Installation Instructions

516

ELECTRIC DUCT HEATER PACKAGE

bryant®

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These instructions are to be used in conjunction with the basic instructions for the Model 516 Fan Coil Unit. Section II of this instruction describes the installation of the electric duct heater package with other than the Model 516 air handlers.

SECTION I

The electric duct heater is designed to be used with the Models 18- and 24-516 Fan Coil Units. Refer to Table I, Ratings and Capacities, for sizes and power inputs. Refer also to the Dimensional Drawing.

The package, as shipped from the factory, contains heater coils, a rating plate, a sequencing relay (for 11- through 14.4-KW size units), automatic temperature control, and a manual temperature control switch. Each heater has both sides of the power line broken by a main contactor and a backup contactor, and has an open set of contacts for fan control.

Before Starting Installation:

1. Check local codes and ordinances for additional requirements.

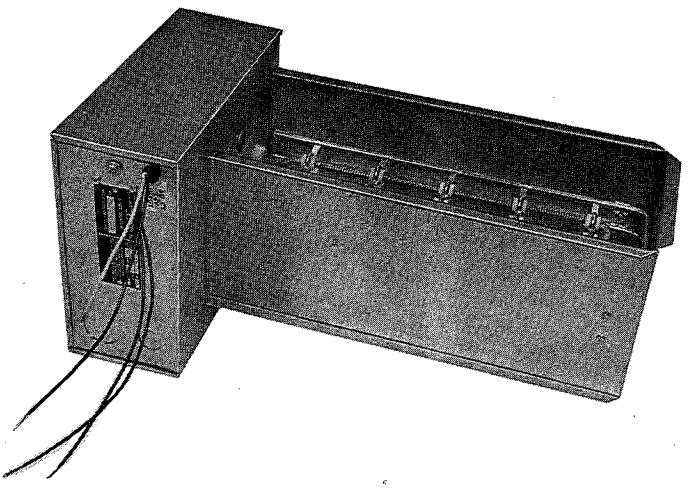
2. Check the incoming power supply to be sure that the rated voltage, frequency, and phase correspond to that stamped on the unit rating plate.

3. Check the building power supply to be sure that it is sufficient to handle the additional electrical load imposed by this equipment.

Installing the Electric Duct Heater Package

The duct heater package is designed for zero clearance from combustible material. There must be a 7-1/2 inch clearance in front of the control box cover.

A collar for mounting the duct heater is provided with each Fan Coil Unit. Use this collar



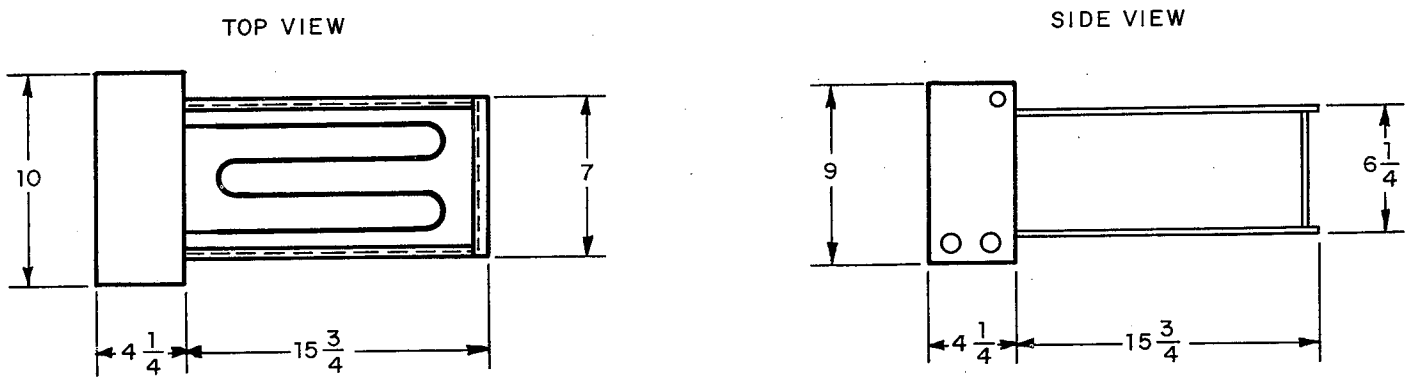
if the heater is to be installed within 6 inches downstream from the Fan Coil. Mount the collar on the duct flanges of the Fan Coil so that the opening for the duct heater is on the same side of the Fan Coil as the coil connections and rating plate. Make certain that the flange is at the bottom of the duct heater opening. This will insure that the heater is placed at the correct depth.

Now, place the heater into the collar and attach it to the collar with four sheet metal screws.

