



# INSTALLATION, OPERATION and MAINTENANCE INSTRUCTIONS for INDEECO EP2 EXPLOSION-PROOF DUCT HEATERS

## I. GENERAL

INDEECO Explosion-proof Electric Duct Heaters for Division 2 Hazardous Locations are cCSAus certified Class I, Division 2, Groups C & D; Class I, Zone 2, Group IIA & IIB. The hazard may be inside as well as outside the air duct.

The maximum operating temperature ignition code is T3, with a maximum surface temperature of 200°C or 392°F. NEVER operate the heater in an atmosphere with an ignition code temperature lower than this rating. The heaters are designed for a minimum airflow velocity with a maximum inlet air temperature of 26°C or 80°F, and for left hand or right hand horizontal airflow. See the data plate for the specific airflow, velocity and direction for the heater. NEVER operate the heater in a vertical mounting orientation or with an airflow contrary to its marking.

For details on the particular hazardous environments having the potential for explosion, refer to Articles 500 through 516 of the National Electrical Code, and/or Section 18 of the Canadian Electrical Code, Part I.

A. The INDEECO Explosion-proof Electric Duct Heaters are intended to be mounted into an air duct by mounting flanges that mate to the heater mounting flanges. The active portion of the heating elements extend into the duct to heat the air. The un-heated portion of the elements extend back through the terminal enclosure. Controls for the operation of the heater may be included as an integral part of the heater or supplied for remote mounting. When included with the heater all arcing, sparking components are located in a Class I Division 1 rated explosion-proof enclosure. Remotely located controls, outside the hazardous area, may be in a standard enclosure, area permitting.

Safety high temperature sensing limit switches are attached to the external surface of the upper outlet side heating element. These safety temperature sensing limit switches must be electrically connected per the wiring diagram to the heater electrical power controls so that the heater power is shut off if excessive temperatures are reached.

The heaters are specifically designed for each application and should be properly installed, operated and maintained for optimum service life.

B. Disassembly of the unit for installation is not required or authorized. When installing:

1. Observe all heater nameplate ratings, warnings and notes.
2. Follow the wiring diagram in making all electrical connections.
3. Keep all electrical connections tight.
4. Keep the heater terminal enclosure and element area clean.
5. Carefully read and comply with all warnings and cautions.

All of the WARNINGS and CAUTIONS are stated in the following Safety Summary and are repeated through these instructions.

## II. SAFETY SUMMARY

### WARNING

INDEECO strongly recommends this heater be installed by qualified personnel familiar with the National Electrical Code and/or the Canadian Electrical Code requirements for hazardous locations as well as any local codes. It is the responsibility of the installer to verify the safety and suitability of the installation.

### **WARNING**

NEVER operate the heater in an atmosphere with an ignition temperature lower than the heater marking.

### **WARNING**

The heater must be mounted horizontally, with the airflow velocity and direction as marked on the data plate to maintain the ignition temperature rating.

### **WARNING**

Disassembly of the unit, for installation, is not required or authorized.

### **WARNING**

The heater is intended to be electrically connected to a coordinated air flow interlock.

### **WARNING**

Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the off position and tag the circuit "Out for Maintenance" before working on this equipment.

### **WARNING**

When making electrical connections to the heater, be sure to follow the wiring diagram provided with the heater. The heater must not be operated without the safety high temperature limit cutouts properly connected in the circuit.

### **WARNING**

Replacement of electrical components should only be done by authorized personnel familiar with the requirements of maintaining electrical equipment in an explosion-hazard area.

Replacement electrical components must be obtained from the factory to maintain the hazardous location rating.

## **III. INSTALLATION**

### **A. Site Selection.**

- 1.) INDEECO Explosion-proof Electric Duct Heaters for Class I, Division 2 Hazardous Locations are designed for use only while permanently mounted in a forced ventilation air duct in a horizontal orientation with an

airflow velocity and direction as stamped on the data plate.

- 2.) The site must allow sufficient free space around the heater for safe and easy installation and maintenance access. Workspace for heater maintenance should be at least 3 feet all around the terminal box.
- 3.) Airflow through the duct should not be restricted or blocked in any manner, and should be uniformly distributed across the full face area of the heater.

### **WARNING**

INDEECO strongly recommends this heater be installed by qualified personnel familiar with the National Electrical Code and/or the Canadian Electrical Code requirements for hazardous locations as well as any local codes. It is the responsibility of the installer to verify the safety and suitability of the installation.

### **WARNING**

The heater must be mounted horizontally, with the airflow velocity and direction as marked on the data plate to maintain the ignition temperature rating.

B. Mechanical Installation. Once an acceptable location has been determined, follow these instructions to complete the mechanical installation.

### **WARNING**

Disassembly of the unit for installation is not required or authorized.

- 1.) Confirm the air duct has sufficient air flow, CFM divided by the heater inside face area, to meet the minimum supply air velocity.
- 2.) The air duct must be installed in accordance with the standards of the National Fire Protection Association for installation of air conditioning and ventilating systems of other than residence type (Pamphlet No. 90A) and residence type warm air heating and air conditioning systems (Pamphlet No. 90B).
- 3.) For proper operation of a heater with a built on airflow switch, see the air flow switch manufacturer's instructions supplied with the heater.
- 4.) Exercise care when installing the heater so as not to damage the heating elements, or temperature sensors.

