

GENERAL INFORMATION

- Nailor electric heaters require little or no maintenance. Be sure the heater elements are free of foreign matter, and then check that the connections are tight and proper control interlocks have been made before turning the heater on.
- Heaters are open wire type and, except on very small heaters with element wires less than 1 kW, use special 'arrowhead' insulators that expose the entire surface area of the element wires to the air stream. This eliminates the possibility of hot spots on the larger wires that can burn the elements in half or cause spalding that enhances hot spots.
- All electric heaters ordered from Nailor are manufactured in-house.
- All Nailor electric coils are ETL listed for safety under UL 1995 as part of the VAV unit.
- All electric heating units have built-in controls for all options required by the engineer.
- Single point power connection.

INSTALLATION

- All single duct terminal units with electric coils are designed to be mounted in a horizontal plane with respect to the "UP" arrow marked on the product label. Fan powered units can be flipped over in the field and will not have "UP" arrow.
- Before applying power, make sure electric coils are not damaged.
- All field wiring must comply with NEC and local building codes.
- Use copper conductors only.
- Phase rotation of the incoming power is recommended when connecting three-phase electric coils.
- Allow a minimum clearance as specified by NEC in front of all electric coil enclosures.
- Always check product label to determine proper wire size and current protection.
- These recommendations do not preclude NEC or local building codes that may be in effect.

OPERATION

- To avoid possible nuisance tripping of the thermal cutouts due to insufficient airflow, a minimum airflow of 70 cfm (33L/s) per kilowatt must be maintained.
- For Single Duct Terminal Units, A minimum of .1" w.g. (25 Pa) of downstream static pressure is required to ensure proper operation of the heater.

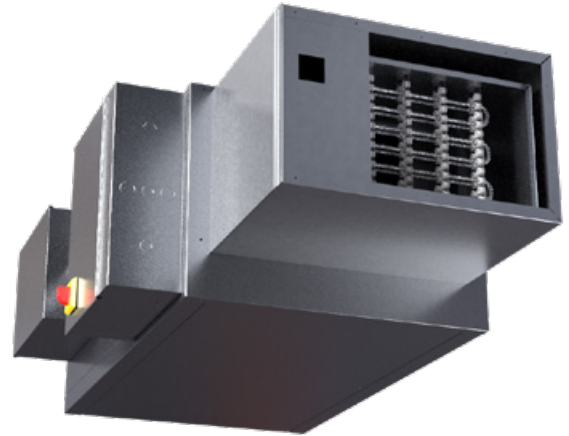


Figure 1. Fan Powered Terminal Unit with Electric Heater



Figure 2. Single Duct Terminal Unit with Electric Heater

CAUTION: ELECTRIC SHOCK HAZARD

1. Turn off power before servicing unit.
2. Do not operate unit without control cover.

NAMEPLATE LABEL


Electric coil data are incorporated in the nameplate label, which is affixed to the control enclosure cover. The label shows all necessary information required by UL with respect to electrical power and circuit protection requirements.

HEATER CONTROL ENCLOSURE

Figure 4 shows the interior of a typical heater control enclosure. All components within this space work together to provide safe operation of the heater. Although it is not required to meet NEC requirements, Nailor recommends a **door interlocking disconnect switch**. This safety switch must be disconnected before the enclosure can be opened. In the absence of a disconnect switch, a **terminal block** is provided for single point power connection. A **ground lug** ensures the proper grounding of the unit housing and enclosure. **Line fuses and fan motor fuses** provide overcurrent protection, and come as an option. An **airflow switch** de-energizes the heater when it detects no airflow across the elements.

In fan powered VAV terminal units, **auto-reset limit switches** in line with each element provide high temperature protection. A single **auto-reset limit switch** provides protection for single duct terminal unit heaters. These switches automatically cut the heater off when overheating occurs, and turn the heater back on when the elements have cooled down. **Manual-reset limit switches** in line with each element provide secondary over temperature protection in single duct terminal units.

A control **transformer** is provided whenever a 24V circuit is required. **PE switches** (when pneumatic controls are used), like **magnetic contactors**, are used to energize stages of electric heat. Small heaters may often use a load carrying PE switch as the only control component. When control systems require frequent cycling or silent operation, **mercury contactors** are available as an option. An **SCR control** will provide fine space temperature control and highest reliability. For fan-powered terminal units, a **fan relay** is provided when required or requested.