If the application does not provide adequate space for the duct heater to be installed 6 inches from the Fan Coil, then the duct heater must be installed 48 inches downstream from the Fan Coil Unit.

To install the heater 48 inches downstream from the Fan Coil, cut a 7-1/8 x 6-3/8 inch hole in the side of the duct; then slide the heater into place. Using the control box as a template, drill four mounting holes and attach the heater with four sheet metal screws.

An air filter must be located in the return airstream.



Electric Duct Heater Dimensional Drawing

TABLE I - RATINGS AND CAPACITIES

Package P/N	KW Rating	* Capacity Btuh			Field Wire Connections		
		208V	230V	240V	No. of Circuits	Minimum Wire Size AWG - 90° C - Copper	Max Fuse Size Amps
65901D03	3	7,690	9,403	10,239	1	12	(2) 20
65901D04	4	10,254	12,538	13,652	1	10	(2) 20
65901D05	5	12,817	15,672	17,065	1	10	(2) 30
65901D06	6	15,381	18,807	20,478	1	10	(2) 40
65901D07	7	17,944	21,941	23,891	1	8	(2) 50
65901D08	8	20,508	25,076	27,304	1	8	(2) 50
65901D09	9	23,071	28,210	30,717	1	6	(2) 60
65901D010	9.6	24,610	30,091	32,764	1	6	(2) 60
65901D011	11	28,199	34,479	37,543	2	10	** (2) 30
						10	(2) 40
65901D012	12	30,762	37,614	40,956	2	10	** (2) 30
						8	(2) 50
65901D013	13	33,326	40,748	44,369	2	10	** (2) 30
						8	(2) 50
65901D014	14	35,889	43,883	47,782	2	10	** (2) 30
						8	(2) 50
65901D015	14.4	36,915	45,136	49,147	2	10	** (2) 30
						8	(2) 50

* Rated at 240V, 60 cycle, single phase

** Includes blower motor and one heating element

Limitations and Recommendations

1. The duct heaters should never be installed from the bottom or the top of the duct - only from the sides of the duct. The heaters must always be installed on the discharge side of the Fan Coil.

2. Only one duct heater may be used in any one duct. If the capacity required exceeds the output of one duct heater, select the total number of heaters and proportion them in separate runouts or separate ducts from the plenum.

3. Install the duct heater at least 18 inches away from any canvas duct connector. If the heater must be located closer, replace the canvas connector with an asbestos connector.

4. The control enclosures of the duct heaters must be completely accessible and so located as to provide ventilation at all times.

5. The air duct should be installed in accordance with the standards of the National Board of Fire Underwriters for the Installation of Air Conditioning and Ventilating Systems of other than Resident Type (pamphlet no. 90A), and Resident-Type Warm Air Heating and Air Conditioning Systems (pamphlet no. 90B).

6. Each duct heater should be provided with a fan relay. The heater and fan motor are to be wired so that the duct heater cannot operate unless the fan is on. Always hook the fan interlock to the high-voltage side of the system. Never use a fan delay with the electric duct heater.

7. The coil of the secondary contactor (general-purpose, continuous duty rated at 6000 cycles) must be wired in series with the manual reset limit control (TMR).

NOTE: Observe at least one complete heating cycle before leaving the installation.

Table II - Air Delivery at Indicated Static Pressure (Dry Coil, Less Filter)

Model	Evaporator Motor Speed Tap	CFM				
		*0.0	*0.1	*0.2	*0.3	*0.4
18-516	High	930	920	905	890	860
	Medium	705	700	690	675	650
	Low	605	600	590	580	550
24-516	High	955	940	915	880	830
	Medium	695	690	680	670	680
	Low	615	605	600	580	555

* Static pressure - inches w.c.

Electrical Connections

Make all electrical connections in accordance with the National Electric Code and any local codes or ordinances that may apply.

Provide power supply (or supplies: 11- through 14.4-KW heaters will have two power supplies) for the heating capacity of the unit being installed in accordance with Table I - Ratings and Capacities. Power supply connections are made at the high-voltage terminals with wire suitable for at least 90°C (194°F). It is good practice to ground casing parts and to check factory wiring connections, to be sure none were loosened in transit or installation. Refer to Figures 5, 6, and 7 for field wiring diagrams.

Thermostat Connection

The electric duct heater and Model 516 Fan Coil Unit are designed for use with a 24-V heat-cool thermostat, Bryant Model 883.

Connect the thermostat and the low-voltage terminal block on the side of the Fan Coil in accordance with field wiring diagrams - Figures 5, 6, and 7. Set the thermostat heating anticipator at 0.8 amps.

