

# Head Pressure Fan Speed Controller (Release 5)

# Installation & Maintenance

### GENERAL

The **temperzone** HP Fan Speed Controller (HPC) is both a temperature sensing head pressure controller and system protection device. It enables **temperzone** products to run effectively at outdoor ambient temperatures below 20°C, and also helps protect against ice-ups in the indoor coil.

The HPC is compatible with **temperzone** OSA and OPA Series units. Mounting holes exist within each unit's electrical compartment for ease of fitting. Refer to **temperzone** engineering for compatibility with other units.

### FEATURES

The HPC has two dip switch selectable modes: Basic and Smart.

**Basic mode** duplicates the functions of the previous HPC Releases 1 to 4, providing HP fan speed control.

**Smart mode** is not intended for use when retrofitting the HPC to existing units. Smart mode has been integrated into the HPC design for future use.

### REPLACING AN HPC

The sensor used on HPC Releases 1 and 2 is **not** compatible with HPC Releases 3, 4 and 5. If replacing an older HPC, replace the sensor also.

### COMPONENTS

Check that the following items are supplied and are in good order:

1. HP Fan Speed Controller (HPC).
2. Wiring loom
3. HP pipe temp. sensor on yellow lead.
4. Hi-temp sleeving, 100 mm (x1)
5. Heat transfer paste.
6. Inseal 50 x 3 x 150.
7. Cable tie (x2).
8. HPC wiring label

Note: Larger units may require additional lengths of wire to complete the installation.

### INSTALLATION

#### Positioning & Mounting

1. Isolate the OSA Outdoor Unit from the electrical supply and remove the access panel and the electrical box cover.
2. Locate the four dedicated mounting holes in the electrical box. If there are no holes, refer to Figure 2.
3. Discharge any static charge on your body by touching an unpainted piece of metal in the outdoor unit and THEN remove the HPC from the antistatic bag.
4. Mount the HPC by firmly pushing its four self locking mounting feet into the mounting holes.

**Note: The HPC should be mounted with the heatsink fins vertical.**

#### Head Pressure Sensor

- a) Place the temperature sensor into the pocket positioned on one of the condenser coil's return pipe bends and ensure it goes all the way in. On current units this pocket is near the bottom of the coil, whereas on older units the pocket is nearer the top of the coil.
- b) Remove the sensor from the pocket and apply some thermal paste (supplied) to the pocket entrance and to the entire sensor.
- c) Slide the sensor fully into the pocket.
- d) Wrap inseal (supplied) around the sensor pocket plus the coil's return pipe bend and secure with cable tie supplied as per figure 3.
- e) Thread the sensor lead back into the electrical box and push the plug onto the 'HPC' labelled pins in the top right hand corner of the HPC (see Figure 1 & 5).
- f) Coil any excess sensor lead and tie it together.

**IMPORTANT: No part of the sensor lead is to come in contact with any copper pipe. Do not tie it to any other wiring at any point.**

