	• Fixed humidity sensing at 72/75% RH • Incorporates night setback
5	Timeswitch	Switch	563515	• 7/24 mechanical type • max 6 cycles/day
6	Thermostat	Switch	563502B	• Adjustable 6-30ºC
7	Trickle-Boost Switch	Switch	455213	• Single Gang Switch
8	Remote Speed Control	Proportional	426332	• Manual fan motor speed control (24Vdc)
9	Carbon Dioxide & Temperature Room Sensor	Proportional	433257	• Control levels settable up to 2000ppm CO_2 & 50ºC • 24Vdc • Temperature output not suitable for use with proportional duct damper
10	Carbon Dioxide Duct Probe	Proportional	433259	• Control level settable up to 2000ppm CO_2 • 24Vdc
11	Remote Fan Status Indicator	Visual Display	433816	• Indicates fan running condition OK. Will flag fan failure.
12	Power Supply	24V dc	433193	• 24W max output
13	Damper Assembly	MIN-MAX Positioning	CPD100 to CPD315	• Sizes 100mm to 315mm • 24V dc actuator
14	PIR Grille Kit	PIR/Humidity controlled damper	434184	●125mm size ducting ●12V ac transformer supplied with kit • ●Mechanical Humidity control included

4. Controller Description:

The enclosure is fitted with a 4-pole 10A isolator that is suitable for fitting a locking device to prevent accidental operation.
Electrical connections to external sensors, instruments, slave bus and fan motor power and control are via pinch connection terminal blocks. Segregation (by board layout) is provided to separate power and control areas of the board and also to prevent unnecessary user access to factory terminations.
The user interface consists of a 16-character backlit alphanumerical x 2 line display with 4 push button control (Parameter, Increment, Decrement and Enter).

The unit accepts single phase (L/N/E) and three phase plus neutral (L1/L2/L3/N/E) mains supply power feeds dependant on model, ie.,
230V +/- 10% / 50/60Hz / 1ph (AC) or
400V +/- 10% / 50/60Hz / 3ph (AC), (4 wire systems only)

A 24V nominal (18-30V) supply at 145mA max is provided for powering switches and sensors etc. Analogue signal returns must be 0-10V dc with common ground for the instrument and cable screen at the control board.
Provision of cable input is via 3-off M16 cable gland apertures (marked CONTROL) and 2-off M20 gland apertures (marked POWER). 1-off each cable gland size are provided loose in the control box.
Cable Screens: Cable screens can be earthed if required by connecting to pins 8, 9 & 10.
Spare Terminals: Pins 82, 83 & 84 are spare terminals connected together.
Fig. 1 shows the controller connections layout in the control box:-

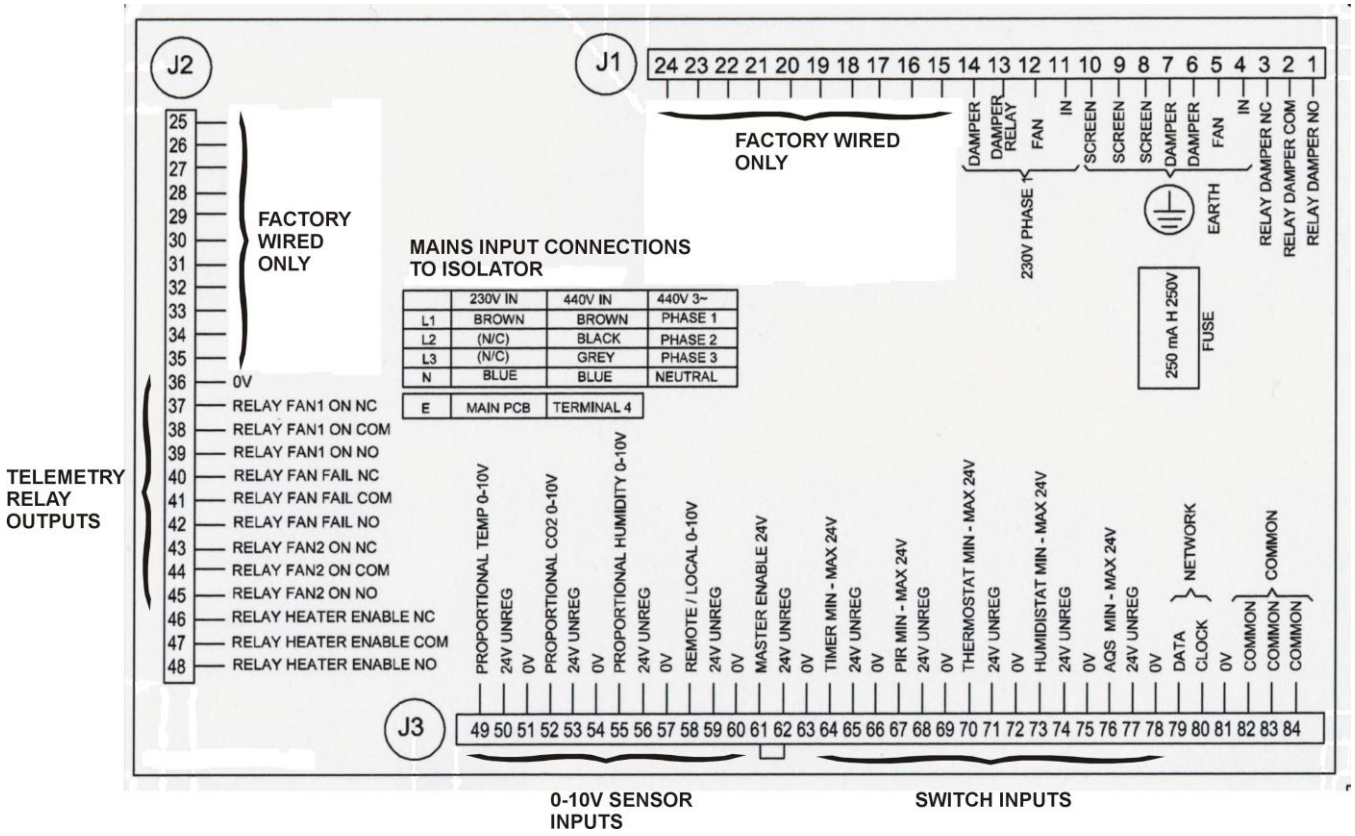


Fig.1 Controller Connections Layout

5. Control Options:

The controller unit can receive signals from a BMS and various sensors and switches which determine the operation of the unit and its commissioning.

The twin units are factory built either with or without a pressure sensor and are configured as such with appropriate factory default settings. Subsequently, during site installation commissioning, the operational control mode is matched to the range and type of the control sensors and switches. As the microprocessor control has a non-volatile memory, it will always remember the selected control settings prior to any shutdown occurring.

(a) **Factory Default Settings:**

Minimum speed = 20%
Maximum speed = 80%
Damper present Y/N = N
Damper operate time = 180s
Heater run-on time = 60s
Pressure set point 150Pa
Temperature set point 22ºC
Temperature proportional band 10ºC
CO_2 Set point 1000ppm
CO_2 Proportional band 1000ppm
Humidity set point 70% RH
Humidity proportional band 40% RH
Fan Change-over period = 6 hours

(b) **Max. Fan Speed:**

Settable via the user interface up to 100%. Sets the maximum speed the fan will operate at under all control methods. Where external (0-10V) analogue sensors or speed references are connected, the fan will operate at the maximum fan speed corresponding to the sensor output.

(c) **Min. Fan Speed:**

Settable via the user interface. Sets the minimum speed the fan will operate at under all control methods. Can be set to zero speed if so required. A non-zero speed setting may also be referred to as a trickle speed. A minimum run speed between 0-20% is not permitted nor is a min. speed > max. speed.

(d) **Master Enable:**

For all operating modes, the "Master Enable" acts as an on/off control for the fan. As factory supplied, there is a link between pins 61 and 62 which permanently enables the fan at MIN speed when powered. Alternatively, this link can be replaced by an on-off control (zero-volt contacts) such as a timeclock, PIR, etc., to control the system availability.

(e) **Damper:**

Damper connections in the controller are based upon the use of industry standard damper actuator (typically Belimo LM24A) using a 24V open signal and a 24V dc close signal (interlocked). No end of travel return is required. For the damper actuators, power is derived from a 24V dc power source (433193).

On the fan start command occurring, the damper open will initiate and the fan will start after the damper delay. Once the fan stops, the damper close command will initiate.

(f) **Telemetry:**

Telemetry signals are available to indicate fan running/fan fail status of each fan unit. These signals are volt free contacts via circuit board mounted relays for connection to the Visual Display indicator. In addition, indication is always available via the LCD to indicate fan status. Fan fail is initiated when the analogue control voltage to the motor is active but there is no feedback from the tachometer or motor fault relay. This will signal a Fan Failure for the following conditions:

Motor failure
Circuit board failure
Open circuit failures of interconnecting wiring

(g) **Duct Heater Interlock:**

When using unit on intake the controller provides a remote on-off function for Vent-Axia Airtrak Duct Heaters with built-in thyristor control. Whilst the fan is running, the heater will be active depending on the temperature set point and the duct thermostat feedback requirement. When the fan is switched off, there is a defined run-on period before the fan stops in order to cool the heating element. The fan run-on period takes priority over damper closing when the fan is switched off via the master enable.

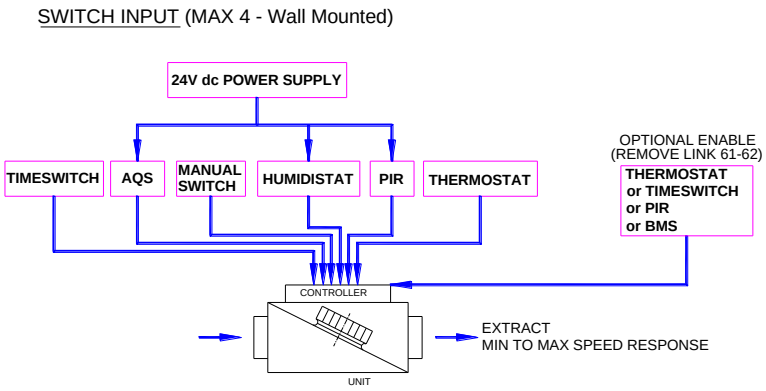
6. Unit Operation:

The flexible control functionality built into the product allows its use in various air movement control configurations which are referred to as operation modes. These are summarized below, with reference to basic system architecture illustrations. However, because the product has been designed with the specifier in mind, there will be numerous additional control possibilities achievable in practice.

(a) **MIN-MAX Mode (MM):**

This is nominally the default factory set-up mode if no pressure sensor is fitted. In this mode, the fan will normally run at the minimum set speed. If any of the Timer, AQS, PIR, etc. inputs are enabled, the fan will run at the maximum set speed. This operational mode is illustrated in Fig 2. Additionally, a switching device may be used as an optional enable.

