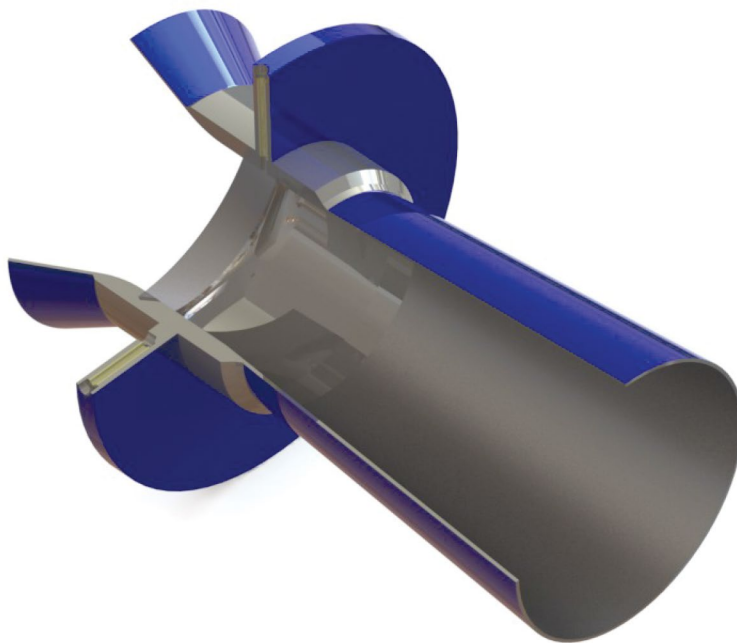


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Insert-Type Venturi Flow Meter Installation and Operation Manual

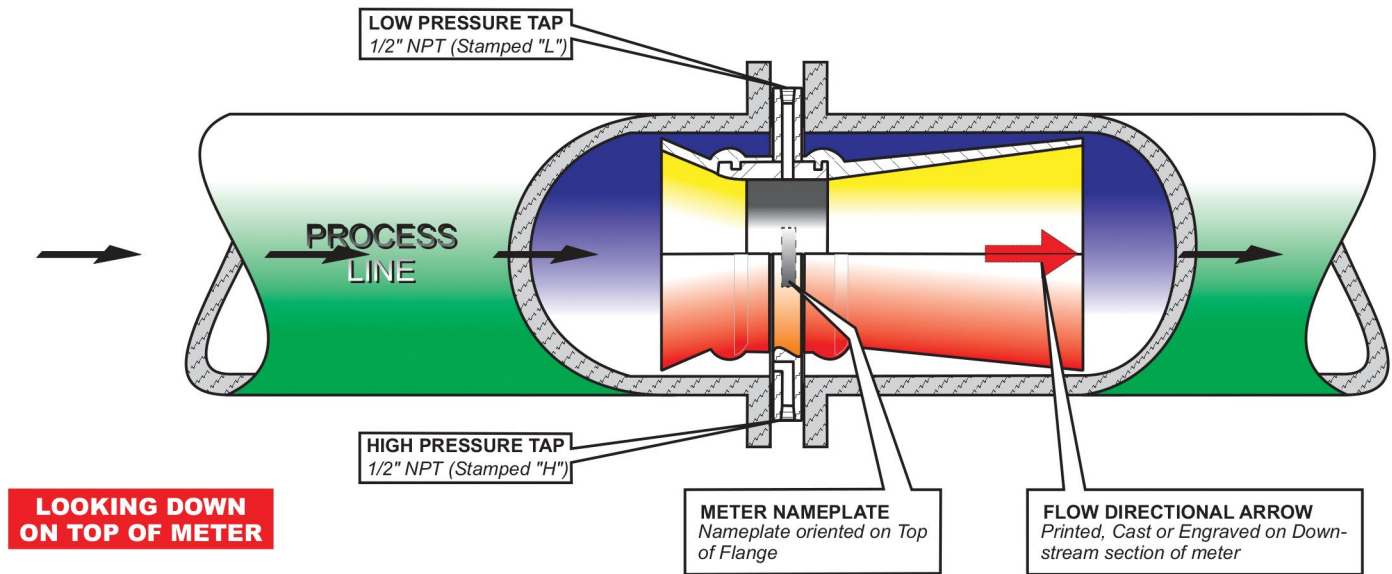


**Please read and save
these instructions.**

Installation Procedures

The Proper Method of Installing a Halmi Venturi Meter

INSERT TYPE DESIGN



Caution:

- This is a high quality flow meter.
- If improperly installed, it must be reinstalled.
- If damaged, it must be replaced.
- Handle it from its outside.
- Do not damage its inside.
- Install meter in the pipe line so that the "Flow Directional Arrow" agrees with the direction of the flow.
- Use gaskets appropriate for use with the flange materials.
- Make sure that the "Inlet Pressure Port" is not covered by the gasket, or plugged in any way.
- Center meter carefully in the pipe.
- Orient Pressure Taps HORIZONTALLY.
- Provide necessary clearances as deemed practical for installation, inspection and maintenance.
- Tolerances should be within industry standards for the above installation instructions.
- Impulse piping to secondary instrumentation should be corrosion resistant, sized and installed in accordance with the instrumentation manufacturer's instructions.

FAILURE TO FOLLOW ABOVE DIRECTIONS MAY VOID WARRANTY.

Installation Procedures - continued

General Piping for PI Single Range Metering

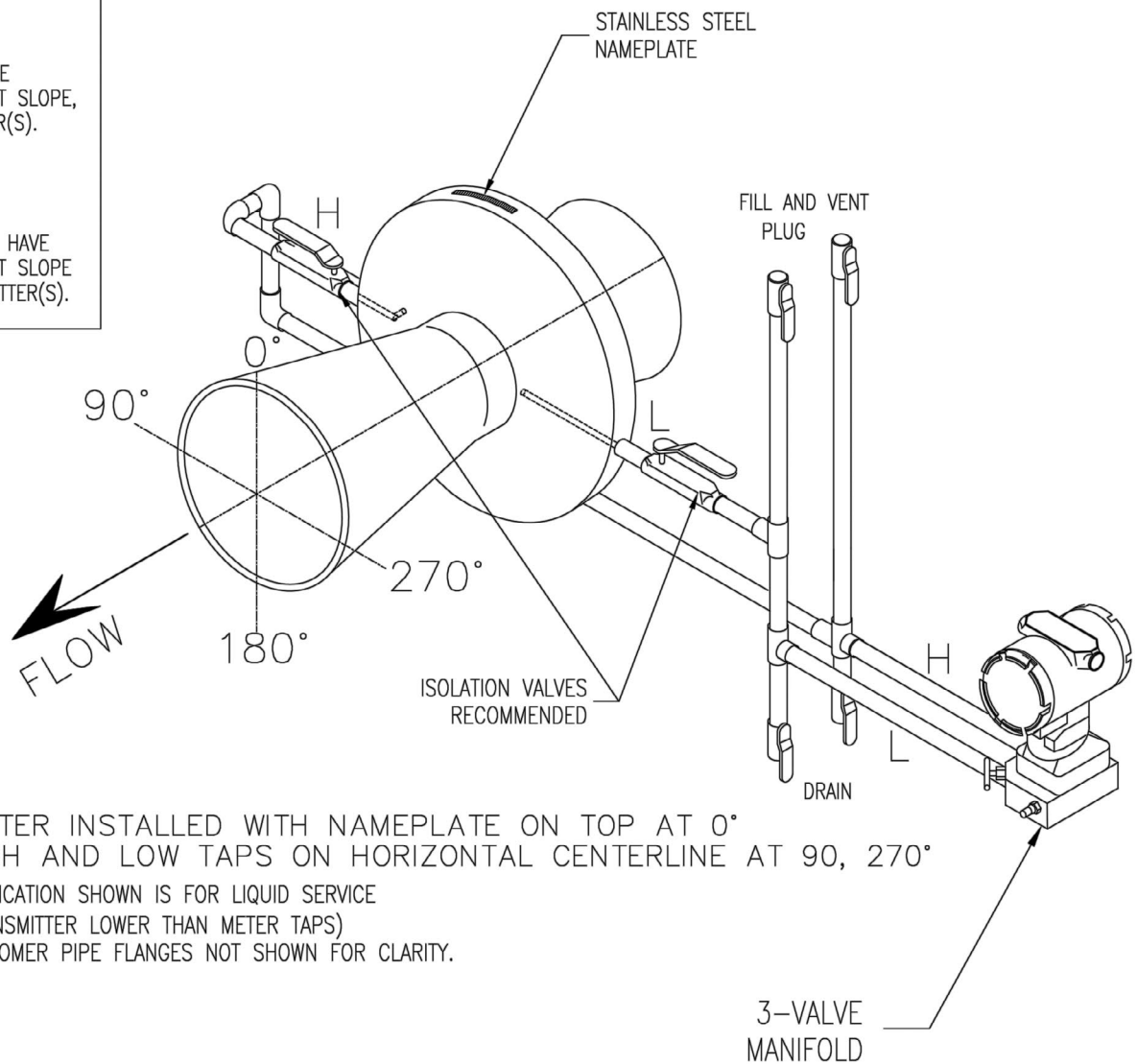
GENERAL NOTE:
FOR LIQUID

APPLICATIONS

IMPULSE PIPING MUST HAVE
MINIMUM 1 INCH PER FOOT SLOPE,
DOWN TO THE TRANSMITTER(S).