Start-up, Adjustment and Checkout

1. Turn on the electrical supply.
2. Set the thermostat to call for heat.
3. The sequence of operation for 3- through 9.6-KW duct heaters is as follows:
   A. When the thermostat calls for heating, the primary contactor closes. See Figures 1 and 2.
   B. The fan and heating elements are energized at the same time.
4. Unit shutdown is as follows:
   A. As the thermostat is satisfied, the primary contactor coil is de-energized.
   B. The fan and heating elements are de-energized at the same time.
5. The sequence of operation for 11- through 14.4-KW duct heaters is as follows:
   A. When the thermostat calls for heating, the sequencer is energized. See Figure 3.
   B. The fan is energized at the same time.
   C. The heating elements are energized in rapid succession.
6. Unit shutdown is as follows:
   A. As the thermostat is satisfied, the sequencer is de-energized.
   B. The heating elements are de-energized in rapid succession.
   C. The blower motor is in operation until the last heating element is de-energized.

Check the control circuit operation. Be sure that the thermostat turns the unit on and off when heating contacts are closed, then opened. Be sure that the thermostat fan switch (if there is one) turns the blower on and off when switch is turned on, then off.

Replace all control box covers and outer cabinet panels.

Minimum Air Velocities

The minimum airflow is directly related to the inlet air temperature. Consideration must be given to both the airflow across the heater and the inlet temperature.

1. The amount of supplementary heat required may be expressed in terms of KW as follows:

$$\text{KW required} = \frac{\text{BTU Heat Loss}}{3413}$$

2. If the air handling equipment is expressed in CFM's, then a direct cross-reference can be made by comparing the temperature of the air (as it enters the duct heater) to the KW rating on the chart at the rated CFM. See Figure 4.
   A. Draw a line horizontally from the inlet air temperature to the KW (BTU) required.
   B. From this point of intersection on the KW line, draw a line down vertically to establish the CFM. See Table II for the CFM at a given static pressure.
   C. The CFM should never be lower than the CFM as determined from the chart. In cases where this is not true, then the CFM must be increased or the KW required must be reduced.
3. In cases where the air handling equipment is expressed in FPM, convert to CFM by multiplying the FPM by the duct area.

Example:

Air Velocity = 1000 FPM
Duct Size = 8 x 20 in. = 160 sq in.

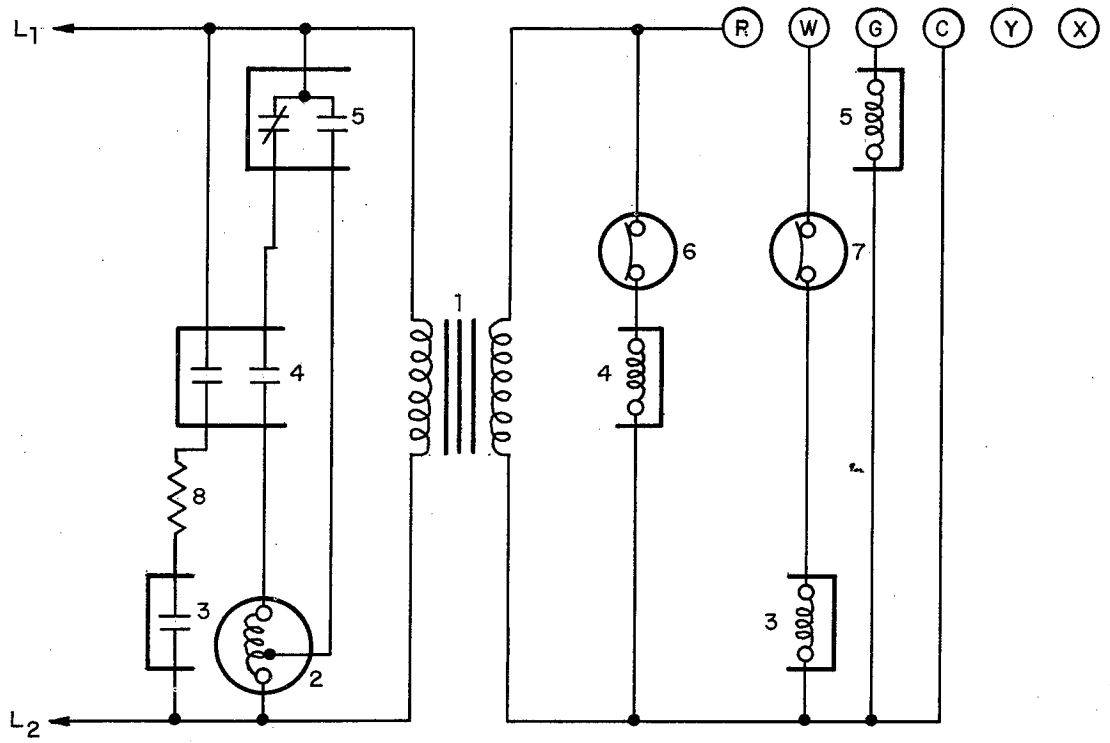
$$\text{Duct Area} = \frac{160}{144} = 1.11 \text{ sq ft}$$

