

## GENERAL DESCRIPTION

Process Air Heater Unit (incorporating open wire/ceramic element assembly mounted in a stainless-steel tubular enclosure).

## HEALTH AND SAFETY

It is essential that all personnel follow safe working practices and adhere to local or site specific regulations.

It is essential that all operating and maintenance instructions appertaining to the heater and associated equipment have been read, understood and implemented prior to operation.

**Particular attention should be paid to safe electrical connections and the air flow operation of each heater unit!**

- Electrical Connection-wiring to be carried out by qualified electrical engineer in accordance with current wiring regulations.
- **Electric Shock Hazard.** Do not touch the heater coils!
- The Units must be earthed without exception.
- Minimum air flow and maximum air pressures must be adhered to. Failure to comply may result in premature failure of the heater elements.
- The heater coil **MUST NOT** be energised without an adequate air flow, as element failure will occur within seconds!
- It is essential to continue air flow for a period (60 seconds minimum) once power to the heating coils has been disconnected to aid safe cooling and prolong element life.
- In most cases, a thermal trip is included which must be appropriately wired within the control circuit. The trip is a normally closed circuit and is designed to open (isolating the power supply to the element) in the event of extreme over temperature situations to avoid fire risk. It will not prevent element failure due to insufficient air flow!
- The body and connection flanges of the heater can get hot during operation, appropriate insulation or guards should be put in place to prevent personal injury or equipment damage.
- It is the installers responsibility to ensure the machinery or system that the heater forms part of complies with the Machinery Directive 2006/42/EC.

## Inspection

A visual check shall be carried out upon receipt of goods, in particular the element, and an assessment of any damage during transit.

## Specification

Ensure the heater supplied meets the instillation requirements as per the label attached.

## Storage

Heaters should be stored in a dry clean environment.

# INITIAL INSTALLATION

## Orientation-Mounting

The preference is for horizontal mounting to give the best element life, although vertical mounting can be accommodated as long as there is sufficient air flow across the elements.

The heater terminal box / flying lead connection should be at the 'cold end' or the air inlet end closest to the air source. Always ensure the air flow is in the direction of the arrow marked on the label. Ensure the heater is securely fastened using suitable mounts and fasteners, and duct joints are sound.

Ensure the inlet and outlet of the heater are not accessible to personnel or foreign objects to prevent electrocution and fire risk. Ensure any flexible ductwork, connected to the outlet, has a suitable operating temperature rating.

## **RIGID DUCTWORK**

A linear portion of ductwork should be on the open inlet and outlet of the heater, minimum 1 x HEATER body length. Do not connect the inlet or outlet directly to a bend. This can cause excessive back pressure and/or un-even distribution of airflow that can cause premature failure.

## Electrical supply-connections

Ensure the supply voltage and amperage coincides with the supply requirements as shown on the label attached to the heater. All overloads (not of our supply) are correctly set at the full load amperage of the heater.

The standard 3 phase delta connections within the terminal box are shown in the diagram below.

TC represents the 70 Deg C N/C bimetallic thermal trip which is rated at 6Amps @ 240v Ac.

This should be used for both maximum inlet temperature and post heating monitoring.

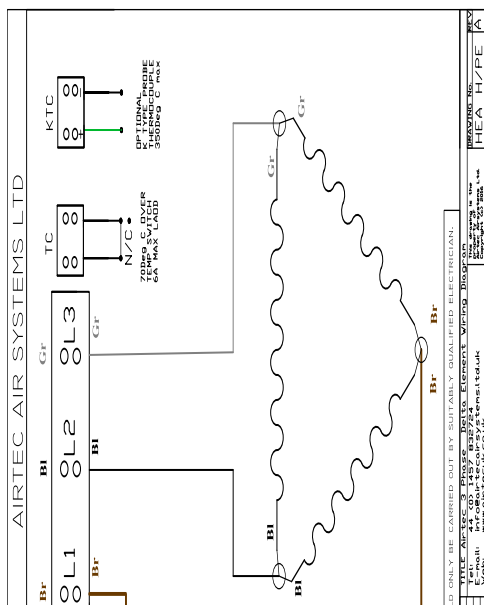
Once the heater is turned off the air must continue until the heater mass has cooled to a level where once the air flow is stopped the residual heat does not exceed 70 Deg C.

KTC represent the K Type temperature probe fitted to the element outlet end of the heater.