FOR GAS
APPLICATIONS:

ALL IMPULSE PIPING MUST HAVE
MINIMUM 1 INCH PER FOOT SLOPE
UPWARDS TO THE TRANSMITTER(S).



Start-Up Procedures

Determine that the meter is properly installed. The venturi meter is a piping component and should be handled accordingly with the same precautions. DO NOT HANDLE METER FROM ITS INSIDE.

Determine that the pressure connections are properly made and are appropriate for the intended service.

Determine that the meter has been installed in strict conformance with the “Installation Directions” included in this manual.

Do not over-pressurize meter. Refer to approval drawing for design pressure.

Do not subject meter to shock pressures or water hammer.

When filling pipe line, bleed-off air in the proper fashion.

Determine that pressure piping to secondary instrumentation is installed correctly.

If the meter appears damaged in any way, contact Armstrong.

Shut-Down Procedures

If it is necessary to isolate the differential pressure signal from the secondary instrumentation, close the isolation valves (if provided) and disconnect impulse piping. If secondary instrumentation is to be disconnected for an extended period, use pipe plugs appropriate for the line pressure.

If the meter is to be removed from the line for any reason, depressurize and drain the pipe line.

Move meter with slings or strapping appropriate for the weight and geometry of the meter.

Preventive Maintenance

1. Check Flange and Pressure Tap Connections for Leaks	Annually	By Instrumentation Operator or Mechanical Personnel
2. Inspect Exterior Finish for Scrapes, Dings, or Blistering	Annually	By Instrumentation Operator or Mechanical Personnel

- No special tools or skills are necessary for preventive maintenance tasking.
- No preventive maintenance parts list applicable.

Corrective Maintenance

In case of loss-of-signal or erratic output, check taps and impulse piping to secondary instrumentation for blockage or debris. Check impulse piping for leaks, trapped condensation (in the case of compressible gas flow), or trapped air (in the case of liquid flow.) In case of blockage, purge lines with air or water (as is appropriate) pressurized to approximately 30 PSI above line pressure.

WARNING: IN NO CASE SHOULD FLUSHING PRESSURE EXCEED THE DESIGN PRESSURE OF THE PROCESS OR IMPULSE PIPING.

In case of trapped condensate or trapped air, remove by use of bleed valves or plugs, or through the manifold at the flow transmitter.

Stop leaks by tightening, resealing, or re-gasketing as necessary.

Touch-up exterior finish with the same or a compatible coating system as necessary.

There are no test points, adjustments, or user-serviceable parts in the Halmi Venturi meter, nor is there any assembly or disassembly. If the problems persist, contact Armstrong.

- Corrective maintenance can be performed by mechanical or plant personnel.
- No special tools are required for corrective maintenance.

Spare Parts

The venturi meters provided on this project were designed and manufactured specifically for this project. The Halmi Venturi meter has no moving parts.

There is no parts list and there is no recommended stocking level.

Storage Requirements

Insert-Type Venturi Flow Meters

Indoor Storage:

- The venturi flow meters can be stored indefinitely indoors in a clean non-corrosive environment. If environment is not clean, meters must be covered.
- Meters should be stored away from high traffic areas in order to minimize damage risk.
- Meters must not be stacked.
- Depending on the service, meters may have uncoated or lightly primed carbon steel components as required by the specification. If meters will be stored in humid or corrosive areas, the carbon steel may need to be coated with a suitable rust preventative. Note that any coating or sealant may need to be removed prior to installation; refer to the specification and applicable standards or codes. Temperature and humidity fluctuations should be minimized.
- Prolonged exposure to sunlight or other ultraviolet sources (fluorescent lights, etc.) may discolor, degloss or chalk the coated or fiberglassed surfaces. See specific meter coating information.
- If storage is to be long-term, it is recommended that meters be covered with a tarp or heavy plastic sheeting.