FAN POWERED TERMINAL UNIT

(UNITE TERMINALE @ VENTILATEUR INTEGRÉ)

DATE (DATE) :	27-Nov-2001	SERIAL NO. (NO. DE SÉRIE) :	150111-2
MODEL (MODÈLE) :	D35SE	TAG NO. (NO. DÉTIQUETTE) :	FPB-1-35
UNIT SIZE-INLET SIZE (DIAMÈTRE D'ENTRÉE) :	4-10	VOLTAGE (VOLTAGE) :	480
CONTROL VOLTAGE (VOLTAGE DE CONTRÔLE) :	24	PHASE (PHASE) :	3
CONTROL SEQUENCE (SEQUENCE DE CONTRÔLE) :	NB	STAGES (ÉTAPES) :	2
VOLT AMP (VOLT-AMPÈRE) :	50	HZ. (HZ) :	50/60
		MOTOR HP (MOTEUR HP) :	1/3
		MOTOR VOLTAGE (VOLTAGE DU MOTEUR) :	277
HOT WATER COIL ROWS (NOMBRE DE RANGÉES SERPENTIN EAU CAUDE) :	N/A	MOTOR AMP (AMPERAGE DU MOTEUR) :	2.0

	KW/HP			AMPS (AMPÈRES)			AMPACITY (AMPACITÉE)			MAX. OVERCURRENT PROTECTION (RESISTANCE DES FUSIBLE MAX.)		MOTOR FUSE SIZE (MOTEUR FUSIBLE)
	TOTAL (TOTALE)	EACH CIR. (CHAQUE CIRCUIT)	EACH STG. (CHAQUE ÉTAPE)	TOTAL (TOTALE)	EACH CIR. (CHAQUE CIRCUIT)	EACH STG. (CHAQUE ÉTAPE)	TOTAL (TOTALE)	EACH CIR. (CHAQUE CIRCUIT)	EACH STG. (CHAQUE ÉTAPE)	TOTAL (TOTALE)	EACH CIR. (CHAQUE CIRCUIT)	
HEATER (CHAUFFAGE)	10.0	10.0	5.0	12.0	12.0	6.0	15.0	15.0	7.5	20	20	N/A
MOTOR (MOTEUR)	1/3				2.0		2.5			3		30
TOTAL (TOTALE)					14.0		17.5			23		

EACH ELEMENT RATED @ 3.3 KW @ 277 VAC. AWG. MIN WIRE SIZE (MIN DIAMÈTRE DE FIL) : 14
 (CHAQUE ÉLÉMENT CLASSIFIER A) MIN. HEATING CFM (MIN. PCM) : 700

USE WIRE SUITABLE FOR AT LEAST 75 .C
 L1 IS COLOR CODED BLACK, L2 IS BLUE, L3 IS RED
 CONTROL WIRES CODED AS MARKED
 USE COPPER CONDUCTORS ONLY.

UTILISER UN FIL MÉTALLIQUE QUI CONVIENT AU MOINS 75 .C
 L1 EST COLORÉ NOIRE, L2 EST BLEU, L3 EST ROUGE,
 LES FILS DE CONTRÔLE SONT IDENTIFIÉS COMME MARQUÉS,
 UTILISÉ DES CONDUCTEURS DE CUIVRE SEULEMENT.

USE CLASS K, RK1, A2D OR A6D FUSE OR HACR BREAKERS. UTILISÉ DES FUSIBLES CLASS K, RK1, A2D, OU A6D OU HACR DISJONCTEURS.