Fig. 1

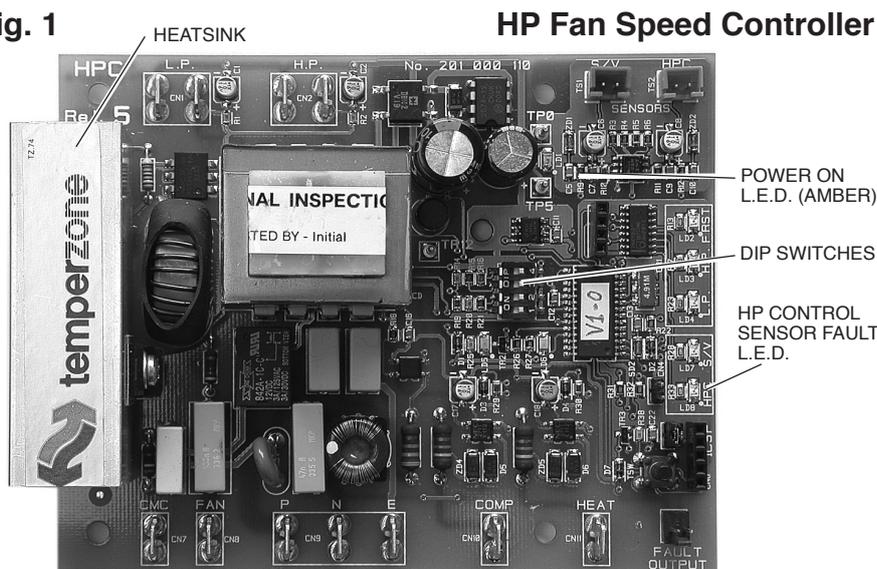
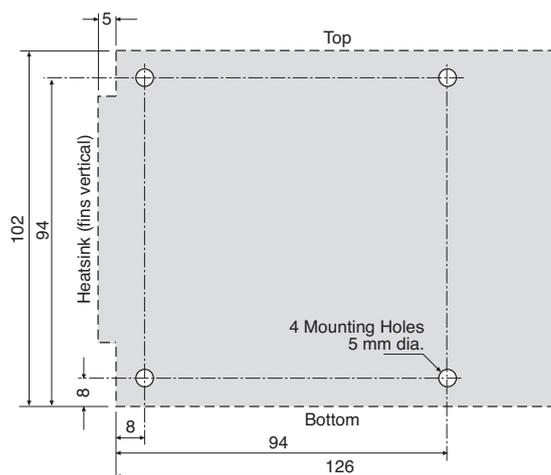


Fig. 2

### Mounting Dimensions (mm)

Most **temperzone** units have four pre-drilled holes in their electrical box. For those that don't, here are the mounting centres.

**Note:** It is recommended the HPC be installed as low down as possible within the electrical box. Allow at least 10 mm clearance on all sides to ensure adequate ventilation of the HPC heatsink.



### SETTING DIP SWITCHES

The HPC has four dip switches. The factory standard settings are highlighted in bold:

1	OFF	<b>Ducted Indoor units</b>
	ON	Ductless Indoor units
2	OFF	<b>HP control to maintain 42°C</b>
	ON	HP control to maintain 50°C
3	OFF	Smart mode
	<b>ON</b>	<b>Basic (Replacement) mode</b>
4	OFF	<b>Outdoor fan low temp. cut off</b>
	ON	Outdoor fan low temp. continuous

DIP switch 3 must be set to 'ON' position.

DIP switch 4 allows the choice between continuous running of the outdoor fan at minimum speed, or cut off mode where the fan will stop when the minimum speed is reached. Continuous running will give a more settled operation but in very cold outdoor ambient conditions could lead to insufficient head pressure.

Note: Ensure there is no power to the HPC before changing DIP switch settings.

### WIRING

First, remove the original grey wire which runs from the unit's compressor contactor (CMC) auxiliary contact to the selected fan speed terminal.

Attach one end of each loom wire (supplied) to the appropriate spade terminal on the HPC, and the other ends to the appropriate terminals as per Wiring Loom - Table 1. If in doubt, refer to your nearest **temperzone** Engineer.

Stick the self adhesive wiring diagram (supplied) somewhere near the HPC, for future reference.

### COMMISSIONING

Check the DIP switch settings on the HPC are set to suit your application and requirements.

To test the outdoor fan runs in the cooling cycle, turn the mains power on with the thermostat set lower than normal to initiate a cooling signal. The compressor should start. As the outdoor coil warms to 20°C the outdoor fan should start rotating at minimum speed and gradually speed up to gain and maintain control of the set condensing temperature. Allow to run for a few minutes.

#### Reverse Cycle Systems

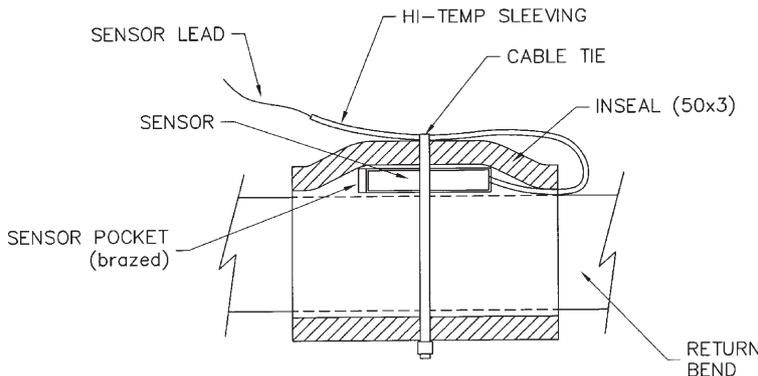
To test the outdoor fan runs in the heat cycle, on a warm day, proceed as follows:

1. With the power off, temporarily fit the short link (pink wire supplied) between the 'COMP' and 'HEAT' terminals on the HPC. This wire saves you having to physically go and change the room thermostat to initiate heating.
2. Switch on the unit at the isolator. After the anti-rapid cycle timer has timed out the compressor should start and the outdoor fan should rotate at its minimum set speed and then accelerate to full speed (230V).
4. Switch the unit off and **remove the pink wire between "COMP" and "HEAT" terminals.**

Slowly reset thermostat to desired set point and unit should start/resume normal operation (nb. compressor will be delayed by the anti-rapid cycle timer).

Fig. 3

### Head Pressure Sensor



CROSS SECTION OF HEAD PRESSURE SENSOR MOUNTING ARRANGEMENT

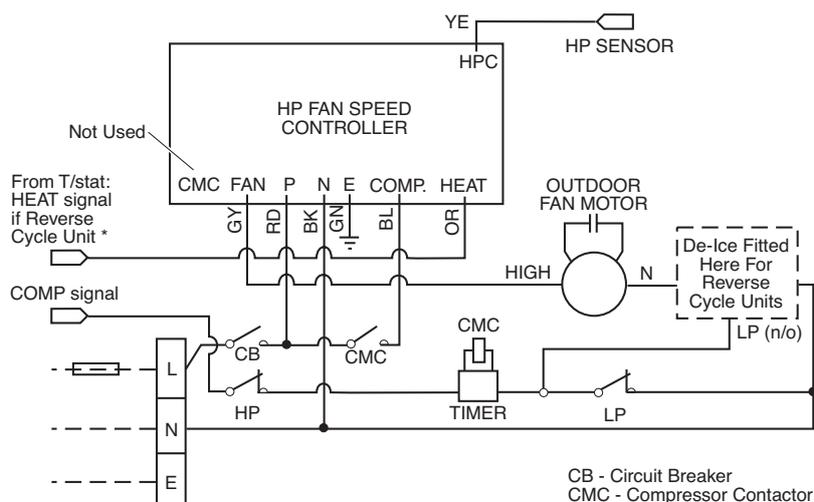
Table 1. Wiring Loom

Item	Length (mm)	Colour	From	To
1	800	Grey	HPC term'l FAN	Fan speed selected
2	660	Red	HPC term'l P	ACTIVE
3	800	Black	HPC term'l N	N
4	800	Green	HPC term'l E	earth stud
5	800	Blue	HPC term'l COMP	CMC
6	800	Orange	HPC term'l HEAT	HEAT
7	100	Pink	Used in Commissioning	

Note: Remove the original grey wire which runs from the unit's compressor contactor (CMC) auxiliary contact to the selected fan speed terminal.

Fig. 5

### Generic Wiring Diagram (Basic Mode)



Note: Some wiring detail has been omitted for clarity.

\* For 24 volt control systems take Heat signal (230V) from reverse cycle valve (RCV) side of heating relay (HR) and compressor signal from downstream side of compressor relay (CR) contacts.

## MAINTENANCE

### Yearly

1. Check that the aluminium HPC heatsink has not become coated in dust, oil or any other contaminant limiting its ability to dissipate the heat.  
Wipe clean where necessary.
2. Check that all electrical connections to the HPC are secure.

## TROUBLESHOOTING

If the fan is not rotating appropriately while the compressor is running the following diagnostic steps should be followed:

### 1. *Is power being received by the HPC?*

With power supply to Outdoor Unit switched ON, check that the yellow/amber light emitting diode (LED) in the top right hand corner of the HPC circuit board is lit.

#### If not, either:

- a) Power is not getting to the HPC.  
Check the voltage between the HPC SUPPLY 'P' and 'N' terminals. Should be 230V a.c.  $\pm 10\%$ . Check wiring and security of connections from fuse / circuit breaker.

#### or:

- b) The HPC has an unserviceable internal fault. Fit a replacement HPC.

