

## Immersion Heaters

# CX & DX Series

## Installation, Operation, & Maintenance Instructions For CE/ATEX and IECEx Models

### Special Notes



CAUTION

**ELECTRIC SHOCK HAZARD.** All electric heating equipment installations must be performed by qualified personnel in accordance with the local electrical codes and standards and must be effectively grounded to eliminate shock hazard.



WARNING

**FIRE/EXPLOSION HAZARD FOR HAZARDOUS LOCATION HEATERS.** This heater shall be used with protection controls as follows:

Liquid Immersion Applications

- a. Liquid level control to maintain all the heating elements totally immersed at all times, in conjunction with temperature controls to limit the liquid temperature below the maximum allowable process design temperature, or
- b. Heating elements sheath temperature controls to limit to the maximum allowable sheath design temperature



WARNING

**FIRE/EXPLOSION HAZARD.** Do not exceed the ratings of the flange as listed in ANSI B16.5. In case of code stamped or registered heater, do not exceed the rating as stated in the data report and/or registration documents. Do not operate the heater in the presence of combustible gases, vapours, dusts or fibres unless the heater is specifically marked for the hazardous location and heater operating temperature does not exceed the temperature code rating. Corrosion of the sheath could result in a ground fault which, depending upon the fluid being heated, could cause a fire or an explosion.



WARNING

**FIRE HAZARD.** If a thermostat is provided, it is designed for temperature control service only. Since the thermostat does not fail safe, it should not be used for temperature limiting duty. Wiring to this device is the users' responsibility.

Heaters are capable of developing high temperatures, therefore extreme care should be taken to:

- a. Use explosion-proof terminal enclosures in hazardous locations;
- b. Maintain distance between heater and combustible materials.



CAUTION

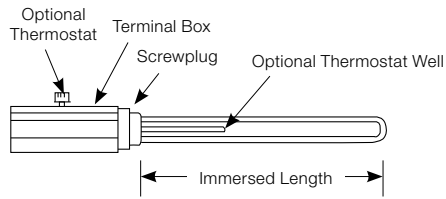
**CAUTION.** This document presents the minimum requirement pertaining to the installation, operation, and maintenance of the respective equipment as required by the manufacturer only. Any additional considerations, including but not limited to any design consideration, in-service inspection, and fitness-for-service assessment for all pressure boundary components to meet any safety principles and local jurisdictional regulatory requirements, shall be the responsibility of the user.



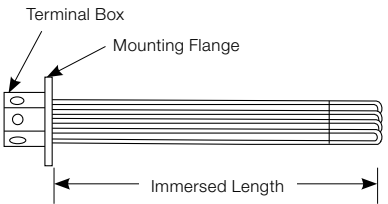
# TABLE OF CONTENTS

- A. Diagrams ..... 2
- B. Description ..... 3
- C. Installation ..... 3
- D. Operation ..... 4
- E. Maintenance ..... 5

