

MANUAL – INSTALLATION + SERVICE

Electric Coils

For VAV Terminals

v100 – Issue Date: 02/22/21

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PRICE[®]

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ELECTRIC COILS

PRODUCT OVERVIEW

General

Price offers a very diverse array of electric heater coils for many Terminal units, over a wide kW range. All of Price Terminal units with Electric Coils, are ETL listed.

The Price Electric Coils are designed to be utilized in environments where:

- Air entering a building needs to be heated before entering another air conditioning process.
- Air must maintain a specified temperature and needs to be reheated before delivery to the desired zone.
- Heat is required for an entire building.
- Electric coils are in close proximity to distribution zones and minimal contactor noise is required, utilizing the Price Silent Guard (discussed in “Silent Guard” section).

Caution To Contractors

1. Disconnect power before servicing unit.
2. Do not operate unit without control cover installed.

NOTE: Price cannot warrant against unauthorized operating conditions as outlined above.

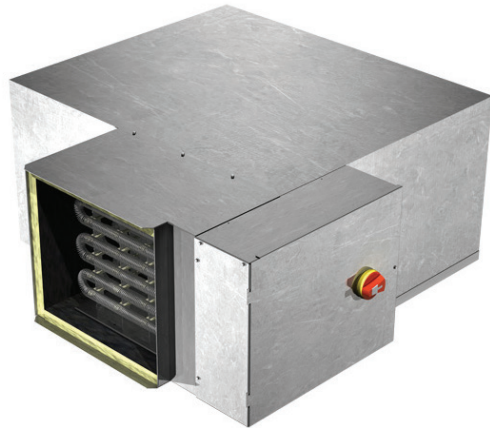
Receiving Inspection

All Price Fan Powered Terminal Units are inspected before shipment. After unpacking the assembly, check it for damage. If any damage to the products is found, report it immediately to the delivery carrier. During unpacking and installation, do not handle the unit by the inlet velocity sensor. Caution is required when unpacking the fan powered units with Electric Coils as not to damage the elements.

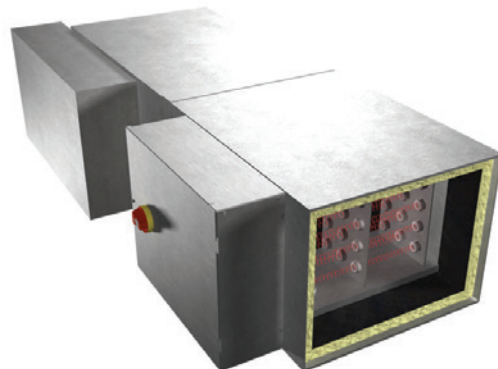
Ensure that all packing material is removed from the inside of the unit, especially around the blower wheel and coil section.

WARNING: Do not adjust the control components

FAN POWERED ▼



SINGLE DUCT ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Pre-Install

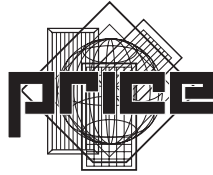
When you receive your terminal unit with electric heat, please follow this short list:

1. Check for any evidence of shipping damage to heater assembly, including but not limited to ceramic coil clips and wire damage. If damage is found, do not power up heater, file claim with carrier and/or replace heater.
2. Check electrical specification label to ensure proper voltage/current ratings.
3. Before wiring your Electric Coil, review and adhere to all local building codes, ordinances and the National Electric Code, pertaining to installation of equipment.
4. Determine if the electric heater/unit is field flippable between left and right handing. If the unit is an SDV or FDCA2, and the element terminal cutout in the bottom of the control panel is centered as shown in Figure X1, then the unit is flippable. The FDC-X-X is also flippable.
5. If mercury contactors are included, ensure the arrow on the label is pointed upward (Figure X2).

NOTE: To maintain ETL certification, Price Electric Coils must only be installed as they have been marked on the installation label provided on the door of the Electric Coil control panel; see "Installation Instructions" diagram.

NOTE: A minimum static pressure of 0.20 inches W.G. is required for stable operation with electric heater controls.

INSTALLATION LABEL ▼



VAV SPECIFICATIONS

Price Order No: _____
 Rep PO: _____
 Customer PO: _____
 Job Name: _____
 Package Tag: _____
 Unit Location: _____



AIR DISTRIBUTION PRODUCTS
 Manufactured By Price

Special Instructions: _____

FIGURE X1 & FIGURE X2 ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Heater Control Panel

The heater control panel houses all elements that are required to power up your Electric Coil.

Figure 1 shows a Fan Powered terminal units' control panel, including its Electric Coil heater controls.

The **interlocking door disconnect switch** is a recommended option for all lines of Electric Coils. It acts as a safety mechanism, as all live parts will be de-energized when the lock is turned off. The Fan and Transformer terminal block provides these two components with power. In most cases, the fan and transformer will use the same voltage (i.e. 115V or 277V). The grounding lug provides a solid connection for the panel to earth ground; a necessary safety measure. The **control transformer** steps the main voltage down to a level suitable for the low voltage control components of the Electric Coils. An optional **fuse block** houses the fuses, which are an inline safety for overcurrent protection of the Electric Coils. If a fault does occur on the coils and too much current is drawn, the fuses will separate the faulty component from the live circuit. The **motor speed controller** provides control of the fan in the terminal unit in an efficient and compact package. The **automatic & manual thermal limit-switches** are required to ensure the temperature within the duct does not exceed safety limits.

Electric coil panels using SCR control will look different than Figure 1, the extra components can be seen in Figures 2 & 3.

NOTE: The SCR acts as an active mode for modulating control of the Electric Coils, allowing for a more accurate method of temperature control.

FIGURE 2 ▼



FIGURE 3 ▼

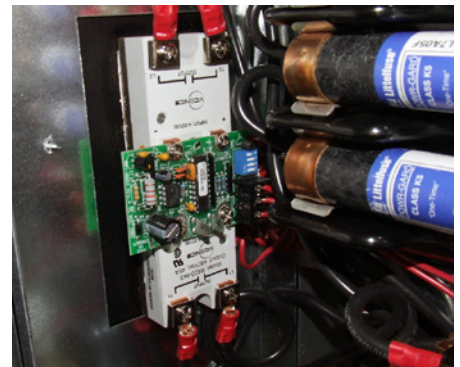
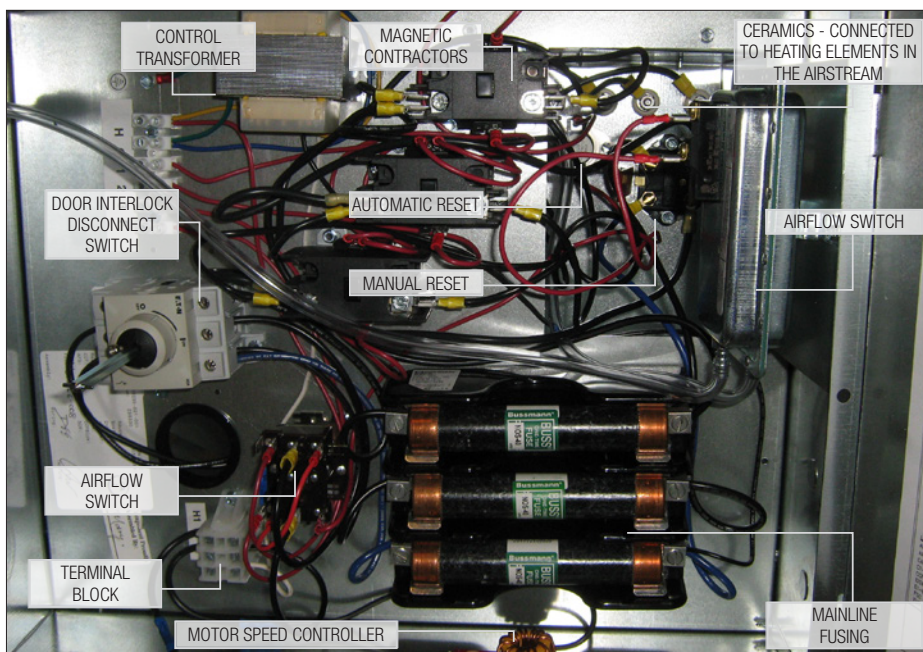


FIGURE 1 ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Price SCR Controller with Optional Discharge Sensor

The Price SCR Controller is a “Silicon Controlled Rectifier” that provides proportional modulation to the output over its full operating range.

The SCR acts like an electronic switch that turns on and off large amounts of power to the load (heater). The Price SCR uses a Zero Crossing feature that allows a soft start of the electronic load which eliminates power surges.

