Fault Finding

HRV 1, 1.25, 1.5, 1.75, 2, 2.75, 2.85, 3, 10 & 10M Units

‘A’ Models

This document covers part numbers
TP400A, TP401A, TP402A, TP403A, TP404A, TP405A, TP406A, TP407A, TP440A & TP441A

Product Identification

Product Code

Serial Number

All maintenance/fault finding/repairs must be completed by a competent person.

Safe isolation procedures must be followed when working on these units.

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Product Features

Model	HRV1 Q+	HRV1.25 Q+	HRV1.5 Q+	HRV1.75 Q+	HRV2 Q+	HRV2.75 Q+	HRV2.85 Q+	HRV3 Q+	HRV10 Q+	HRV10M Q+
Part number	TP400A	TP406A	TP403A	TP404A	TP401A	TP405A	TP407A	TP402A	TP440A	TP441A
Continuous Speed	●	●	●	●	●	●	●	●	●	●
Setback Speed	●	●	●	●	●	●	●	●	●	●
Boost Speed-With Overrun Timer	●	●	●	●	●	●	●	●	●	●
Summer Mode	●	●	●	●	●	●	●	●	●	●
Ø100 & Ø125mm Ducting	●	●								
Ø125& Ø150mm Ducting			●	●	●	●	●	●	●	●
Constant Volume Fans					●			●		
Independent Adjustment Of Fans	●	●	●	●	●	●	●	●	●	●
Step Less Fan Speed Setting	●	●	●	●	●	●	●	●	●	●
Automatic Frost Protection	●	●	●	●	●	●	●	●	●	●

Continuous Speed

Continuous Speed is the normal continuous extract and supply air flow running speed of the units.

Setback Speed

Setback Speed is used to reduce ventilation rates. Setback Speed is automatically set at the mid point between minimum possible continuous speed and the selected continuous speed. The Setback Speed can be enabled by connection of a volt free one-way switch, or combined with the Boost Speed with the 3 position switch TP 508.

Boost Speed with Overrun Timer

Boost Speed increases the extract and supply air flow. Boost Speed is configured with Step-less independent fan controls and includes an Overrun Timer variable between 0 and 60 minutes. The Boost Speed can be triggered by any device which provides a volt free one-way switch, such as a PIR, thermostat, humidistat or a standard one-way switch.

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Summer Mode

In properties where it is desirable to reduce the supply of warm fresh air during hot weather, but where full Summer Bypass may be inappropriate or not available, the optional Summer Mode operation is available. Summer Mode operates by stopping the supply fan. Summer Mode can be triggered either manually or automatically:
Manual - This is by means of a volt-free switch wired directly into the controller PCB
Automatic - This is by means of a dedicated wall mounted room thermostat. In this configuration Summer Mode will only operate when the temperature within the room has exceeded the dedicated thermostat setting. When Summer Mode is selected the supply fan will remain off even if the HRV is placed into Boost.
Summer Mode must not be installed in dwellings where open flue combustion appliances are used. Summer Mode must not be installed on HRV *Q Plus* ABD or HRV *Q Plus* ABS units.

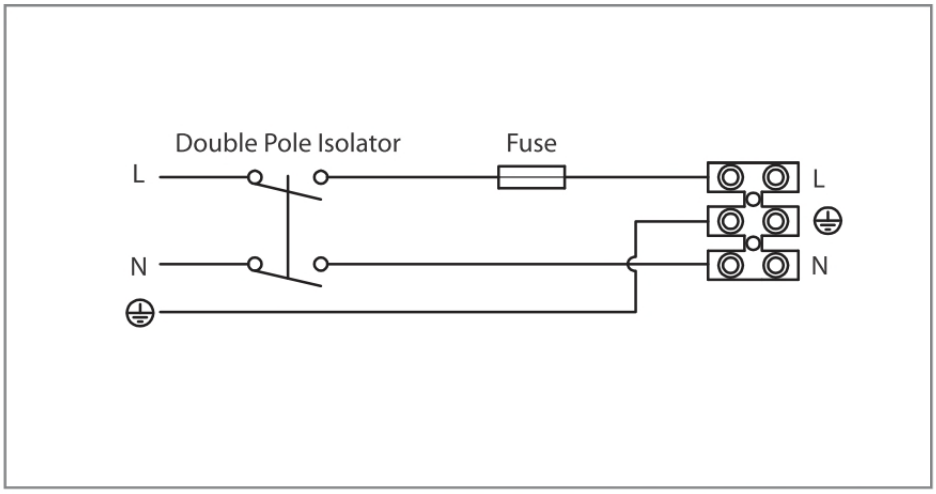
Constant Volume Fans

These automatically adjust their speed depending upon the system resistance, thus ensuring that the required airflow is always maintained.

