HEATING PLANT ELECTRICAL DESIGN

DESCRIPTION

1. GENERAL

1.01 This section covers the electrical requirements and recommendations for all electrical work associated with heating plants installed in telephone equipment buildings. The objective of this section is to provide electrical design criteria for the safe operation of all heating plants.

1.02 Whenever this section is reissued, the reason(s) for reissue will appear in this paragraph.

1.03 The recommendations contained in this section are minimum requirements. Other codes having jurisdiction will apply if they are more stringent. Engineering judgment, based on a specific job, may dictate more stringent requirements. All electrical work should conform to the latest National Electrical Code.

2. DESIGN CRITERIA

2.01 All ***control*** circuits should be 150 volts or less, line to neutral. ***Power*** circuits to burners, blowers, compressors, etc, can be more than 150 volts, line to line. One side of the control circuit shall be grounded and sized in accordance with the National Electric Code, Article 250-94. Additionally, an equipment grounding conductor shall be installed, in accordance with National Electric Code 250-95, from the panel box to the control cabinet. The frame of the transformers, motors, and safety shutoff valves should be grounded. (See Fig. 1.)

2.02 One side of all holding coils, eg, fuel solenoid valves, motor contactors, etc, shall be connected to the neutral (grounded) conductor.

2.03 All switches, operating and limit controls, interlocks, and overcurrent limiting devices should be electrically located in series in the ungrounded (hot) conductor (Fig. 1).

2.04 All conductors should be installed in raceways which can be rigid, Intermediate Metallic Conduit (IMC), or Electrical Metallic Conduit (EMT). The EMT is lighter and less rugged; therefore, use it only where it will not be subjected to severe physical damage. Flexible metallic conduit, eg, Greenfield or BX, should not be used. All conductors should be stranded copper wire with THWN insulation. Final connection made to fans, burners, fuel valves, and controls mounted on boiler/furnace, ducts, or louvers should be made with liquid tight flexible metal conduit. Allow sufficient slack for easy removal of controls and sensors without disconnecting the conductors.

2.05 All conductors should be run from point of origin to final termination without intermediate splices.

2.06 All conductors should be color coded or numerically identified. All wire connections to terminals should be made using crimped, circumferential type connectors.

2.07 All ignition wiring for the electric arc igniters should conform to the requirements of Underwriters Laboratories 814, Standard for Gas Tube Sign and Ignition Cable.

2.08 Run wiring for the flame-sensing control in a separate conduit or with shielded conductors.

2.09 Motor starters should be nominal 120-volt control with overload protection in all ungrounded conductors for motors over 1/2 horsepower. Equip the burner motor starter with one set of normally open auxiliary contacts wired in series with the fuel valves. This prevents the fuel valves from being open when the burner motor is de-energized.

2.10 ***DANGER: While testing fuel valves, the reintroduction of fuel into the firebox can be hazardous.*** Install test switches in series with the main and pilot fuel valves. This permits testing of the valves without electrically disconnecting the solenoids. The test switches shall be operated for the interval of time required for the flame relay of the primary combustion control to operate and shut down the system.