Benefits

- Proportional modulation of the heater maintains set point more accurately than on/off control, providing maximum comfort in the space.
- Energy efficient by avoiding overshooting and undershooting and reduces operation costs.
- Quiet operation of solid state components compared to mechanical relay or contactor pulling in and dropping out.
- SCR can be tied into existing BAS controller, or can be used in a standalone application.

Features

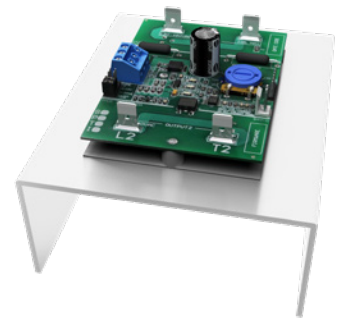
- Power requirements – 24VAC, polarity sensitive
- Aluminum heat sink to provide proper heat dissipation
- Load Power ranging from 120-480VAC, and a current rating of 10-45A depending on the model
- 5 available models:
 - 019455-108 – 3 Phase at 25A maximum
 - 019455-109 – 1 Phase 45A maximum
 - 019455-110 – 3 Phase at 45A maximum
 - 019455-111 – 1 Phase at 10A maximum (Lite Model)
 - 019455-112 – 3 Phase at 10A maximum (Lite Model)
- Both original and Lite models have same functionality
- Multiple Control Input signals from stand alone controller or BAS controller can be selected using jumper:
 - 2-10VDC signal
 - 4-20mA signal
 - Disable (turns off input and SCR)
 - 24VAC Pulsed signal
- LED indication for: Firmware Version, Type of Input Signal, and Output Indication

NOTE: 24VAC Power to the SCR Controller is polarity sensitive. The HOT and the COM connections must be maintained from the 24VAC power source to the SCR controller. I.e. HOT to HOT, and COM to COM. Warning: The SCR will still power up if the polarity is switched but the control signal will not function as intended.

PRICE SCR ▼



LITE MODEL ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Mounting Requirements and Precautions

The Price SCR will typically be factory mounted in an enclosure with an electric heating coil by Price. This assembly must be mounted so that the fins of the heat sink on the SCR are vertical, not horizontal. Vertical mounting will induce proper heat dissipation of the unit. Also, the heat sink must be open to its surrounding, meaning it must not be put into an enclosure or air flow obstructed in any way. This too, will allow for proper heat dissipation from the heat sink. The heat sink should not be painted during construction, as it will shorten the life of the SCR Lite controller.

Operation

Standard Modulating Control (no D.A.T.):

When no D.A.T. probe is connected, the SCR operates in standard modulating mode. With the jumper in the 2-10V or 4-20 mA position, an analog signal can be sent to the SCR. The heater output is then cycled proportionally to the signal being sent.

0–2V (0–4mA) = Heat Off. 2V–10V (4–20mA) = 0 – 100% duty cycle.

With the jumper in the Pulsed 24VAC position, a 24VAC signal can be used to turn on or cycle the heater. In this mode, when a 24VAC signal is sensed, the heater is turned on until the signal is de-energized.

24VAC Pulse Width Modulation Time Cycle – Use with Jumper in “Pulsed 24VAC” position:

Price recommends a minimum 2 second period at 0.5 Hz as an input for the 24VAC pulsed signal. See Figure 4.

Discharge Air Temperature Control mode:

When a D.A.T. probe is connected, the SCR operates in D.A.T. control mode. With the jumper in the 2-10V or 4-20mA position, if any signal above 2V (4mA) is sensed; the heater will engage and modulate to maintain its discharge air temperature setpoint. With the jumper in the 24VAC position, when a 24VAC signal is present, the heater will attempt to maintain its setpoint.

Price SCR Control Wiring Configurations

FIGURE A ▼

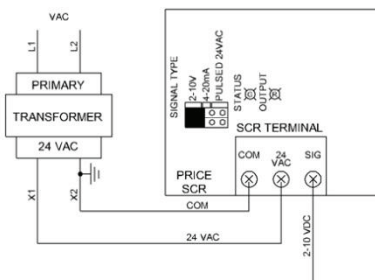


FIG. A: 2-10VDC SIGNAL WIRE FROM BAS CONTROLLER WILL PROVIDE A MODULATING SIGNAL TO THE OUTPUT. JUMPER SHOULD BE SET TO 2-10V.

FIGURE B ▼

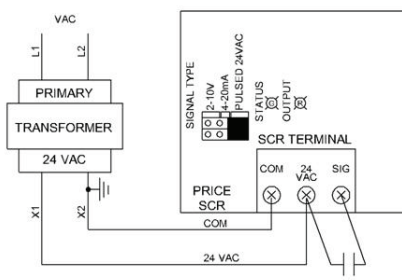


FIG. B: 24VAC BINARY OUTPUT SET OF CONTACTS FROM A CONTROLLER OR RELAY WILL PROVIDE AN OUTPUT PULSE. SEE FIG. 1 ABOVE FOR PWM CYCLE. JUMPER SHOULD BE SET TO PULSED 24VAC.

FIGURE C ▼

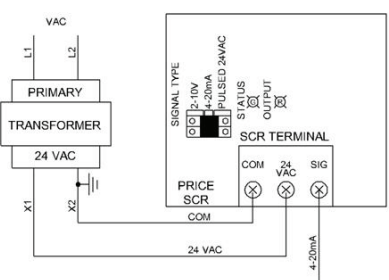
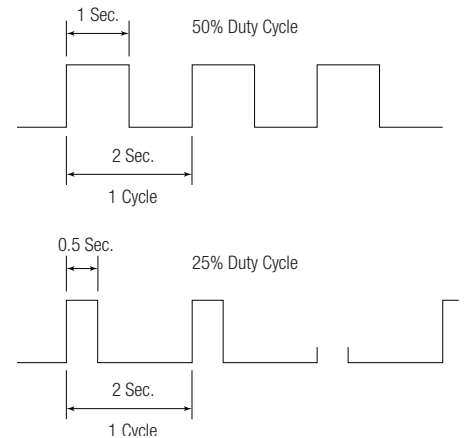


FIG. C: 4-20MA SIGNAL WIRE FROM BAS CONTROLLER WILL PROVIDE A MODULATING SIGNAL TO THE OUTPUT. JUMPER SHOULD BE SET TO 4-20MA.

FIGURE 4 ▼



$HZ = 1/P$
 $P = 1/HZ$
 WHERE P = PERIOD, AND HZ = FREQUENCY

ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Initial Power Up

Jumper Setting	Green Status LED	Red Output LED(s) *Lite Model has two	SSR Input LED(s) *Non-Lite Model only	Result
Any Position	Long Blinks	OFF	OFF	3 Long blinks on initial power up indicates Firmware Version 3

During Operation

Jumper Setting	Green Status LED	Red Output LED(s) *Lite Model has two	SSR Input LED(s) *Non-Lite Model only	Result
Any Position	1 Blink	OFF	OFF	No Output, Heat is off
2-10 VDC or 4-20 mA	2 Blinks	OFF	OFF	No Output, Heat is off (within range of 0-2VDC, or 0-4mA)
2-10 VDC or 4-20 mA	3 Blinks	ON – Pulsing	ON – Pulsing	Output, Heat is modulating (within range of 2-9.5VDC, or 4-19mA)
2-10 VDC or 4-20 mA	4 Blinks	ON	ON	Output, Heat is modulating (within range of 9.5-10VDC, or 19-20mA)
Pulsed 24VAC	5 Blinks	ON – Pulsing	ON – Pulsing	Heat is on and Output LED is on when signal is present. See Fig.1 below. Note: 24VAC input can also be used with a binary ON/OFF 24VAC signal.
Any Position (except disable)	6 Blinks	ON – Pulsing	ON – Pulsing	DAT mode – heat increasing at 2% every 5 seconds – if input greater than 2 VDC
Any Position (except disable)	7 Blinks	ON – Pulsing	ON – Pulsing	DAT mode – heat decreasing at 5% every 5 seconds
Any Position (except disable)	8 Blinks	ON – Pulsing	ON – Pulsing	DAT mode – heat steady – no change required - will maintain
Any Position (except disable)	9 Blinks	OFF	OFF	DAT mode – no call for heat – DAT sensor/thermistor detected
Any Position (except disable)	10 Blinks	N/A	N/A	Fault – contact Price for support (204-661-7807)

ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Discharge Air Temperature (DAT) Sensor Option

When a DAT sensor is plugged into the SCR, it will switch to DAT mode. Any call for heat above 2VDC (or 24VAC pulse) will enable the SCR and in DAT mode, the SCR will pulse to maintain the requested temperature. The requested Discharge temperature can be set with the blue dial in a range of 65°F to 130°F. If the requested temperature cannot be met (example: 130°F setpoint and the discharge is only measuring 110°F) the SCR will be on at 100%.



