

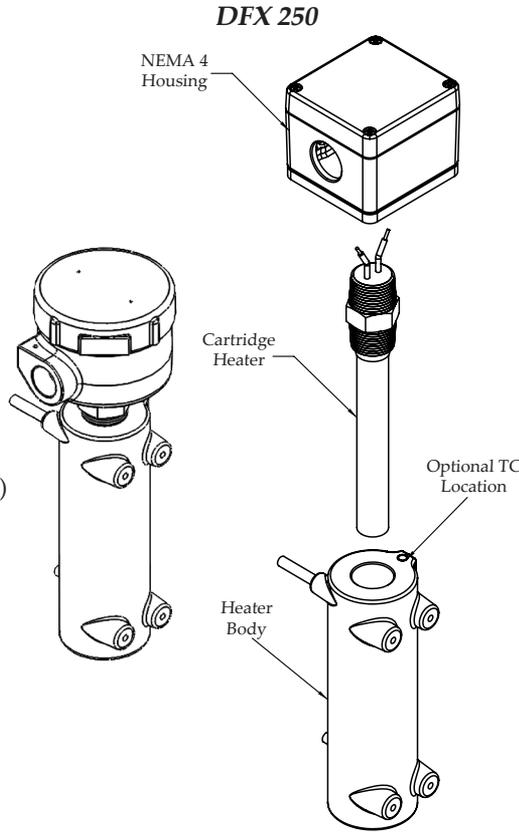


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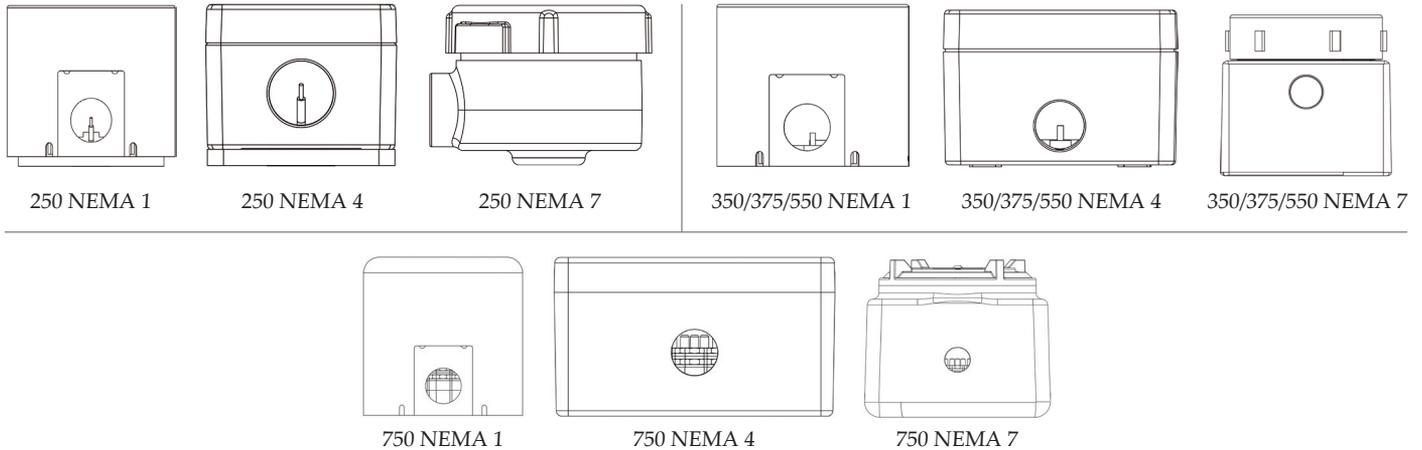
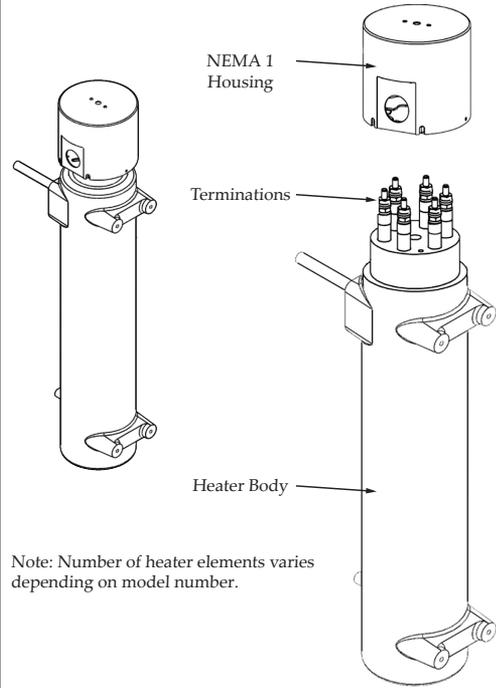
# DFX Cast Circulation Heater Installation & Operation Manual