Fig.2: MIN - MAX MODE

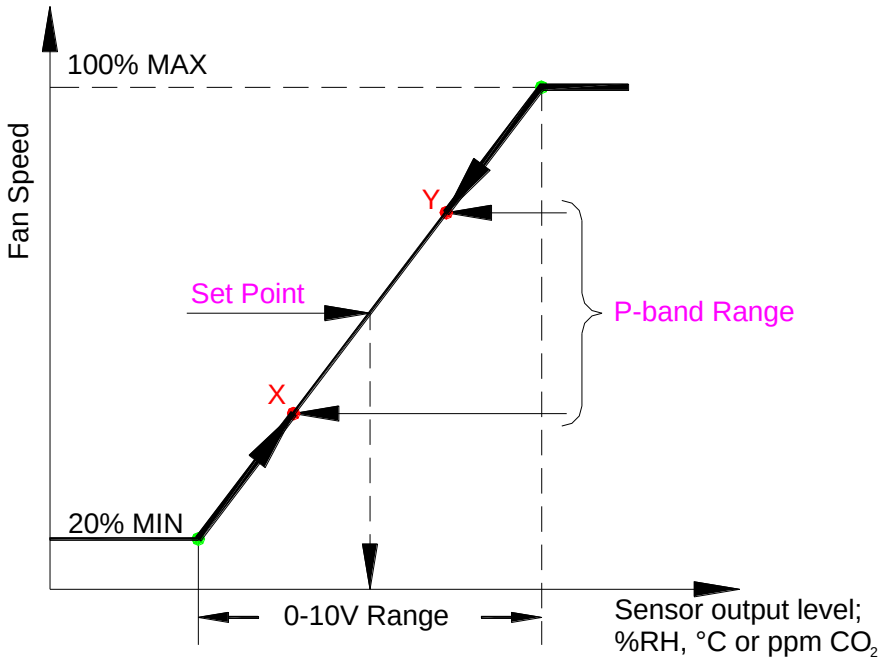


(b) **Proportional Control Mode (PC):**

In this operational mode, sensors are used with an analogue 0-10V output to monitor the Indoor Air Quality such that the fan speed response is a proportional demand of the maximum set speed. The default sensor set point and the proportional control range (P band) are held in software as follows:

	Set Point	**P-Band**	**0-10V Range**
Carbon Dioxide	1000ppm	1000ppm	0-2000ppm
Humidity	70% RH	40% RH	0-100% RH
Temperature	22ºC	5ºC	0-50ºC

The P-band range is equally distributed about the set point. The set point, P-Band, min. speed and max. speed are all user settable if required. The P-band range is essentially the min. to max. set speed of the fan, assuming that neither the min. or max. speed settings are within the P-band range, in which case the fan speeds are truncated at those settings. Referring to the Figure below, this shows the nominal default relationships:-

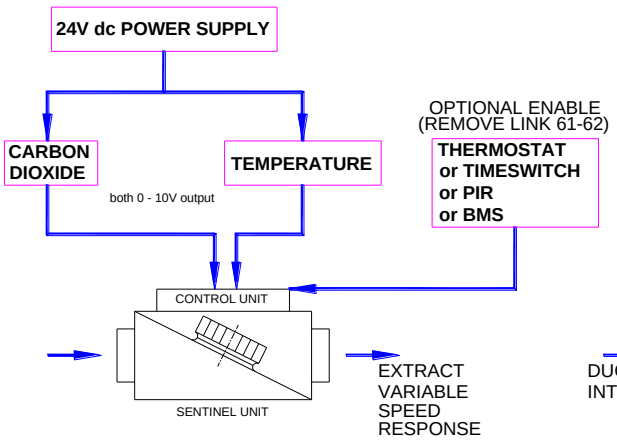


If, for example, the fan speeds are 20% and 100% (Note! Factory defaults are 20% and 80%), and the P-band range is equivalent to, say, X and Y, then point X becomes the 20% fan speed and point Y becomes 100%. It can be seen that if the P-band is set too narrowly, the fan speed response becomes coarse.

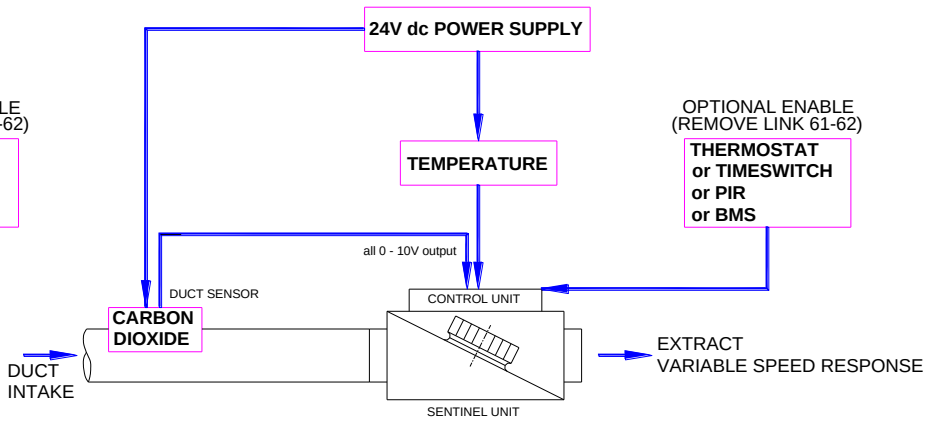
The proportional mode system set-up illustrations are shown in Fig.4. The carbon dioxide sensor can either be room mounted or duct mounted. If all 3 types of sensor are installed, the one with the highest sensor value takes priority. Each sensor input is monitored and controlled independently. As with other operating modes, a switching device may be used as an optional enable.

Fig.4: PROPORTIONAL CONTROL MODE

A) WALL MOUNTED SENSORS



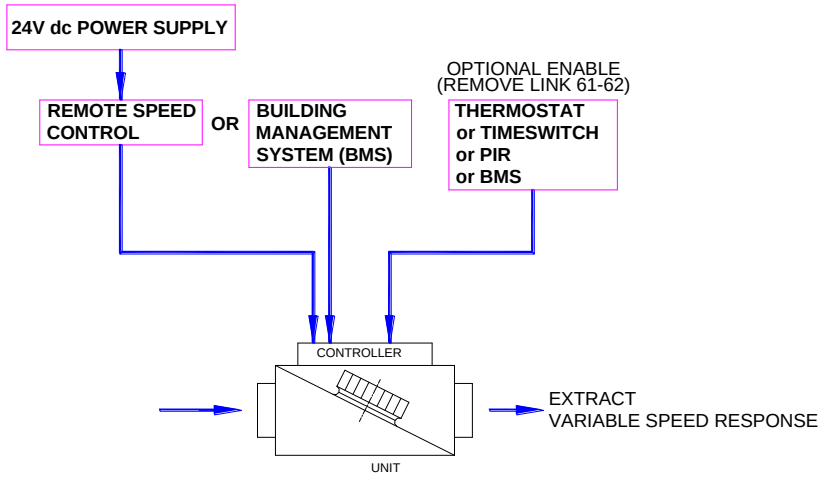
B) MIXED SENSOR LOCATION



(c) **Remote/Local Proportional Control:**

In this mode, the controller allows the input of a 0-10V input either from a remote (manual) speed control or from a Building Management System (BMS). Although the 0-10V input range is matched against the 20%-100% default speed setting condition, max. and min. speeds are installer adjustable if necessary, in which case, any voltage input below the new min. setting or above the new max. setting will retain the min.-max. values. This operational mode is illustrated in Fig.5. A switching device may be used as an optional enable.

Fig.5: LOCAL/REMOTE CONTROL MODE



(d) **Network Master/Slave Mode:**

By default, every unit is a "Master". However, "Slave" unit(s) can be added to the master unit to produce a balanced air intake/extract system. The master unit would be configured in any of the above modes with the slave connected and simply set to run at the same speed as the master multiplied by a "slave gain" factor between 0.5 and 2.0.

7. Installation:

(a) **Location:**

The unit must be stored in clean, dry conditions. DO NOT install these fans in areas where the following may be present:

1. Excessive oil or grease laden atmosphere.
2. Corrosive or flammable gases, fluids or vapours.
3. Ambient temperatures higher that 40ºC and below -10ºC
4. Relative humidity above 95%
5. Possible obstructions which will hinder removal.
6. Sudden ductwork transformations close to the unit.

If the unit is to be stored for a long period of time the fan impeller must be rotated by hand at monthly intervals to prevent hardening of the lubricant and corrosion or static indentation of the bearings.

It is recommended that before installation, the resistance to earth should be measured and if found to be less than 2MΩ the motor should be dried out before applying mains voltage.

(b) **Safety:**

All air moving equipment may present electrical, mechanical or noise hazards either during installation or during operation. These instructions are meant to help in the prevention and/or minimization of these hazards. It is important that due consideration is given to the implementation of these instructions and to due attention being given to applicable statutory requirements.

Potential hazards from rotating parts that can be reached during operation must be eliminated by using appropriate guards meeting statutory requirements.

(c) **General**

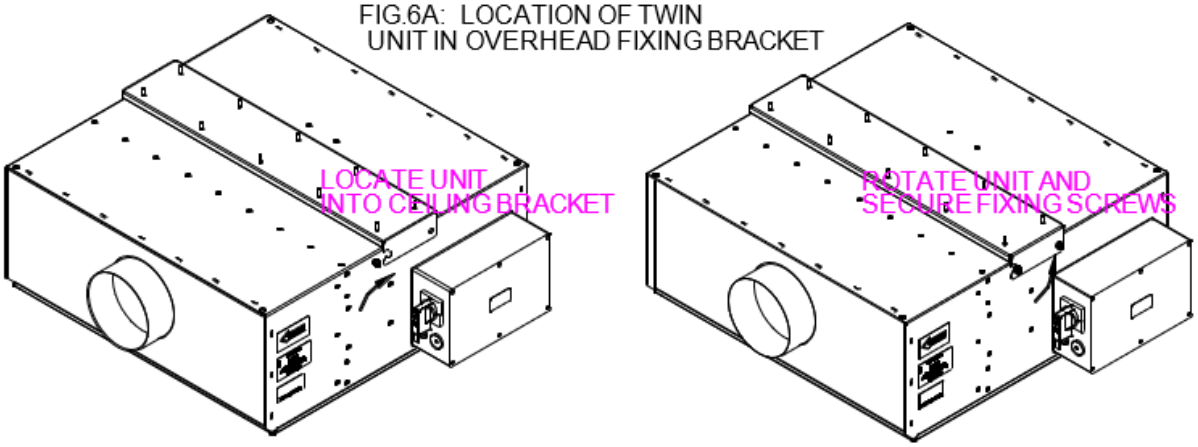
All fans generate noise during operation. Dependant on the installation sound attenuators or other acoustic treatment may be necessary to achieve acceptable noise levels in the ventilation area or the area surrounding the fan installation. The product catalogues indicate the noise levels generated by the equipment in standard test situations. The installed condition may affect the actual noise levels experienced in operation.

When fitting clamping bands to flexible connectors, ensure that the flexible connectors are pulled tight and the ducts are not misaligned.