3 POSITION PLUGGABLE TERMINAL:

- COM – 24VAC COMMON
- 24VAC – 24VAC HOT
- SIG – 2-10VDC OR 24VAC SIGNAL

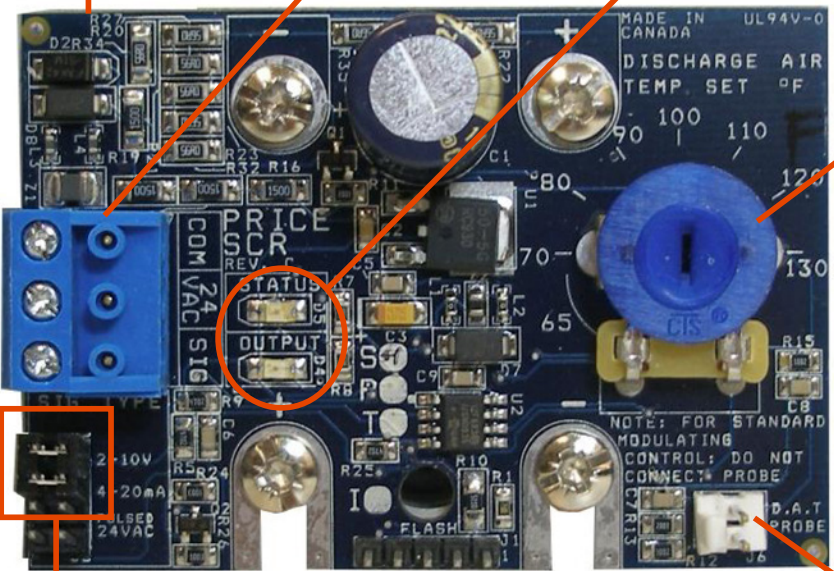
GREEN STATUS LED

- SHOWS CURRENT STATUS

RED STATUS LED

- SHOWS HEAT OUTPUT

NOTE: Lite Model has 2 Red Status LED's and a slightly different PCB layout.



DISCHARGE AIR TEMPERATURE (DAT) SETPOINT

- 65°F - 130°F RANGE

SCR

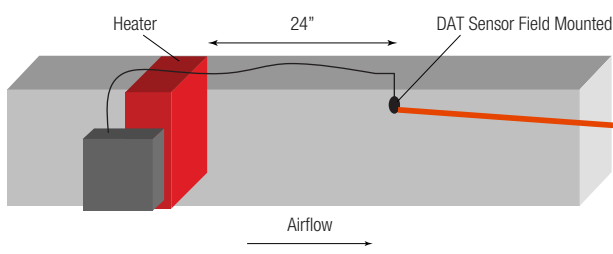
- CYCLE HEAT TO MAINTAIN THE DISCHARGE SETPOINT



JUMPER SETTING – DEFAULT IS 2 – 10 VDC INPUT. BUT CAN BE FIELD CHANGED TO:

- 4-20MA
- PULSED 24VAC
- NO JUMPER (DISABLES UNIT)

Jumper clockwise/counterclockwise rotation does not matter, all four pins are connected.



TEMPERATURE SENSOR MOUNTED DOWNSTREAM OF HEATER. RECOMMEND MOUNTING 24" DOWNSTREAM OF HEATER COIL.

ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Wiring Checklist

When your Terminal unit arrives, and it has passed the damage inspection section, there is a procedure that should be followed to safely bring power into the Electric Coil panel. This procedure can be seen below; please be sure to locate the wiring diagram that corresponds with each individual Electric Coil (secured to the inside of the Electric Coil panel door).

1. Review Electrical wiring diagram included with heater (typically glued to inside of electrical enclosure door). Note the type of control signal required; either switched HOT or switched COMMON. (Switched HOT control has the common always tied to the load, and the hot will be switched – like a light switch. Switched COMMON uses the opposite: hot is wired to the load and the common is switched).
2. Ensure circuit powering the heater has proper capacity. Follow local building codes.
3. The electric duct heater must have an uninterrupted or unbroken electrical ground to minimize the chance of injury should an electrical fault occur. This may consist of an electrical wire or approved conduit when installed in accordance with existing electrical codes.
4. Review and inspect safety devices
 - a. Automatic Reset – This safety feature is included on all Electric Coil units. This is the first line-of-defense for thermal protection of the coils. The Automatic Reset will trip if the air surrounding the coils is too hot; often caused by insufficient airflow through the duct. The Automatic Reset will trip at an air temperature of approximately 130 °F, which will break the control signal to the heater. Once tripped, the Automatic Reset will reset itself after cooling, typically 115 °F.
 - b. Manual Reset – This safety feature is included on all Electric Coil units. If the temperature of the air around the coils increases rapidly, the Manual Reset may trip. When the duct air temperature reaches approximately 150 °F, the Manual Reset will trip. This relay operates as a backup for the Automatic Reset, by breaking power to the heater. (To reset this, press the red tab toward the reset switch contacting the protruding metal tab on the relay. If your electric coil doesn't have a red tab, simply press down the protruding metal tab on the relay by hand.).

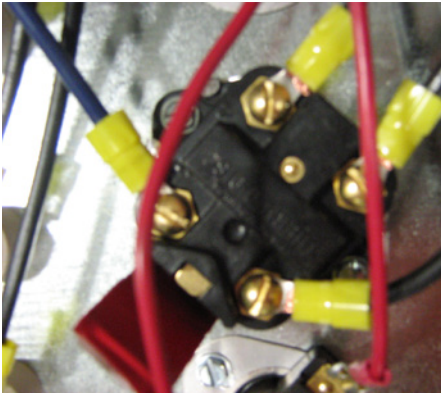
NOTE: The auto and manual resets are isolated from each other, as the manual breaks the power to the heater and the auto breaks the power to the control circuit. This is a safety feature on all Price Electric Coils.
 - c. Airflow Switch (optional on some units) – Trips ON when approx 0.05" W.C. of static + velocity pressure is detected. Ensure that the airflow switch probe points into the air stream. **NOTE:** The airflow switch must be mounted in a vertical plane; if this is not followed, the switch will always output a constant ON or OFF regardless of airflow.

ELECTRIC COILS

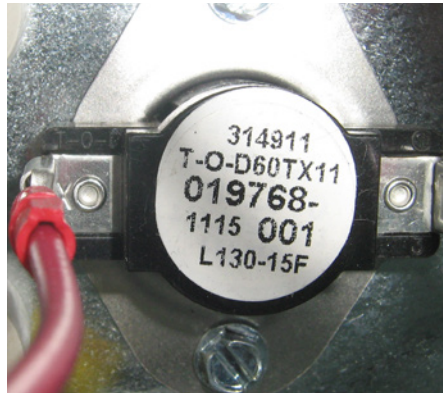
INSTALLATION AND MOUNTING INSTRUCTIONS

- d. Mercury Contactors (Optional) - The mercury contactor serves the same function as the standard magnetic contactors, but operate silently. Field flippable heaters with mercury contactors must be inspected to ensure that the contactor is in the proper orientation. If the arrow is pointing down in the desired unit handing, the mercury contactor must be flipped.

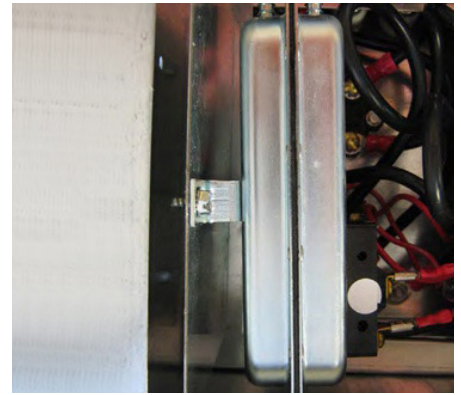
MANUAL RESET ▼



AUTOMATIC RESET ▼



AIRFLOW SWITCH ▼



MERCURY CONTACTOR ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Fan Powered Electric Coil Removal Instructions

CAUTION: Disconnect all incoming power before any electrical installation or service is performed on the unit(s).

Ensure line power is off to the Fan Powered Terminal Unit (FPTU) Control Panel. The Control Panel contains hazardous voltages when energized; make certain that incoming line voltage has been disconnected.