PRIMARY CFM (MAX/MIN) : 1000/1000
 FAN CFM :

PRIMARY L/S (MAX/MIN) : 472/472
 FAN L/S :

Figure 3. Sample Nameplate Label. Fan Powered Terminal Unit

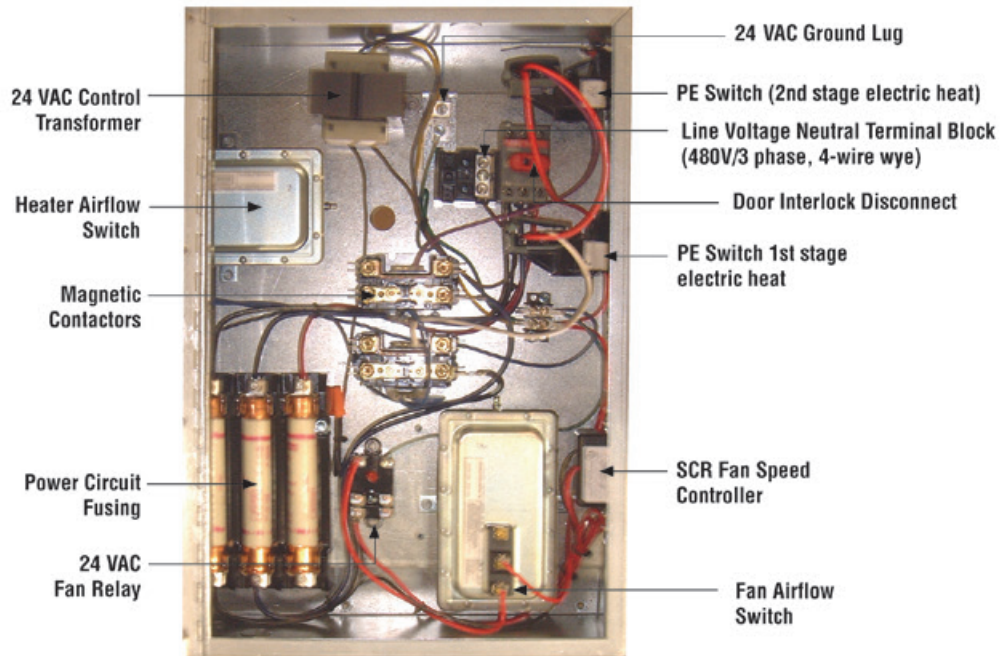


Figure 4: Typical Line Voltage Control Enclosure Box

Wiring Diagrams

A specific wiring diagram for each heater including all controls is glued to the inside of the control panel door. Another wiring diagram is provided loose in the control box.

Heater Element Rack Replacement For Series Fan Powered Terminal Units

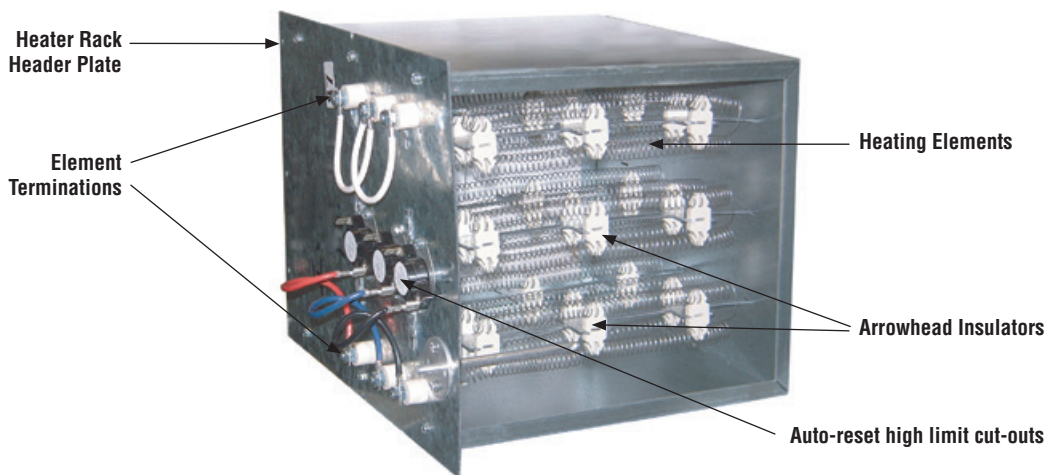


Figure 5. Typical element rack for a series Fan Powered Terminal Unit

On series fan Powered Terminal Units, the element rack is removable for replacement. The header plate is located behind a hinged door enclosure on the side of the terminal electric heater section.

1. Turn off power supply before servicing.
2. Locate the element rack header plate.
3. Before removing wires from the element rack header plate, mark where the wires are connected so they can be reconnected correctly on the new element rack.
4. Remove the wires and screws holding the heater plate in the coil housing.
5. Insert the new element rack into coil housing and replace the screws to secure the element rack.
6. Replace the wires.
7. Replace the enclosure cover before turning on the power.

