

INSTAHEAT

User Manual



1 Important Safety Instructions to the Users

- This manual presents information that will help to install, operate and maintain the equipment properly. It is expected that the contents be carefully read before handling the equipment.
- All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly observed.
- To ensure appropriate use, only use the InstaHeat in applications where the operating pressure and temperatures do not exceed the specifications used for sizing at the ordering stage.
- The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.
- Any hazards that could be caused in the InstaHeat by the process medium, operating pressure or by moving parts are to be prevented by taking appropriate precautions.
- A good installation is a permanent asset while a bad one can be a constant source of trouble. It can cost much more to correct a bad installation than to put a new one.
- The InstaHeat is a product of many years of knowledge, field experience & engineering effort, to provide long life & excellent service to the users. This unit will provide continued trouble-free service, if instructions on installation, operation and maintenance are properly followed.
- It is expected that the person involved in Installation, Operation & Maintenance possessing necessary qualification, competence, license & authority (if applicable) only should handle the product. It is solely the responsibility of the equipment owner & user to ensure that all applicable statutory (if applicable) norms are adhered to during Installation, Operation & Maintenance of this equipment.
- The mechanical devices supplied as a part of the unit are chosen because of their known ability to perform, with

proper operating techniques and maintenance procedures. Tampering with the safeties & controls or bypassing any of these is not permissible at any time.

- Any “Automatic” features included in the design do not relieve the attendant of any responsibility. Such features may free him of certain repetitive chores and give him more time to devote to the proper upkeep of the equipment.
- No amount of written communication can replace intelligent thinking & reasoning.

The following symbols/terms have been used in this manual at the end of some chapters for the attention of the users:



This is a symbol of “**warning**” to the equipment user & provides information about practices or circumstances that should never be allowed as can lead to personal injury or death, property damage, or economic loss.



This symbol is for hot surface areas where there is chance of temperatures above ambient temperatures which causes injuries.



This symbol is to avoid hand/fingers getting crushed with the flange joints/pipes.



Avoid the injuries while working in steam leaking areas.



This is a symbol of “**Caution**” to the equipment user & provides information about the care to be taken on the actions or procedures which if not performed correctly may lead to personal injury or incorrect function of the instrument or connected equipment.



Recommended action

2 Abstract

Thank you for choosing sustainable solutions in energy and environment which helps in conserving resources and preserving the future. This manual describes the principle of operation, instructions for installation, operation & maintenance of InstaHeat supplied by Thermax Ltd. The General Instructions which are not detailed out in this

document, need to be performed in accordance with standard and safe acceptable practices. Further, please contact Thermax for detailed clarification. The instructions contained within this manual must be read before undertaking any work on the equipment supplied. For any queries, please contact Thermax Limited.

3 Product Identification

The product specifications and details are mentioned in the name plate details, please refer the figure 3.1A for template.



For all maintenance, service & spares requests, it is important to mention the serial identification number as mentioned in the name plate details of your product to Thermax Ltd.



Figure 3.1A

4 Working Principle

InstaHeat is a packaged, instantaneous hot water generator that uses steam as a heat source to heat the process water in a compactly designed heat exchanger.



InstaHeat is Thermax's packaged instantaneous hot water system. The hot water is generated by indirect heating of water in a heat exchanger with steam as the heating medium. The hot water system uses plate heat exchanger (PHE) along with a properly designed temperature control system and condensate management system. The PHE consists of corrugated metal plates with openings for passage of fluids and the metal plates are separated by gaskets which seal the channels (a channel is formed between two metal plates) and steam and water flow in alternate channels. Every second channel is open to the same fluid and heat transfer takes place between two adjacent channels.

Counter flow arrangement of the fluids ensures higher heat transfer rates. Properly designed/ selected heat exchanger helps in minimum stall. Optimally designed temperature control

system maintains the required temperature of water. Additional temperature shut off valve in the system provides extra temperature protection to the secondary side. Condensate from the heat exchanger is routed back to the condensate return line through pump and trap combination.