1. Open the Control Panel and disconnect any incoming wires that are not integrated in the enclosure; i.e. mains supply, motor wires and as seen in Illustration B.
2. Make sure the motor wires are loose and can move freely through the knock-out. See Illustration C.
3. Using a ¼" driver, remove the screws securing the Control Panel to the FPTU. These screws will be located close to the inside corners of the control box. See Illustration D.
4. Use a knife to cut the sealant between the housing and FPTU. See Illustration E.
5. Once the screws have been removed and the sealant has been separated, the Electric Coil can slide out of the FPTU. Grab the control box securely and slide the coil out of the unit horizontally. Slide out the coil slowly to ensure the insulation doesn't tear. See illustration E.

Be cautious when cutting the sealant and removing the screws as they are the only securing medium for the Electric Coil.

ILLUSTRATION A ▼



ILLUSTRATION B ▼

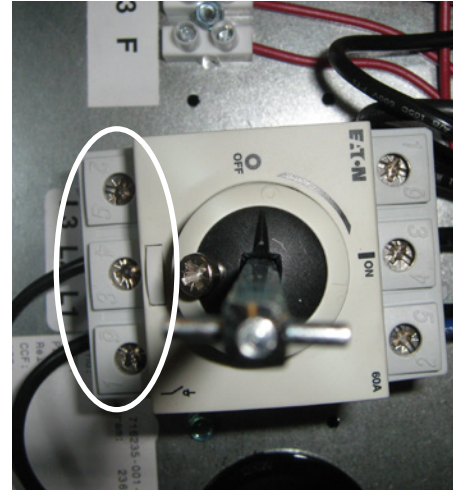


ILLUSTRATION C ▼

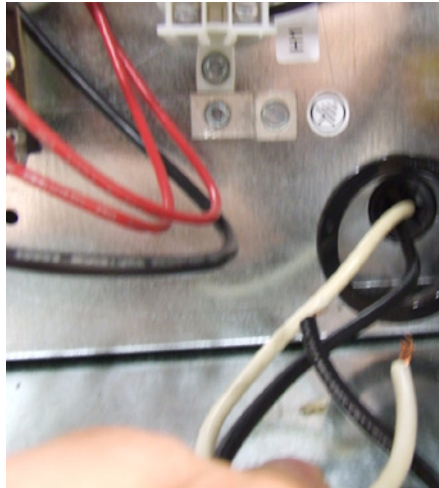


ILLUSTRATION D ▼



ILLUSTRATION E ▼

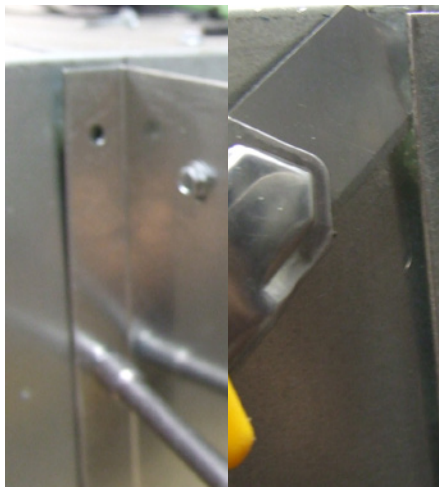
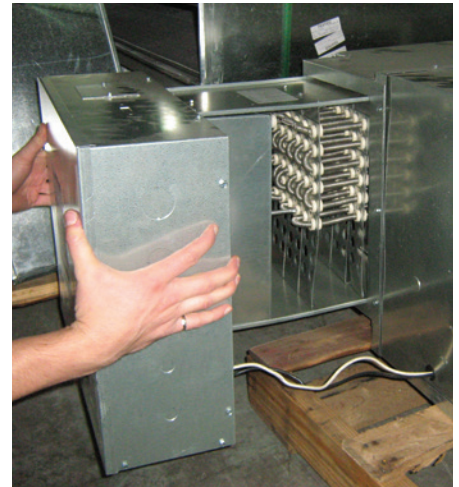


ILLUSTRATION F ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Single Duct Electric Coil Removal Instructions

CAUTION: Disconnect all incoming power before any electrical installation or service is performed on the unit(s).

Ensure line power is off to the Single Duct Control Panel. The Control Panel contains hazardous voltages when energized; make certain that incoming line voltage has been disconnected.

The Single Duct Electric Coil assembly, seen in Illustration AA, can be removed by following the steps listed below:

1. Open the Control Panel and disconnect any incoming wires/tubing that are not integrated in the enclosure; i.e. main supply, pitot tubing, as seen in Illustration BB.
2. In the Control Panel, there will be a minimum of four (4) ¼" screws securing the coils to the Single Duct. These screws will be located at strategic locations around the corners of the enclosure, see Illustration CC. **NOTE:** It is not necessary to separate the enclosure from the coils, but just remove the entire assembly from the Single Duct.
3. Use a utility knife to cut the sealant between the Control Panel and the Single Duct, this seal can be seen in Illustration DD.
4. The Electric Coil assembly can now be removed from the Single Duct. It will simply slide out of the ducting. See Illustration EE to see coil assembly and some screws that secure the Control Panel to the Single Duct.

ILLUSTRATION AA ▼

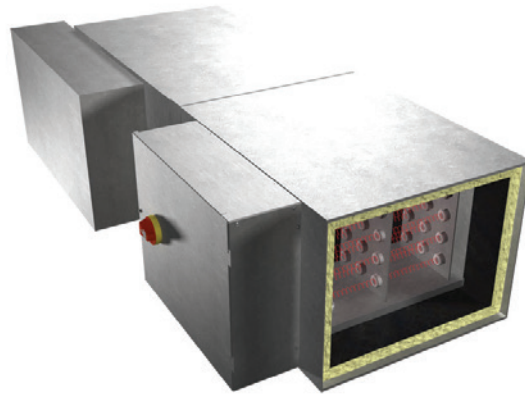


ILLUSTRATION BB ▼

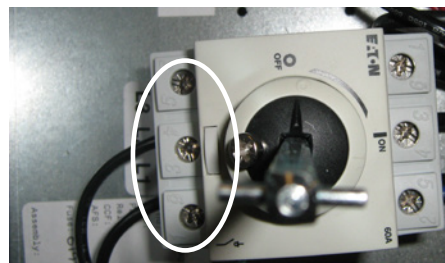


ILLUSTRATION CC ▼

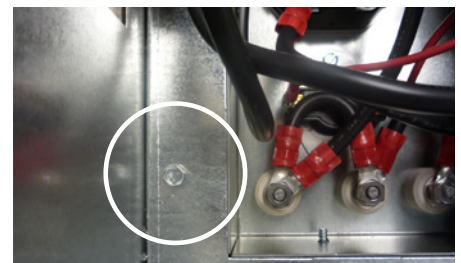


ILLUSTRATION DD ▼

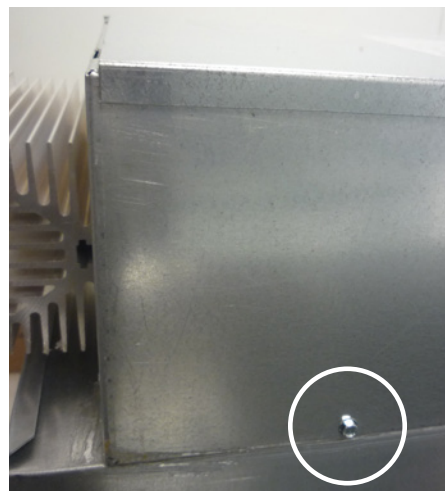
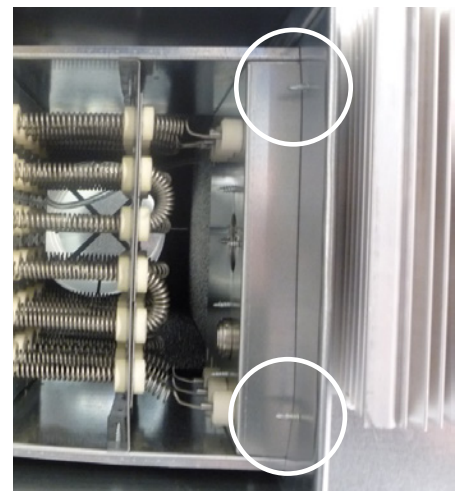


ILLUSTRATION EE ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Controls Hookup

Power (24 VAC) for the Price Silent Guard is supplied to the 24VAC HOT and 24VAC COMMON ¼” spade tabs near the status LED labeled **Power**.

