THERMAX

Thermax Steam Flow Meter

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 A2Z Flo-S 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 A2Z Flo-S 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 A2Z Flo-S 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 help in conserving resources and preserving the future. Anything measured will be recorded, anything recorded will be analysed and anything analysed will help in strategizing improvement. This manual describes the principle of operation, instructions for installation, operation & maintenance of A2Z Flo-S 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 as may be required by local codes, specifications and or regulations. The instruction 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

When steam passes through orifice plate installed in pipeline, Pressure Drop (DP) occurs. A Differential pressure transmitter measures DP across the orifice and compute the corresponding flow.

A2Z lo-S is a steam flow meter for measuring the mass of saturated and superheated steam. It works on the principle of differential pressure (as mentioned above), it has high level of accuracy and main advantage is that it is resistant to errors due to pipeline vibrations.

Steam flow is proportional to square root of this pressure drop. Pressure sensor is provided to measure the change in density of the fluid and all inputs are taken into computation unit for calculating the mass flow. Then instantaneous and totalised steam mass flow displayed on computing unit screen.

5 Unloading Receiving and Inspection

The A2Z flo-S components are supplied in semi assembled condition, duly packed in polythene sheets & wooden cases/ boxes 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.

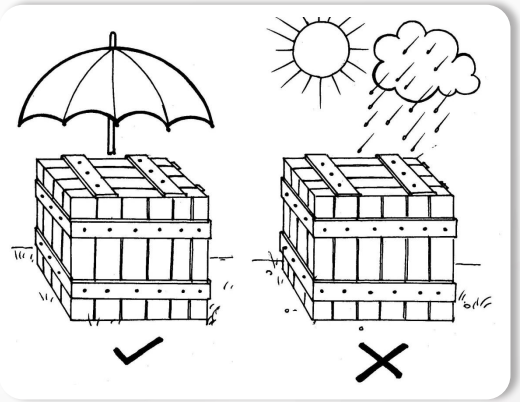
6 Storage

The place of storage of these equipment should be:

- Dust free, clean, dry and well ventilated
- Silica gel packed in cloth back shall be placed inside the electrical panels for absorbing moisture.
- The silica gel shall be inspected periodically for colour change. Re-charging of silica gel shall be carried out, as and when required.

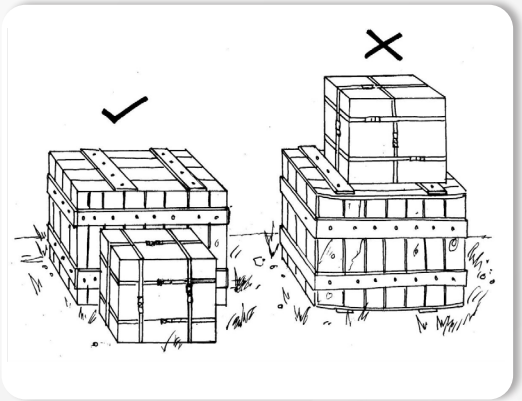
A) All the material should be stored under roof and should be protected from rain, water or direct sunlight.

Figure No 6.1A: Material should be stored under roof.



B) Do not pile up cases.

Figure No 6.1B: Do not pile up cases.



C) Do not store heavy material on soft soil.
E) Parts should not be stored under corrosive atmosphere.

F) Periodically, the unit should be inspected to make sure no damage, such as corrosion, is taking place.

7 Installation Guidelines

- Install the orifice plate in the correct direction as punched on the plate.
- Maintain straight distance of 18D at inlet and 8D at outlet of the orifice plate assembly without any tapings on either side.
- Install the condensate pots in such a way that the outlets of the pots to be at a height of 500 mm above the centre line of the steam pipe.
- Ensure minimum bends for the SS tube from condensate pot to the DPT.
- Connect the drain valve for the SS tubing.
- Upstream side impulse tube should be connected to “H” port and downstream side to “L” port of the DPT.
- Kindly refer the figure 7.1 & figure 7.2 for installation of SFM.

