

Electric Coil Installation, Operation, and Maintenance Manual

(For use with Titus Electric Coils manufactured after June 2 001)

General Information

- All fan terminals with electric coils are ETL listed.
- All single duct electric coils are ETL listed.
- All electric coil control enclosures meet NEMA 1.
- Single point power connection.

Installation

- All terminal units with electric coils are designed to be mounted in a horizontal plane with regard to the UP arrow marked on the product label.
- Always inspect electric coils for damage prior to applying power.
- Use copper conductors only.
- All field wiring must conform to NEC and local building codes.
- Phase rotation of the incoming power is recommended when connecting three phase electric coils to balance building loads.
- Always allow a minimum clearance of 36" in front of all electric coil enclosures.
- All terminal units must be properly grounded per NEC 424-14 and 250.
- Always check product label for voltage and current data to determine proper wire size and current protection.
- These recommendations are not meant to preclude NEC requirements or local building codes that may be applicable, which are the responsibility of the installing contractor.



Fan Terminal Unit with Heater



Single Duct Terminal Unit with Heater


CAUTION **ELECTRIC SHOCK MAY RESULT**

- 1. DISCONNECT POWER BEFORE SERVICING UNIT.**
- 2. DO NOT OPERATE UNIT WITHOUT CONTROL COVER INSTALLED.**

Data Label

All electric coils are provided with a product label affixed to the control enclosure cover. This label contains all necessary information regarding electrical power and circuit protection requirements, as specified by UL. See Figure 1.

Figure 1.

| | | | |
|---|--------------------|---|--------------------|
|  | | FAN UNIT | |
| MODEL NO | DTQS | CODE | 99-361901-B 6 REV: |
| MOTOR | VOLT 277 HP 1/6 | PHASE 1 FLA(EA) | HZ 60 1.40 |
| HEAT | VOLT 277 KW 6.0 | PHASE 1 AMPS | HZ 60 21.66 |
| MOTOR(S) ARE THERMALLY PROTECTED | | MAXIMUM OVERCURRENT PROTECTION = 15 AMP | |
| MIN. SUPPLY CIRCUIT AMPS 1.38 AMP | | XXXXXXXXXXXXXXXXXXXXXXXXXXXX | |
| MAX. OUTLET AIR TEMPERATURE 200° F | | | |
| UNIT DESIGNED TO OPERATE AT NO LESS THAN 0.2 IWG STATIC PRESSURE | | | |
| ZERO CLEARANCE FROM UNIT, CONNECTED DUCT AND/OR PLENUM TO COMBUSTIBLE MATERIAL. | | | |

Heater Control Enclosure

Figure 2 shows the interior of a typical electric coil control enclosure. Various components contained within this enclosure are necessary for the safe operation of the product. An **interlocking safety door disconnect switch** is recommended, but not required. It prevents access to the enclosure until all ungrounded conductors are disconnected from the electric coil circuit. If an optional disconnect switch is not ordered, a **terminal block** will be provided for single point electrical hook-up. A **ground lug** is provided to insure proper grounding of the terminal unit housing and enclosure. Optional **line fuses** and **fan motor fuses** provide overcurrent protection, if permitted by local building codes. An air flow switch is always provided to lock-out the coil when there is no air flow across the elements. An **automatic reset thermal cut-out** is required to de-energize elements whenever discharge temperature is excessive. The coil will resume operation when discharge temperatures decrease. An optional **manual reset thermal cut-out** will protect the elements in the event of a thermal cut-out failure and prevent the coil from operating until qualified service personnel can make repairs. **Fuse links** are required on all single duct electric coils to provide safety in event of a thermal cut-out failure. Fuse links must be replaced as they cannot be reset. A **control transformer** is provided whenever a 24 V circuit is required. **PE switches** may be load bearing on small pneumatically-controlled electric coils, or pilot duty when current loads require **magnetic contactors**. Optional **mercury contactors** are available for extra long service life and / or silent operation. In addition to these components, fan powered terminals may include an **SCR motor speed control** and a **fan relay**.