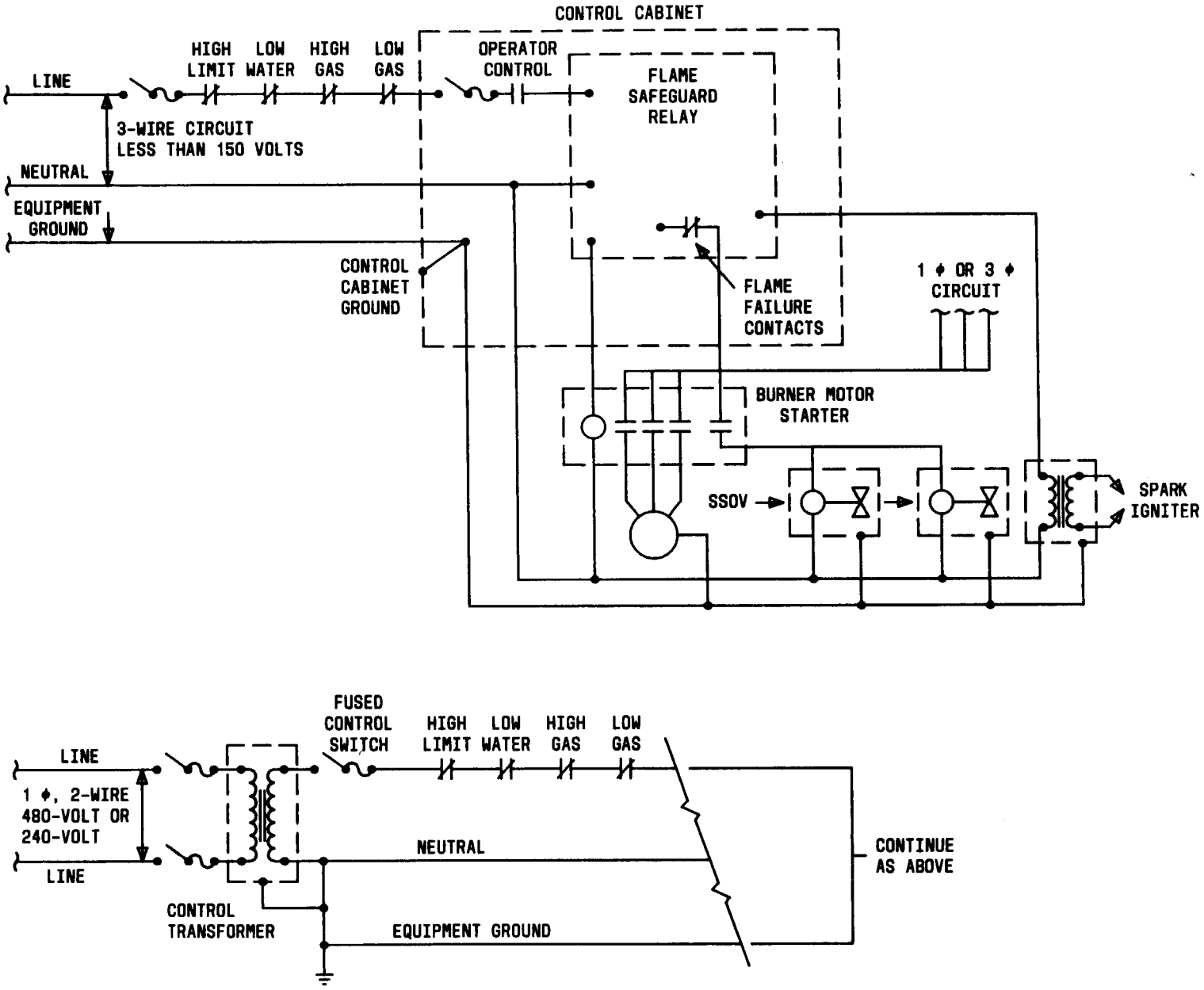

Fig. 1—Heating Plant Control Circuit

2.11 Disconnect switches should be provided as required by code. Install switches so that the switch blade is de-energized when the switch is open. Fuses should be on the load side of the switch so that they can be replaced in a de-energized condition.

2.12 Emergency disconnect means should disconnect all power to the heating plant motors and controllers. This device should be located outside the boiler room door, mounted on the wall on the strike jamb side. This device should be painted red and labeled "Boiler/Furnace Emergency Disconnect."

2.13 An alarm system can be installed on all limit controls, eg, high pressure/temperature, low water cutoff, high or low gas pressure, or flameout. If these controls are provided with an audible alarm, the functioning of any of these alarms should activate an alarm remoting relay. This relay with either normally closed or open contacts can be used for transmitting a heating plant alarm condition to an attended center. If the alarms are provided, it is recommended that the flame safeguard control, burner motor starter, fuel valve test switches, control circuit fuse, and alarm bell and indicators be installed in a cabinet. Mount this cabinet near the burner front of the boiler/furnace so that all alarm lamps are seen when tests or work is being performed on the heating plant. Control panels are not recommended on small heating plants.

2.14 Mount an electrical wiring diagram for the heating plant in a well-lighted place within the boiler/furnace room. Keep this diagram current to reflect any changes and enclose it in plastic or mount it under glass to maintain legibility.