Figure 7.1

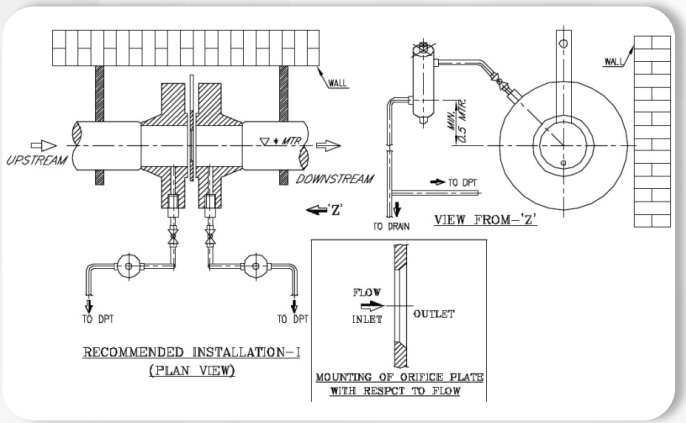
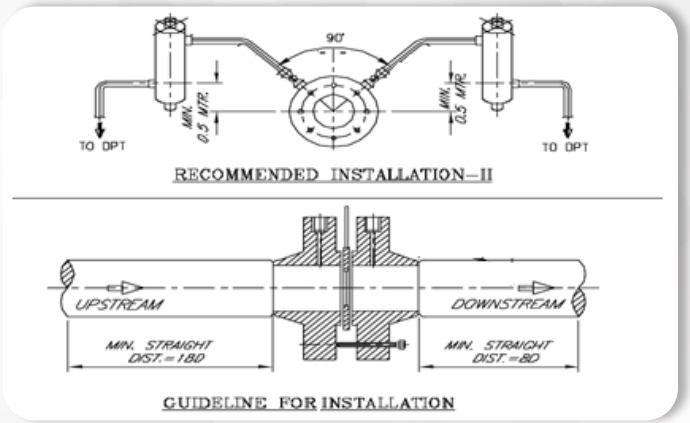


Figure 7.2

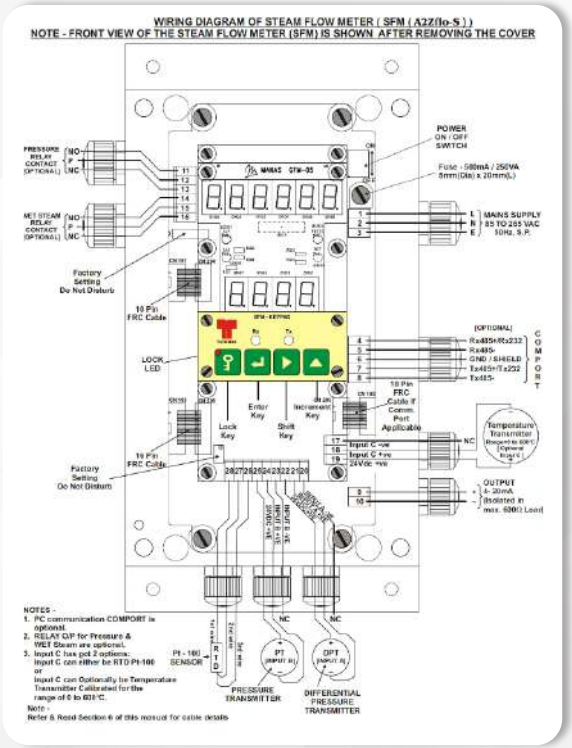


- Ensure no leakages in the pipes and fittings from isolation valves to DPT.
- Protect the panel, DPT & PT from water entry.
- Necessary IBR approvals to be obtained from local authorities.

8 Control Panel & Instruments

- A2Z Flo-S smart control panel will come as an optional. This smart control panel is pre-programmed at factory, it has fixed parameters. During pre-commissioning parameters to be entered as per figure 8.1.2. Refer note (i). These settings are normally sufficient for general usage of flow meter.
- 230V, 1 Phase, with proper earthing (voltage to neutral & earth to be less than 3V) UPS power supply to be provided by customer at site.
- The unit displays instantaneous mass flow rate and totalized (refer note (i)) mass of steam. Unit offers facilities for accurate flow totalizing (refer note (i)) in both compensated as well as uncompensated mode. The unit has two alarms, configured on pressure input. The instrument accepts signals from flow/DP transmitter, & pressure transmitter. It computes instantaneous density from pressure signal as per ASME norms & computes the mass flow as per guide lines from BS1042 / ISO: 5167.
- For the flow meter supplied with A2Z Flo-S smart panel, customer to provide 2 core 1.5 Sq mm cable for DPT & PT. These cables need to be laid with proper gland packing and cable tray. Refer the figure 8.1.1 for terminal connections
- For the model for which A2Z flo-S is not supplied 2 core 1.5 sq mm cable to be connected from 24V DC source of customer.