Controls supplied by Price or others are connected via the six ¼” spade tabs labeled **Controls**. The inputs are auto detecting for either switched HOT or COMMON inputs from relays or triacs.

NOTE: Polarity of the 24VAC HOT and COMMON must be observed and consistent throughout the system. Wiring errors will cause erratic operation of the heater control and zone controls.

Controls hookups are as follows:

- H – 24VAC hot power output to controls (protected by auto-resetting thermal fuse) [Max 25VA load]
- C – 24VAC common power output to controls (protected by auto-resetting thermal fuse) [Max 25VA load]
- F – Engages fan relay (note: only available/active on fan powered terminals)
- 1 – Engages heater stage (step) 1 (if airflow/fan conditions are met)
- 2 – Engages heater stage 2 (if airflow/fan conditions are met)
- 3 Engages heater stage 3 (if airflow/fan conditions are met)

To verify operation of F,1,2,3 short ¼” terminal/tab to either 24VAC HOT or COM. Relay should engage 1 second later.

NOTE: If fan powered unit, heating stages will not engage without a FAN (F) signal. For single duct units, heating stages will not engage without a STEADY airflow signal from airflow switch. Check status blinks for more information.

Stages of Heat Jumper

The stages of heat (SOH) jumper is typically factory set and does not need to be adjusted in the field. Please note the heater will be physically factory wired with a certain number of stages and this cannot be changed in the field. Below shows the heater operation using the SOH jumper.

Relays Energized by Stage Demand and SOH Position			
Stage Demand:	1	2	3
SOH Jumper = 1	E1, E2, E3	-	-
SOH Jumper = 2	E1, E3	E2	-
SOH Jumper = 3	E1	E2	E3

ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Status LED

The green status LED next to the 24VAC POWER input blinks out codes showing the current heater controller mode. This is helpful for testing and troubleshooting the controls.

Blinks	Modes	Notes
1	Stage 1 of heating active	Controls/Thermostat are requesting 1 stage of heat <ul style="list-style-type: none"> To verify operation disconnect Controls/Thermostat and jumper Stage 1 terminal to either H or C (24VAC hot or common). Relay(s) should click and red LED(s) should light. (see table on previous page)
2	Stage 2 of heating active	Controls/Thermostat are requesting 2 stages of heat <ul style="list-style-type: none"> To verify operation disconnect Controls/Thermostat and jumper Stage 1, 2 terminals to either H or C (24VAC hot or common). Relays should click and red LEDs should light.(see table on previous page)
3	Stage 3 of heating active	Controls/Thermostat are requesting 3 stages of heat <ul style="list-style-type: none"> To verify operation disconnect Controls/Thermostat and jumper Stage 1,2,3 terminals to either H or C (24VAC hot or common). Relays should click and red LEDs should light. (see table on previous page)
4	Fan (only) is engaged	Controls/Thermostat are requesting fan only <ul style="list-style-type: none"> To verify operation disconnect Controls/Thermostat and jumper F terminal to either H or C (24VAC hot or common). Relay should click and FAN1 yellow LED should light.
5	Heat cannot engage due to lack of air.	Single duct with Airflow Switch (AFS) <ul style="list-style-type: none"> AFS must sense at least 0.05" W.C. of pressure for 15 seconds before it will engage AFS must be mounted vertically, it will not function properly if mounted horizontally Fan Powered without Airflow Switch (AFS) <ul style="list-style-type: none"> Heat will not engage unless Controls/Thermostat requests FAN Fan interlock prevents heat from engaging without airflow
6	Automatic Reset has tripped	Automatic Reset has tripped Automatic reset trips when it reaches 135°F. This will cut power to the Control Relays (E1, E2, E3). Automatic will reset after it cools.
7	Manual Reset has tripped	Manual reset trips when it reached 150°F. This will cut power to the Safety Relays (L1, L2). Manual reset requires service personal to reset. This typically means a major overheating condition has occurred in the heater. Re-check ductwork and design airflows.
8	All safeties are OK, with no call for heat/fan	No call for fan and/or heat. Controller is standing by.

ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Technical Specifications

Power:	24VAC +-10% @ 50/60Hz (10VA – required for Silent Guard + Controls Load)
Controls 24VAC output:	Thermal Fuse protection (with auto reset) – limited to 25VA maximum
F, 1, 2, 3 inputs:	Auto detect switched HOT or COMMON 24VAC
Operating Conditions:	0°C to 50°C (32°F to 122°F) 0% - 95% R.H. non-condensing
Storage Conditions:	-30°C to 50°C (-22°F to 122°F) 0% - 95% R.H. non-condensing
Processor:	8-bit flash microcontroller with on board Analog to Digital Converter
Inputs:	6 Analog custom, 2 digital
Outputs:	5 Digital custom
Relays:	277VAC maximum, 30 Amps maximum resistive load
Connections:	¼" Spade Terminals – Recommend 18-22AWG copper wire
Dimensions:	5.5" by 8.55" (139.7 mm by 217.2 mm)
Shipping Weight:	0.67 lbs (303.9 grams)
Certification:	ETL listed product

ELECTRIC COILS

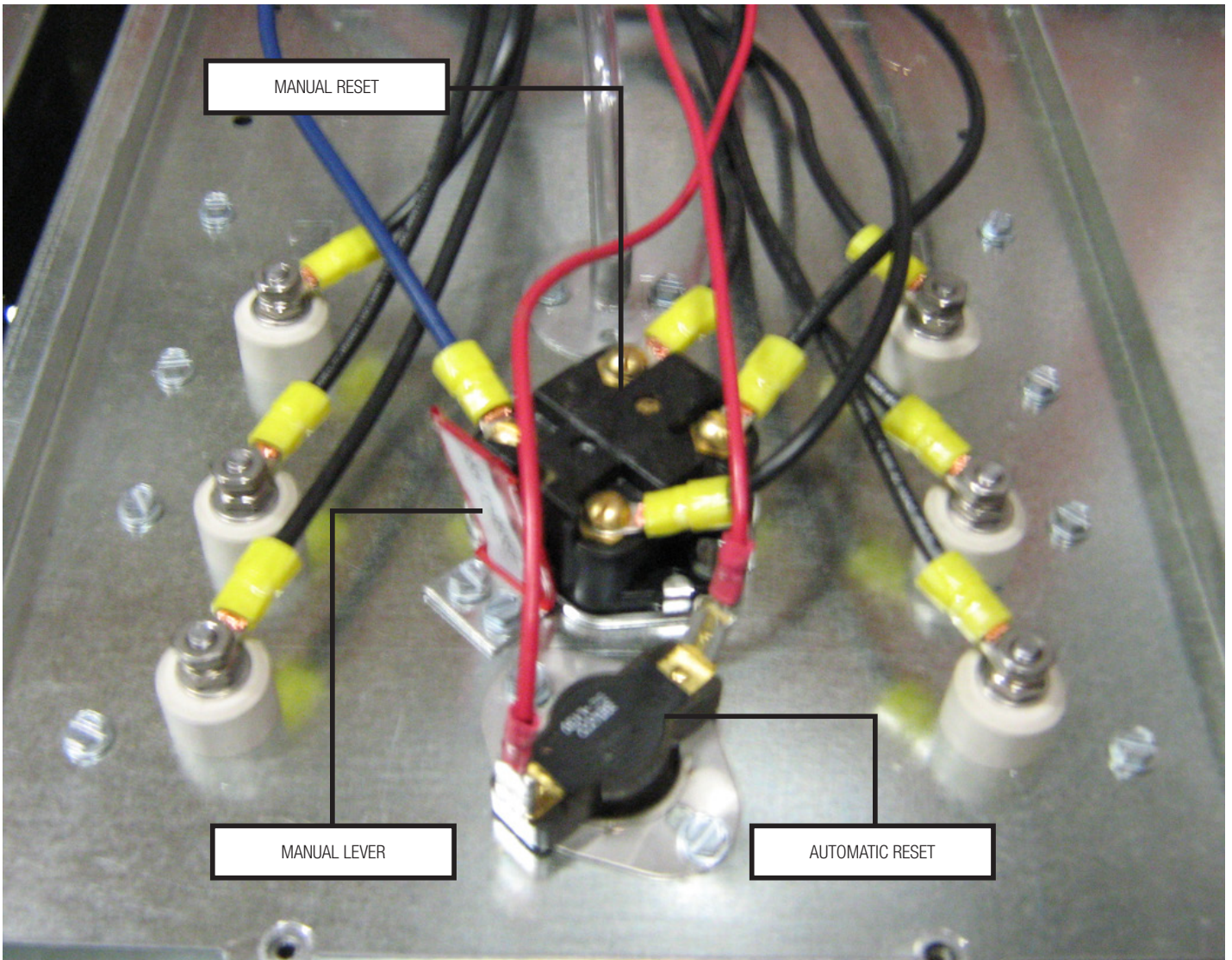
INSTALLATION AND MOUNTING INSTRUCTIONS

Electric Duct Heater Startup Checklist

Step 1 – Receiving Checklist

1. Check for any evidence of shipping damage to heater assembly. If damage is found, do not power up heater. File claim with carrier and/or replace heater.
2. Check electrical specification label for proper voltage/ current ratings ordered.
3. Before wiring review and adhere to all local building codes, ordinances, and/or the National Electric Code pertaining to installation of equipment.