Airflow = 1000 FPM x 1.11 sq ft = 1110 CFM

SECTION II

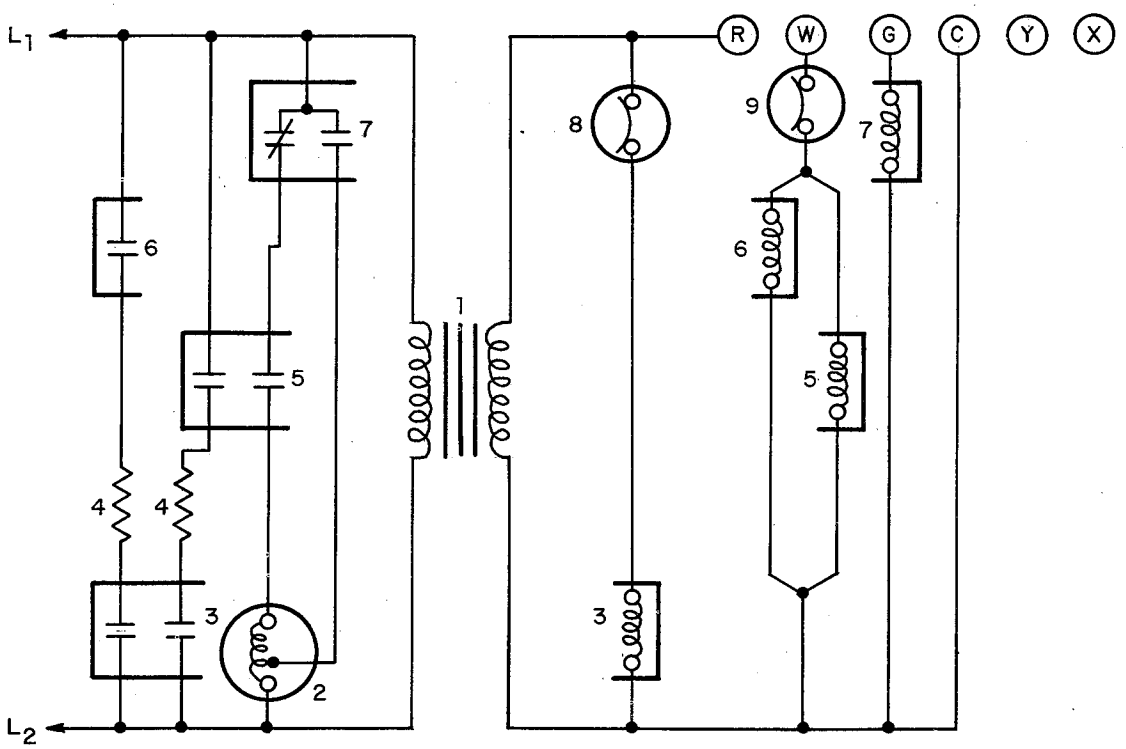
If the electric duct heater package is used with an air handler other than our Model 516 Fan Coil Unit:

1. All previous instructions, limitations, and recommendations apply to this type of installation.
2. The duct heater must be mounted 48 inches downstream from the air handler. It cannot be mounted 6 inches downstream as on the Model 516 Fan Coil Unit.