Automatic Frost Protection

During very cold weather, Automatic Frost Protection will detect temperatures that could form ice inside the unit. It will reduce the supply ventilation rate to prevent ice build up within the heat cell. Automatic Frost Protection reduces the flow rate of cold air, thus allowing the warmer stale air to raise the temperature within the heat cell to such a level that prevents the formation of ice. As internal temperatures rise Automatic Frost Protection will increase the supply ventilation flow rate back to the commissioned settings.

Wiring Diagrams



Supply wiring diagram 230V~50Hz ref EE 141

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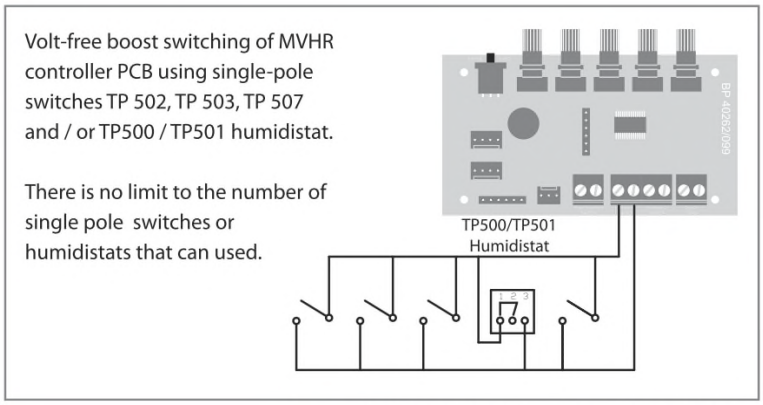
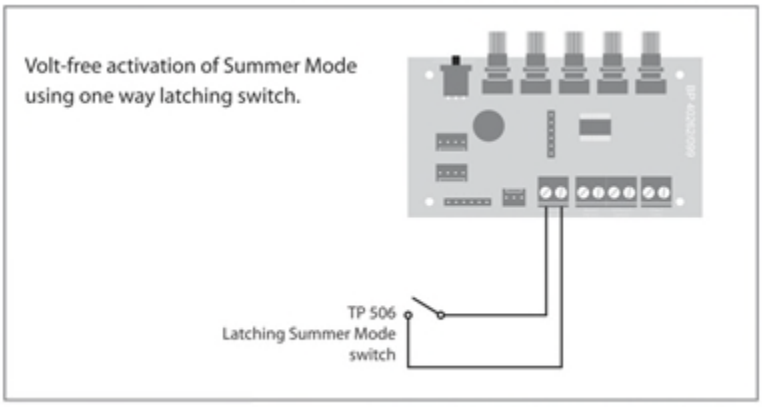
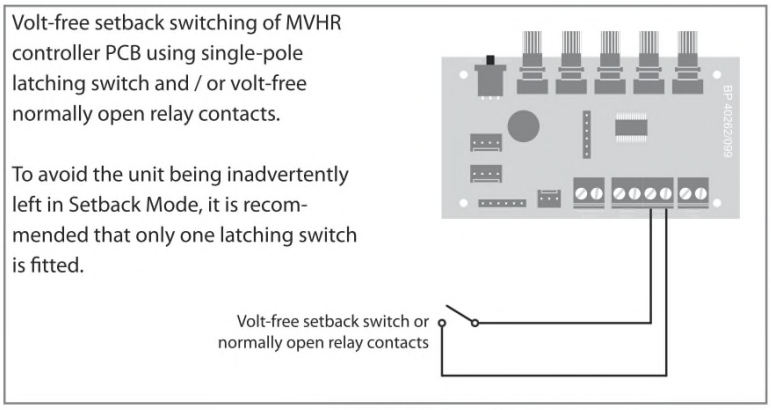


Boost switching and Humidistat connection ref EE 142



Summer Mode switch connection ref EE 144



Setback Mode switching and connection ref EE 143

<u>Check the Control PCB has the correct version of software</u>

The PCB should be marked 'FW0001-…..', see fig 5.