Figure 8.1.1



Parameters	Design values to be entered
DPPF	00.00 (Decimal point position of Flow)
DPPT	000.000 (Decimal point position of Totalizer Scale)
*CNRT	005.000 (same as REFL e.g. if flow is 5TPH)
*REFL	05.00 (Reference Flow as per Orifice plate data sheet)
dPTY	LINEAR
FLOY	COMP
CTYP	P-COMP (Compensation type)
	P=When PT in line
*P-SP	21.00 (Pressure range of PT used0-21kg/ cm2)
*PREF	10.00 (Reference pressure or line pressure)

It is generally recommended for the transmitter which will display and deliver the outputs only as DP instead of mass flow. For the transmitter models which is having mass flow and totalizer as their default feature in the display, it may not require the A2Z flo-S smart control panel. Please refer note (i) for further details

It is always recommended to check the continuity of the cables before termination.

Note

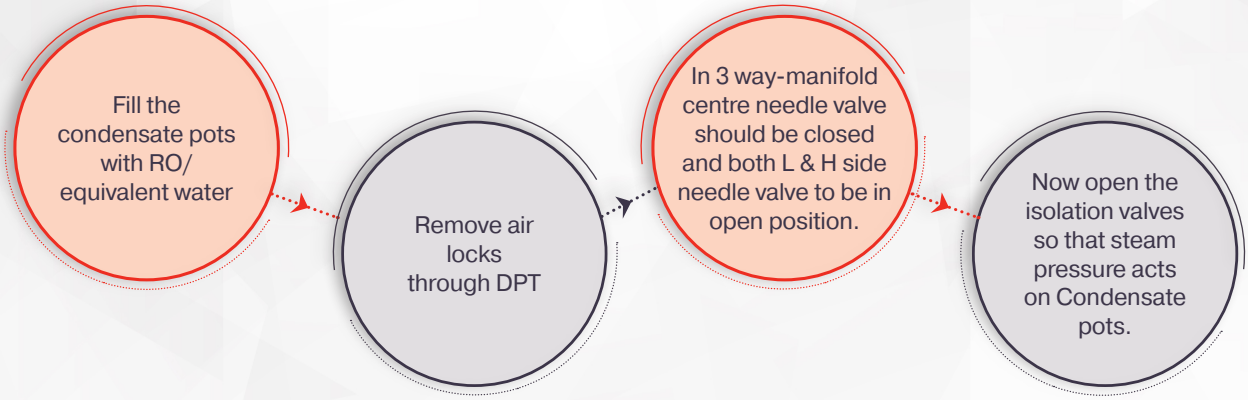
(i): For the standard models, the panel will be supplied.

For non-standard models, the totalizer and instantaneous flow will be displayed in the DPT itself.

The figure 8.1.2 shows the settings to be carried out.

9 System Operation

- System needs to be flusheda thoroughly before starting of the unit.