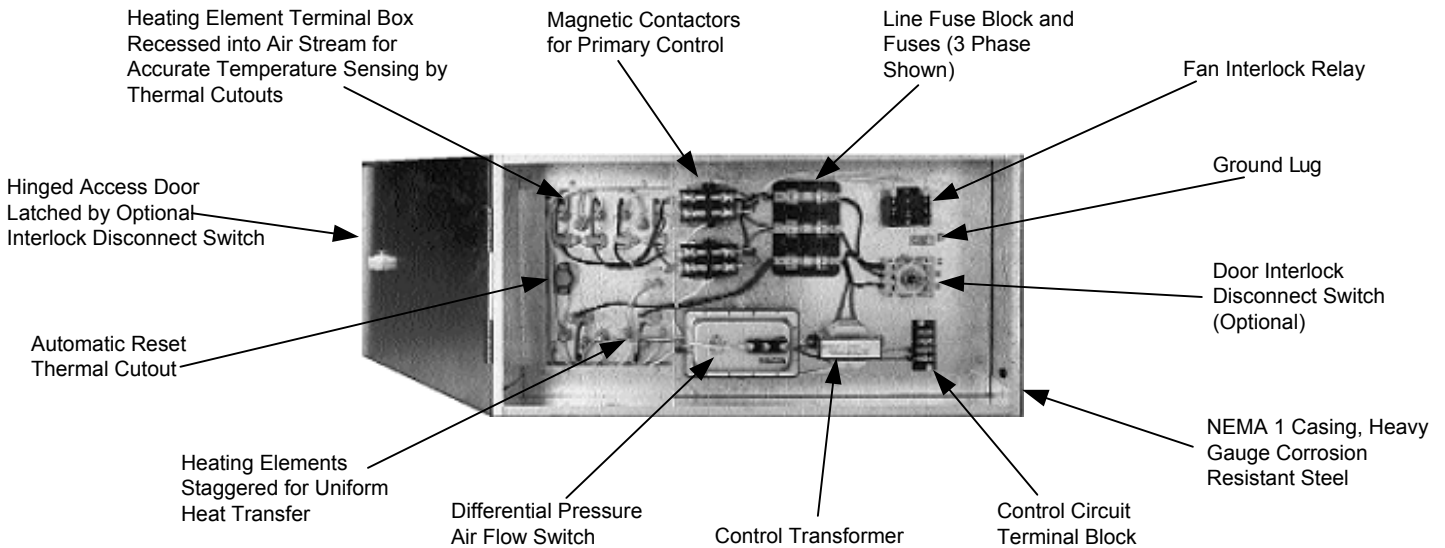


Figure 2.

Wiring Diagrams

Figure 3 - Typical pneumatic parallel fan powered terminal with load bearing PE switches.

Figure 4 - Typical pneumatic parallel fan powered terminal with contactors.

Figure 5 - Typical pneumatic series fan powered terminal with load bearing PE switches.

Figure 6 - Typical fan powered terminal with factory wired controls.

Figure 7 - Typical electronic fan powered terminal with field mounted controls.

Figure 8 - Typical electronic single duct terminal with field mounted controls.

Figure 9 - Typical pneumatic single duct terminal with contactor.

Figure 3.
Pneumatic Parallel (Variable Volume) Fan Powered Terminal
Electric Reheat, 277V, 1φ, 2 Stage, 2 Element