(d) **Mounting Arrangements:**

- ALL TWIN units MUST be installed in a horizontal position, either on a loft floor or inverted from the roof slab. (Units mounted outdoors are only suitable for floor mounting.) Provided that the roof or ceiling is horizontally flat, a fixing bracket is provided with 100mm to 150mm fan units.
- If the fixing bracket is used, firstly bolt the bracket to the roof or ceiling. Latch the into the 2 bracket slots, as shown in Fig.6A, then rotate and secure with 2 further bolts. Tighten all bolts.
- If the fixing bracket cannot be used, 4 x Ø10mm clearance holes are provided for roof hanger rods, see Section 2 for location dimensions.
- With the larger 200mm to 500mm fan sizes, parallel fixing brackets are provided on both sides of the unit, Fig 6B, and because of the additional weight of these sizes, extra fixing holes are provided for additional hanger rods.

FIG.6A: LOCATION OF TWIN UNIT IN OVERHEAD FIXING BRACKET



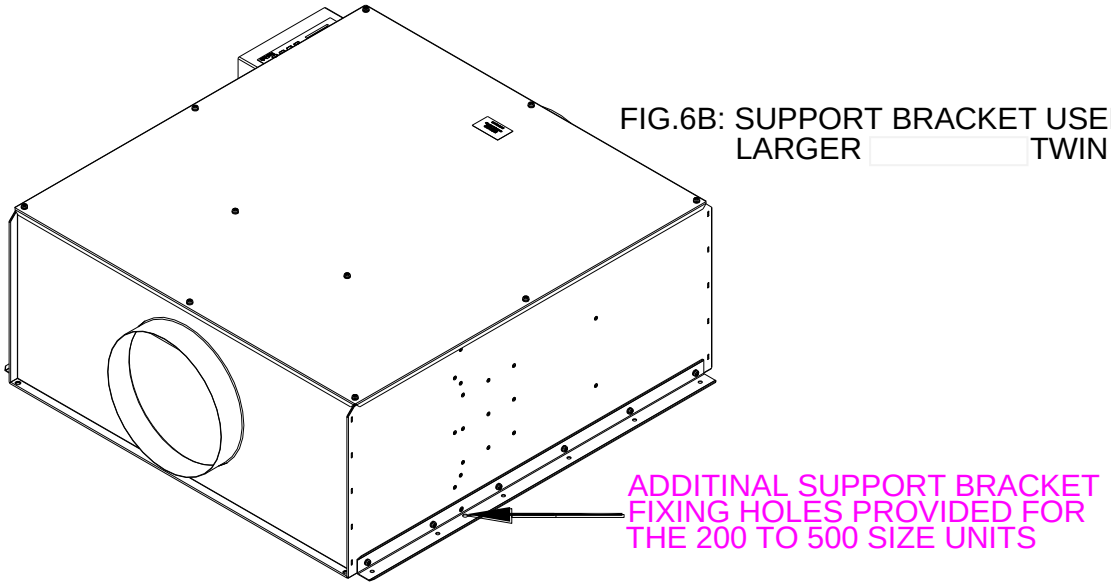
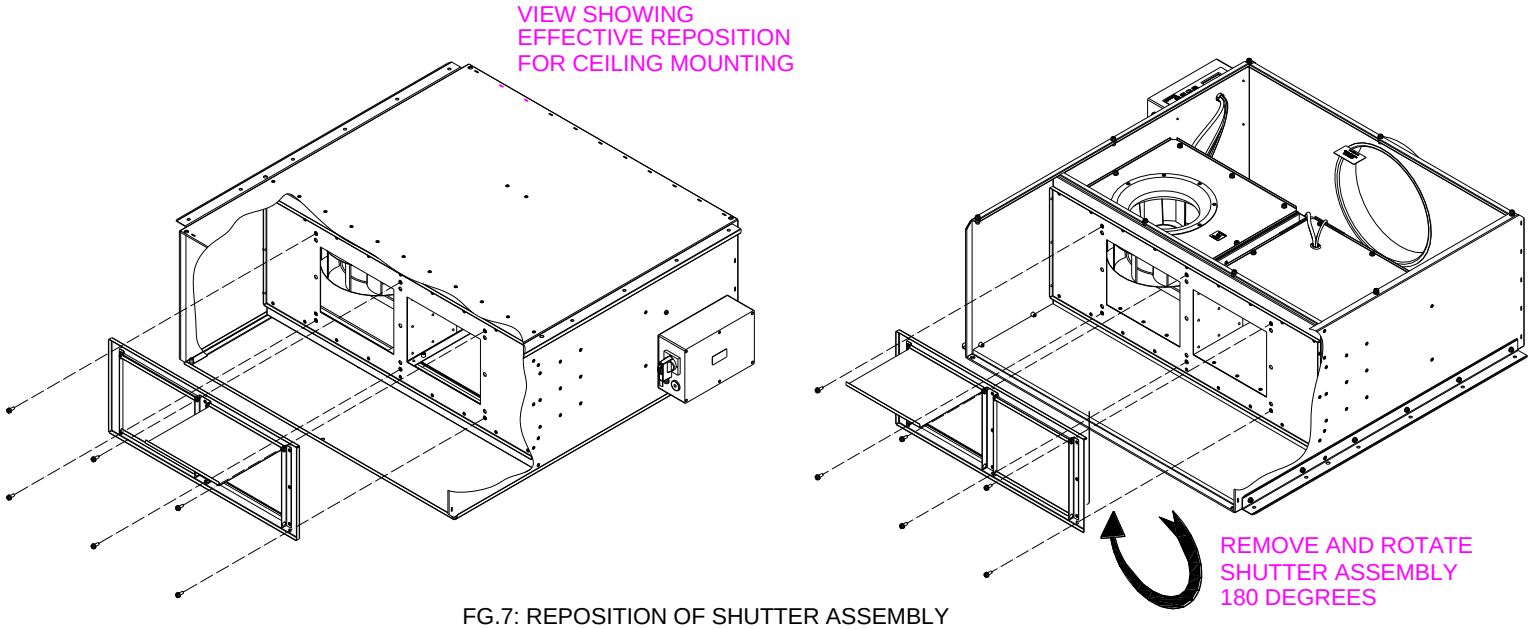


FIG.6B: SUPPORT BRACKET USED ON LARGER TWIN UNITS

- All Twin units have a a pair of exit airflow gravity shutters fitted which must be orientated correctly to match the floor or ceiling horizontal mounting chosen for the installation. As supplied from the factory, the gravity shutters are correctly fitted for floor mounting the unit. If the unit is to be ceiling mounted, the shutter assembly must be repositioned, Fig.7. To do this, remove the top cover to gain access to the outlet plenum area. Remove the 6 x M6 screws holding the shutter assembly in place, then detach the assembly and rotate through 180 degrees. Then refit the assembly using the 6 x M6 screws ensuring that the foam sealing strips remain fitted correctly.



FG.7: REPOSITION OF SHUTTER ASSEMBLY

(e) **Weatherproof Units:**

Hierarchy model is suitable for external roof mounting. They **MUST** only be installed horizontally on the roof or other external horizontal surface. When installed outdoors, these units **MUST NOT** be used in any other orientation. Alternative mounting arrangements and kits do not apply to units mounted outdoors, either singles or twins. The supplied controller cover **MUST** be fitted when mounting outdoors.

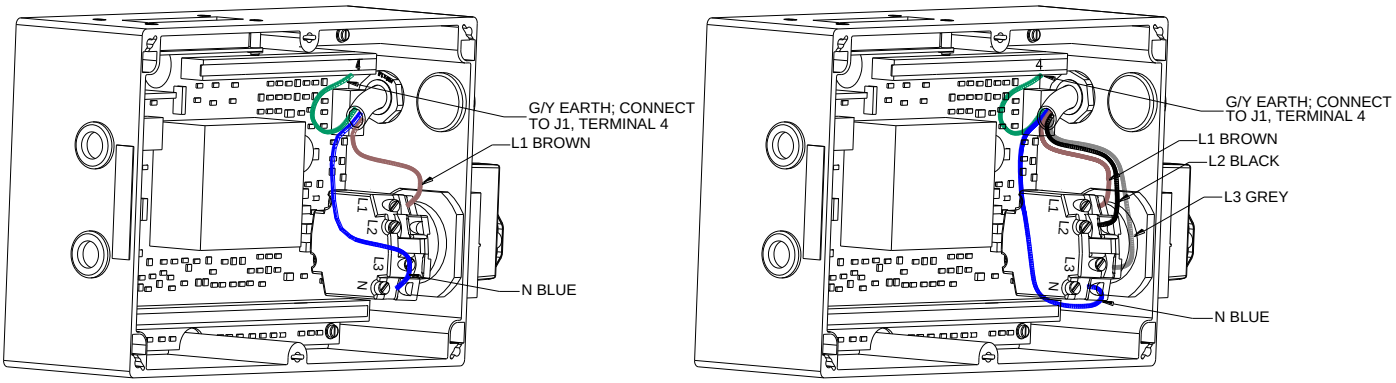
8) Controller Electrical Connections:

a) **Mains Supply:**

Fan sizes 100mm to 400mm are single phase. The 500mm unit is 3-phase. Connection to the control box should be via a suitably sized round cable through the M20 cable gland provided. The gland must be sealed properly to maintain the IP rating of the unit. The wiring to the unit should be via a double pole isolating switch (single phase) or a TP&N switch (3-phase) adjacent to the unit or alternatively the connection taken back to the distribution board.

Note: If an RCD unit is used in the 3-phase supply line to the 500 unit, the RCD must be a high frequency tolerant type, eg Hager CDH440 or 463

Remove the controller protective cover and then the controller front cover and connect the L/N/E or L1/L2/L3/N/E supply to the controller isolator terminals as identified on the isolator. The isolator will have been wired to the pcb by the factory. Connect Earth to J1 pin 4. In the case of units mounted outdoors, you MUST ensure that the controller protective cover is replaced.



a) SINGLE PHASE b) THREE PHASE

FIG 8: CONTROLLER MAINS SUPPLY CONNECTIONS

b) **Switch Connection (MIN-MAX Setting)**

These refer to connections 64 to 75 (J3) in Fig.1. In all cases except the timeswitch, the 24V dc switch supply voltage is derived from the pcb. The active 24V line is also used for the switch relay status. Connection diagrams are as follows:-

Fig.9 - PIR;
Fig.10 - Air Quality Sensor
Fig.11 - Ambient Response Humidistat;
Fig.12 - Ecotronic Humidistat
Fig.13 - Timeswitch (240V supply);
Fig.14 – Thermostat