Unit Not Running

- Check the continuity across the fuse & that mains power is present at the two pole spur. (Fig 2 & wiring diagrams)
- Check mains power is present at the three way terminal block (Fig 3). N.B. some units are fitted with a suppression filter before the terminal block (Fig 4), power needs to be check on the input and output sides of the filter.

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- Isolate the power at spur, remove the front cover or ducting from stale air to atmosphere and fresh air to habitable rooms spigots. Check if fans will run freely. Check for obstructions.
- KEEPING Hands away from the unit switch on power, wait approx. 40 sec and look to see if fans are spinning, 'kicking' or are stationary
- If 'kicking' or are stationary there is a likely to be a PCB or fan fault.
- Disconnect fan 1 Molex (Supply fan) connector from the PCB (Fig 5), does fan 2 run? If yes then fan 1 is faulty. If no reconnect.
- Disconnect fan 2 Molex (Extract Fan) connector from the PCB (Fig 5), does fan 1 run? If yes then fan 2 is faulty. If no reconnect.
- If disconnecting fans has not resolved the issue, then either the PCB and/or both fans are faulty.
- Check the fans run (see fig 1), turning the potentiometer adjusts speed from max to min or vice versa.
- Check the resistance across the boost terminals on the PCB (this checks if the boost circuit has been damaged and caused a knock on affect to damage the PCB operation), see fig 6

Unit Trips RCD Or MCB

- Disconnect both fans from the mains supply terminal Fig 3. Try powering up the unit, if the power does not trip there is a fault with one fan or both fans. If it trips then there is an issue with the supply cable or external wiring.
- Connect in turn both fans back into the mains supply terminal Fig 3, Try powering up with each fan, to determine which fan(s) is causing the fault.

N.B. The most common reason for tripping the unit is water/moisture in the fan(s). There are generally two causes:-

- The ducting has not been insulated, as required by DVCG
- The condensation drain has no trap and/or is not air sealed, as required in the manual.

Supply Fan (fan1) Not Running

- Check Molex connector for Fan 1 is firmly pushed onto PCB (fig 5)
- Is the unit in summer mode? Are wires fitted to Summer Mode terminals see fig 5.
- Is the unit in frost protection mode? Disconnect the thermistor, if the fan then responds the unit is in frost protection mode. Check the resistance across the thermistor, if higher than 29.75KΩ, then the unit should be in frost protection mode.
- Isolate the power at spur, remove front cover or ducting from fresh air to habitable rooms spigots. Check fan will run freely. Check for obstructions.
- KEEPING Hands away from the unit switch on power, wait approx. 40 sec and look to see if fan is spinning, 'kicking' or is stationary.
- Disconnect the Molex connectors for both fans, put Molex connector from fan 1 onto the PCB connector for fan 2. If the fan runs then the PCB is faulty if the fan does not run the motor is faulty, see Fig 5.
- Check the fan runs (see fig 1), turning the potentiometer adjusts speed from max to min or vice versa.
- Check the resistance across the boost terminals on the PCB (this checks if the boost circuit has been damaged and caused a knock on affect to damage the PCB operation), see fig 6

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Extract Fan (fan 2) Not Running

- Check Molex connector for Fan 2 is firmly pushed onto PCB (fig 5)
- If still not running isolate power at spur, remove front cover or ducting from stale air to atmosphere spigot. Check the fan will run freely. Check for obstructions.
- KEEPING Hands away from the unit switch on power, wait approx. 40 sec and look to see if fan is spinning, 'kicking' or are stationary.
- If still not running disconnect the Molex connectors for both fans, put Molex connector from fan 1 onto the PCB connector for fan 2. If the fan runs then the PCB is faulty if the fan does not run the motor is faulty.
- Check the fan runs (see fig 1), turning the potentiometer adjusts speed from max to min or vice versa.
- Check the resistance across the boost terminals on the PCB (this checks if the boost circuit has been damaged and caused a knock on affect to damage the PCB operation), see fig 6

N.B. The most common reasons for the extract fan failing are, that the duct to atmosphere is not fully insulated or the condensation drain is has no trap and/or is not air sealed.