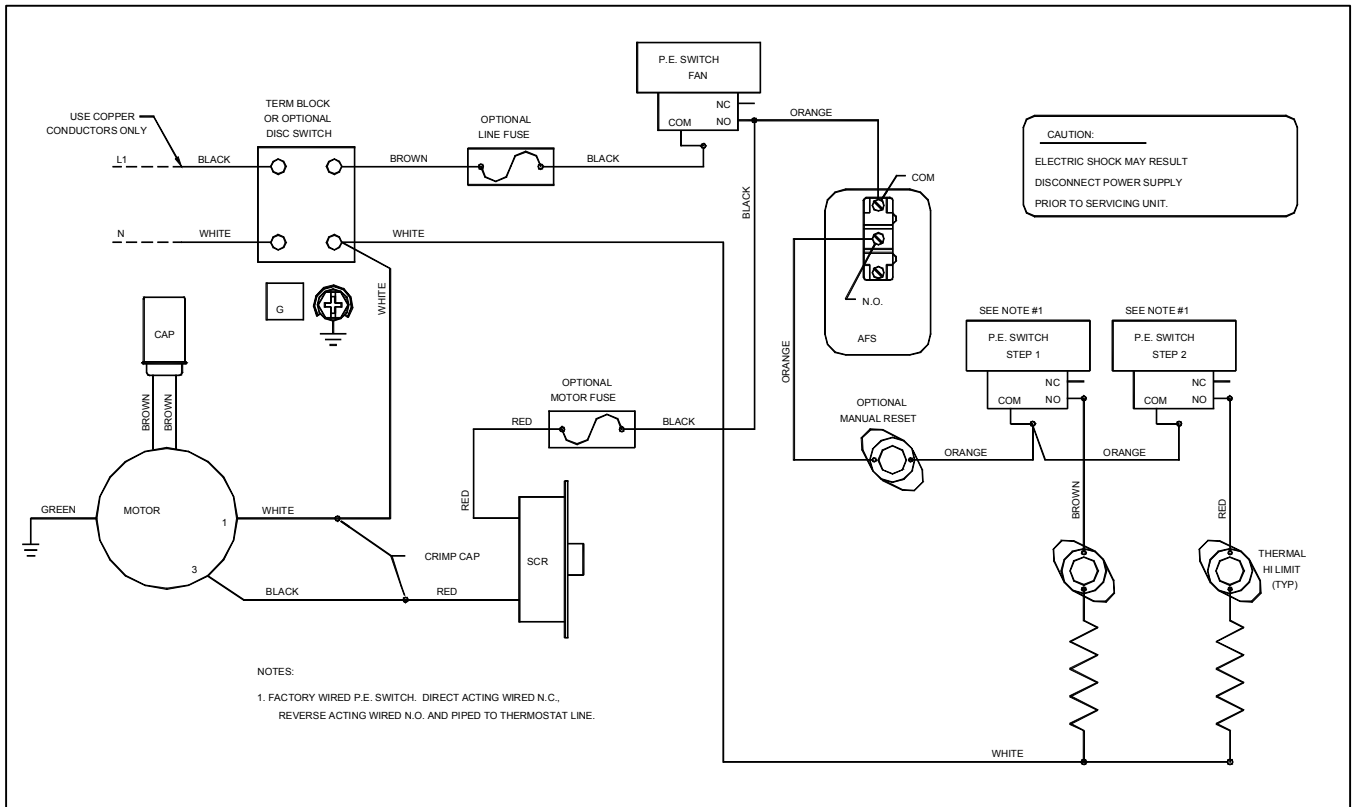


Figure 6.
 Typical Fan Powered Terminal, Factory Mounted Controls
 Electric Reheat, 277V, 1φ, 1 Stage, 1 Element

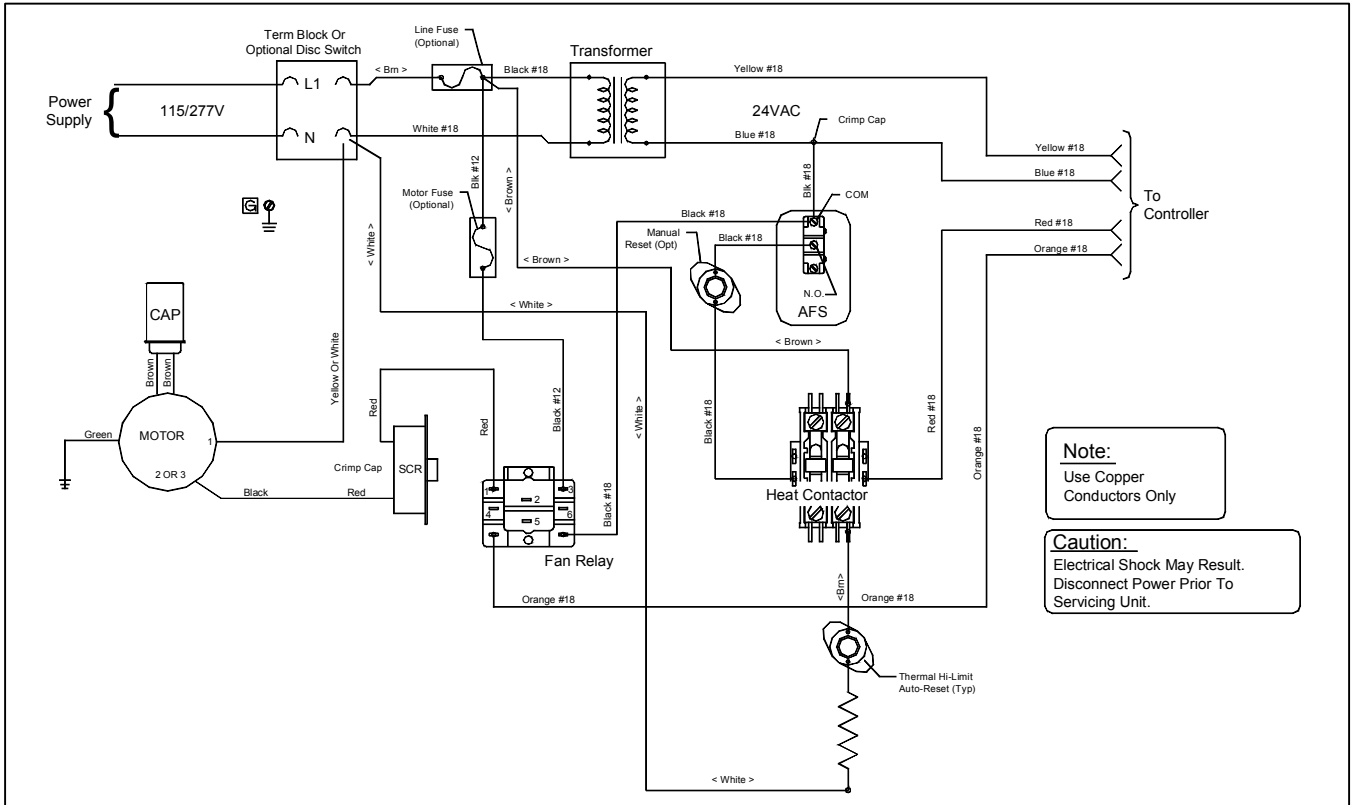


Figure 7.
 Typical Fan Powered Terminal, Field Mounted Controls
 Electric Reheat, 480V, 3φ, 2 Stage, 3 Element