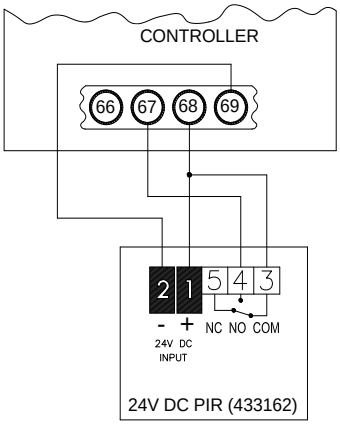


FIG 9: SYSTEM BOOST CONNECTION FOR PIR MIN TO MAX SETTING

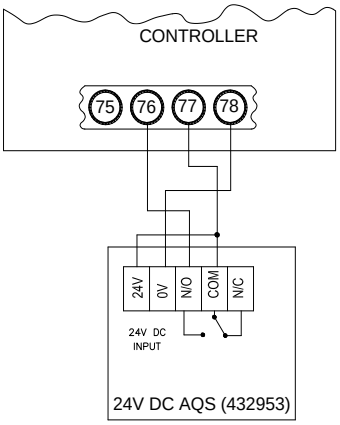


FIG 10: SYSTEM BOOST CONNECTION FOR AQS MIN TO MAX SETTING

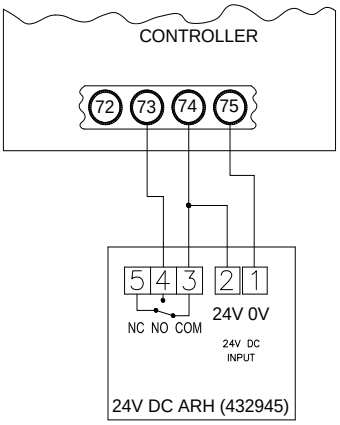


FIG 11: SYSTEM BOOST CONNECTION FOR AMBIENT RESPONSE HUMIDISTAT MIN TO MAX SETTING

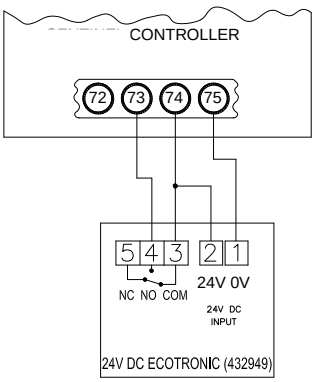


FIG 12: SYSTEM BOOST CONNECTION FOR HUMIDISTAT MIN TO MAX SETTING

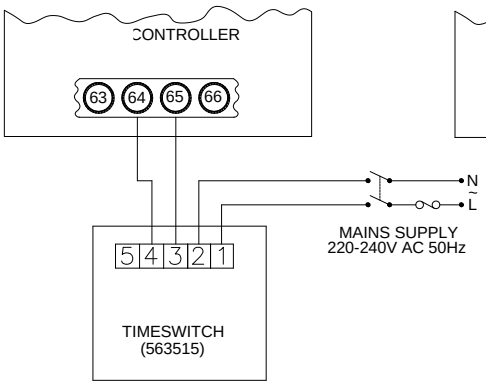


FIG 13: TIMESWITCH CONNECTION DIAGRAM

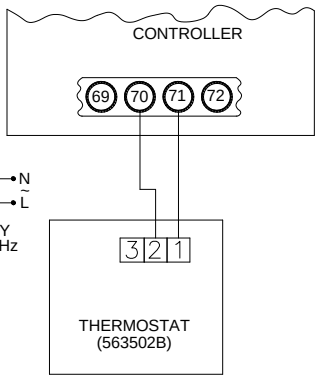


FIG 14: THERMOSTAT CONNECTION DIAGRAM

c) **Master Enable Connection (OFF to MIN setting)**

As received, the controller has a link installed between terminal connections 61 and 62 (J3) as standard. This means that the fan will run at the MIN setting all the time that power is applied to the unit. Alternatively ONE switch can enable this connection once the 61-62 link is removed. The connection diagrams are as follows for the various options:-

Fig.15 - Ecotronic Humidistat; Fig.16 - PIR
Fig.17 - Timeswitch; Fig 18. - Thermostat

If available, a BMS enable signal can also be used between connections 61 and 62

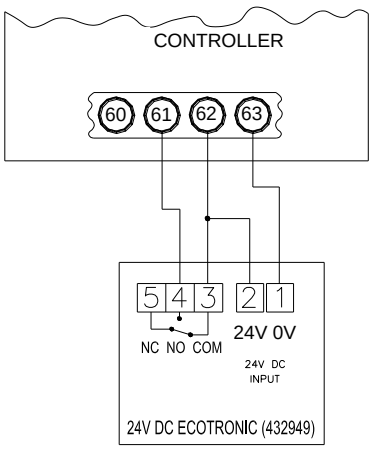


FIG 15: HUMIDISTAT MASTER ENABLE CONNECTION TO CONTROLLER (NOTE! ENSURE LINK 61-62 IS REMOVED)

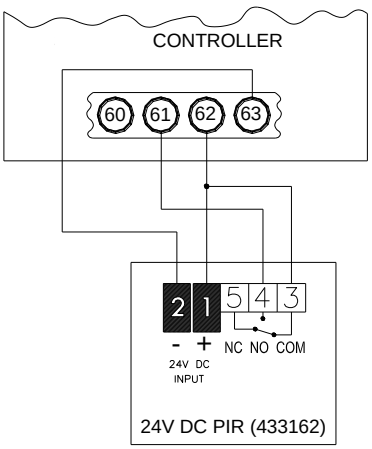


FIG 16: PIR MASTER ENABLE CONNECTION TO CONTROLLER (NOTE! ENSURE CONTROLLER LINK 61 to 62 IS REMOVED BEFORE CONNECTING PIR)

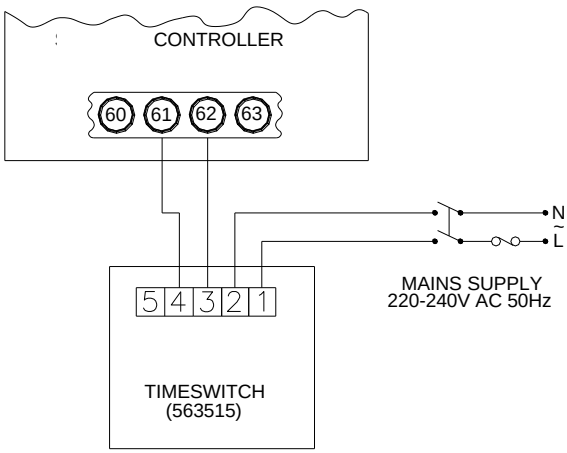


FIG 17: TIMESWITCH MASTER ENABLE CONNECTION TO CONTROLLER (NOTE! ENSURE LINK 61-62 IS REMOVED)

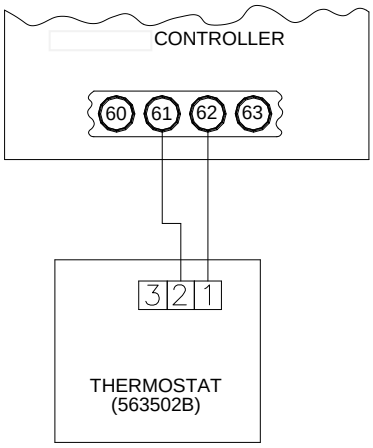


FIG 18: THERMOSTAT MASTER ENABLE CONNECTION TO CONTROLLER (NOTE! ENSURE LINK 61-62 IS REMOVED)

d) **Sensor Connections (Proportional Control)**

These are specifically carbon dioxide, temperature and humidity. If more than one sensor is present, the one with the highest output takes priority. If no external signals are present when this mode is enabled, the running speed of the fan will be the minimum speed set point. Connection diagrams are as follows:-

Fig.19 - CO2 Duct Sensor
Fig.20 - CO2/Temperature/Humidity Sensing

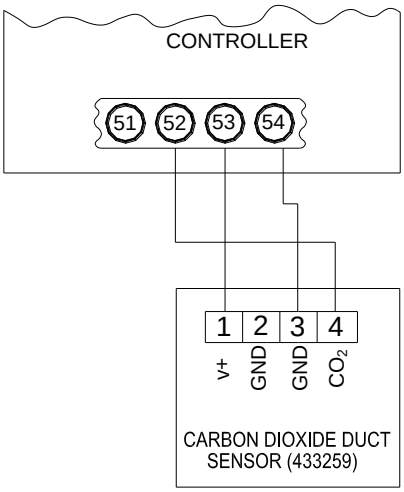


FIG 19: CARBON DIOXIDE DUCT SENSOR CONNECTION TO CONTROLLER

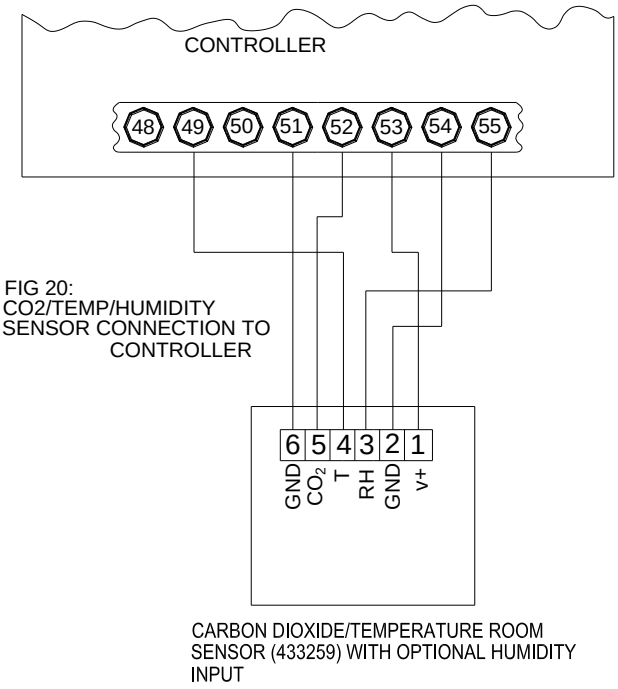


FIG 20: CO2/TEMP/HUMIDITY SENSOR CONNECTION TO CONTROLLER

e) **Remote/Local Proportional Control**

If there is a Building Management System monitoring Indoor Air Quality and Demand, this can be connected to pins 58-60 on J3 provided that the BMS input is analogue 0-10V dc. The connection pins are:-

59 = 24V supply
58 = 0-10V BMS input
60 = 0V

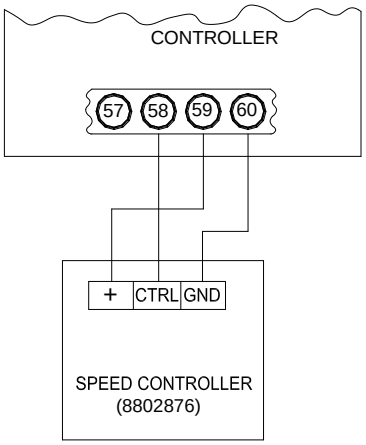


FIG 21: REMOTE SPEED CONTROL CONNECTION TO CONTROLLER

This nominally provides for air extraction but can also control a balanced intake – extract system if suitably configured with a slave unit.
A local speed control can alternatively be used if a manual fan control is required, Fig.21.

f) **Remote Display Indicator**

The remote display unit can either be wired directly into the Controller, Fig.22 or wired in conjunction with the Power Supply, Fig.23 if there are insufficient power connections or outlets available on the controller pcb. For normal running conditions the green light will show and in the case of a fan failure condition, the red light will show.