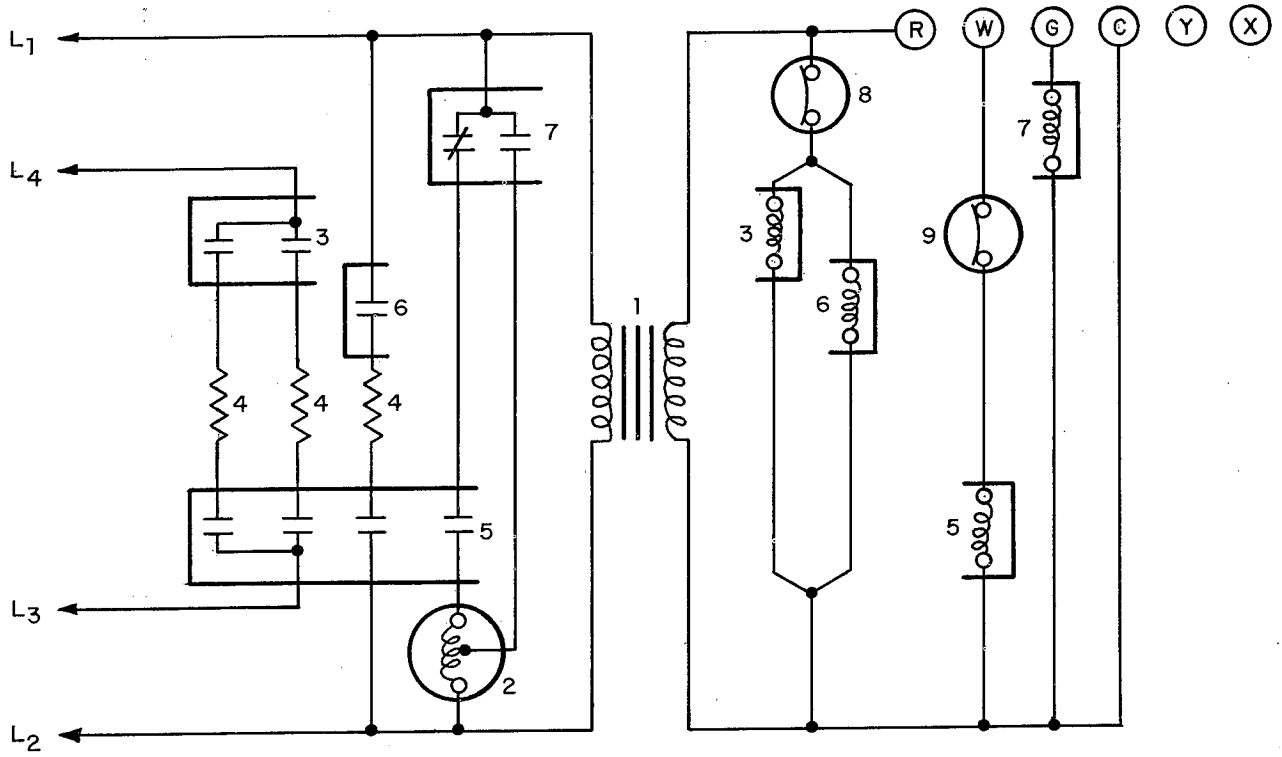
1. Transformer
2. Blower motor
3. R2 Contactor
4. R1 Contactor
5. Cooling fan relay
6. Manual reset limit switch
7. Automatic reset limit switch
8. Heater

Figure 1 - Wiring Diagram for 3-, 4-, & 5-KW Electric Duct Heater



1. Transformer
2. Blower motor
3. Contactor R3
4. Heaters
5. Contactor R2
6. Contactor R1
7. Cooling fan relay
8. Manual reset limit switch
9. Automatic reset limit switch

Figure 2 - Wiring Diagram for 6-, 7-, 8-, 9-, & 9.6-KW Electric Duct Heater



1. Transformer
2. Blower motor
3. Contactor R1
4. Heaters
5. Sequencing relay
6. Contactor R2
7. Cooling fan relay
8. Manual reset limit switch
9. Automatic reset limit switch