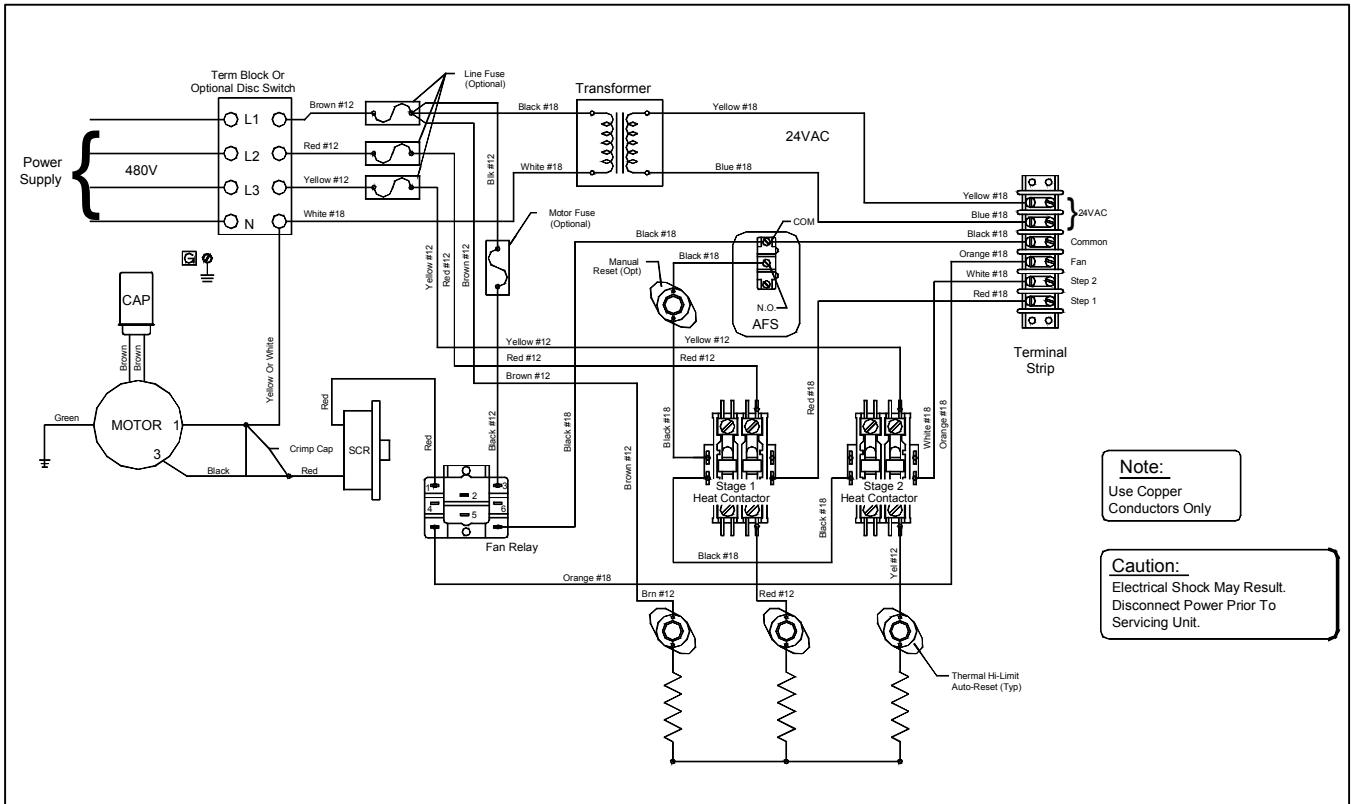


Figure 8.
 Typical Single Duct Terminal, Field Mounted Controls
 Electric Reheat, 480V, 3 ϕ , 3 Stage, 3 Element