Electric Heater Replacement Parts

Description	RAPP Code	Description	RAPP Code
Disconnect Switches		Power Distribution Blocks	
Toggle Disconnect Switch 1P, 600V, 25A	EC-DISTG251P	2 pole, 175A, 600V, 1 in / 4 out	H1-0271A
Toggle Disconnect Switch 3P, 600V, 40A	EC-DISTG403P	2 pole, 300V, 1 in / 4 out (quick connect)	H1-0293
Toggle Disconnect Switch 3P, 600V, 60A	EC-DISTG603P	3 pole, 600V, 1 in / 4 out	H1-0270
Interlocking Disconnect Switch 3P, 600V, 25A	EC-DISINT25A	Power Terminal Blocks	
Interlocking Disconnect Switch 3P, 600V, 40A	EC-DISINT40A	1 pole, 600V	H1-0044
Interlocking Disconnect Switch 3P, 600V, 60A	EC-DISINT60A	2 pole, 600V	H1-0076
Interlocking Disconnect Handle	EC-DISINTHDL	3 pole, 600V	H1-0004
Interlocking Disconnect Shaft	EC-DISINTSFT	Fuse	
Contactors		Fuse, 250V, 15A	EC-FUS250V15
Contactor MAG 1P, 600V, 50Amp	EC-CONM50A1P	Fuse, 250V, 20A	EC-FUS250V20
Contactor MAG 1P, 600V, 40Amp	EC-CONM40A1P	Fuse, 250V, 25A	EC-FUS250V25
Contactor MAG 1P, 600V, 30Amp	EC-CONM30A1P	Fuse, 250V, 30A	EC-FUS250V30
Contactor MAG 2P, 600V, 50Amp	EC-CONM50A2P	Fuse, 250V, 35A	EC-FUS250V35
Contactor MAG 2P, 600V, 40Amp	EC-CONM40A2P	Fuse, 250V, 40A	EC-FUS250V40
Contactor MAG 2P, 600V, 30Amp	EC-CONM30A2P	Fuse, 250V, 45A	EC-FUS250V45
Contactor MAG 3P, 600V, 50Amp	EC-CONM50A3P	Fuse, 250V, 50A	EC-FUS250V50
Contactor MAG 3P, 600V, 40Amp	EC-CONM40A3P	Fuse, 250V, 60A	EC-FUS250V60
Contactor MAG 3P, 600V, 30Amp	EC-CONM30A3P	Fuse, 600V, 15A	EC-FUS600V15
SCR/SSR		Fuse, 600V, 20A	EC-FUS600V20
SCR Elect. Heat controller, 600V, 1ph, 45A	EC-SCR	Fuse, 600V, 25A	EC-FUS600V25
SSR Elect. Heat controller, 600V, 1ph, 45A	EC-SSR	Fuse, 600V, 30A	EC-FUS600V30
Transformers		Fuse, 600V, 35A	EC-FUS600V35
Transformer 120V, 24V, 50VA	EC-TRANS120A	Fuse, 600V, 40A	EC-FUS600V40
Transformer 208-240V, 24V, 50VA	EC-TRANS208A	Fuse, 600V, 45A	EC-FUS600V45
Transformer 277V, 24V, 50VA	EC-TRANS277A	Fuse, 600V, 50A	EC-FUS600V50
Transformer 480V, 24V, 50VA	EC-TRANS480A	Fuse, 600V, 60A	EC-FUS600V60
Isolation Transformer 24V, 24V, 40VA	EC-TRANS2424	MISC	
Transformer 120V/208/240/480 to 24V, 75VA	EC-TRANSB	Airflow Switch	EC-AFSW
Transformer 277V, 24V, 75VA	EC-TRANS277B	Airflow Switch Probe 4"	EC-AFSWPB
		Airflow Switch Probe 6"	EC-AFSWPBL
		Auto Temp. LMT Swtch	EC-AUTOLMTSW
		Manual Temp. LMT Swtch	EC-MANLMTSW
		Fan Relay 24V	EC-FANRELAY



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