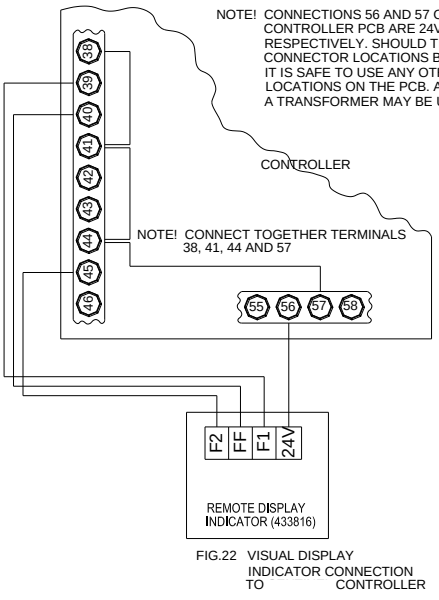


FIG.22 VISUAL DISPLAY INDICATOR CONNECTION TO CONTROLLER

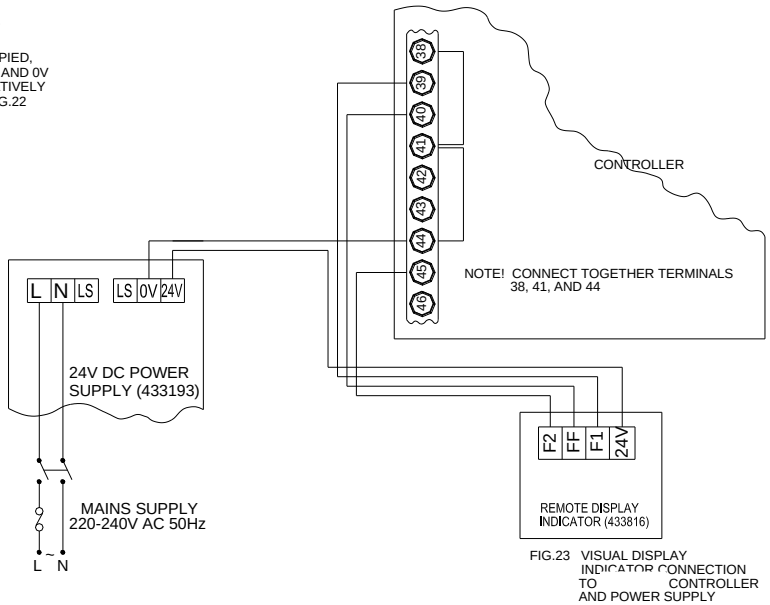


FIG.23 VISUAL DISPLAY INDICATOR CONNECTION TO CONTROLLER AND POWER SUPPLY

g) **Network**

The connections are as follows, using twisted pair cables:-

Master pin 79 connect to Slave pin 79	Cable 1
Master pin 78 connect to Slave pin 78	
Master pin 80 connect to Slave pin 80	Cable 2
Master pin 81 connect to Slave pin 81	

The Master can either be extract or intake. Up to 3 Slave units are possible with a single master, either Single units or Twin units, Fig. 24. The maximum allowable length of the twisted pair cable is 10m. Contact Technical Support if longer cable lengths are required for an installation.

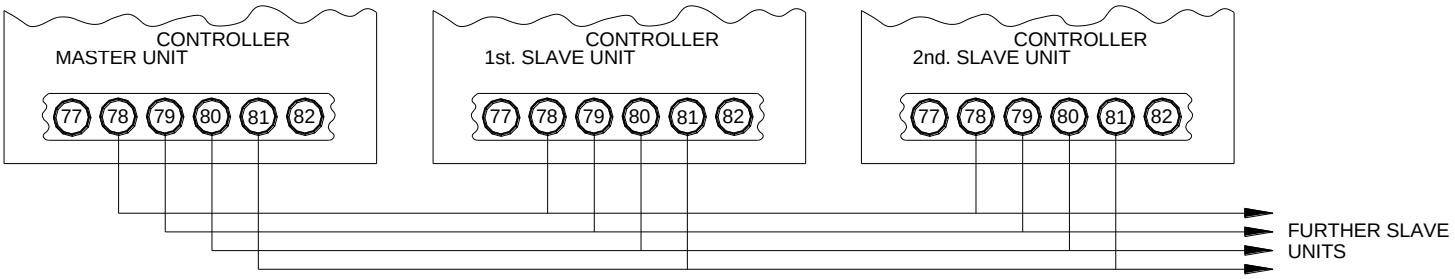


FIG 24: MASTER-SLAVE NETWORK CONNECTIONS

h) **Shut-Off Duct Damper**

For connection of an in-line damper directly to the controller, see Fig.25. If a mains supply for the transformer is not readily available , it is possible to connect the L transformer input to Controller connector 14 and the N input to connector 18. However, this can only be used for a one-off damper.
In order that the damper operates as indicated, the arrow on the top right hand corner of the actuator body must be positioned as shown in Fig. 25

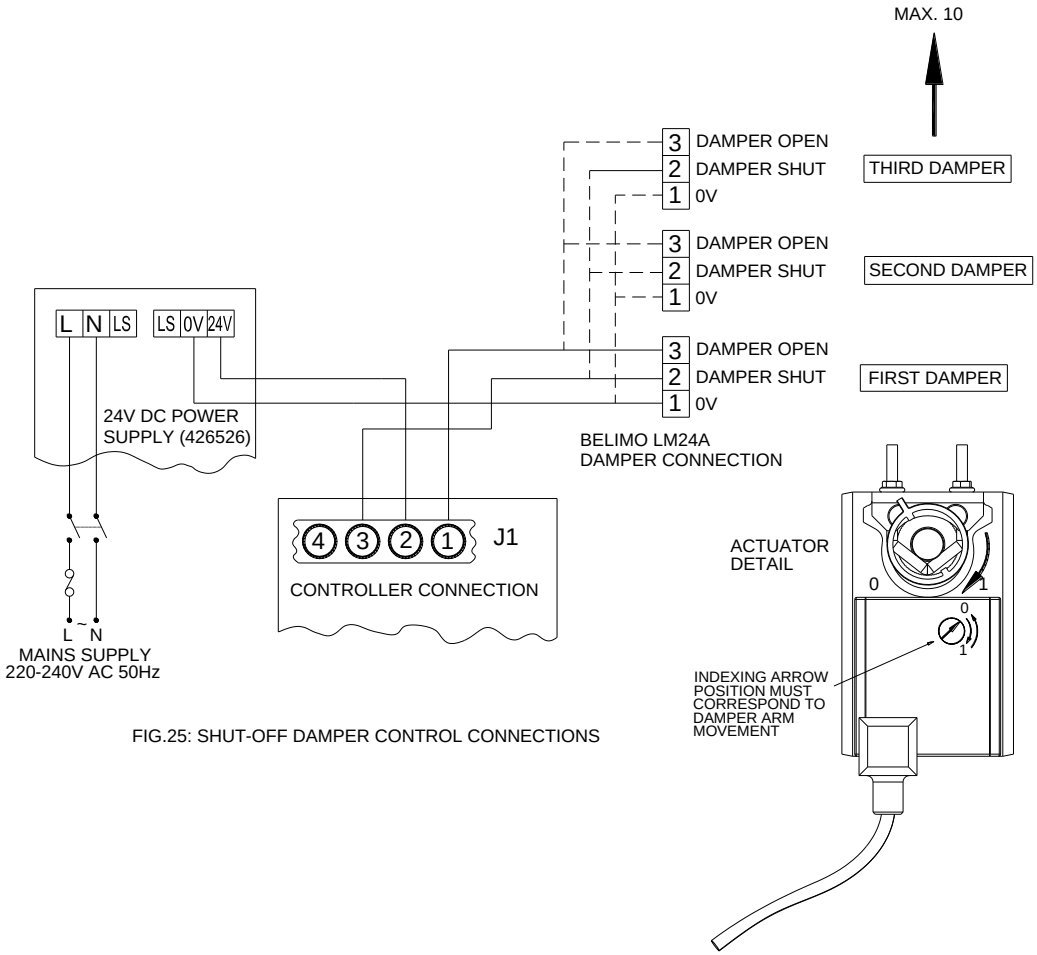


FIG.25: SHUT-OFF DAMPER CONTROL CONNECTIONS

i) **Heater Interlock**

Connecting the TIME/CLK connections on the Airtrack Duct Heater thyristor control pcb as in Fig.26., drives the heater “active” as long as the fan in the unit is running.
Note that whilst the heater can be connected to any unit, Master or Slave, the heater run-on timeout can only be set on the Master.

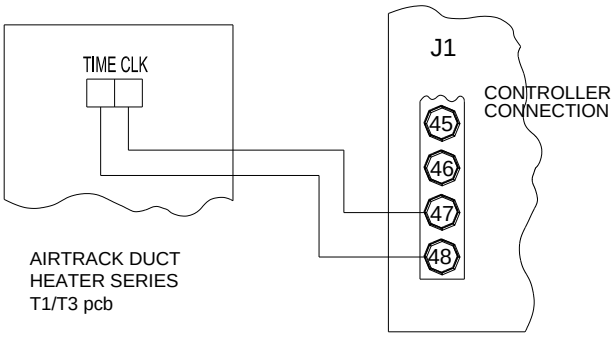


FIG 26: HEATER INTERLOCK CONNECTION

9) **Other Electrical Connections**:

a) **Damper Control (MIN-MAX)**

In Constant Pressure operating mode, it is possible to operate in-line dampers with switches, eg PIR, Humidistat, AQS etc., Fig 3B or alternatively with sensors, Fig.3C. With switches, the damper operates from shut/MIN/trickle to open/MAX/boost positions using DVDxxxMM dampers, Fig.27a, b, c & d.