Unit Will Not Boost

- Is a boost setting required – is continuous requirement higher or the same as the boost requirement?
- Is it actually boosting but the boost speed is just higher or the same as continuous, therefore no audible difference.
    - Check the flow rates at continuous and boost to see if there is a difference.
    - Change units speed to determine if difference is then audible.

Unit speeds can be determined by looking at the top of the relevant potentiometer and seeing where the arrows point. If the arrows on the continuous and boost pots are in the same or similar positions the flow rates and noise will be similar.
Turning Anticlockwise – decrease speed
Turning Clockwise – increase speed

- Is the unit already running at full speed?
- Is a boost switch fitted?
- Are the boost cables connected to correct terminals (fig 5 & wiring diagrams)?
- Is the boost switch providing a connection across the boost terminals?
    - Disconnect the boost wires and check for continuity, with a continuity tester or multimeter.
    - The boost function can be tested by bridging the terminals, using a link wire, see Fig 7

- If using momentary switches is the overrun timer set to zero?
- Is the unit in commissioning mode? Programming switch should be in the central position see fig 5 & 10
- Has 230v been incorrectly applied to the PCB (all switching is volt free). The PCB may show signs of damage but not always. If a voltage has been applied, this can be proved by measuring the resistance across the boost terminals (with boost cables removed), if open circuit then a voltage has been applied. If a voltage has been applied the PCB will require replacing. It may also result in one or both of the fans requiring replacing, depending whether damage has been limited to the PCB or not (Fig 6)

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Unit Will Not Drop Out Of Boost

- Is the unit in boost commissioning mode? Programming switch should be in the central position see fig 5 & 10.
- Are all boost switches in the OFF position?
- Is overrun timer set high? After resetting, switch the unit off for 20 seconds and switch back on.
- Is there a boost switch wiring or switch fault – check continuity at boost terminals.
- Has 230v been applied to boost terminals – control circuitry has been damaged, check as Fig 6
- If an external humidity sensors is fitted, is the humidity within property sufficiently high to trigger boost unit.
- If a proximity sensors is fitted is it continuously being triggered by movement.

N.B. If the mains cable and boost cables are run in close proximity it is possible the 230v cables can induce a voltage into the boost cables and result in the unit not dropping out of boost. Five core cable – live, neutral, earth and two for boost must not be used.

Unit Speed Drops Below Normal Running Level

- Is the unit in setback mode, check switches/wiring (fig 5 & wiring diagrams)
- Is the unit in frost protection mode? When external temperatures reaches above approximately 6ºC the unit should automatically return to normal running.
- If this fails to happen then check the thermistor resistance against ambient temperature. Leads must be disconnected from the PCB to complete this check. See fig 5 & 8

Excessive Fan/Unit Noise

- Has the unit been set to the correct continuous flow rates and running in continuous mode, if yes are the speeds higher than predicted (reference unit fan curves – available on our web site). If yes check for excess resistance/leakage:-
    - Is there excess flexible ducting or tight bends?
    - Are all ducts connected and sealed?
    - Are ducts the correct size?
    - Are external terminals (roof terminals or air bricks) suitable for the application?
    - Have ceiling terminals been wound too far in?
    - Are there any deviations from the design?
    - Are there any blockages in the ducting or in the air ways in the unit?
- Has the unit been mounted on a stable surface using the mounting brackets provided?
- Is the unit horizontally & vertically square?
- Isolate power at spur, remove front cover or ducting from stale air to atmosphere and fresh air to habitable rooms spigots. Check fans will run freely, with no unexpected bearing noise or signs the fan is hitting/rubbing against its housing.

HRV2&3. The set speeds may be correct but resistance is causing the fans to run at a faster speed to achieve the required flow rate (constant volume motors). Remove ducting to the unit, one duct at a time. If the fan speeds drop dramatically then there is excessive resistance in that duct run.