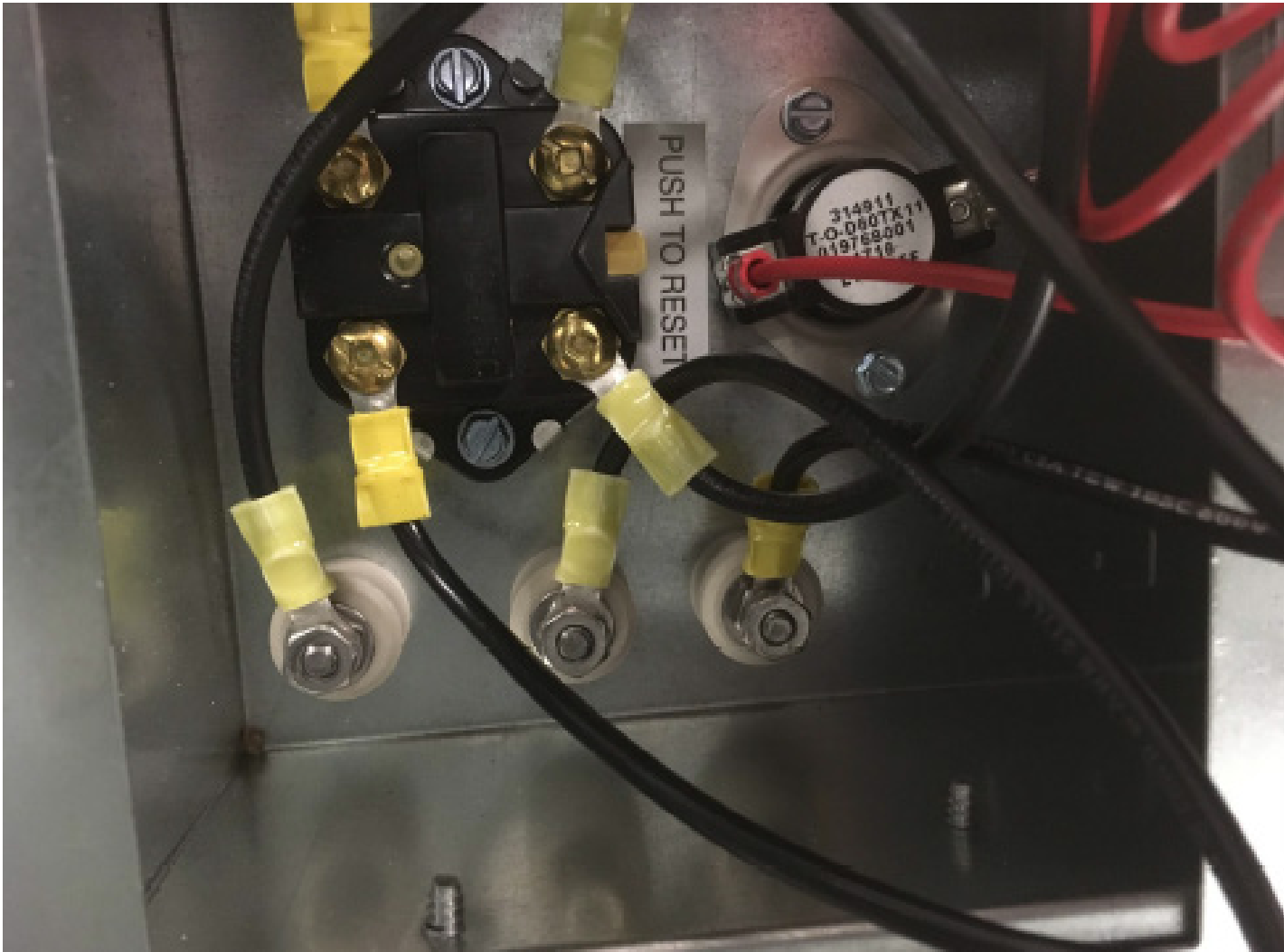
ELECTRIC DUCT HEATER WITH MANUAL LEVER ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

ELECTRIC DUCT HEATER WITHOUT MANUAL LEVER ▼



ELECTRIC COILS

INSTALLATION AND MOUNTING INSTRUCTIONS

Step 2 – Wiring Checklist

1. Review Electrical wiring diagram included with heater. (Typically glued to inside of electrical enclosure door.)
NOTE: The type of control signal required. Either switched HOT or switched COMMON.
2. Ensure circuit wired to heater has proper capacity. Follow local building codes.
3. The electric duct heater must have an uninterrupted or unbroken electrical ground to minimize the chance of injury should an electrical fault occur. This may consist of an electrical wire or approved conduit when installed in accordance with existing electrical codes.

4. Review and inspect safety devices
 - i. Manual Reset (Ensure not tripped) - If applicable, the red tab resets switch, if no red tab supplied, press reset tab by hand. Included on all units.
 - ii. Automatic Reset (resets after cooling) – included on all units.
 - iii. Airflow Switch (optional on some units) – trips ON when approx 0.05" W.C. of static + velocity pressure detected. Airflow switch tubing points into the air stream.

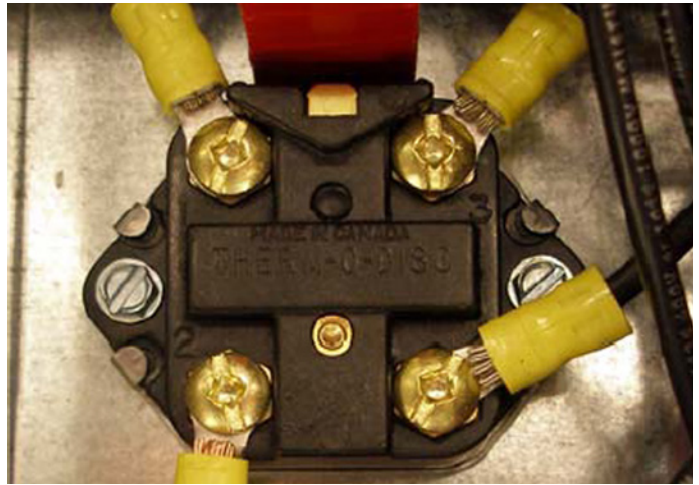
NOTE: Airflow switch must be operated in a vertical plane. If not switch will always output a constant ON or OFF regardless of airflow.

- iv. Air velocity is important for the electric heater to operate efficiently. Loss or impedance of airflow may result in nuisance tripping or short element life. Excessive level of airflow will result in low air temperature rise. **Price Electric Coils must have at least 70 CFM per KW to maintain ETL certification and to ensure proper operation of the heater and safety circuits.**

WARNING: Disconnect all power to the unit before servicing

- v. Field flippable heaters must be inspected to ensure the mercury contactors(if supplied) is in the proper orientation, where the arrow on the label is pointing upwards. Refer to page 8. .