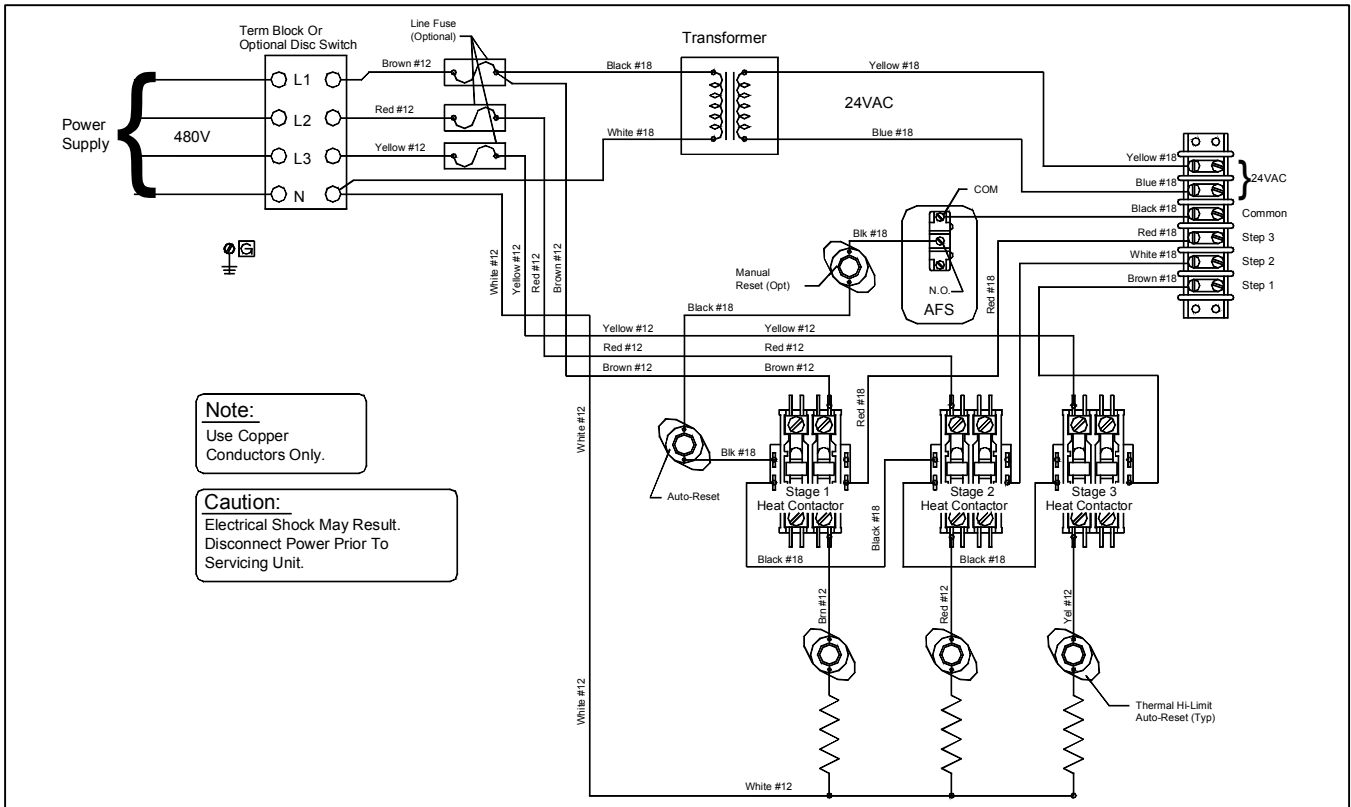
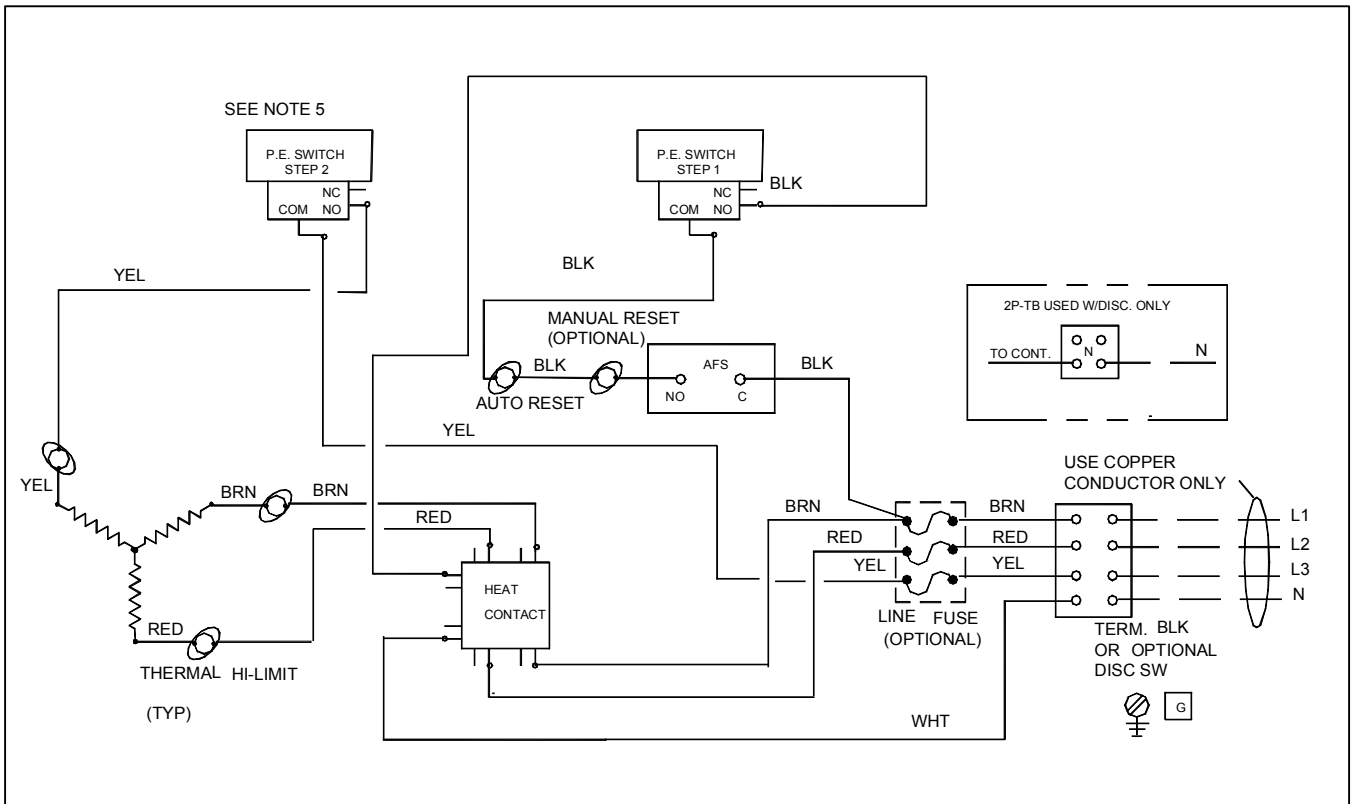