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Unit Will Not Respond When Commissioning

- Unit not in the commissioning mode – program switch has not been moved, see fig 10.
- Check position of the potentiometers – N.B. Boost cannot be set lower than Continuous & Continuous cannot be set higher than Boost.
  Unit reset
  - Turn both Continuous potentiometers to minimum
  - Turn both Boost potentiometers to maximum
  - Push the program switch fully to the right, then fully to the left, then back to the middle.
- Has 230v been applied to the boost terminals? Fig 5.
- HRV2 & 3 Models, Remove the ducting from the unit and check if the fans then respond.

Unit Ramps Up Without Manual Switches Being Operated

- If room or in duct humidity sensors are fitted, has the humidity within property increased sufficiently to trigger boost. Increase the humidity trigger point to maximum, then switch the unit off for 20 seconds then put back on.
- If PIR's are fitted are these being triggered.

Required Fan Rates Cannot Be Achieved

- Incorrect unit selected – refer to unit literature for unit capacities.
- Excess resistance/leakage:-
  - Is there excess flexible ducting and/or tight bends?
  - Are all duct connected and sealed?
  - Are ducts sizes correct?
  - Are external terminals (roof terminals or air bricks) suitable for the application?
  - Have the ceiling terminals been wound too far in?
  - Are there any deviations from the design?
  - Are ducting joints sealed (silicone or other recognised method)?
  - Are there any deviations from the design?
  - Are there any blockages in the ducting or in the air ways in the unit?

Cold Air Is Being Supplied Into Habitable Room

- Has the air temperature been measured and compared with the air temperature in the wet rooms? The difference should be approx. 2-3ºC. *Moving air does feel cold!*
- If the ducts from the unit to the wet rooms and/or those to the habitable rooms pass through a cold void, are they fully insulated?

Moisture/Water On Or Around Unit

- Are the ducts to atmosphere fully insulated from the top of the unit to the underside of the roof (roof terminal) or to the brickwork (airbrick)?
- If the stale to atmosphere rises vertically to a roof terminal is a condensation trap fitted?
- If the ducts from the unit to the wet rooms and/or those to the habitable rooms pass through a cold void, are they fully insulated?

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- Is the internal condensation tray split?
- Is the unit fitted square both horizontally and vertically?
- Is the condensation drain fitted?
- Is the condensation drain fitted with a proprietary trap and the pipe sealed to the trap?
- Does the condensation drain run have a minimum of 5º fall?
- Has the ducting been connected to the correct unit spigots?
- Is there moisture on or inside the ducts?

Moisture Inside The Unit

It is usual to find water in the condensation tray and within the heat recovery cell, especially after there has been high humidity within the Kitchen or Wet Rooms. The unit will dry itself after a reasonable period.

If water is found in the fan scrolls, underneath the tray, around the fan EPP or in the vicinity of the PCB's this indicates there is an issue with the installation.
Check the following.

- Are the ducts to atmosphere fully insulated from the top of the unit to the underside of the roof (roof terminal) or to the brickwork (airbrick)?
- If the stale to atmosphere rises vertically to a roof terminal is a condensation trap fitted?
- If the ducts from the unit to the wet rooms and/or those to the habitable rooms pass through a cold void, are they insulated?
- Is the internal condensation tray split?
- Is the unit fitted square both horizontally and vertically?
- Is the condensation drain fitted?
- Is the condensation drain fitted with a proprietary trap and the pipe sealed to the trap?
- Dose the condensation drain run have a minimum of 5º fall?
- Has the ducting been connected to the correct unit spigots?
- Is there moisture on or inside the ducts?

Unit Performance Has Dropped

- The filters have become clogged.
- Flexible ducting has been crushed.
- Rigid ducting has been knocked or moved resulting in air leakage.
- Ceiling terminals have been tampered with.
- Airbricks and /or roof terminals have become blocked or restricted.

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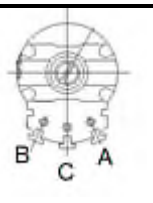
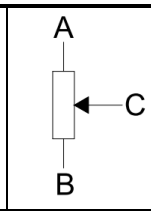
PCB Reset

Following a controller reset the ventilation system will need to be fully commissioned.

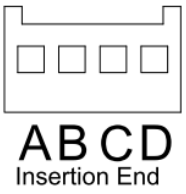
The procedure to reset the Titon HRV *Q Plus* controller is a simple three step operation. The unit will need to be powered up during the reset procedure.