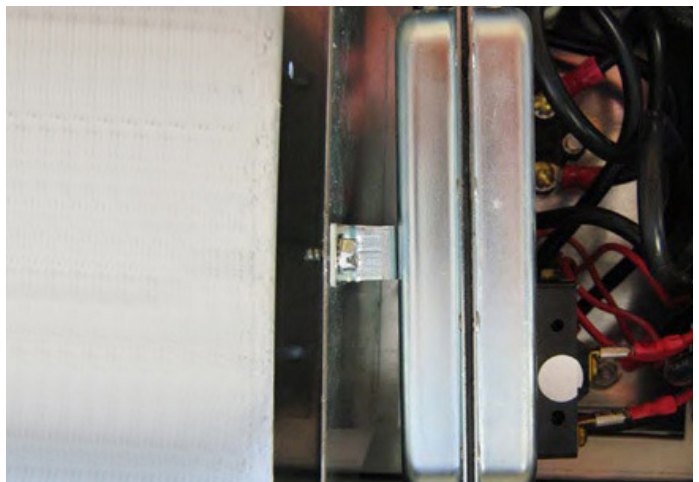
MANUAL RESET ▼



AUTOMATIC RESET ▼



AIRFLOW SWITCH ▼



ELECTRIC COILS

MAINTENANCE

Electric Coil Troubleshooting

Problem	Potential Cause	Potential Solution
No Heat	Disconnect Switch	Check to see if the door interlock switch is active
	Fuses	Use a Digital Multimeter (DMM) to measure resistance (R) of each fuse, should read a negligible amount. If R is in MΩ, fuse most likely is blown, order a new fuse from replacement list
	Wiring	De-energize panel and trace wires with wiring diagram to check for loose or broken/burned wires
	Transformer	The transformer provides 24 volts to secondary; with primary voltage active, use DMM to measure the secondary: 24V ± 2V, if not in this range, replace transformer
	Automatic Temperature Limit-Switch	Increase airflow to allow coils to cool faster, switch will automatically reset
	Manual Temperature Limit-Switch	Use the metal tab(if applicable) to press towards the switch to reset it, the airflow may have to be increased
	Airflow Switch	Consult “Airflow Switch” Troubleshooting section
Heat Cycles On/Off	Automatic Temperature Limit-Switch	Increase airflow to allow coils to cool faster, switch will automatically reset, check to see if airflow to coils is unobstructed
	Manual Temperature Limit-Switch	Use the metal reset tab (if applicable), press it toward the switch to contact the switch and reset it, airflow should be increased, check to see if airflow to coils is free
	Airflow Switch	Consult “Airflow Switch” Troubleshooting section

ELECTRIC COILS

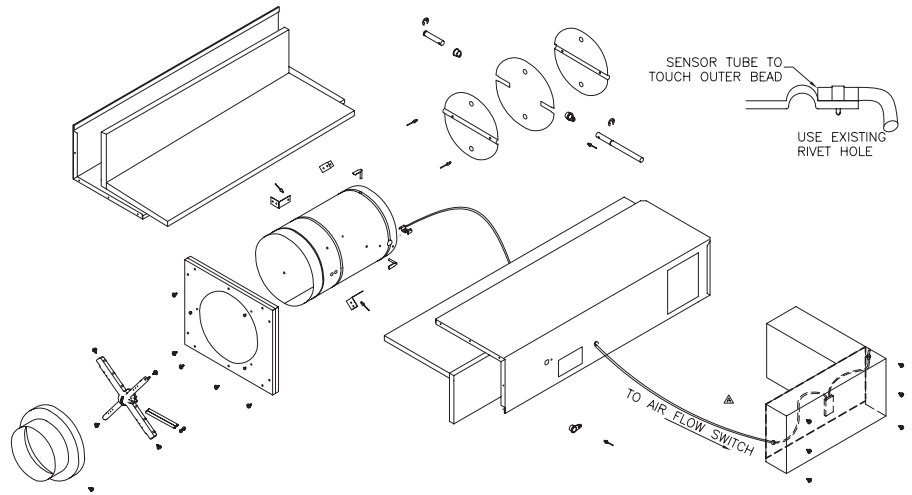
MAINTENANCE

Airflow Switch Troubleshooting

The Airflow Switch MUST be mounted in the vertical plane to ensure proper operation. If there is a problem with your airflow switch, this will most likely be the cause. Another common problem that may be experienced is simply airflow in the duct is not enough to keep the switch closed. With all Price Electric Coils an airflow rate of at least 70 CFM per kW of heat must be maintained to ensure safe operation of the coils. This means that if your Electric Coil is rated at 9.5 kW, you must have $9.5\text{kW} \times 70\text{CFM/kW} = 665\text{CFM}$. If airflow is sufficient and your switch is mounted in the vertical plane, there may be an issue with your airflow switch. To verify airflow switch operation please check the following:

1. Assure static pressure of the heater is at least .1" w.g. Add pressure if required by closing downstream dampers or adding resistance to stimulate AFS. Short out the Airflow Switch (AFS) terminals (temporarily!) to verify the problem is with the AFS and not another part of the heater. (i.e.: no call for heat, blown breaker, fuse, tripped auto/manual reset, faulty wiring, etc).
2. Check that the clear tubing is securely connected to the HIGH and LOW ports port of the AFS
3. Ensure the tubing is not pinched or cut.

SINGLE DUCT AFS CONFIGURATION ▼



AIRFLOW SCOOP ▼



ELECTRIC COILS

MAINTENANCE

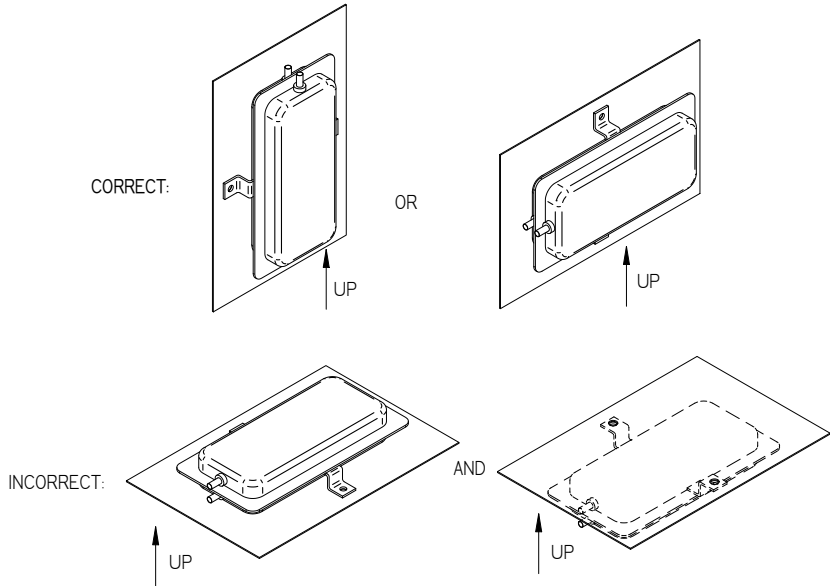
4. Ensure the LOW pressure tubing is properly routed out of the control box, through the strain relief. Check if the open end of the clear tubing is blocked or plugged.
5. Check pressure with a gauge and verify at least 0.05" (+-.02") W.C. Then check brass terminals with an ohm meter to verify operation.
NOTE: These "metal can" airflow switches have a large dead-band (0.02" W.C minimum). **NOTE:** The AFS tubing points into the air stream giving a static + velocity reading.
6. If known good AFS is available, replace existing to verify a replacement AFS is necessary.

On our single duct models with Electric Coils the pitot tube, also known as an airflow 'scoop', which detects airflow in the duct, is placed near the outlet of the duct. The clear tubing will be run outside of the Single Duct terminal unit and into the AFS.

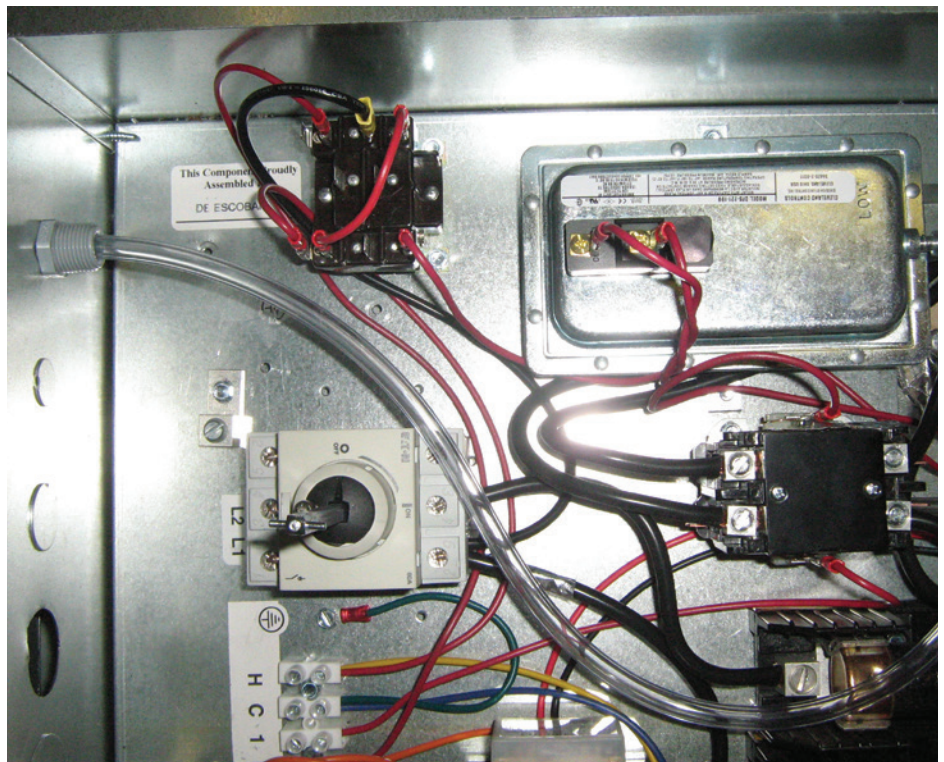
Inside the control panel, the clear tubing on the HIGH inlet of the airflow switch will run to the airflow 'scoop', while the LOW inlet tubing will run out of the control box to the surroundings.