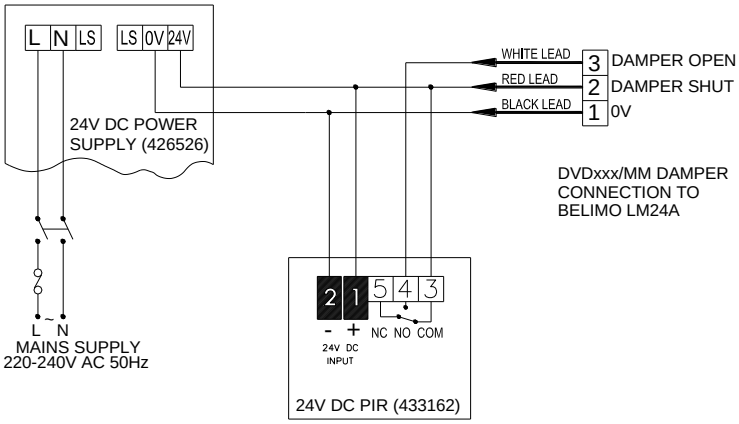


FIG 27A: DUCT DAMPER CONNECTION CIRCUIT TO PIR

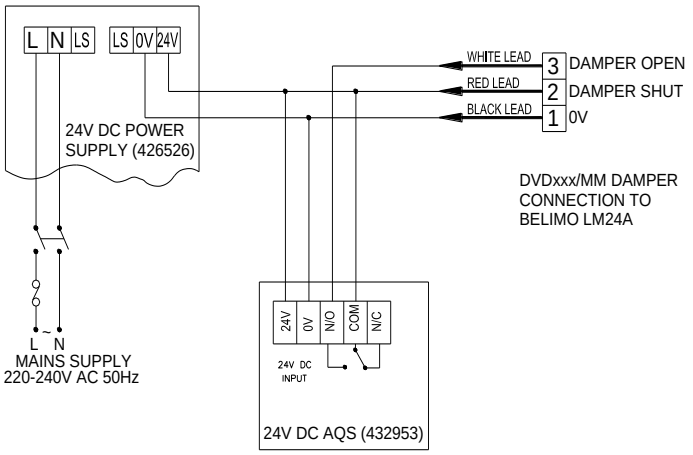


FIG 27B: DUCT DAMPER CONNECTION CIRCUIT TO AQS

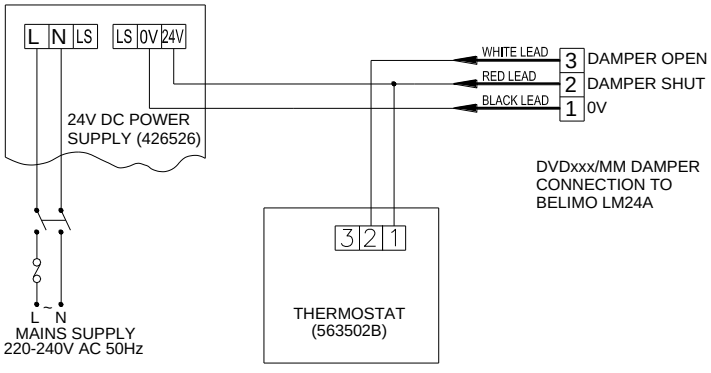


FIG 27D: DUCT DAMPER CONNECTION CIRCUIT TO THERMOSTAT

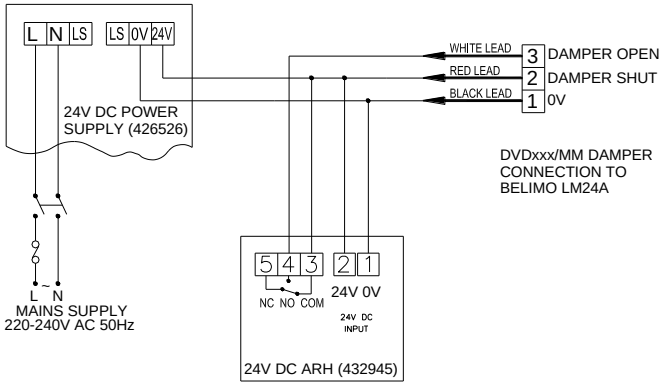


FIG 27C: DUCT DAMPER CONNECTION CIRCUIT TO AMBIENT RESPONSE HUMIDISTAT

b) **PIR Grille**

The connection diagram for the PIR Grille is shown in Fig.29. It should be noted however that when the power is initially connected, the grille flap may open and stay open for up to 20 minutes until the PIR electronics stabilize. Once the PIR grille is activated in normal use, the grille will then stay open for 20 minutes regardless of whatever person traffic is observed in the meantime. The electrical connections for the Grille Kit are shown in Fig.29.

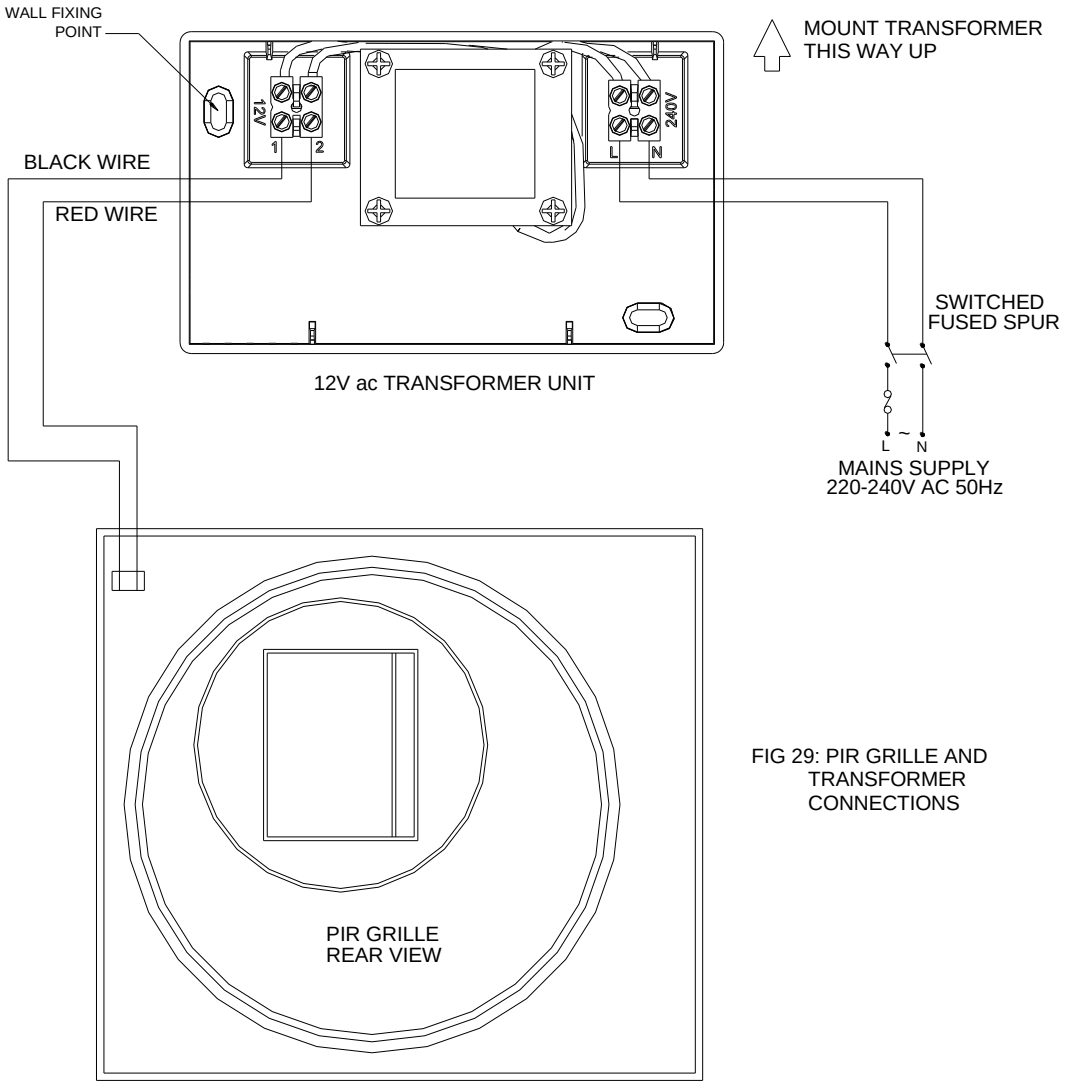


FIG 29: PIR GRILLE AND TRANSFORMER CONNECTIONS

10) **Commissioning:**

From the factory, the stored operating modes will be MIN-MAX. Following switch-on, the unit will display the "Commissioning ?" message to which the user has 10 secs. to reply "Y" in order to alter the factory defaults. If the user does not respond, the current stored parameters will remain and the unit will run in the current stored mode. If the used responds "Y", the unit will perform self-diagnostics such that if a signal over a default threshold (P-Band) is detected the unit will go into Proportional control mode and similarly if a signal is detected at the Remote/Local input, the unit will go into that control mode. Otherwise the unit will stay in MIN-MAX mode.

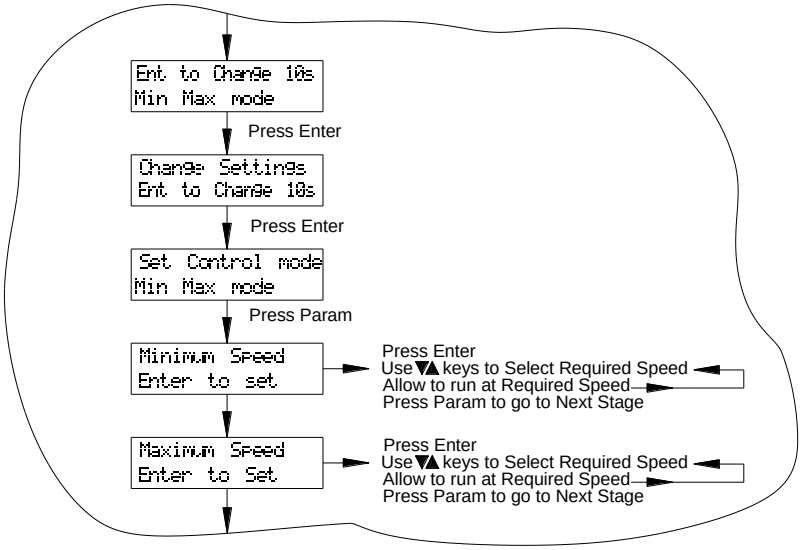
Note that:-

- If the mode displayed to the user is not the required mode, it can be changed by turning off the unit, then re-entering the commissioning procedure.
- If the Network-Slave mode is required, this must be manually set, see Page 24.
- If no feedback is received from the fan motor, the unit will go into a fault condition.
- All commissioning settings are retained during a shut down or power failure.
- For models installed outdoors, once commissioning is complete, replace the controller display protective cover. Loosen centre fixing screw, fit cover and re-tighten.

If the user responds "Y" to the "Commissioning ?" prompt, the procedures for the different commissioning modes are as the following flow diagrams.

a) **Balancing the System**

If, during the system set-up and balancing, the fan is required to run for long periods of time at either minimum speed or maximum speed, irrespective of what sensors or switches are active, it is possible to do this by interrupting the commissioning process. In all of the following commissioning diagrams, a stage is reach approx half way through where the installer is asked to "Set the Control Mode" followed by "Minimum Speed, Enter to set" and "Maximum Speed, Enter to Set". In both the Minimum Speed Stage and the Maximum Speed stage, once the required speeds are entered, the fan will run at that required speed continuously until Param is pressed. If system work is required at either of these speed settings, do not enter Param to confirm that setting until the required installation work is complete. See below.



b) **MIN-MAX**

The commissioning flowchart is shown diagrammatically in Fig.30. The typical display at the end of the set-up gives the following information:-