During normal conditions, high pressure condensate moves to the return line by passing through the trap directly. When the temperature approaches close to the set point, the control valve moves to the closed condition resulting in pressure drop of steam entering the PHE and hence drop in the condensate pressure. In this condition, the condensate pressure may not exceed the back pressure exerted by the condensate transfer line, resulting in accumulation of condensate inside the pump vessel. This is called as stall condition.

The Conductivity based level switch in the pump chamber senses whether the condensate level in the chamber has reached to the upper set level. When condensate level reaches the upper set point, a 3-way valve is energized allowing motive steam in the pump body. This motive pressure discharges condensate from pump. The inlet disc valves fitted in the pump prevent any back flow to the receiver.

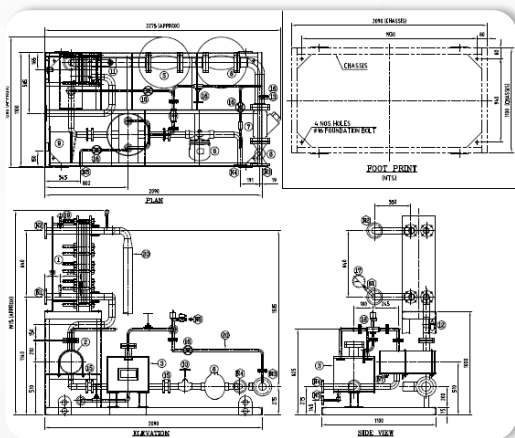
During this period, incoming condensate is stored in the receiver. Condensate is discharged out of pump chamber till the level reaches to the lower level. When level reaches minimum lower level, it de-energizes the 3-way valve and opens the vent port. The pump is depressurized and condensate starts flowing in the pump from receiver again.

The filling and discharge cycles are repeated. The frequency of cycles depends upon condensate flow in to the receiver from the plant.

5 Reference Drawings

The site reference drawings which have been submitted by Thermax Ltd. are to be preserved and referred during installation. Figure 5.1A represent general arrangement of the InstaHeat.

Figure 5.1A



5.1 Unloading Receiving and Inspection

The InstaHeat components are supplied in semi assembled condition, duly packed wooden cases for assembly & installation at site.



Ensure that the wooden cases should not be dropped or turned to any other position other than marked on the cases.

At the time of receipt at site, a thorough visual inspection of the product should be made for evidence of damage during shipment. Packaging slip should be referred for checking the items supplied for the system.

On receipt of the consignment at site, check that all the cases have been received per delivery documents & packing slip.

By careful inspection, determine whether any damage/ loss has occurred in transit, in spite of proper Checking and loading of each component/equipment, at our factory before dispatch.

In the event if any damage is noted, the Company should be notified at once, so they can start claims procedure for repairs or replacements, as per applicable clauses of contract.



Your product is carefully manufactured, assembled and inspected at each level before dispatch. Sometimes during transit, there is a possibility of piping connections getting loose. The same is to be tightened at the site during installation, if found loose.

6 Storage

The place of storage of these equipment should be:

- Dust free, clean, dry and well ventilated
- All the material should be stored under roof and should be protected from rain, water or direct sunlight.

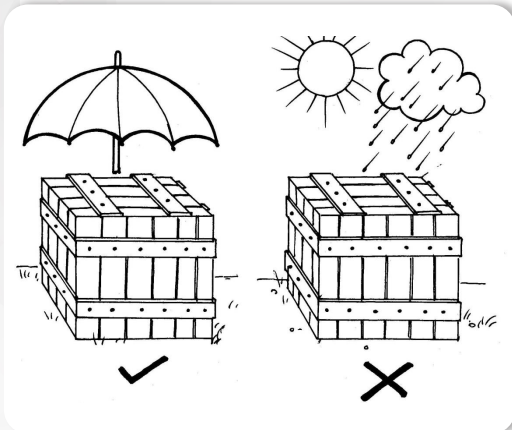


Figure No 7.1A: Material should be stored under roof.

- Do not pile up cases.