Outdoor Storage – Short Term (less than 3 months):

- Meters should be stored away from high traffic areas in order to minimize damage risk.
- Meters must not be stacked.
- If meters will be stored in humid or corrosive areas, any unpainted carbon steel may need to be coated with a suitable rust preventative appropriate for outdoor exposure. Note that any coating or sealant may need to be removed prior to installation; refer to the specification and applicable standards or codes.
- Depending on unit and order size, the venturi meters are either boxed/crated or the ends are capped to prevent foreign matter from damaging the internal portions of the meter. The meters should not be uncrated, nor should the caps be removed until installation.
- The pressure sensing tap connections have pipe plugs to eliminate the possibility of clogging. These caps must not be removed until installation.
- If the exterior finish gets damaged, it must be touched-up with the same or a compatible coating system. Note that prolonged exposure to sunlight may discolor, degloss or chalk exterior finish.
- It is recommended that the meters be covered with a tarp or heavy plastic sheeting.

Long Term Storage:

- Long-term storage requires indoor storage where temperature and humidity fluctuations are minimized. Otherwise, contact Armstrong.

Meter Transport:

- Depending on unit and order size, the venturi meters are either boxed/crated or strapped onto pallets or custom skids.
- Using the skids, the meters can be moved with a forklift of adequate capacity. DO NOT DRIVE THE FORKLIFT THROUGH THE FLANGE CAPS OR INTO THE METER INTERIOR.
- The meters can be lifted by a crane or forklift in conjunction with an appropriate sling.
- Do not scrape or scratch the coated surfaces. Touch-up coatings as needed.

Safety

Prior to Start-Up:

- Determine that the meter is properly installed. The venturi meter is a piping component and should be handled accordingly with the same precautions. DO NOT HANDLE METER FROM ITS INSIDE.
- Determine that the pressure connections are properly made and are appropriate for the intended service.
- Determine that meter has been installed in strict conformance with the “Installation Directions” included in this manual.
- If the meter appears damaged in any way, contact Armstrong.

At Start-Up:

- Do not over-pressurize the meter. Refer to approval drawing for design pressure.
- Do not subject meter to shock pressures or water hammer.
- When filling pipe line, bleed-off air in the proper fashion.

After Start-Up:

- Do not over-pressurize the meter. Refer to approval drawing for design pressure.
- Do not subject meter to shock pressures or water hammer.
- Conform to “Preventive Maintenance” procedures included in this manual.

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VERIS, Inc.
Limited Warranty and Remedy

Veris, Inc. ("Veris") warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended shall be free from defects in material and workmanship for a period of five (5) years from the date of installation, but not longer than 63 months from the date of shipment from the Veris factory, unless a Special Warranty Period applies, as noted below. This warranty does not extend to any product that has been subject to misuse, neglect or alteration after shipment from the Veris factory. Except as may be expressly provided in a written agreement between Veris and the user, which is signed by both parties, Veris **DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by Veris, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other basis or theory, is limited to Veris' repair or replacement of the part or product, or, at Veris' option, to repayment of the purchase price. In addition to replacing any part of parts found to Veris' satisfaction to be defective, Veris will pay the cost of shipment of both the defective part to the Veris plant and the replacement part to the original user. As a condition of enforcing any rights or remedies relating to Veris products, notice of any warranty or other claim relating to the products must be given in writing to Veris: (i) within 30 days of last day of the applicable warranty period, or (ii) within 30 days of the date of the manifestation of the condition or occurrence giving rise to the claim, whichever is earlier. **IN NO EVENT SHALL VERIS BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OR PROFITS OR INTERRUPTION OF BUSINESS.** The Limited Warranty and Remedy terms herein apply notwithstanding any contrary terms in any purchase order or form submitted or issued by any user, purchaser, or third party and all such contrary terms shall be deemed rejected by Veris.

Special Warranty Periods are as follows:

Vortex Shedders, Venturi, Orifice Plates, Flow Nozzles and Wedge Meters: one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the Veris factory.

Electromagnetic Flow and BTU Meters, Ultrasonic Flow and BTU Meters: 21 months from the date of installation, but not longer than 24 months from the date of shipment from the Veris Factory.

Electronic components, including without limitation, differential pressure transmitters, multivariable transmitters, flow computers, rate or totalizer displays: one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the Veris factory.

*Designs, materials, weights and performance ratings are approximate and subject to change without notice.
Visit armstronginternational.com for up-to-date information.*



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