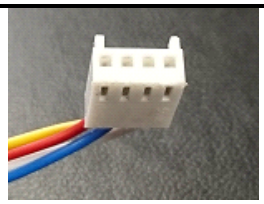
1. Rotate the Supply and Extract Continuous Speed potentiometers fully anti-clockwise.
2. Rotate Supply and Extract Boost Speed potentiometers fully clockwise move the Run/Program Switch from the Run position to the Continuous position, from the Continuous position to the Boost position and back to the Run position. To ensure that the reset switch movements are registered by the controller wait two seconds between each switch movement. Controller reset is now complete.



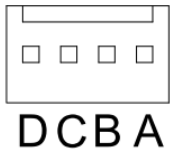


10KΩ Potentiometer Connections





Molex Fan Connector



PCB Connector

Connect a 10KΩ Potentiometer across the terminals shown and rotate to check if the fan will respond. If this is not possible, try bridging the A and C terminals on the fan connector, the fan should then run at full speed.

Fig 1

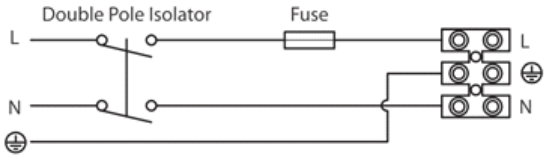
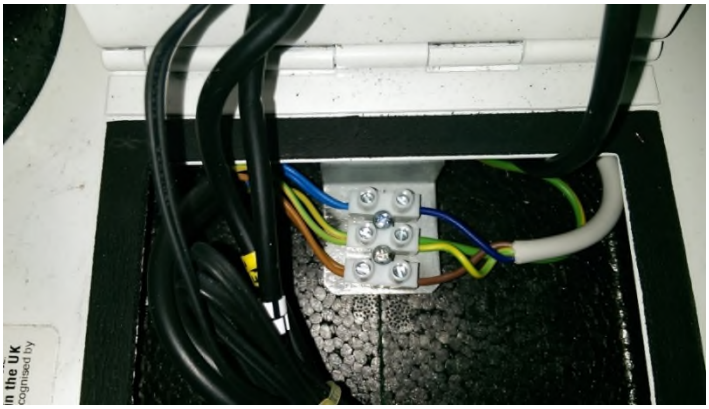


Fig 2



Mains Terminal Block

Fig 3

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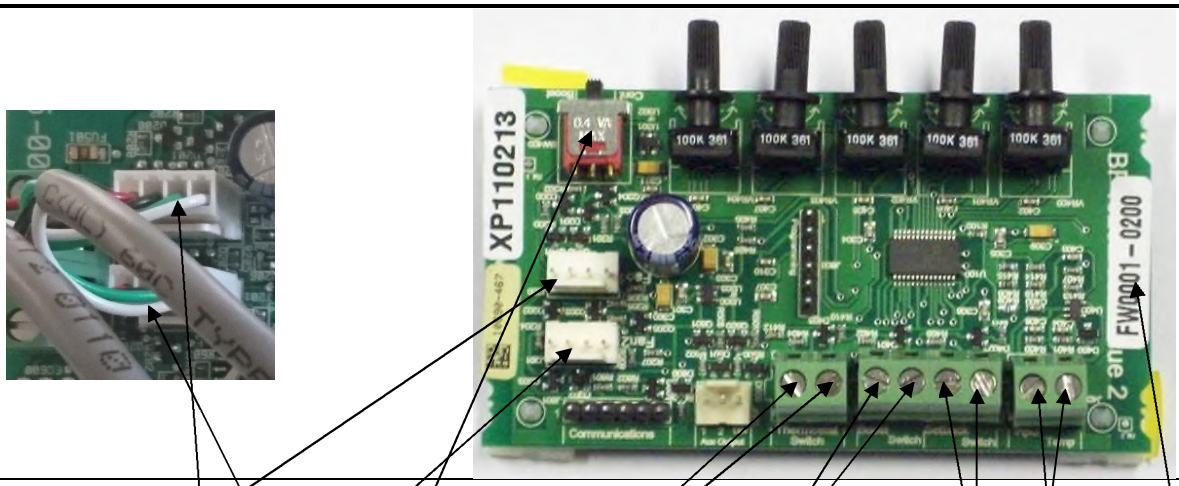
Mains filter