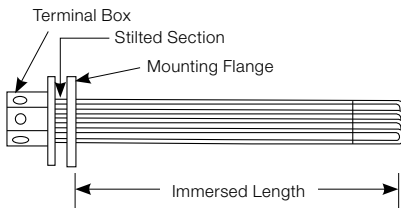
## A. DIAGRAMS



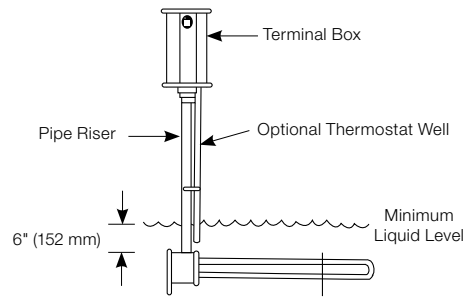
**Screwplug Immersion Heater**



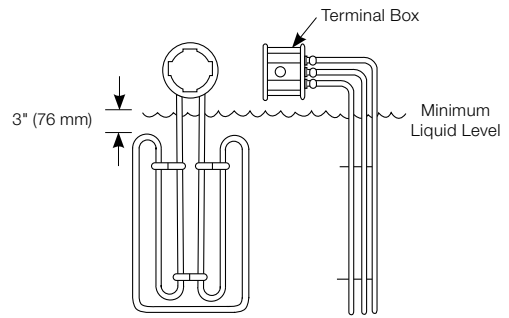
**Flanged Immersion Heater**



**Flanged Immersion Heater  
(with optional stilted terminal box)**



**Over-the-Side Immersion Heater  
(bottom mount)**



**Over-the-Side Immersion Heater  
(side mount)**

## B. DESCRIPTION

1. Immersion heaters for liquid service are designed for operation only while completely immersed in liquids. Never allow the heating elements to be exposed while energized or failure will result.



**CAUTION** Use the heater only in liquids and at pressures for which it was designed (unless specifically designed for non-liquid applications). Normally copper sheath is recommended in water, steel or alloy sheath in oil, and the appropriate alloy sheath for heating chemical solutions. Check factory for recommendations.

2. In the case of flanged (and some screwplug type) heaters where a gasket seal is required, the gasket surface should be clean and dry before the heater is seated.



**WARNING** DO NOT insulate over the heater flange, stilted area and terminal enclosure.

3. The terminals must be protected at all times from moisture or vapour. In hazardous locations, explosion resistant terminal housings must be used. In outdoor locations, moisture resistant housings are required. It is recommended to use a drip loop to prevent moisture from entering the terminal box via the wire.
4. Protect terminals of heating elements from drippings, condensation, fumes, spray or any other substance which could result in element contamination.

5. When melting solids by direct immersion, a surface vent should be provided to allow gases to escape. Operate the heater on ½ voltage until melted material completely covers the heating elements. Heaters used for this purpose may require special design features. Check factory for recommendations.

6. For  $\text{C}\text{E}$  and/or IECEx Certification:

$\text{C}\text{E}$  II 2 G Ex d IIC Gb T1....T6  
II 2 D Ex tD A21 IP66 T....°C

In accordance with:

EN60079-0:2012 + A11: 2013	EN61241-1:2004
EN60079-1:2007	IEC60079-0:2011
EN61241-0:2006	IEC60079-1:2007-04

**Caloritech™**  
Engineered Electric Heat  
2721 PLYMOUTH DR. OAKVILLE, ON. CANADA

**CE** 0518

**Ex** II 2 G

**KEMA 05ATEX2002**  
Ex d IIC Gb T\*\*\*, IP66  
**IECEx CSA 07.0004**  
Ex d IIC Gb T\*\*\*, IP66

**SP** **US**

CAT. NO.   
NO. CAT.

PART NO.  TYPE   
PIECE NO.

S.O. NO.  DATE

VAC  PH.  KW  Hz

HAZARDOUS LOCATION/EMPLACEMENT DANGEREUX

CLASS  ZONE  GR.   
CLASSE  ZONE  TEMP. CODE

PROCESS TEMP. MAX.  °C  °F

TEMP. MAX. D'OPERATION  °C  °F

AMBIENT TEMP. -50° TO 60°C  
TEMP. AMBIANTE -58° TO 140°F

MADE IN CANADA / FABRIQUÉ AU CANADA  
THERMON HEATING SYSTEMS, INC.  
www.thermon.com

20020-01

## C. INSTALLATION



**CAUTION** Heaters with overtemperature devices require specific installation orientation.



**ELECTRIC SHOCK HAZARD** Disconnect all power before installing or servicing the heater. Failure to do so could result in personal injury and/or property damage. All maintenance and installation should be done by qualified personnel in compliance with local codes.



**FIRE OR SHOCK HAZARD** Moisture accumulation on the dielectric material of the elements, sheath corrosion or overtemperature on the heaters could cause a fault to ground generating arcing and molten metal. Install proper ground fault protections to prevent personal injury or property damage.