Figure 3 - Wiring Diagram for 11-, 12-, 13-, 14-, & 14.4-KW Electric Duct Heater

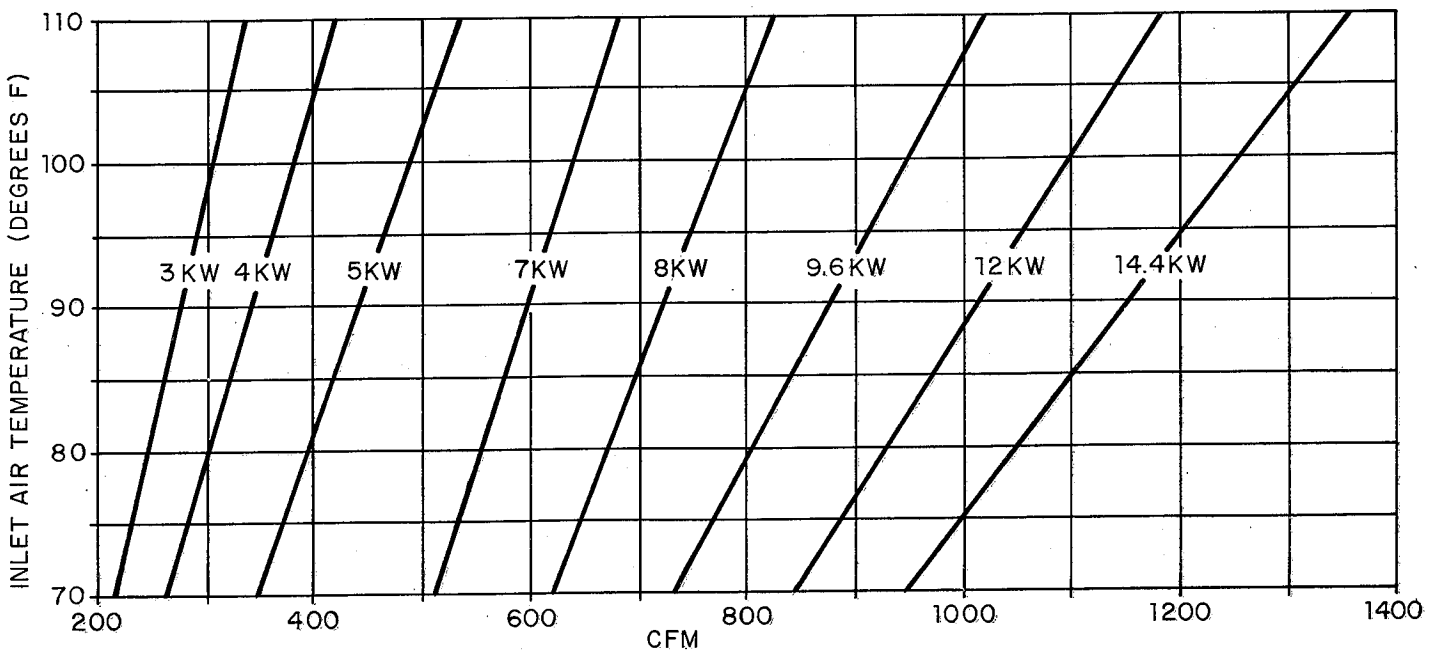


Figure 4 - Minimum Required Airflow with Optional Electric Duct Heater

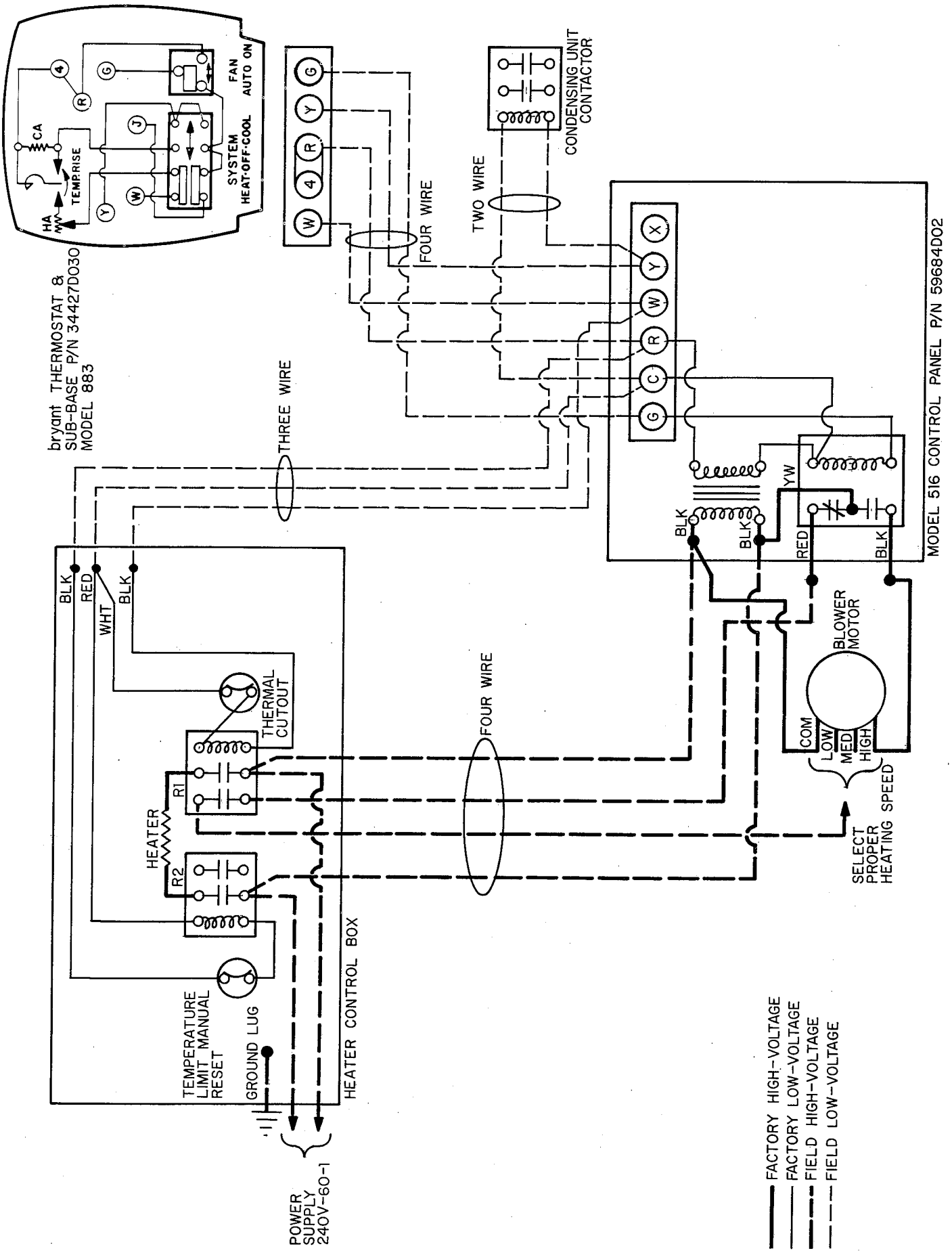