MM trickle 020%

Where MM = Min-Max mode

trickle = minimum speed, no switch input is active

MM speed = 100% eg., = maximum speed switched input is active

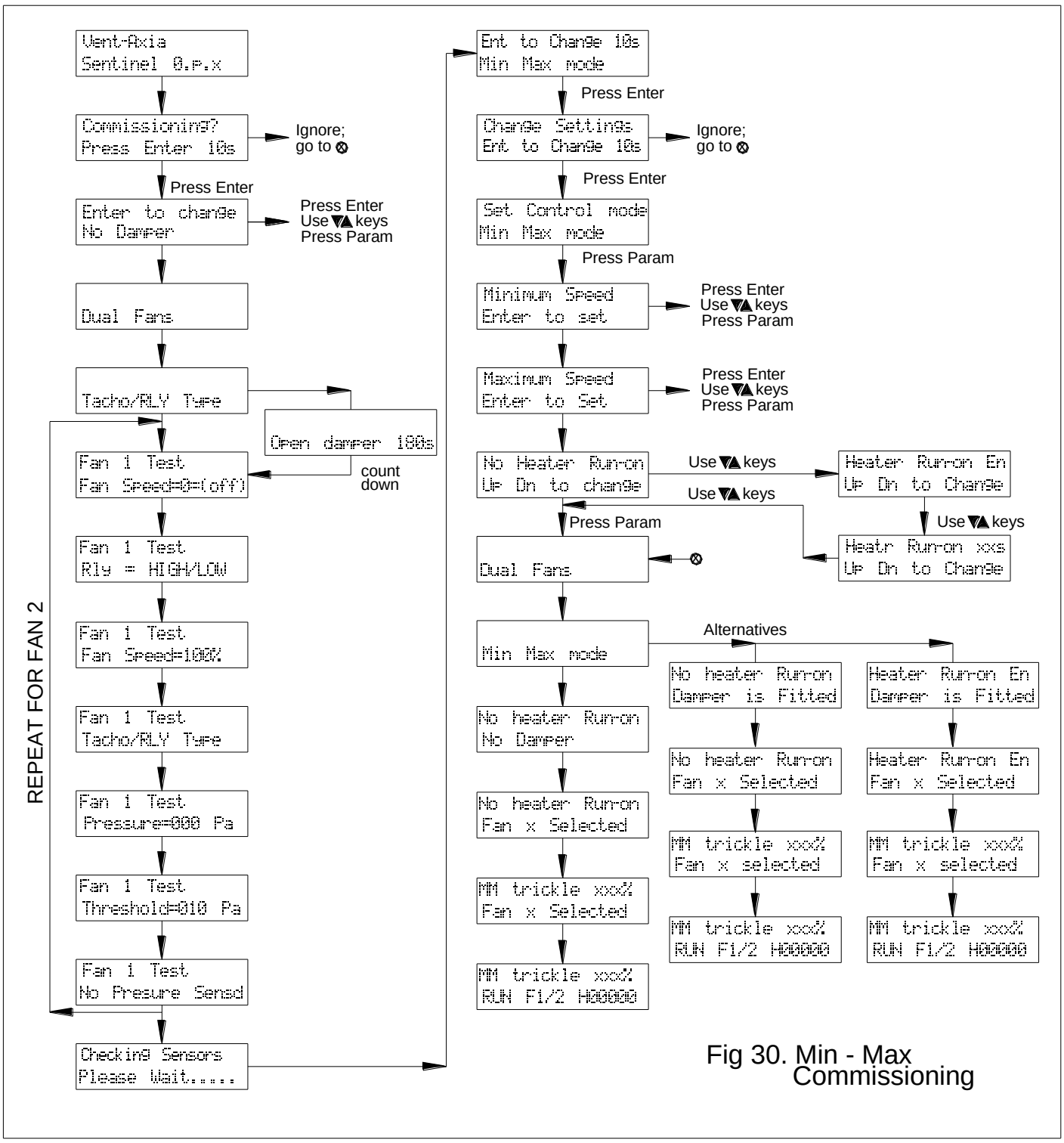


Fig 30. Min - Max Commissioning

c) **Proportional Control**

The proportional control commissioning flowchart is shown diagrammatically in Fig.31. The typical display at the end of the setting-up process gives the following information:-

C0700H065T023 050

Where C0700 = CO2 concentration being measured in ppm

H065 = % relative humidity level being measured

T023 = temperature being measured in deg.C

050 = running speed of fan is 50% of full load speed, depending on the 0-10V sensor output levels

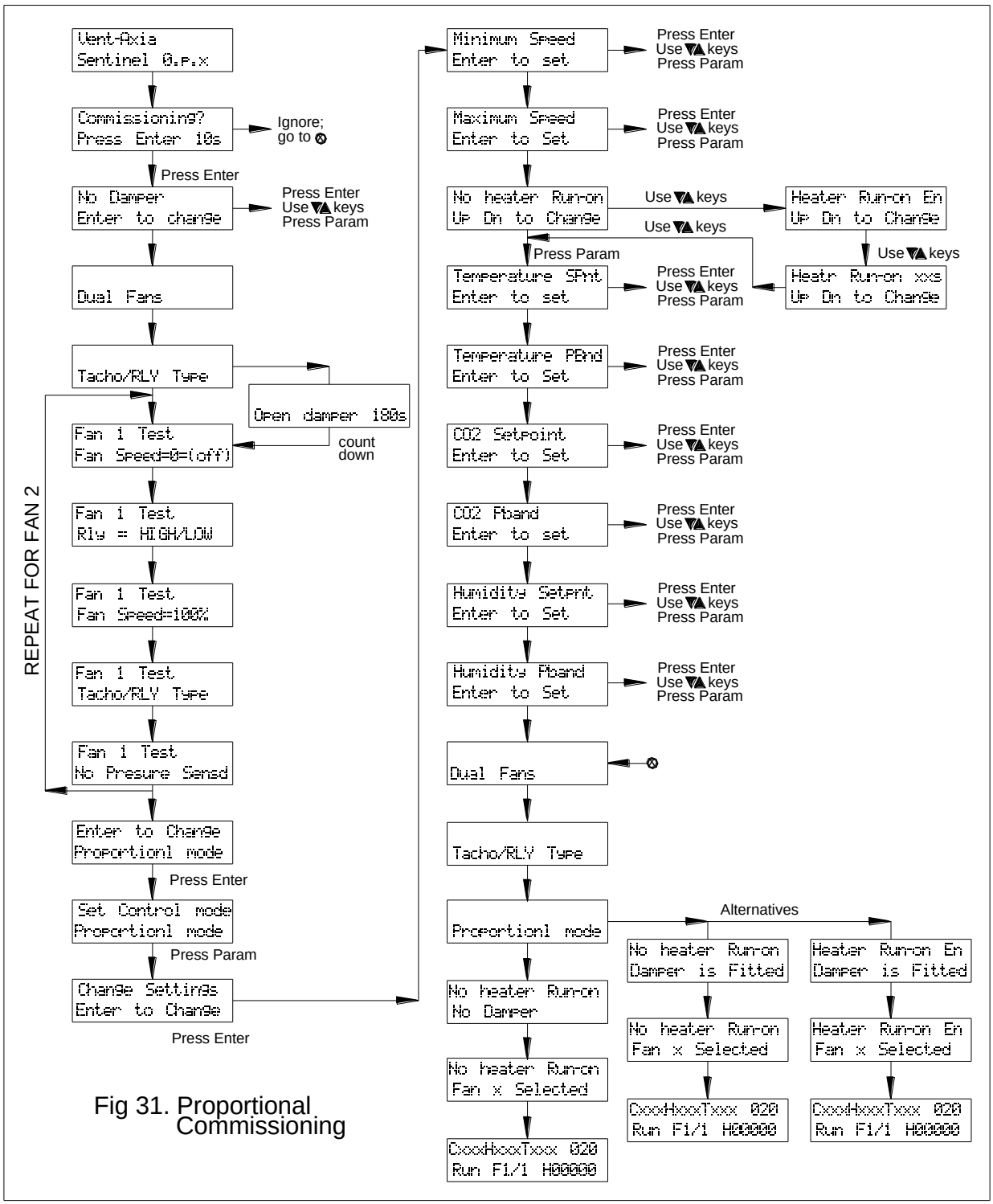


Fig 31. Proportional Commissioning

d) **Remote/Local Proportional Control**

The remote/local commissioning flowchart is shown diagrammatically in Fig.32.

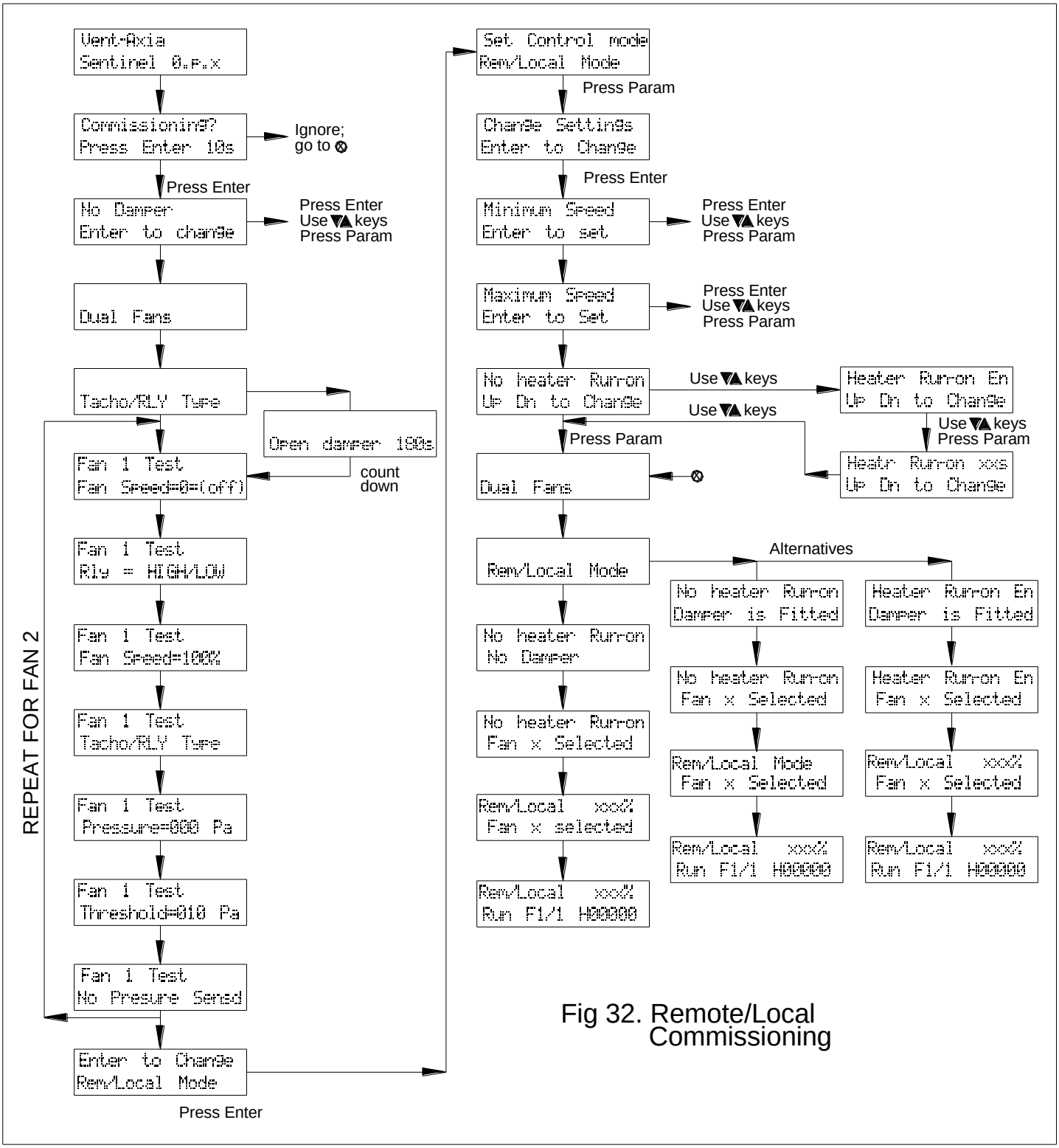


Fig 32. Remote/Local Commissioning

e) **Network Slave Mode**

To commission a Slave unit, firstly commission the Master unit and then install the network cables. With the Master unit running, then commission the Slave unit as shown diagrammatically in Fig.33. The typical display at the end of the set-up procedure gives the following information:-

Slave Mx1.2 020%
Where Slave = slave mode
Mx1.2 = fan speed received on network multiplied by the slave gain factor
020% = slave fan speed eg.