- 5.) Be sure a gasket rated for the application is installed between the sealing surfaces of the heater mounting flanges.
- 6.) Be sure sufficient flange bolts are installed to properly support the heater and that they are securely tightened.

### C. Electrical Installation.

Follow these instructions to complete the electrical installation:

#### **WARNING**

The heater is intended to be electrically connected to a coordinated air flow interlock.

#### **WARNING**

Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the off position and tag the circuit "Out for Maintenance" before working on this equipment.

- 1.) Follow the wiring diagram and any Code recommendations in making all electrical connections.
- 2.) Use only an approved explosion-proof means of wiring, such as mineral insulated cable or copper conductors in rigid conduit with threaded connections. Install suitable rated conduit seals within 18" of the explosion-proof control enclosure entrances or as identified on the enclosure.
- 3.) Follow the NEC and/or CEC and any local electrical and building codes related to the installation and intended use of the heater in an explosion-hazard area.
- 4.) When doing any work on a heater, including the initial electrical connection, disconnect the electrical current at the main branch circuit switch, and lock the switch in the off (open) position and tag the circuit "Out for Maintenance" to prevent potential lethal shock hazards.
- 5.) Confirm that the electrical power supply matches the nameplate voltage, phase and amperage rating of the heater to be connected.
- 6.) Ensure conductors are of appropriate gauge size. Size all input conductors according to accepted standards

consistent with the temperature rating of the wire being used. Use minimum 75°C rated wire.

- 7.) Proper installation of the heater requires that an adequate grounding conductor be connected to the ground terminal. This terminal is painted green or marked with the letter "G" and is located on the inside of the control enclosure next to the power input terminals.
- 8.) Refer to the wiring diagram to ensure that all connections are as required.
- 9.) Check and confirm all connections are securely fastened.
- 10.) Ensure that input conductors and conduit have adequate strain relief at installation.
- 11.) Before application of electrical power, recheck all connections to ensure compliance with the wiring diagram and any code requirements. Remove any foreign objects from the terminal enclosure. Reinstall cover tightly.
- 12.) See operating instructions, Section V, before operating the heater.

### IV. FIELD INSTALLED CONTROLS

Contact the factory for co-ordination of any field installed controls. Field installed controls not shown on the wiring diagram may void the INDEECO warranty and the agency certification.

### V. OPERATION

The INDEECO Explosion-proof Electric Duct Heaters may be operated normally with inlet air temperatures of 80°F (26°C) or less, and in atmospheres containing less than 21% oxygen by volume. All of these conditions must be met before attempting to operate the heater. The heater should never be operated in an oxygen-enriched atmosphere or with inlet temperatures above 80°F. At higher inlet conditions the safety high temperature limit cutouts may activate. If this occurs, the installation should include some means to de-energize the heater during high ambient conditions, such as an automatic temperature control thermostat or a manually operated disconnect switch, to prevent excessive cycling of the controls.

#### **WARNING**

NEVER operate the heater in an atmosphere with an ignition temperature lower than the heater marking.

## WARNING

The heater must be mounted horizontally, with the airflow velocity and direction as marked on the data plate to maintain the ignition temperature rating.

A. Initial Operation. Check to make sure the mechanical and electrical installation is complete and that it is safe to operate the heater.

B. Normal Operation.

- 1.) Inspect the heater installation for loose bolts, covers, signs of overheating or corrosion that could impair the ability of the heater to operate safely. Loose bolts should be tightened prior to operation. Signs of overheating or corrosion should be reported to the factory.
- 2.) Check the air duct for restrictions, or blockages, and uniform flow.
- 3.) Place the heater in service.

## VI. MAINTENANCE

A. Electrical

### WARNING

Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the off position and tag the circuit "Out for Maintenance" before working on this equipment.

### WARNING

Replacement of electrical components should only be done by authorized personnel familiar with the requirements of maintaining electrical equipment in an explosion-hazard area.

### WARNING

Replacement electrical components must be obtained from the factory to maintain the hazardous location rating.

- 1.) Annually inspect all terminal connections and visible insulation for damage, looseness, fraying, etc., as applicable. Tighten any loose terminals and replace or repair damaged or deteriorated insulation.
- 2.) If reduced heat output is suspected verify the condition of the heating elements by using an ammeter to check the current draw of each input line. All input lines should draw approximately equal current which should agree with nameplate rating. If they do not, one or more of the heating elements could be burned out.

B. Mechanical

- 1.) Check the terminal enclosure, and conduit connections for evidence of water leaks or moisture collection. Tighten connections and check covers as required.
- 2.) The explosion-proof control box is designed with threaded joints and metal-to-metal contact at the cover joint to prevent an explosion. Do not attempt to install gasket material of any type at these joints.
- 3.) Annually check the tightness of all mounting bolts and nuts.
- 4.) Annually check elements for dirt build up or corrosion, and clean as required. Report signs of overheating or corrosion to the factory.

## VII. REFERENCE DATA

- 1.) Wiring Diagrams. Please refer to the enclosed wiring diagrams in making all electrical connections to the heater and in performing any required maintenance.
- 2.) Data Plate Information. The data plate contains the catalog number and rating information. Please copy this information down and have it available when communicating with the factory.

Keep these instructions for future reference.



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