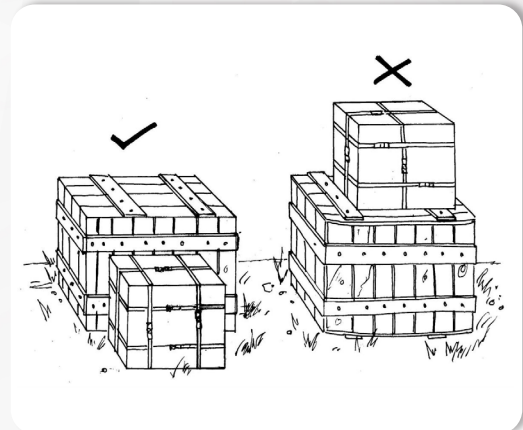


Figure No 6.1A: Do not pile up cases.

- Do not store heavy material on soft soil.
- Parts should not be stored under corrosive atmosphere.
- Periodically, the unit should be inspected to make sure no damage, such as corrosion, is taking place.

7 Installation Guidelines

- Check foundation for readiness as per foundation drawings.
- Check foundation is at 100 mm above zero level.
- Flush all steam, air, water lines fabricated at site before connecting to InstaHeat.
- Connect steam, air, water, condensate lines to respective nozzles. Refer figure 5.1A.
- Ensure tightness of all interconnecting flanges.



Specifications of gaskets and fasteners to be used as recommended/supplied by Thermax. (Note: As per design calculations, HT Bolts and metallic spiral wound gaskets are not required until specified by Thermax).

8 Control Panel & Instruments

- Lay power cable of 3 core, 1.5 mm² armoured with earth connection cable connected to the ground from main isolation switch to control panel.
 - Connect earthing to panel as well to pump body.
 - Connect Single phase 230 V, 50 Hz, AC supply to panel through 1 KVA CVT / UPS.
 - Ensure correct rating of backup fuse / MCB.
 - All external electrical connection cabling is to be sealed by double compression cable glands. This is to be done to ensure sealing to avoid moisture entry into the controller.
 - Smart Control panel will be delivered along with InstaHeat. The controller is pre-programmed at factory, it has fixed tuning parameters. These settings are normally sufficient for general usage of InstaHeat.
 - RTD will be supplied for measuring the temperature at the outlet of InstaHeat to regulate the control valve and signals from the RTD and control valve to be transmitted via 1.5 mm² shielded cable. This cable needs to be provided by customer with proper gland packing and cable tray.
- If the pump, tank and magnetic level gauge with reed switches are part of Thermax supply, ensure the following safeties are maintained as follows,
- Ensure the working of magnetic level switch and ensure extra low level is tripping the pump in case water is not available.
 - Make up water arrangement to be made by customer in order to do the makeup when the tank level drops below 60%.
 - Up to 5000 hours of operation, strainer needs to be checked for every 200 hours of operation.
 - After 5000 hours of operation, the strainers need to be checked for every 5000 hours.
 - If any additional or new welding work carried out in any piping of InstaHeat and if InstaHeat is shifted to other location, then, again for up to 5000 hours of operation, strainer needs to be checked for every 200 hours of operation.



9 Operation

Maintain water level in hot water storage tank

Hot water outlet temperature will be maintained according to temp, set point.

Start temperature control system by providing required set point.

Put the water circulation pump into operation and remove air from water circuit



Note: 1. Ensure the circulation of water hardness is less than 5 ppm, TDS less than 150 ppm and pH 8.5-9.5
System needs to be flushed thoroughly before starting of the unit.