Figure 5 - Wiring Diagram for Model 516 with 3-, 4-, & 5-KW Electric Duct Heater

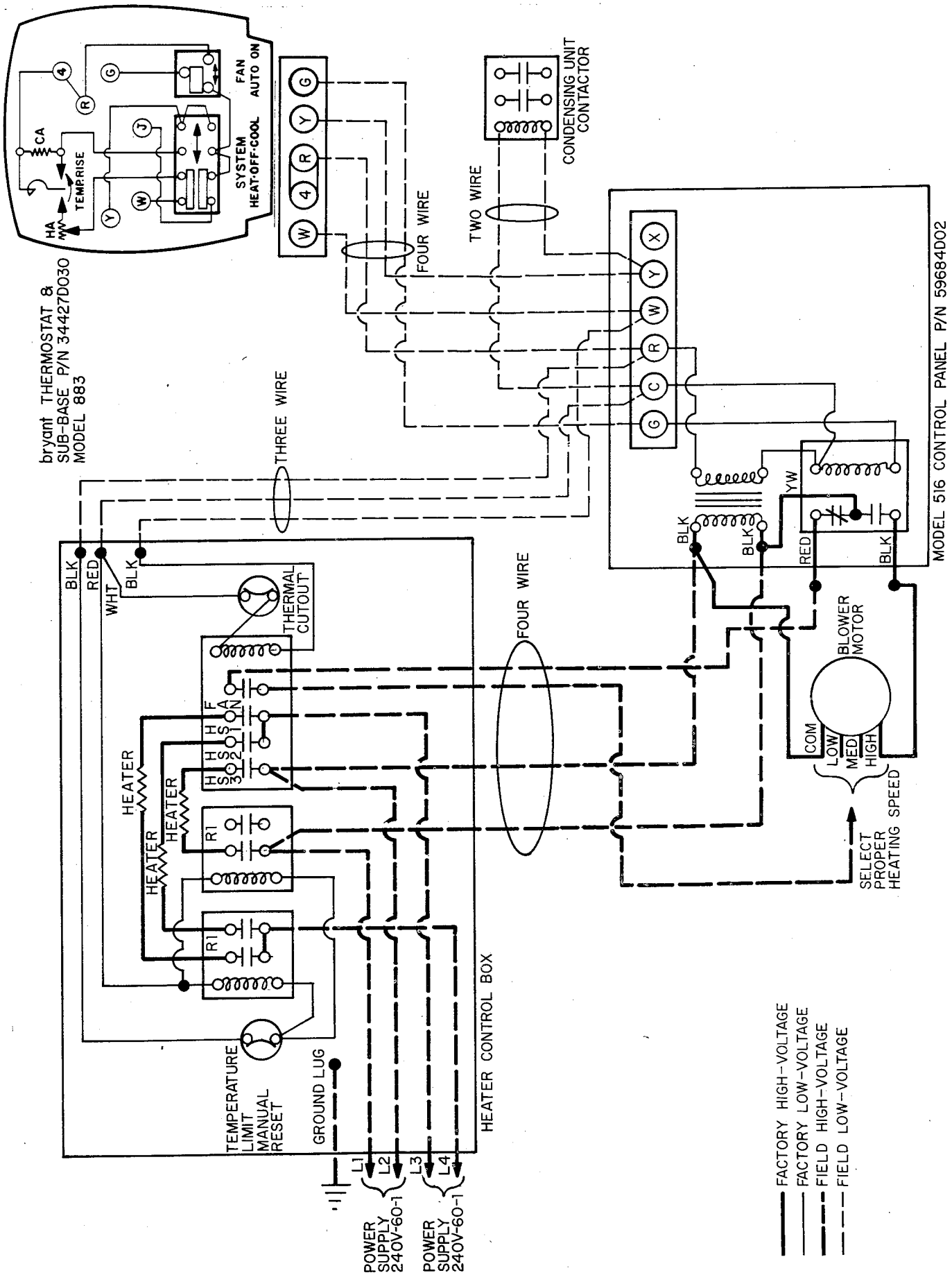


Figure 6 - Wiring Diagram for Model 516 with 6-, 7-, 8-, 9-, & 9.6-KW Electric Duct Heater