Figure 9.
 Pneumatic Single Duct Terminal
 Electric Reheat, 480V, 3 ϕ , 2 Stage, 3 Element



Electric Coil Components

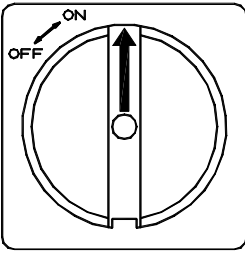
| Description | Vendor Model Number* | Part Number |
|---|------------------------------|--------------------|
| Door Disconnect Handle | ABBOHB1AH1 | 10329301 |
| Door Interlock Disconnect, 3 Pole, 40 Amp | ABBOT32ES | 10329101 |
| Door Interlock Disconnect, 3 Pole, 80 Amp | ABBOT63ES | 10329201 |
| Adapter Kit: Includes - Adapter plate, Interlocking Disconnect Switch, Selector Handle, Square Shaft, #8 x 1/2 TEK Screw | | |
| 3 Pole, 40 Amp | | 31489601 |
| 3 Pole, 80 Amp | | 31489602 |
| Power Terminal Block, 2 Pole | 1102, 55A or 9-85-2, 85A | 10052301 |
| Power Terminal Block, 3 Pole | 1103, 85A or 9-85-3, 85A | 10052401 |
| Power Terminal Block, 4 Pole | 1104, 55A or 9-85-4, 85A | 10055001 |
| PE Switch 1 Step | CCE-3011B or P658E1001 | 10000901 |
| PE Switch 2 Step | CCE-3012B | 10199801 |
| PE Switch 3 Step | CCE-3013B | 10199802 |
| Magnetic Contactor, 24 Volt, 30 Amp, 2 pole | 3100-20Q334 or R8242B1006 | 10054401 |
| Magnetic Contactor, 208 / 240 Volt, 30 Amp, 2 Pole | 3100-20U334 or R4242B1013 | 10054404 |
| Magnetic Contactor, 277 Volt, 30 Amp, 2 Pole | 3100-20V334 or R4242B1021 | 10054403 |
| Relay, 24 Volt, Double Pole Double Throw | 9100266Q34 | 10161801 |
| Relay, 24 Volt, Single Pole Single Throw (Fan) | 9100401Q34 | 10156901 |
| Auto Reset Thermal Cutout (All Models) | 60TX01 or 402-834 | 10052101 |
| Manual Reset Thermal Cutout (All Models) | 60T14L160F | 10118801 |
| Transformer 208 / 240 / 24 Volt, 50 VA | 4000-09AW18AE34 | 10057501 |
| Transformer 277 Volt / 24 Volt, 50 VA | 4000-03AW18AE34 | 10006601 |
| Transformer 480 / 24 Volt, 50 VA | 4000-04AW04K34 | 10100301 |
| Air Flow Switch | DFS221112 or RH1505-DO | 10269501 |
| Air Flow Switch Sensor, 4" Length | 3000018 or 1729 | 10057201 |
| Air Flow Switch Sensor, 6" Length | 3000017 or 1729-22 | 10057202 |
| Mercury Contactor, 24 Volt Holding Coil, 35 Amp, 1 Pole | 35NO - 24A or 1035A24AC | 10162001 |
| Mercury Contactor, 24 Volt Holding Coil, 35 Amp, 2 Pole | 235NO - 24A or 2035A24AC | 10162002 |
| Mercury Contactor, 24 Volt Holding Coil, 35 Amp, 3 Pole | 335NO - 24A or 3035A24AC | 10162003 |
| Mercury Contactor, 208 / 240 Volt Holding coil, 35 Amp, 1 Pole | 35NO - 220A or 1035A208ACDV | 10162201 |
| Mercury Contactor, 208 / 240 Volt Holding Coil, 35 Amp, 2 Pole | 235NO - 220A or 2035A208ACDV | 10162202 |
| Mercury Contactor, 208 / 240 Volt Holding Coil, 35 Amp, 3 Pole | 335NO - 220A or 3035A208ACDV | 10162203 |
| Mercury Contactor, 277 Volt Holding Coil, 35 Amp, 1 Pole | 35NO - 277A or 1035A277AC | 10162301 |
| Mercury Contactor, 277 Volt Holding Coil, 35 Amp, 2 Pole | 235NO - 277A or 2035A277AC | 10162302 |
| Mercury Contactor, 277 Volt Holding Coil, 35 Amp, 3 pole | 335NO - 277A or 3035A277AC | 10162303 |
| Mercury Contactor, 24 Volt Holding Coil, 60 / 50 Amp, 1 Pole | 60NO - 24A or 1050A24AC | 10162004 |
| Mercury Contactor, 24 Volt Holding Coil, 60 / 50 Amp, 2 Pole | 260NO - 24A or 2050A24AC | 10162005 |
| Mercury Contactor, 24 Volt Holding Coil, 60 / 50 Amp, 3 Pole | 360NO - 24A or 3050A24AC | 10162006 |
| Mercury Contactor, 208 / 240 Volt Holding Coil, 60 / 50 Amp, 1 Pole | 60NO - 220A or 1050A208ACDV | 10162204 |
| Mercury Contactor, 208 / 240 Volt Holding Coil, 60 / 50 Amp, 2 Pole | 260NO - 220A or 2050A208ACDV | 10162205 |
| Mercury Contactor, 208 / 240 Volt Holding Coil, 60 / 50 amp, 3 Pole | 360NO - 220A or 3050A208ACDV | 10162206 |
| Mercury Contactor, 277 Volt Holding Coil, 60 / 50 Amp, 1 Pole | 60NO - 277A or 1050A277AC | 10162304 |
| Mercury Contactor, 277 Volt Holding Coil, 60 / 50 Amp, 2 Pole | 260NO - 277A or 2050A277AC | 10162305 |
| Mercury Contactor, 277 Voil Holding Coil, 60 / 50 Amp, 3 Pole | 360NO - 277A or 3050A277AC | 10162306 |