Fig 4



Molex - Fan 1 Supply

Molex - Fan 2 Extract

Programming switch

Summer Mode

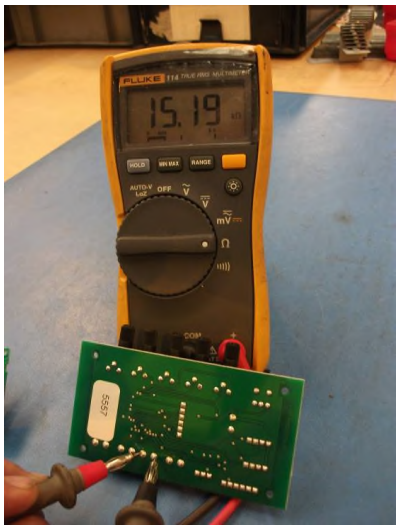
Boost

Setback

Thermistor

Firmware Version Unit Specific

Control PCB Fig 5



Measure resistance across the boost terminals, this is easier across the soldered joints rather than the terminals block.

If reading is open circuit, it is probable that 230v has been applied.

If reading is approx. 15kΩ, then the circuit is ok.

This only checks the boost circuit and does not prove overall functioning i.e. PCB may still be faulty if reading is approx. 15kΩ

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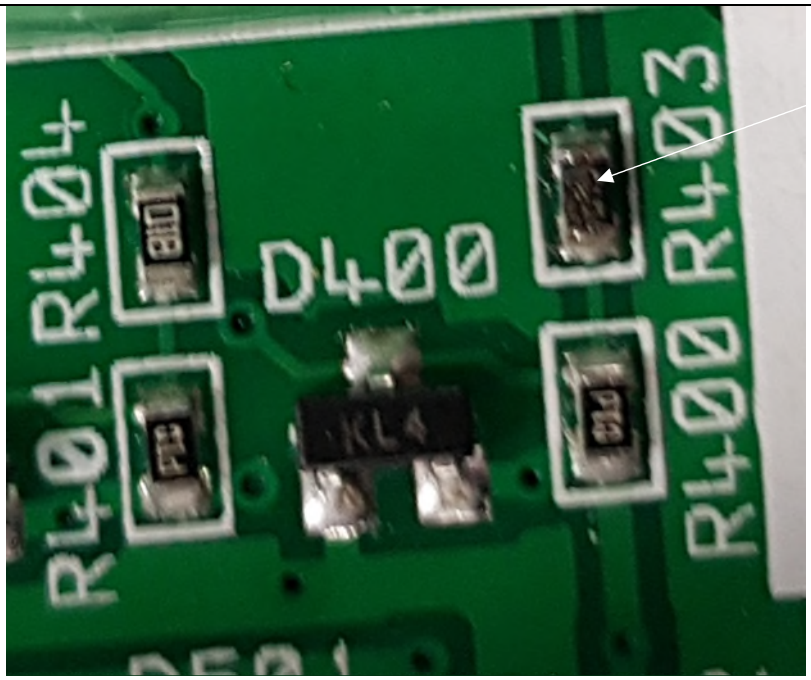

Damaged component. The failure is often very difficult to see. The surface of the resister is damaged / burnt