## PARTS LIST:

1. Electrical Enclosure
2. Cast Heater Body
3. Connection Fittings (optional)
4. Thermostat (optional)
5. Sheet Metal Insulation Jacket (optional)
6. Foam Insulation Sleeve (optional)
7. Thermocouple (optional)
8. Replaceable Heater (DFX 250 Only)



## DFX 350, 375, 550 and 750 Series



## BEFORE INSTALLATION

### NOTICE!

Read this entire document before installing, operating or servicing this product. Failure to do so may cause personal injury and/or equipment damage.

Read all WARNING! messages. They call out important safety information to prevent personal injury and/or equipment damage.

1. Unpack the heater and ensure all parts are included. Consult Durex Industries for instructions if parts appear to be missing or if the product appears to be damaged. **DO NOT OPERATE DAMAGED EQUIPMENT.**

2. Check nameplate information to ensure the product complies with the required specifications. Contact Durex Industries if there appears to be an error **prior to proceeding with the installation.**

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## INSTALLATION

### WARNING!

**EXPLOSION & FIRE HAZARD.** Avoid installation of heater near combustible vapors or flammable gas-laden atmospheres as hot heater surfaces can possibly ignite the flammable mixtures and cause personal injury and equipment damage.

**EXPLOSION & FIRE HAZARD.** The user of this product is entirely responsible for determining and complying with ALL hazardous location classification requirements for the application of this product.

**BURN HAZARD.** Uninsulated DFX heater body (casting), electrical enclosure and mounting leg parts can reach temperatures well in excess of 140°F (60°C). User is responsible for appropriate thermal insulation and personnel protection to avoid personal injury.

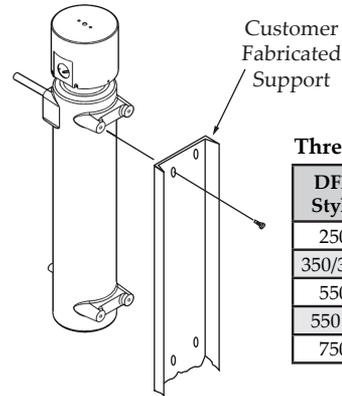


Figure 1

Thread Size & Depth

DFX Style	Thread Size	Thread Depth	Hole Depth
250	#10-32	3/8"	1/2"
350/375	1/4" - 20	3/8"	1/2"
550	1/4" - 20	1/2"	5/8"
550 L	3/8" - 20	3/4"	1"
750	1/2" - 20	1"	1 3/8"

1. **Megohm check.** Electric heater elements may absorb moisture during shipping and storage. This can cause excessive current leakage. Therefore, it is recommended to check the heater megohm value prior to energizing. A test voltage of 500VDC should be used between the heater element terminal pin and heater sheath. A reading of 10 megohms or greater is acceptable. If a low megohm level is measured, there are two remedies. The best remedy is to remove the electrical enclosure and termination hardware along with thermostats, sensor and temp switches. Then place the unit in an oven set at 250°F (120°C) for a minimum of 8 hours. Remove the heater from the oven and check the megohm value. Once a minimum of 100 megohms has been achieved, remove from oven and allow the unit to cool to room temperature. Then do a final megohm re-check and proceed with reassembly of enclosure hardware and wiring.

The second remedy is to remove the enclosure cover, connect wires and power the heater at low voltage (start out at about 1/4 of the rated voltage) until an acceptable megohm value is reached. **Ensure the high limit safety device is operating to prevent an overheat condition.** Allow heater body to "soak" at a temperature of no more than 250°F for about 4 hours.