Note : All Electric Coil Components Are U. L. Listed Or Recognized.

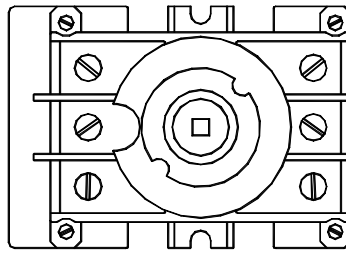
See Next Page For Views Of Electric Coil Components.

* Vendor Model Number are for reference only. TITUS reserves the right to change vendors as needed.

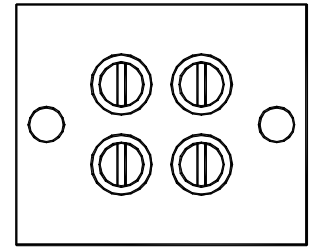
Use "Description" to match components if Model Numbers are different.



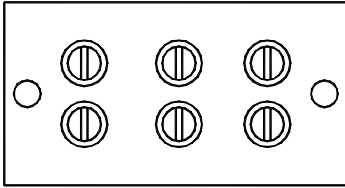
Door Disconnect Handle



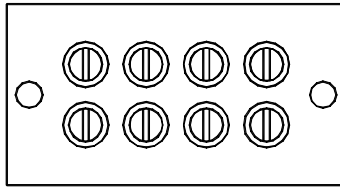
Door Disconnect Sub Base



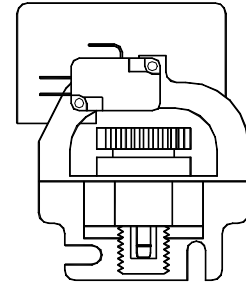
Terminal Block 2 Pole



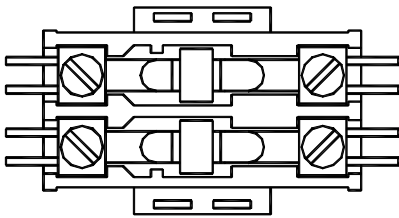
Terminal Block 3 Pole



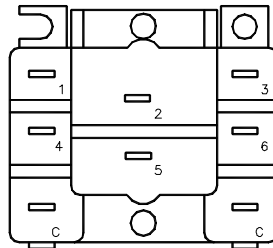
Terminal Block 4 Pole



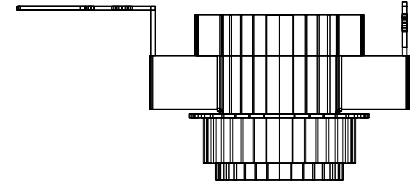
PE Switch



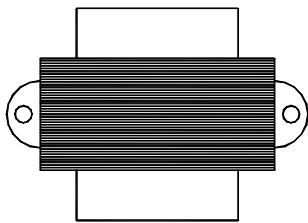
Magnetic Heat Contactor



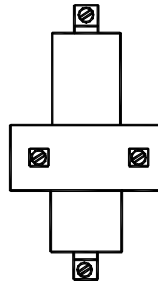
Relay 24V SPST (Fan)
Relay 24V DPDT



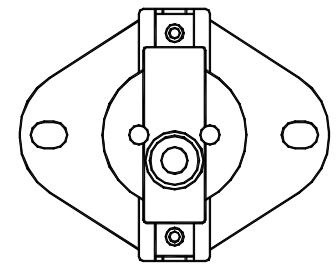
Auto Reset Thermal Cutout
(All Models)



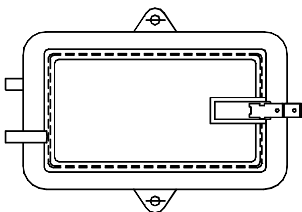
Transformer



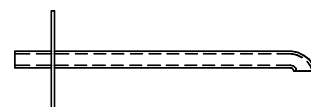
Mercury Contactor
(1 Pole)