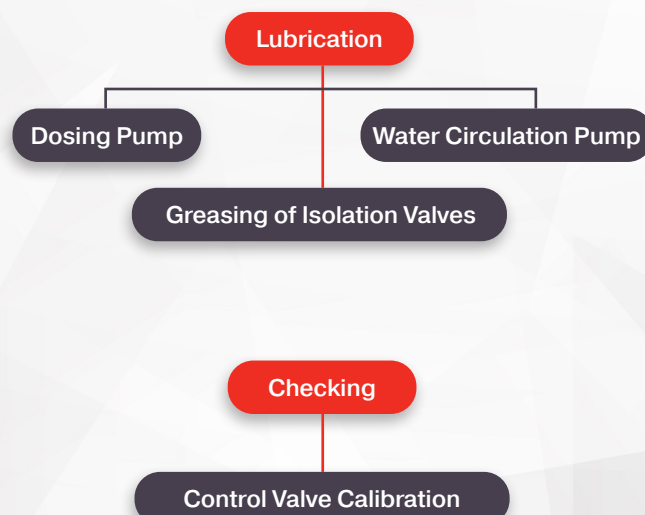
10 Safety Interlocks

11 Troubleshooting

Faults	Probable Cause	Corrective Action
Low water temperature	High water flow rate	Ensure the water flow rate as per design condition
	Steam pressure low	Increase steam pressure
	Condensate flow restriction	Float trap choke/ 3 way valve passing
High Water Temperature	Control Valve not closing	Check and clean foreign particle between plug & seat
	Calibration disturbed	Do re-calibration
Steam on/off control valve failed to operate	No/Low air pressure	Adjust air pressure as specified on actuator
	No input signal to valve from controller	Check relay output from PID controller and set temperature in AL value Replace controller if observed faulty

12 Maintenance

- Up to 5000 hours of operation, strainers need to be checked for every 200 hours of operation.
- After 5000 hours of operation, the strainers need to be checked for every 5000 hours. If any additional or new welding work carried out at the upstream of the pipeline and if InstaHeat shifted to other location, then, again for up to 5000 hours of operation, strainers need to be checked for every 200 hours of operation.



13 Warranty

Only trained or instructed person may be assigned to operation or servicing.

All our equipment is thoroughly inspected before dispatch and therefore can be depended upon for long and trouble-free services. We undertake to make good by replacement or repair, defects arising out of faulty design, materials or workmanship within 12 (twelve) months of the date of commissioning or 18 (eighteen) months from the date of dispatch whichever is earlier, subjected to being mentioned in your purchase order warranty terms. The parts, in respect of which a claim is made, must be sent to our works at buyer's expenses. If the claim is found to be legitimate, we shall refund such expenses.

13.1 Warranty Excludes

- Normal Wear & Tear
- Damages/defects due to wrong operation at the purchaser's end, and/or arising out of forced major.
- Bought out components are guaranteed by us only to the extent of guarantees given to us by our suppliers.
- Electrical components such as heaters, motors, contactors etc. Rubber components and instruments such as pressure gauges, thermometers, Controllers, etc. are however, not covered under this warranty.

13.2 This warranty is valid subject to the following conditions: -

- Installation completed within three months from the date of dispatch of the equipment and as per our installation instructions.
- The supply/ installation formally accepted as per the handing over clause.
- Use of specified utilities in technical quotation.
- The equipment being operated and maintained as per our Operation and Maintenance Manual.
- The equipment or part thereof not being subject to accident, alteration, abuse or misuse.

- Any replacements/repairs required under provisions of the above warranty will be carried out either at site or at works. In the latter case, Buyer will send the defective parts to our works at Buyer's cost & liability.
- Warranty period for the entire equipment including replaced or repaired parts will be limited to the unexpired portion of the total warranty period.
- Accessories and fittings not manufactured by us, form an integral part of the equipment supplied, the warranty for such accessories & fitting will be in line with main equipment.
- If the purchaser delays to lift the equipment up its readiness, the warranty will be limited to 18 months from the date of readiness at our works.
- Any repair / replacement on our equipment during the warranty period shall be carried out by authorized representatives in writing from us.
- The warranty obligations will be honoured by us, provided the Buyer has fulfilled obligations under the order relating to release of due payments, etc.
- After repairs/replacement, warranty period for the entire equipment including replaced or repaired parts will be limited to the unexpired portion of the total warranty period.
- Any short supply or damages to the equipment to be intimated to Thermax within 15 days of receipt of material at site. Any late report will void the warranty.
- If the transit insurance is in client scope, damages and missing items during transit to be claimed by clients directly.
- Any improper use, intervention in the design and deviation from the design data will automatically lead to termination of the warranty.



Diaphragm will get damaged if steam directly comes in contact with the diaphragm, such a failure is not cover under warranty.

As per note 1, the circulation water parameters to be maintained. Any failures attributed because of water parameters will not be covered under warranty.

14 Recommended Spares

- Actuator
- Diaphragm
- TD Trap
- Pressure Gauges
- Safety Valve spring
- RTD
- PID Controller
- E/P Positioner
- Solenoid Coil
- PHE plates
- PHE gaskets
- Level Sensor



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