(This is standard on multiple element heaters and optional on single element heaters)

The maximum recommended outlet temperature is 350 Deg C, the elements will not be covered by warranty should this temperature be exceeded. All heaters must have an outlet temperature monitoring device installed within 50mm of the heater outlet set to 350Deg C with a reaction time of 1 second or less to qualify for the elements to be covered by operational warranty.

Proof of installation and connection will be required to validate any such claim.



### **Pressure rating**

Standard models are suitable to use on air pressures up to 1Bar.

(A very small amount of ambient temperature air may bleed into the terminal box due to the cable insulation type)

Higher pressure units are available on request.

### **Limitations of warranted operating conditions**

Maximum inlet temperature:            Continuous    70 degrees C

Maximum outlet temperature:

P type            three ceramic element heater            Continuous    350 degrees C

H type            single ceramic element heater            Continuous    600 degrees C

B type            single mica element heater            Continuous    250 degrees C

Minimum flow velocity                    6 meters per second.

### **Air quality**

Premature element failure will occur with one or more of the following conditions, excess dust/debris, high moisture or contaminant levels. It is recommended that a suitable intake filter of 10 microns or less is fitted to the air source to prevent contaminants entering the air stream.

Failure to fit a maintained suitable filter will invalidate any warranty.

### **Pre operation checks**

Ensure no loose material has been left in the air source/heater or system and the air has a free passage throughout the process. Establish correct air flow before energizing the heater.

### **Maintenance**

The internal surfaces of the heater casing/coils should be periodically inspected for deposits which can adhere, reducing efficiency and possibly causing premature coil failure. Cleaning procedures are dependent upon the degree and type of contamination. The minimum amount of cleaning is therefore recommended. If excessive deposits are present, check the air filter!

Due to varying site conditions specific time intervals for inspection cannot be forecast and is therefore a liability of site maintenance engineers to determine a suitable schedule.

### **Fault diagnosis**

If the heater fails to operate as expected at any time, a qualified electrician should inspect the unit to ascertain any fault within the coils or control system.

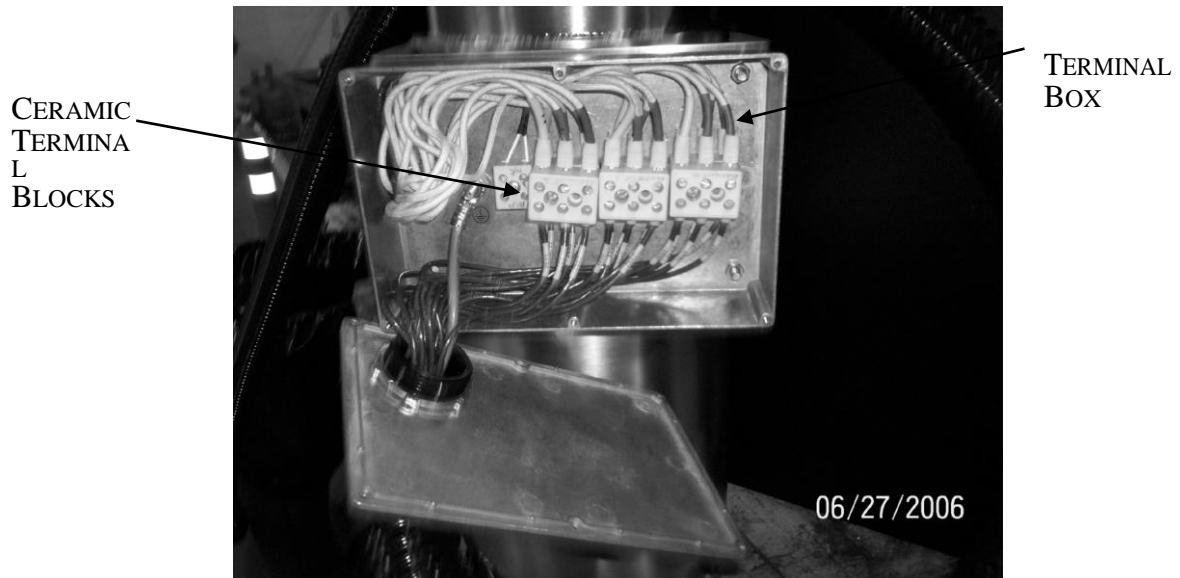
Coils should have a resistance in the range 10 to 50 ohms resistance dependent on type. A visual inspection may also be carried out, with the coils de-energised, to ascertain the integrity of the coils.

If the heater is faulty it should be repaired by a qualified electrician using genuine replacement parts available from Airtec Air systems Ltd. There is also a return to base service for any repairs required.