2. Mount the heater to a structural member using the tapped holes on the mounting legs (Figure 1). Do NOT use tubing and tubing connections to support the heater. The structural member should have slotted holes on one end to allow for heater expansion and contraction. Mounting bolts should be torqued in accordance with SAE standards.

3. DFX heaters MUST be mounted vertically as shown in Figure 2. Regardless of electrical enclosure orientation, **ensure that the lower tube is the flow inlet and the upper tube is the outlet.**

Enclosure "Down" orientation is recommended for higher temperature outlet applications (300°F or 150°C+) to reduce enclosure temperatures. If the heater has a "stand-off" enclosure, mount the heater vertically with the enclosure up.

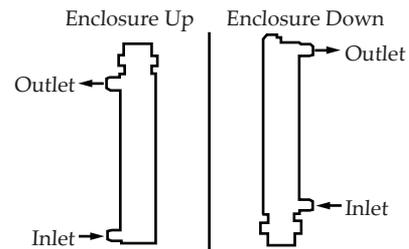


Figure 2

4. Ensure enough clearance to easily access electrical enclosure for service.
5. Connect user supplied tubing to the DFX heater flow tubes using appropriate connections. Pressure-test the system to ensure tight, leak-free connections.
6. Protect the electrical enclosure from spray, condensation, dripping and vapors. The appropriately rated enclosure should be used if the heater will be subject to these conditions.
7. For DFX 250 heaters only, ensure the electric heater element is snugly tightened to the cast heater body.
8. If thermal insulation is not included with the heater, install appropriate thermal insulation and protective personnel shielding against high surface temperatures that might cause burns and/or may be too high for the hazardous location classification. If operating temperatures are expected above 300°F (150°C), it is recommended to install ceramic or high temperature composite thermal barriers between the heater mounting legs and customer structural mounting support. This will greatly aid in reducing conduction heat losses to the frame.
9. Further recommendations: Pumps or blowers should be installed on the inlet side of the heater. A flow switch is recommended to prevent operating the heater when flow rate is insufficient. A suitable filter should be used to prevent flow tube clogging. A pressure relief valve is also recommended for higher pressure applications.



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## WIRING

### WARNING!

**ELECTRIC SHOCK HAZARD.** Disconnect power prior to making (or servicing) wire, cable and conduit connections. Failure to do so may cause personal injury or equipment damage. Only qualified electricians should install wiring, and ensure proper grounding, in accordance with the NEC, NFPA 70 and other local codes.

**EXPLOSION & FIRE HAZARD.** For classified hazardous locations, user must verify that the properly rated enclosure is being employed and is responsible for proper field connections as required by NEC, NFPA70 and other local codes.

**EXPLOSION & FIRE HAZARD.** A high limit safety device (preferably FM Approved or similar rating) such as high limit temperature controller, temperature switch or other redundant control **MUST** be used to prevent a potentially dangerous heater over-temperature condition. This condition could lead to personal injury and equipment damage.

1. It is the user's responsibility to properly size and install proper feed wire and protective conduit. Due to potentially

high operating temperatures, use minimum 250°C (480°F) rated power feed wire. Apply appropriate ampacity de-rate factors to the wire based on expected enclosure operating temperature conditions. Feeder wire should also be housed in properly sized and rated conduit.

2. Consult wiring diagrams for wiring connection guidance. Consult factory if anything is unclear.
3. After heater is wired, check tightness on each terminal by supporting lower hex nut and tightening upper hex nut to a maximum torque of 20 in-lb (2.25 N-m). **Over tightening will lead to termination breakage and render heater inoperable!**
4. Use copper connector lugs to land power supply wiring (not applicable to DFX 250). Refer to wiring diagrams for assistance.
5. Ensure that process temperature controllers, high limit controllers and thermocouple(s) are properly wired and connected. Ensure that the power switching device (relay or SSR) is properly rated for voltage and current requirements.
6. If using a thermostat, ensure that it is properly wired and connected. If the thermostat is used as pilot duty, verify proper wiring to user supplied contactors and field wiring.
7. Thermostats and temperature controllers should not be used to "power off" or disconnect power to the heater. Use of a disconnect switch or circuit breaker is required to interrupt power supply to the heater and electrical connections.