Manual Reset Thermal Cutout



Air Flow Switch

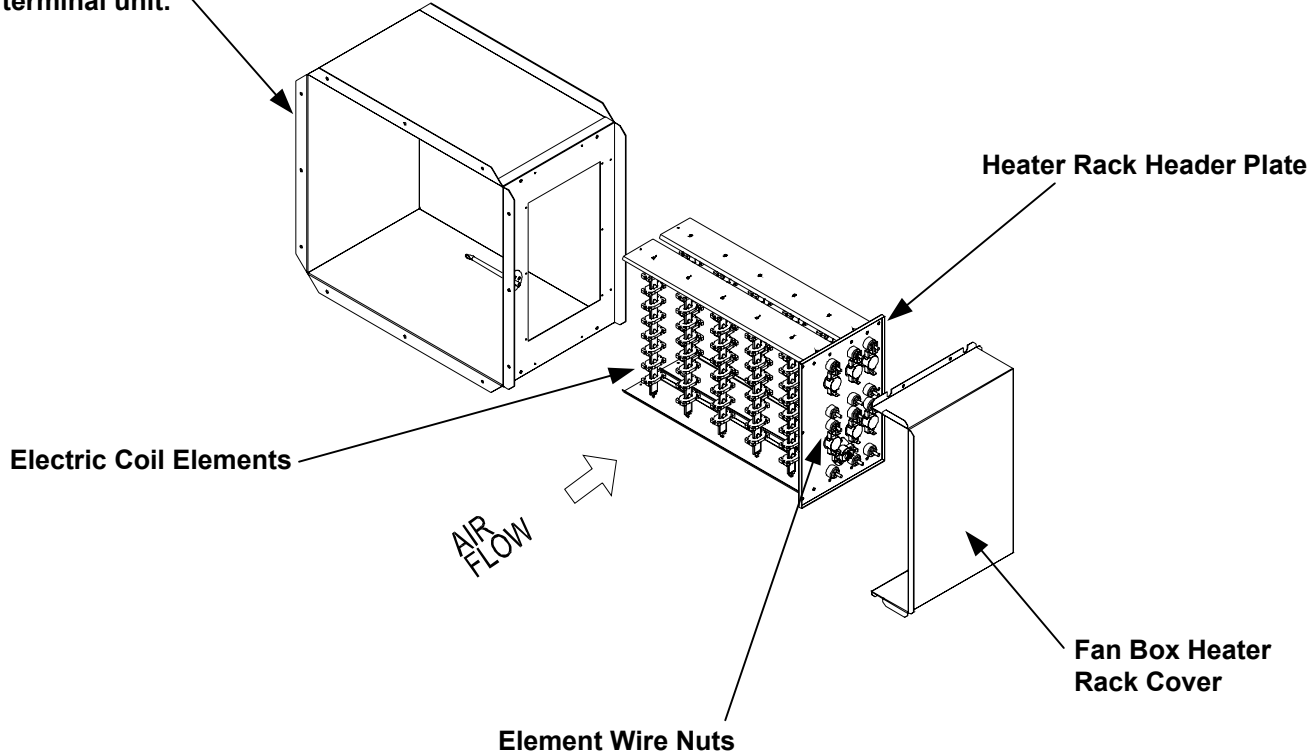


Air Flow Sensor

Heater Rack Replacement

Fan powered terminal heater is shown below.

Flanges mount to discharge of terminal unit.



On the fan powered terminals, the elements rack is located at the discharge end of the terminal under a metal heater rack cover held with screws. On the single duct terminals, the element rack is located inside the control enclosure on the side of the terminal.

1. Turn power off to the terminal unit before servicing.
2. Locate element rack header plate.
3. Before removing wires from the element rack header plate, mark the wires and where they are connected, to insure they are reconnected correctly on the new element rack.
4. Remove the wires and screws holding the header plate in the coil housing.
5. Insert the new element rack into the coil housing and replace the screws to secure the element rack.
6. Replace wires in the same locations as removed from old element rack.
7. Replace enclosure metal cover or door before turning on power to the electric coil.

Troubleshooting - Problems and Possible Solutions

| Problem | Possible Cause | Possible Solution |
|---------------------------------|---|--|
| Heater will not operate or heat | Disconnect or circuit breaker | May be in off position |
| | Fuses | May be blown, wrong amp size; replace with new fuses of correct size |
| | Manual reset cutout | If opened, manually reset it |
| | Air switch | Insufficient air flow or tube is disconnected from air pickup probe to air switch |
| | Automatic reset thermal cutout | Opened circuit from over heating, increase airflow |
| | P E switch | Check if wired DA/NC or RA/NO terminal and common |
| | Electronic controller | Check to see if controller is setup for proper heat sequence |
| | Element wire burned out | Use ohm meter to check for resistance, no resistance, replace with new elements |
| | Transformer | Check to see if getting 24 volts on secondary side +/-2 volts or replace new |
| | Heat contactor | Won't close contacts with power to holding coil terminals; replace with new contactor |
| Wiring problem | Check if correctly wired per wire diagram | |
| Heater cycles | Air switch opening and closing | Not sufficient air flow at times, increase airflow |
| | Transformer | Short on volt amps for full operation of equipment; need larger transformer |
| | Contacting chattering | Transformer under sized or air switch not staying closed; need larger transformer or more air for air switch |
| | Automatic reset thermal cutout | Increase air flow or look for insulation obstructing airflow over coil |