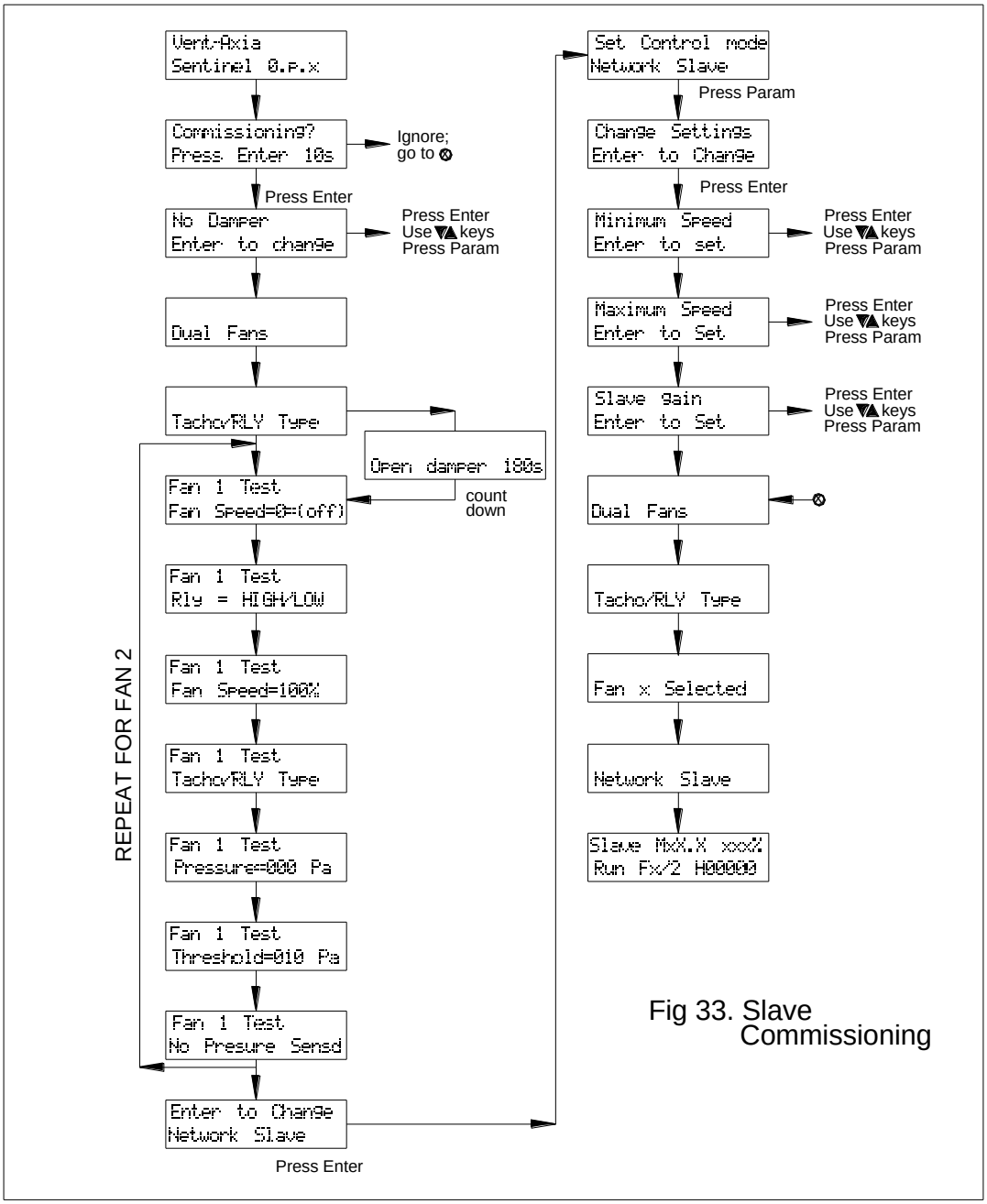


Fig 33. Slave Commissioning

11) **Controller Display Line Status Messages**

ERROR MESSAGE	DESCRIPTION
Check Tach1 hi x	Fan 1 Fail Timeout in x seconds
Check Tach1 lo x	Fan 1 Fail Timeout in x seconds
Check Tach2 hi x	Fan 2 Fail Timeout in x seconds
Check Tach2 lo x	Fan 2 Fail Timeout in x seconds
Commissioning?	User can select Field Commissioning
Disabled-Master	Pins 61-62 link is open. Fan will not run.
Disabled-Network	Slave unit, Pins 61-62 link is open on Master. Fan will not run.
EEPROM checksum error	Internal hardware error
FAN 1 FAILED	Failure of fan 1, pcb or connecting wiring
Fan 1 test	Fan 1 being tested, during commissioning
FAN 2 FAILED	Failure of fan, pcb or connecting wiring
Fan 2 not fitted	Second fan not sensed during commissioning
Fan 2 test	Fan 2 being tested during commissioning
FAULT - No Master	No message received from Master, slave mode
No pressure sensor	No pressure detected during commissioning
Pressure sensor ok	Measured Pressure over threshold during commissioning
Pressure x Pa	Measured Pressure x Pascals during commissioning
Relay type fan	Displayed during commissioning
Tach rly pulses	Fan Tachometer/Alarm line pulsing when checked during commissioning
Tacho type fan	Displayed during commissioning.
Threshold x Pa	Pressure sensor detect threshold x Pascals during commissioning
F1/1	Single unit, fan 1 is in use (RUN)
F1/2	Twin unit, fan 1 is in use (RUN)
Hxxxx	Total run time for fan
Open Damper 180s	Damper being opened; 180s timed delay on fan start
Close Damper	Damper being closed; 180s timed delay, fan not running

12) **Spares**

TWINS FAN SPARES LIST			
Item Reference	**Component**	**Applicable Models**	**Part Number**
1	Motor	100/125/150	434597
1	"	200	434598
1	"	250	434599
1	"	315	434600
1	"	400	434601
1	"	500	434602
3	Pressure Sensor	All CP	434135
2	Pivot Mounting Bracket	100/125/150	434793
2	"	200/250	434829
4	Controller	All	434101
5	Controller Fuse	All	434794
6	Controller isolator knob	All	434795
7	Controller lid screw	All	434796
8	Controller Blind Grommet (Large)	All	434797
9	Controller Blind Grommet (Small)	All	434800
10	M20 Cable Gland	All	434798
11	M16 Cable Gland	All	434799
12	Controller Lid Gasket	All	434801
13	Controller Cover	All Weatherproof	475873
14	Shutter Flap Assembly	100/125/150	434067
14	"	200	434079
14		250	434080
14	"	315/400	434082
14	"	500	434083

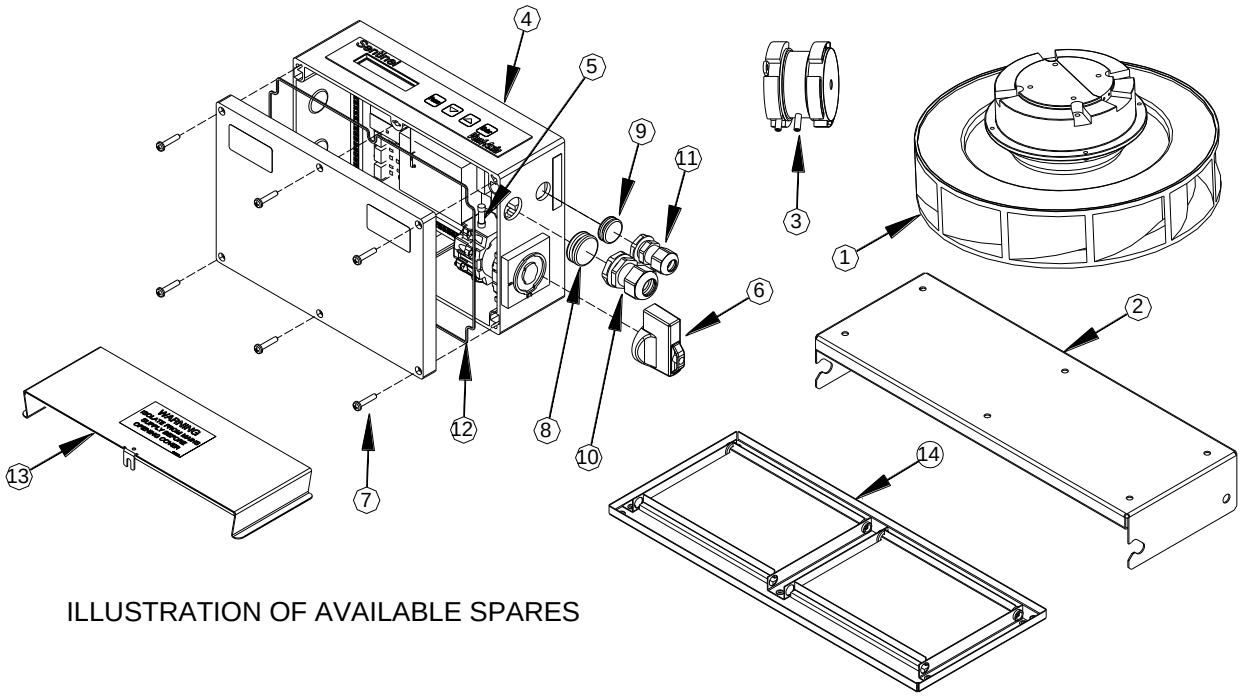


ILLUSTRATION OF AVAILABLE SPARES

The Breathing Buildings Guarantee

Applicable only to products installed and used in the United Kingdom. For details of guarantee outside the United Kingdom contact your local supplier.

Breathing Buildings guarantees its products for the period of 18 months after the Date of Delivery or 12 months from the date of issue of the Final Inspection Certificate, whichever is the first to expire. In the event of any part being found to be defective, the product will be repaired, or at the Company's option replaced, without charge, provided that the product:-

- Has been installed and used in accordance with the instructions given with each unit.
- Has not been connected to an unsuitable electricity supply. (The correct electricity supply voltage is shown on the product rating label attached to the unit).
- Has not been subjected to misuse, neglect or damage.
- Has not been modified or repaired by any person not authorised by the company.

IF CLAIMING UNDER TERMS OF GUARANTEE

Please return the complete product, carriage paid to your original supplier or nearest Breathing Buildings Centre, by post or personal visit. Please ensure that it is adequately packed and accompanied by a letter clearly marked "Guarantee Claim" stating the nature of the fault and providing evidence of date and source of purchase.

The guarantee is offered to you as an extra benefit, and does not affect your legal rights

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