### 2. *Is the appropriate 230V a.c. $\pm 10\%$ signal getting to the HPC's 'COMP' and 'HEAT' terminals?*

The HPC needs these signals to determine when a COOL/HEAT cycle is operational.

**If not:** Look for a wiring fault from the thermostat or compressor contactor to the HPC.

### 3. *Does the fan run on HEAT cycle?*

Put the system on HEATING if it is Reverse Cycle, or temporarily fit a link between "COMP" and "HEAT" terminals on the HPC if the unit is Cooling Only. A pink loop wire is supplied with the HPC kit for this purpose. Power on the system. The fan should start and gradually speed up from minimum set speed.

#### If not:

- a) Check the voltage from the FAN 'P' terminal to SUPPLY 'N'. A reading of less than 50V a.c. is unlikely from any meter at minimum fan speed.  
All meters should read approximately the full mains potential across these two terminals within 1 minute of the compressor starting on HEAT cycle. If this does not happen the HPC probably has a fault and should be replaced.
- b) If there was a sensible FAN 'P' voltage available in 'a)' above and the fan still does not run, then switch off the unit at the mains isolator. Disconnect the grey wire on the HPC connected to the FAN 'P' terminal and measure the resistance of the fan motor windings from this grey wire to 'N'. It should be neither open circuit, nor short circuit. If it is short circuited, fit a replacement fan motor and HPC. If open circuit, replace only the fan motor. Reconnect the grey wire if motor is okay.

**Note:** Remove the link fitted between 'COMP' and 'HEAT' if this was a Cooling Only unit.

### 4. *Does the fan run on "HEAT" cycle but not COOL?*

The 'HPC' sensor fault LED may be illuminated or flashing. The fan will not start in this situation on cooling cycle.

- a) Switch off the power to the unit.
- b) Remove the SENSOR plug from the HPC.
- c) Measure the resistance of the sensor.  
[Insert a 1 mm diameter or less wire into each hole in the sensor's plug.]  
The resistance should be in line with the following readings at the applicable temperature:

-10 °C	58 kΩ
- 5 °C	44 kΩ
0 °C	34 kΩ
10 °C	20 kΩ
20 °C	12.6 kΩ
30 °C	8 kΩ
40 °C	5.2 kΩ
50 °C	3.5 kΩ
60 °C	2.3 kΩ
80 °C	1.15 kΩ

#### Diagnosis:

- i) If the resistance is well out of range the sensor is faulty. Fit a replacement.
- ii) If the resistance measured is okay, check that the sensor has not fallen out of the pocket on the coil.  
If so, refit ensuring that there is thermal paste between the pocket and the sensor. Reconnect the sensor plug to the HPC. If the fan still does not run on COOL, fit gauges to the unit and check refrigerant charge.

#### Diagnosis:

- A. If the unit is low on charge recharge it as per its Installation & Maintenance instructions. Once the unit has been recharged, the HPC should be able to run the fan.
- B. If charge is okay, feel the return pipe bend the sensor is attached to, after the cooling cycle has been going for at least one minute.
  - a) If this return pipe bend is hot, the HPC has an internal fault. Replace it.
  - b) If the return pipe bends is cold, there may be a blockage in the coil circuit. This blockage must be either cleared or the entire coil replaced; refer to your nearest **temperzone** sales office. The unit can be operated with the HPC disabled until the repair / coil replacement is carried out. To disable the HPC:
    - i) Switch power to the unit off.
    - ii) Disconnect the grey wire from the 'FAN' terminal of the HPC to the selected fan motor speed tapping. Connect the loose end back to the selected speed terminal.
    - iii) Run a new wire from the load side of the compressor contactor (using the same phase as supplies the HPC mains supply 'P' terminal) to the selected fan speed terminal.

- iii) Close the electrical compartment and replace any covers. Restore power to the unit.

The unit is now ready to run as normal off its thermostat - the outdoor fan running on full speed whilst the compressor is running.

### 5. *The fan runs slowly on both cycles but the motor hums loudly or groans.*

The HPC has an internal fault. Replace it.

This pamphlet replaces the previous issue no. 2466 dated 02/05.  
Table 1 - Note added.

## NOTE

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