Fig 6

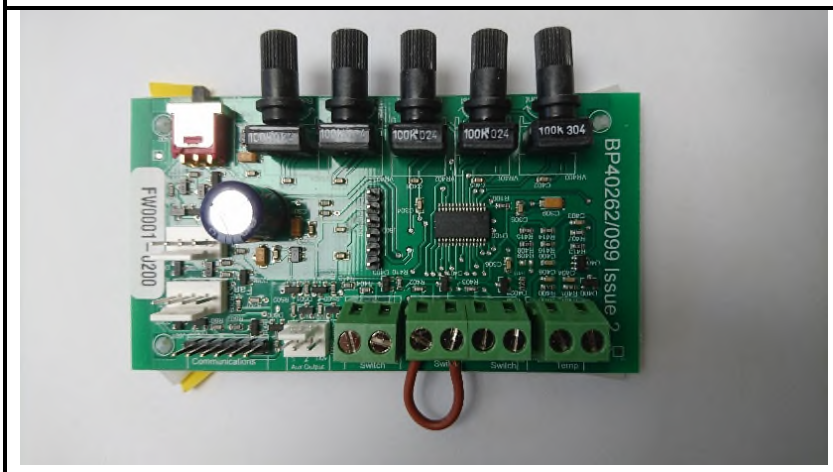

Fig 7

Thermistor Values

Temp ºC	Resistance (KΩ)
-10	42.47
-9	40.57
-8	38.77
-7	37.06
-6	35.44
-5	33.90
-4	32.44
-3	31.05
-2	29.73
-1	28.48
0	28.48
1	26.13

Temp ºC	Resistance (KΩ)
2	25.03
3	23.99
4	23.00
5	22.05
6	21.15
7	20.30
8	19.48
9	18.70
10	17.96
11	17.24
12	16.56
13	15.90

Temp ºC	Resistance (KΩ)
14	15.28
15	14.69
16	14.12
17	13.58
18	13.06
19	12.56
20	12.09
21	11.63
22	11.20
23	10.78
24	10.38
25	10.00
26	9.63

Fig 8

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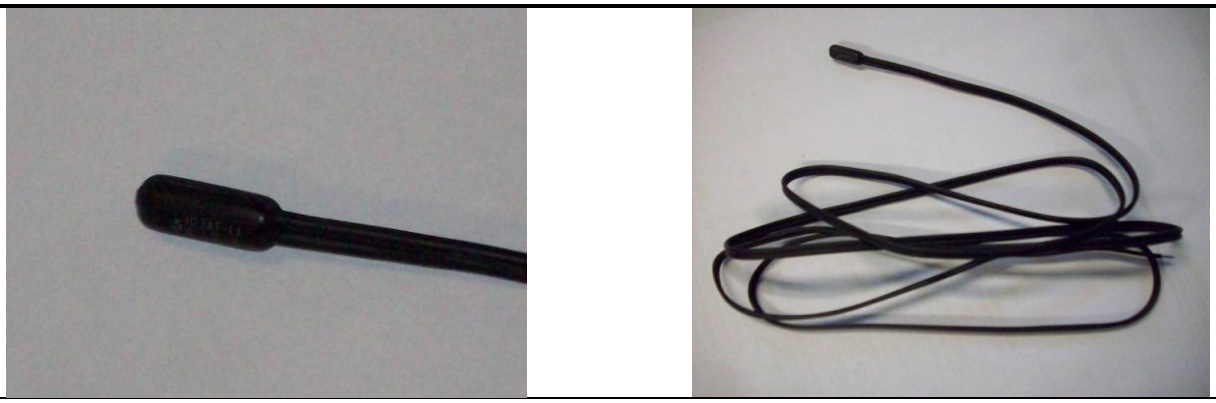

Thermistor Fig 9

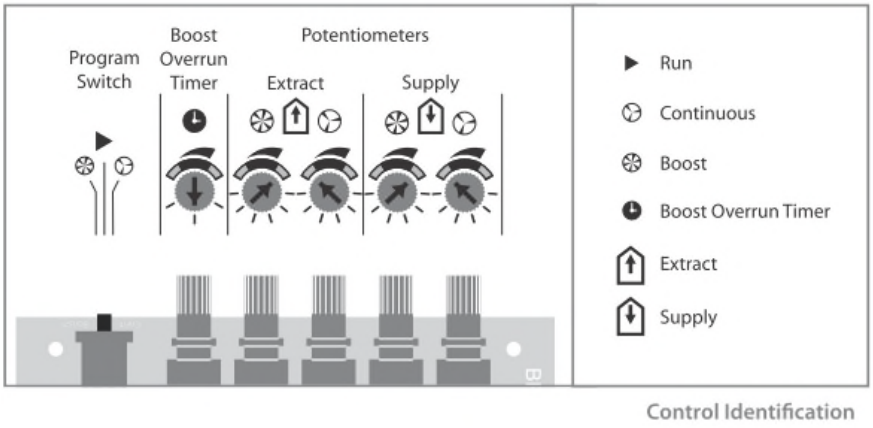

Fig 10

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