## ELEMENT REPLACEMENT INSTRUCTIONS

*Note: These instructions are generalized for this series of heaters. Your heater and junction box may differ slightly from pictures shown.*

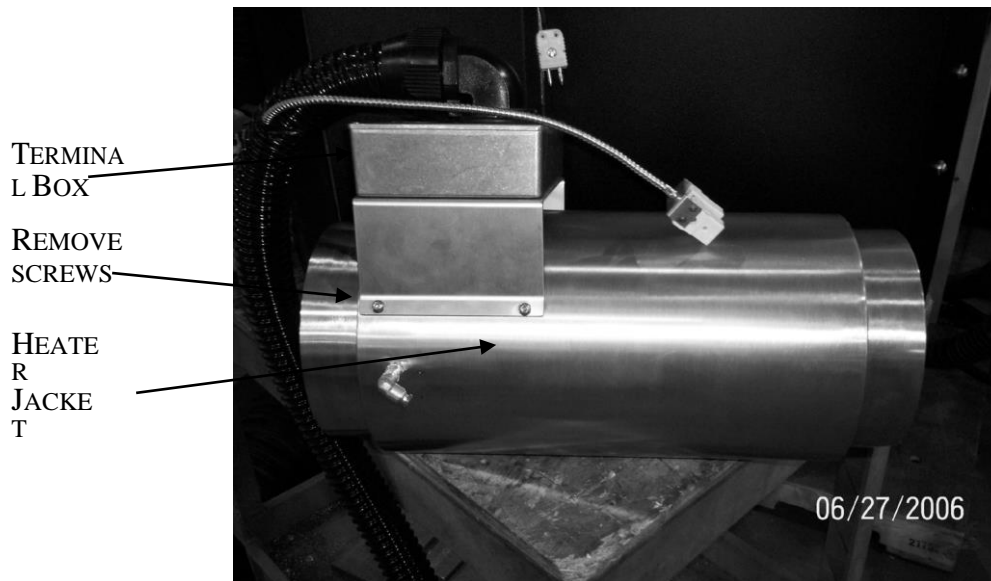
1. Open the terminal box located on the outside of the heater jacket.
2. Begin by making a sketch of the wire connections in the terminal box.



3. Mark all wires and their locations on the terminal blocks as per the sketch that you made in Step 1. We recommend using a fine point marker to mark the ceramic terminal blocks and wires.
4. Loosen and then remove the wires from their terminals.
5. Loosen and then remove the strain relief from the wires coming into the terminal box.



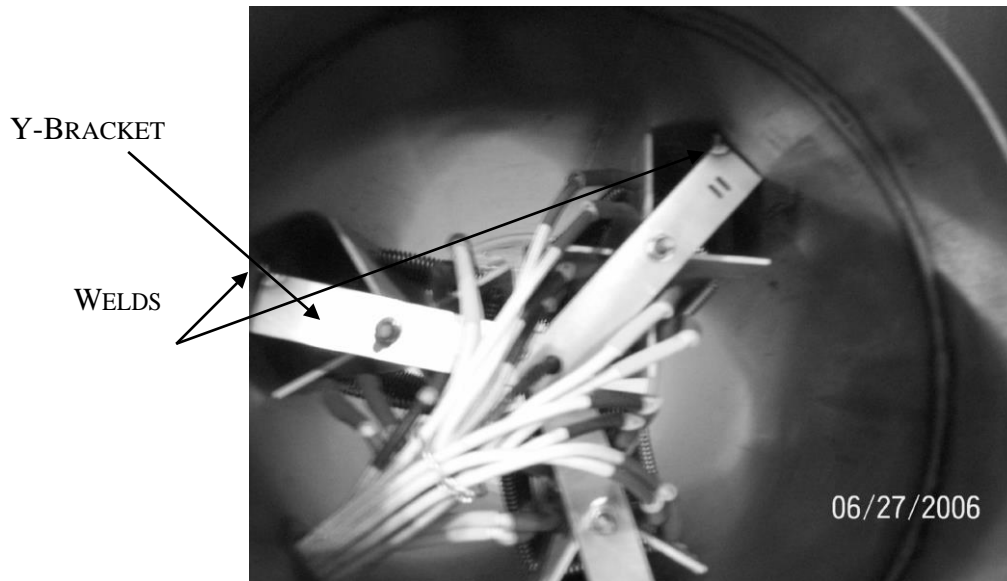
6. Remove the terminal box and mount by removing the screws holding the mount to the insulated heater jacket. Pull the wires through the terminal box.