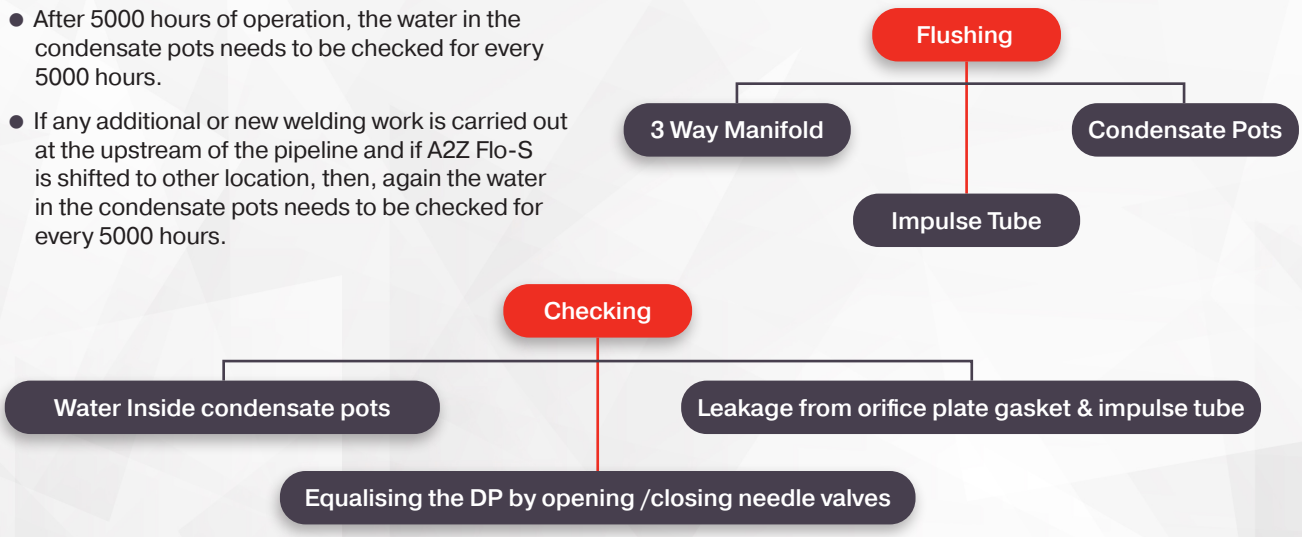


10 Troubleshooting

Problem	Possible Cause	Solution
No display	Fuse blown	Change the fuse
	PCB card faulty	Change PCB card
Error (AOPN/BOPN/ COPN)	INPUT A/B/C OPEN	1. DPT/PT/TT wire may be open check both ends. 2. DPT/PT/TT wire interchanged. 3. DPT/PT/TT faulty.
Error (AOVF/BOVF/COV F)	INPUT A/B/C OVER	1. Input A/B/C signal exceed design range by 7%. 2. Wrong range selection. 3. Short circuit 4. Steam pressure drops below minimum specified.
Steam flow not matching	Low flow	1. Check the log book. 2. Increase load.
	Parameters incorrect	Recheck CNRT/REFL parameter.
	DPT out of calibration	Recalibrate DPT
	3 way manifold/ SS tube choked	Clean 3 way manifold and SS tube. Re-fill water in condensate pots.
Showing flow in no flow condition	DPT out of calibration	Recalibrate DPT
	Difference in condensate pots elevation	Install condensate pots at same elevation.

11 Maintenance

- After 5000 hours of operation, the water in the condensate pots needs to be checked for every 5000 hours.
- If any additional or new welding work is carried out at the upstream of the pipeline and if A2Z Flo-S is shifted to other location, then, again the water in the condensate pots needs to be checked for every 5000 hours.



12 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 goods 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, subject to what has been 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.

Warranty Excludes

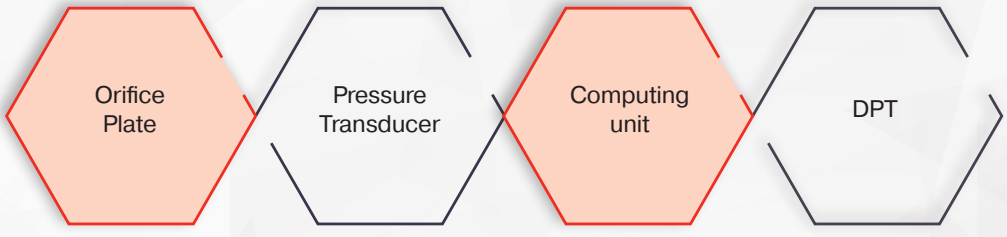
- Normal Wear & Tear
- Damages/defects due to wrong operation at the purchaser's end, and/or arising out of forced major.
- Bought out components are guaranteed by us only to the extent of guarantees given to us by our suppliers.
- Electrical components such as heaters, motors, contactors etc. Rubber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

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 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 covered under warranty.

13 Recommended Spares



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