## OPERATION

### WARNING!

**EXPLOSION & FIRE HAZARD.** Do not operate the heater at pressures higher than for which it is rated. Also, do not heat materials that are corrosive to the flow tubing. The flow tube may rupture potentially causing personal injury or equipment damage.

1. Establish fluid flow. If a liquid, it is preferable to bleed the air out of the lines if possible.
2. Energize the heater and control system. Set proper temperature and process parameters. Make sure the system is working properly before leaving it unattended.
3. Do not allow heater to operate if flow is interrupted or allow pressure to build up in excess of pressure ratings.

## MAINTENANCE

### WARNING!

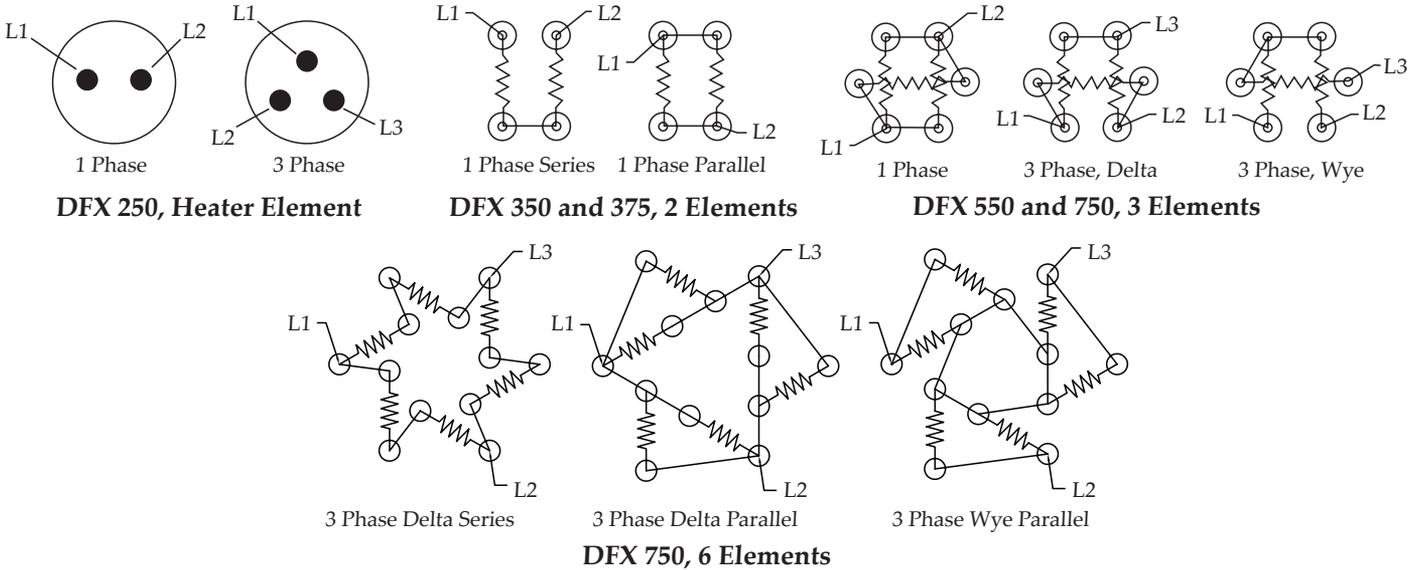
**ELECTRIC SHOCK HAZARD.** Disconnect power prior to servicing wire, cable and conduit connections. Failure to do so may cause personal injury or equipment damage. Only qualified electricians should service wiring, and ensure proper grounding, in accordance with the NEC, NFPA 70 and other local codes.

1. Periodically check high limit functionality as well as temperature control.

2. Periodically, check electrical connections and retighten those that may have loosened in service. Replace wires and connection hardware that appear to be oxidized and which would interfere with electrical conduction.
3. Periodically disconnect the process flow tube and visually inspect to ensure no build up or corrosion of the flow tube.
4. If a moisture resistant enclosure, check the gasket condition and replace if needed.
5. NOTE: Maintenance intervals are to be established by the user.

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## WIRING DIAGRAMS



## TYPICAL THERMOSTAT WIRING DIAGRAMS