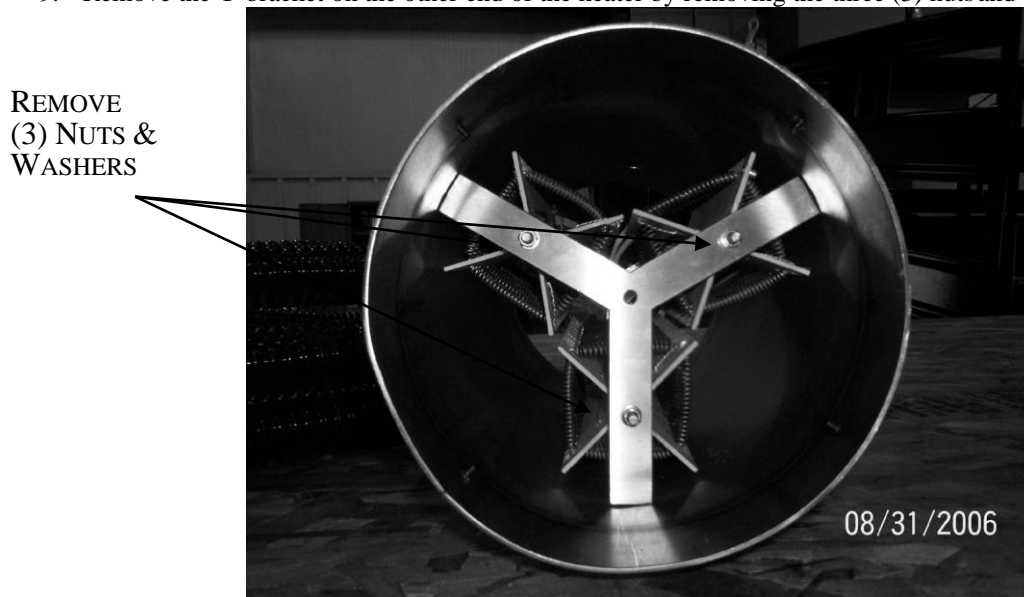
7. Loosen then remove the strain relief nut and gasket at the insulation jacket.



8. Note that the Y-shaped bracket is welded to the heater tube on the strain relief (wirebundle) end of the heater.



9. Remove the Y-bracket on the other end of the heater by removing the three (3) nuts and washers.



10. Carefully pull all the wires through into the heater tube.  
*Note: Use caution! If the wires are pulled too hard, a connector may come loose*

PULL ALL  
WIRES  
THROUGH  
H

REMOVE  
(1) NUTS &  
WASHER



11. Remove one (1) nut and washer.
12. Carefully pull the element assembly out of the heater tube.
13. Repeat steps #10 & #11 for the remaining two element assemblies.
14. Reassemble using the reverse order of steps above.

## FAULT FINDING SCHEDULE

*Fault – heater will not energise*

Probable cause – voltage supply failure on one or more phases

Remedy – check and verify correct voltage supply

*Fault – heater will not energise with correct voltage supply*

Probable cause – coil failure on one or more phase

Remedy – check and verify coils with a resistance meter. Coils will be in the range 10 to 50 ohms resistance dependant on type. If open circuit, coil needs replacing. A visual inspection may also be carried out, with the coils de-energised, to ascertain the integrity of the coils.

*Fault – heater gets hot but no longer reaches desired temperature*

Probable cause – coil failure on one or more phase

Remedy – check and verify coils with a resistance meter. Coils will be in the range 10 to 50 ohms resistance dependant on type. If open circuit, coil needs replacing. A visual inspection may also be carried out, with the coils de-energised, to ascertain the integrity of the coils.

Replacement coils are available, refer to type on nameplate.

Notes: coil failure can be due to a number of conditions

including:

- Too low or no air flow
- Contaminated Air.
- Over temperature on heater outlet (refer to maximum safe operating temperatures)
- Direct coupling to a centrifugal blower without air mass separator
- Bend or excessive restriction on inlet
- Incorrect voltage supply
- Incorrect wiring of elements.

*Correctly fitted and supplied coils should provide many years of service without fault. If the coils are deemed to fail prematurely, you must contact Airtec to discuss suitability of application.*

### Element codes

All Airtec heaters are marked with a part number that denotes the type of heater coil and body code.

e.g. EC3-124003DL

EC3 denotes the standard ceramic element  
12 denotes all the power rating of each coil in Kw,  
400 denotes the phase to phase voltage supply  
D denotes DELTA wiring configuration