**WARNING** Heaters are electrical components, designers are responsible for the proper integration to the electrical systems, including protections, backups, and controls.



**CAUTION** A conduit seal must be installed within 50 mm (2") of the enclosure.

For hazardous locations an approved liquid level and/or temperature limiting control must be used to de-energize in the event of system malfunction. Use supply wire suitable for 90°C min.

1. Unpack and check heater for any damage that may have been caused during shipping.
2. Remove any protective packaging in the screw or flange connecting fitting.
3. Remove any dessicant material in the electrical box.

4. Insert heater into vessel/reservoir and verify that the heating elements are not making contact with the surface of the vessel.
5. Check that all terminal connections are tight.



**CAUTION** Use copper conductors only with sufficient current carrying capacity for the heater circuit load and in accordance with the local electrical code. Check the heater nameplate for minimum conductor temperature rating. Temperature deration factors must be applied for heaters operating above 30°C (86°F).

6. Check supply voltage for compliance with heater nameplate voltage. DO NOT connect the heater to a voltage source other than listed on the heater nameplate.
7. A line voltage or pilot duty thermostat should be used to control the heater. The pilot duty thermostat must be used with a contactor and (if required) a transformer. Generally, heaters supplied with built-in thermostats will be factory prewired if suitable for line voltage operation. Integral thermostats not factory prewired are usually intended for pilot duty.
8. It is recommended that the control circuits be supplied from the isolated secondary windings of transformers avoiding the need for two supply circuits, or as an alternative, that mechanical or electrical interlocking be provided so that both supplies must be disconnected before live parts can be made accessible.

9. If there is even the slightest possibility that the liquid level may fall below the elements, a level control switch or overtemperature sensing device affixed to the uppermost heating element is required. Check factory for recommendations.
10. If the heater is installed in a pressurized system, a safety relief valve must be used to prevent a hazardous pressure buildup.
11. Horizontal element support bundles may be necessary with an immersed length over 1270 mm (50").
12. For flange heaters installed in a pressurized system, proper bolting hardware must be used that is suitable for the pressures and temperatures of the equipment. Use an appropriate gasket for the pressure and temperature; torque the bolts on an even clockwise or counter clockwise pattern.
13. Heaters with explosion resistant terminal housings must only be used in locations for which the heaters are certified.
  - a. Check heater nameplate information for approval code.
  - b. Never energize an explosion resistant heater unless the terminal housing cover is properly tightened.
  - c. An immersion heater for hazardous locations is approved for use only if an approved liquid level control and/or temperature limiting device is used to de-energize the heater under low liquid conditions.
14. On ATEX/CE certified heaters which are being installed in the EU, the installation of heater shall be in accordance with the requirements of the local jurisdiction.

## D. OPERATION



**RISK OF EXPLOSION** Do not operate heater at voltages higher than the rating specified on the nameplate. Failure to do this will cause elevated temperatures.



**WARNING** For metal sheathed heaters, prior to operation an insulation resistance check must be performed. Heater with values less than 0.5 MΩ should follow a drying process. Please contact factory for details on procedure if heater is under 0.5 MΩ.



**FIRE HAZARD** Heater should be submersed in the fluid for proper operation and to avoid element overheating that could result in fire or damage of the heater.



**WARNING** When operating the heaters in a closed system or vessel, system designers must ensure that proper controls are used to maintain the temperature and pressure at normal levels.



**WARNING** Low megohm on heating elements with epoxy or hermetic seals cannot be serviced in the field. Typical resistance values when sealed are 1000 MΩ or greater.