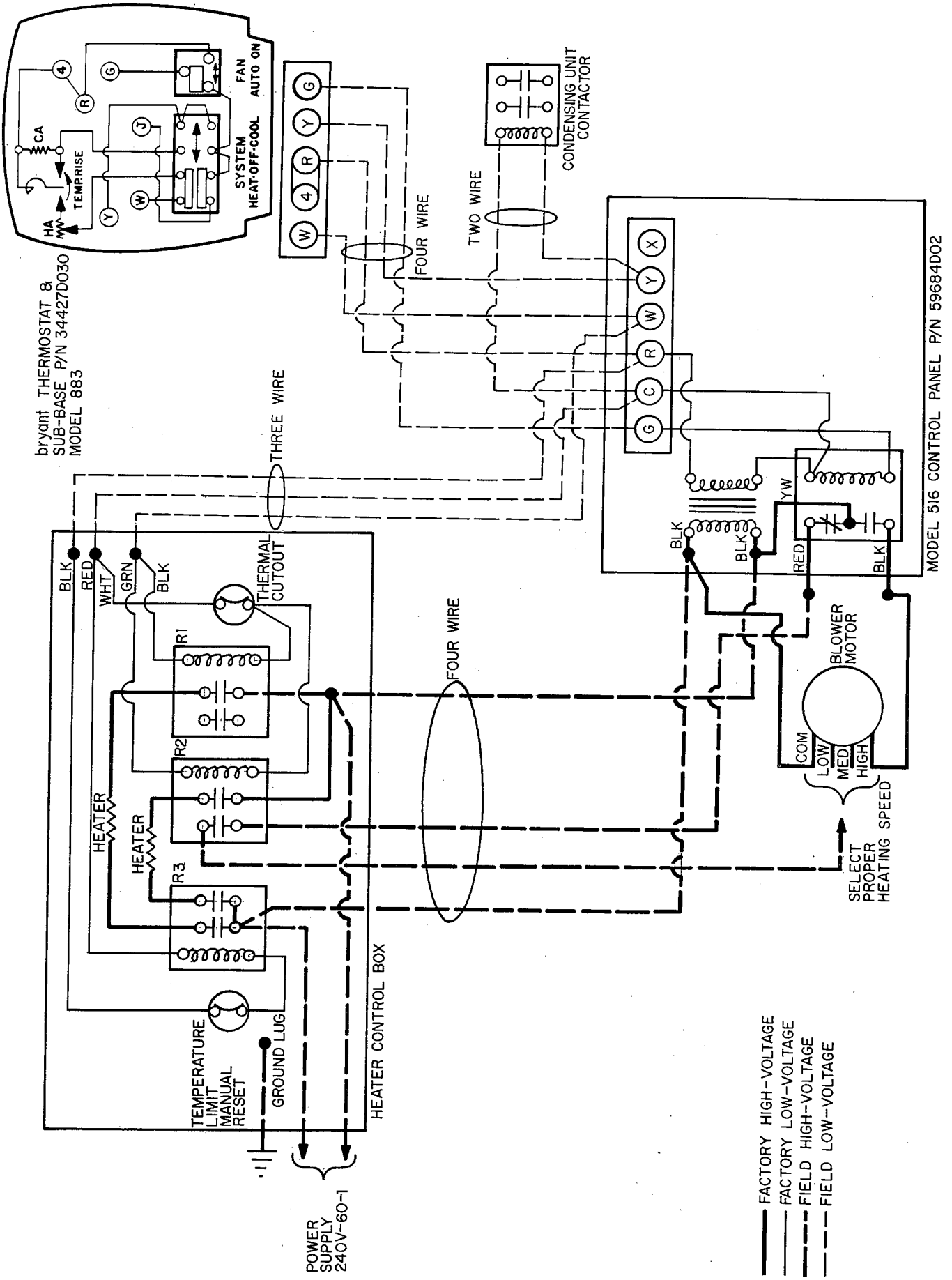


Figure 7 - Wiring Diagram for Model 516 with 11-, 12-, 13-, 14-, & 14.4-KW Electric Duct Heater