In case of malfunction check if AFS tubing has been disconnected or is pinched.

ORIENTATION ▼



LOW PORT ROUTED OUT OF CONTROL BOX ▼



ELECTRIC COILS

MAINTENANCE

Notes for Remote Mount Electric Coils (FDCG and FDCA2 only)

When the FDCG or FDCA2 terminal is selected, the option of having the Electric Coil control panel located away from the unit may be desired. Please refer to the Manual for Fan Powered Constant Volume Terminal Units for the terminal installation. Once the unit is installed, and an appropriate location is selected for the controls panel, be sure to follow these installation notes:

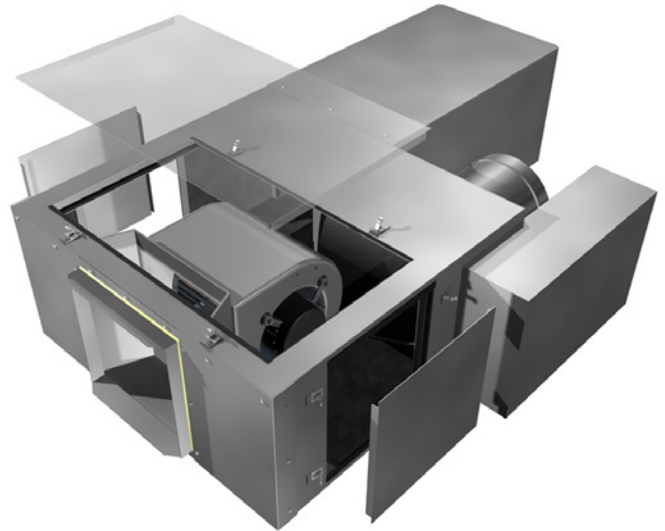
CAUTION: Disconnect all incoming power before any electrical installation or service is performed on the unit(s).

Electric heating coils provided are of the capacity scheduled on the drawings. The heating coils are factory mounted at the discharge outlet of the terminal unit. The entire assembly is constructed of heavy gauge galvanized steel; adding rigidity and strength to the unit. An automatic reset thermal cut-out is provided as primary protection against overheating. A secondary thermal cut-out is provided as a back-up to the automatic reset thermal cut-out. The entire assembly is ETL listed to meet UL1995 and CSA no. 236.

Ensure at least 70 CFM/kW as a minimum airflow across the heater is maintained and that there is at least 0.1" w.g. of air pressure downstream from the coils.

1. All field wiring is to be in accordance with the National Electrical Code ANSI/NFPA No. 70 or the Canadian Electrical Code, Part 1, CSA Standard C 22.1.
2. Run the appropriate conduit (supplied by others) from the control panel to the Electric Coil. The field wiring will be run within this conduit.
3. Refer to the electrical schematic which is permanently affixed to the backside of the electrical control cabinet door prior to hook-up. Wire the unit accordingly. Check the voltage requirements to ensure proper voltage supply is used and is wired to the correct terminals.

FDCG OR FDCA2 ▼



ELECTRIC COILS

MAINTENANCE

Replacement Parts

Component	Qty per unit	Description	Part#
Terminal Block	1	Push-in 12 pole terminal block	019064-013
Relay (24V)	1	These relays are 2 pole Magnetic contactor type	
30FLA			019416-001
Relay (120V)			
30FLA		FLA stands for Full Load Amps	019863-001
Relay (240/277V)			
40FLA			019417-003
Relay		These relays are 2 pole Mercury contactor type	
30 Amp			019863-002
60 Amp			019863-003
Airflow Switch	1	Safety airflow switch ensures flow	019425-002
PE Switch			
24 - 120V			019873-001
Transformer (Standard)	1		
120V 50VA		Transformer 120/24V 50VA FT-MT	019436-001
277V 50VA		Transformer 277/24V 50VA FT-MT	019439-001
208,240V 50VA		Transformer 208,240/24V 50VA FT-MT	019436-011
480V 50VA		Transformer 480/24V 50VA FT-MT	00-14050
Fuse Block (1 pole)		Fuse block 1 pole 600V 30A	
600V 30A		Model: H60030-1	019764-001
600V 60A		Model: H60060-1	019764-002
600V 30A		Model: BM6031SQ for Motor Fuse	019459-001
Fuse Block (3 pole)		Fuse block 3 pole 600V	
600V 30A		Model: H60030-3	019765-001
600V 60A		Model: H60060-3	019765-002

ELECTRIC COILS

MAINTENANCE

Replacement Parts

Component	Qty per unit	Description	Part#
Fuse			
600V 40A		Fuse 600V 40A Class H	019766-008
600V 45A		Fuse 600V 45A Class H	019766-009
600V 50A		Fuse 600V 50A Class H	019766-010
600V 60A		Fuse 600V 60A Class H	019766-011
500V 8A		Motor Fuse 500V 8A	019124-001
500V 3A		Motor Fuse 500V 3A	019124-002
500V 4A		Motor Fuse 500V 4A	019124-003
500V 2A		Motor Fuse 500V 2A FNQ Style	019124-004
500V 2.5A		Motor Fuse 500V 2.5A FNQ Style	019124-005
500V 3.5A		Motor Fuse 500V 3.5A FNQ Style	019124-006
500V 4.5A		Motor Fuse 500V 4.5A FNQ Style	019124-007
500V 5A		Motor Fuse 500V 5A FNQ Style	019124-008
500V 6A		Motor Fuse 500V 6A FNQ Style	019124-009
500V 7A		Motor Fuse 500V 7A FNQ Style	019124-010
500V 9A		Motor Fuse 500V 9A FNQ Style	019124-011
500V 10A		Motor Fuse 500V 10A FNQ Style	019124-012
500V 12A		Motor Fuse 500V 12A FNQ Style	019124-013
500V 14A		Motor Fuse 500V 14A FNQ Style	019124-014
500V 15A		Motor Fuse 500V 15A FNQ Style	019124-015
500V 20A		Motor Fuse 500V 20A FNQ Style	019124-016
500V 25A		Motor Fuse 500V 25A FNQ Style	019124-017
500V 30A		Motor Fuse 500V 30A FNQ Style	019124-018
600V 5A		Fuse 600V 5A Class H	019766-001
600V 10A		Fuse 600V 10A Class H	019766-002
600V 15A		Fuse 600V 15A Class H	019766-003
600V 20A		Fuse 600V 20A Class H	019766-004
600V 25A		Fuse 600V 25A Class H	019766-005
600V 30A		Fuse 600V 30A Class H	019766-006
600V 35A		Fuse 600V 35A Class H	019766-007
Auto Temperature Reset	1	Thermal disc automatic @ 130°F	019768-001
Man Temperature Reset	1	Manual temperature reset @ 150°F	019769-001
Disconnect Switch	1	Door disconnect switch	
600V 25A		600V 25A Model: R5A3025U	019774-005
600V 40A		600V 40A Model: R5A3040U	019774-002
600V 60A		600V 60A Model: R5B3060U	019774-003
KT3 Terminal Block	1	KT3 Kadio terminal assy 600V 40A	019949-001
NDN111 Terminal Block	1	NDN111 terminal assy 600V 90A	21-12269

ELECTRIC COILS

MAINTENANCE

Component	Qty per unit	Description	Part#
Cable	1	Plenum Cable 18 AWG containing:	
5 Wire		5 wires	019469-003
3 Wire		3 wires	019469-006
SCR		Silicon Controlled Rectifier power	
480V 25A		3 phase 480V 25A R820-423	019455-108
480V 45A		1 phase 480V 45A R820-441	019455-109
480V 45A		3 phase 480V 45A R820-443	019455-110

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