1. Check that all connections are tight.
2. If a thermostat is provided, verify that it is operating properly by cycling it and verifying cutout.
3. Perform an IR test prior to energization and verify that levels are acceptable (500,000 ohms min).
4. Energize the heater and check for signs of hotspots in the electrical connections or vessel.
5. Retorque all bolted fitting connections and all electrical connections after 10 cycles.
6. Always maintain a minimum of 51 mm (2") of liquid above the heated portion of the element or element failure may result.
7. Heating elements should be kept above sediment deposits or it may overheat and shorten life expectancy.

## E. MAINTENANCE

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**WARNING** Disconnect all power before servicing the heater or heated equipment. Failure to do so could result in personal injury and/or property damage. All maintenance and installation should be done by qualified personnel in compliance with local codes.

1. Heaters stored for prolonged periods may absorb moisture. Using a 500V DC megger (insulation resistance tester) check the value of the insulation resistance to ground for each circuit. Initial readings of over 500,000 ohms to ground are normally acceptable. Should lower readings be observed, check factory for instructions.
2. Periodically check electrical connections for tightness and check wire insulation for any damage and replace if necessary.
3. Remove the immersion heater periodically to inspect for corrosion, sludge build-up and for scale removal. Do not continue to use a heater showing visible signs of damage.

**For further assistance, please call 24hr hotline: 1-877-325-3473 (U.S.A. and Canada)  
Please have model and serial numbers available before calling.**

**WARRANTY:** Under normal use the Company warrants to the purchaser that defects in material or workmanship will be repaired or replaced without charge for a period of 18 months from date of shipment, or 12 months from the start date of operation, whichever expires first. Any claim for warranty must be reported to the sales office where the product was purchased for authorized repair or replacement within the terms of this warranty.

Subject to State or Provincial law to the contrary, the Company will not be responsible for any expense for installation, removal from service, transportation, or damages of any type whatsoever, including damages arising from lack of use, business interruptions, or incidental or consequential damages.

The Company cannot anticipate or control the conditions of product usage and therefore accepts no responsibility for the safe application and suitability of its products when used alone or in combination with other products. Tests for the safe application and suitability of the products are the sole responsibility of the user.

This warranty will be void if, in the judgment of the Company, the damage, failure or defect is the result of:

- Vibration, radiation, erosion, corrosion, process contamination, abnormal process conditions, temperature and pressures, unusual surges or pulsation, fouling, ordinary wear and tear, lack of maintenance, incorrectly applied utilities such as voltage, air, gas, water, and others or any combination of the aforementioned causes not specifically allowed for in the design conditions or,
- Any act or omission by the Purchaser, its agents, servants or independent contractors which for greater certainty, but not so as to limit the generality of the foregoing, includes physical, chemical or mechanical abuse, accident, improper installation of the product, improper storage and handling of the product, improper application or the misalignment of parts.

No warranty applies to paint finishes except for manufacturing defects apparent within 30 days from the date of installation.

The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the product(s).

The Purchaser agrees that all warranty work required after the initial commissioning of the product will be provided only if the Company has been paid by the Purchaser in full accordance with the terms and conditions of the contract.

The Purchaser agrees that the Company makes no warranty or guarantee, express, implied or statutory, (including any warranty of merchantability or warranty of fitness for a particular purpose) written or oral, of the Article or incidental labour, except as is expressed or contained in the agreement herein.

**LIABILITY:** Technical data contained in the catalog or on the website is subject to change without notice. The Company reserves the right to make dimensional and other design changes as required. The Purchaser acknowledges the Company shall not be obligated to modify those articles manufactured before the formulation of the changes in design or improvements of the products by the Company.

The Company shall not be liable to compensate or indemnify the Purchaser, end user or any other party against any actions, claims, liabilities, injury, loss, loss of use, loss of business, damages, indirect or consequential damages, demands, penalties, fines, expenses (including legal expenses), costs, obligations and causes of action of any kind arising wholly or partly from negligence or omission of the user or the misuse, incorrect application, unsafe application, incorrect storage and handling, incorrect installation, lack of maintenance, improper maintenance or improper operation of products furnished by the Company.



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