


# **V110 VERIS Verabar®**

## **Installation and Maintenance Manual**



**Please read and save  
these instructions**

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# General Safety Information

Instructions and procedures listed in this manual may require special precautions to ensure the safety of the individuals performing the operations. **Review the entire manual, taking note of safety messages prior to performing any operations listed in the manual.**

## Product Information

The VERIS Verabar® averaging pitot flow sensor provides unsurpassed accuracy and reliability. With its solid, one-piece construction and bullet shape the VERIS Verabar® makes flow measurement reliable and precise.

The unique sensor shape reduces drag and flow induced vibration. The location of the low-pressure ports eliminates the potential for clogging and improves signal stability.

The V110 model is the simplest, most economical design that features mounting through a tube fitting, and includes additional support on the opposite wall of the pipe.

### Section 1 Scope

These instructions provide a description of procedures for installing the V110 Verabar® model flow sensor. Procedures are given for all industrial flow measurement applications including liquid, steam and gas, for both horizontal and vertical piping configurations.

### Section 2 Receiving Inspection

The following tasks should be performed as part of the receiving inspection procedure:

- Check items received against the packing list.
- Check sensor nameplate for proper model number, serial number and tag number.
- Verify the actual pipe diameter matches the ID stated on the sensor nameplate.
- Check the bullet shaped sensor tube for any signs of damage. Damage to the sensor tube may result in erroneous flow readings.
- Check the round covertube for any damage, especially axial gouges or scratches. Damage to the covertube may prevent the ferrule from sealing properly.

### Section 3 Safety Precautions

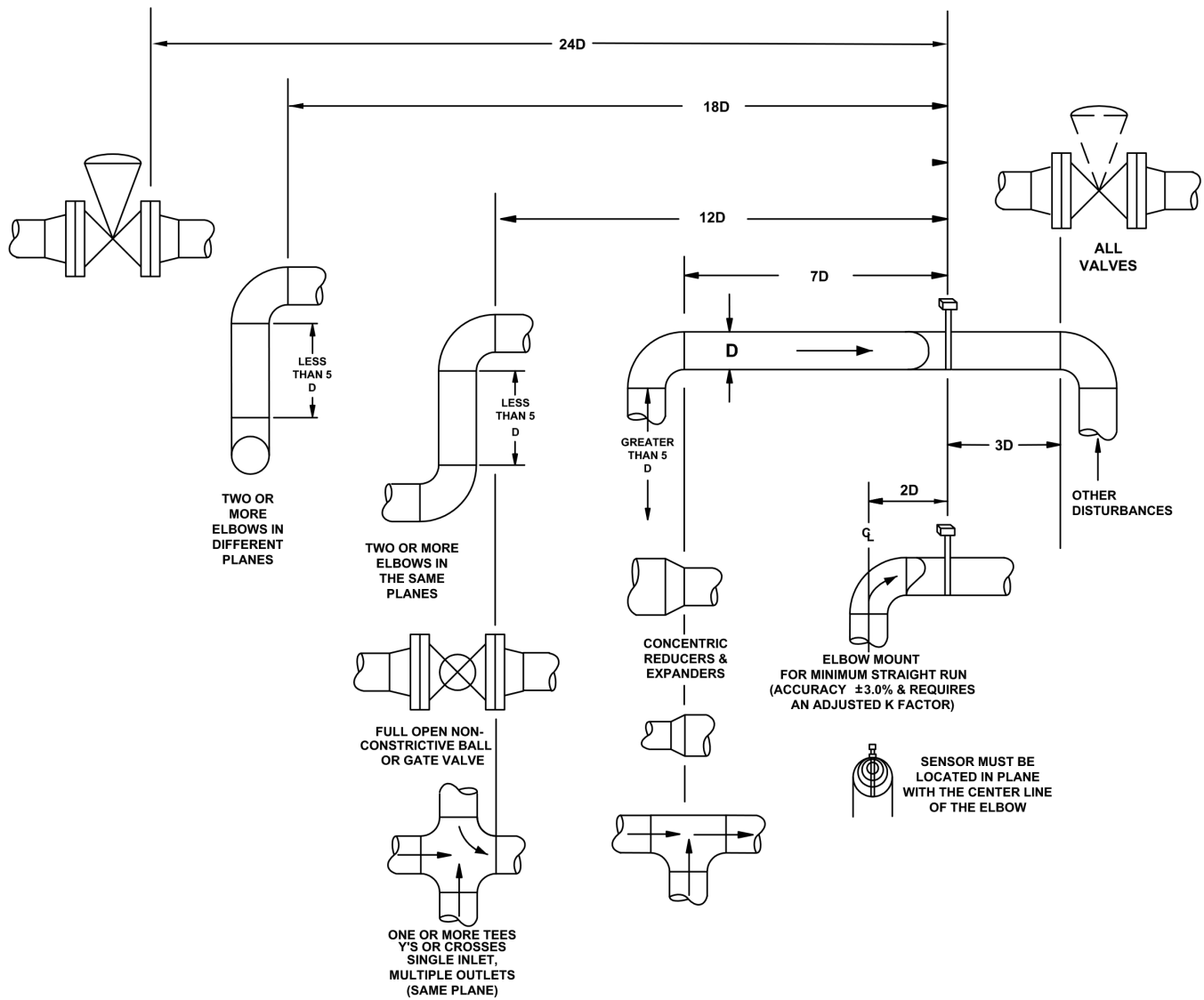
The following process should be conducted prior to installing the Verabar® flow sensor:

- Check the maximum operating conditions on the flow sensor nameplate. Verify that the maximum operating conditions of the application do not exceed the parameters stated on the nameplate. If any pressure, temperature, or flow limits will be exceeded, contact the factory before proceeding.
- Check to ensure the pipe is depressurized and drained prior to installation.
- Be cautious of pipe temperature prior to prepping the pipe for installation.
- Verify all pressure containing components are properly installed and tightened prior to pressurizing the system.

### Section 4 Installation Preparations

#### 4.1 Location

For the most accurate flow measurement, a minimum straight run of pipe is required. Table 1 shows the minimum straight run requirements. If longer straight runs are available, position the Verabar® such that the ratio of upstream straight run to downstream straight run is approximately 4 to 1. If straight run lengths are less than the values stated in Table 1, contact Armstrong's VERIS Flow Measurement Group directly. Straightening vanes should be positioned such that the end closest to the Verabar® is half way between the Verabar® and the closest upstream configuration. For elbow installations, mount the Verabar® in the same plane as the closest upstream elbow.



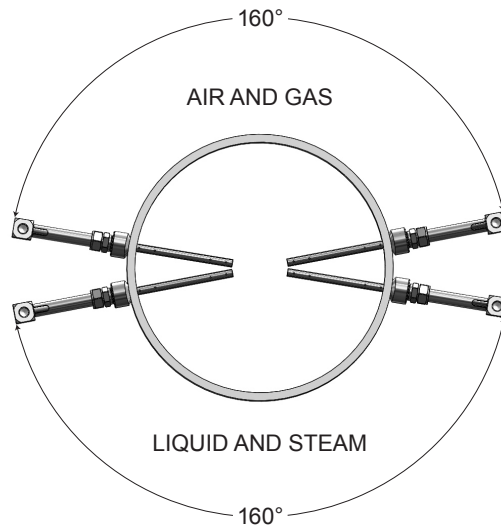
**Table 1. Straight Run Requirements**

## 4.2 Orientation

Verify the proper sensor orientation by checking for an “-H” (horizontal piping) or a “-V” (vertical piping) in the model number on the Verabar® sensor nameplate. Deviation from the following mounting location instructions may cause inaccuracy in the flow measurement.

### 4.2.1 Horizontal Piping

For air or gas installations, mount the Verabar® in the upper 160° of the pipe to allow any condensate to drain into the pipe (Figure 1). For liquid or steam installations, mount the Verabar® in the lower 160° of the pipe. This allows any entrained air to bleed back into the pipe for liquid applications and allows condensate to collect in the instrument piping for steam applications.



**Figure 1. Verabar® Orientation in Horizontal Pipe**

#### 4.2.2 Vertical Piping

The Verabar® may be mounted in any location around the circumference of the pipe for any vertical piping applications.

#### 4.3 DP Transmitter/Local Indicator Location

When choosing a Verabar® location, consider the DP transmitter/local indicator location:

- The transmitter must be mounted below the Verabar® for liquid and steam applications.
- The transmitter must be mounted above the Verabar® for air and gas applications.

#### 4.4 Installation Drawings and Bill of Materials

Additional information is available in the Installation Drawings and Bill of Materials VB-7061 (Contact factory for access information). It contains standard and alternate transmitter locations and a complete bill of materials based on the fluid type and sensor orientation on the pipe.

## Section 5 Installation Procedure

### 5.1 Preparing the Pipe

- Completely depressurize and drain pipe prior to installation of the Verabar®.
- Mark the location of the hole through which the Verabar will be mounted. Then, mark the location of the hole for the opposite end support 180° from the first hole. Use a center punch to mark the holes to prevent the drill bit from walking on the pipe.
- Drill the pipe with the proper sized holes per the following table (Important: Do not torch cut holes!):

Sensor Size	Hole Diameter
V100-05	½" (13mm)
V100-10	1" (25mm)

- **IMPORTANT:**

Deburr the holes on the inside of the pipe.

## 5.2 Fitting Welding

- Loosely assemble the sensor, compression nut, back ferrule, front ferrule and compression body to the thread-o-let (hand tight) and insert the sensor assembly into the pipe. The back ferrule and front ferrule must be in the proper sequence and orientation as shown in Figure 2.

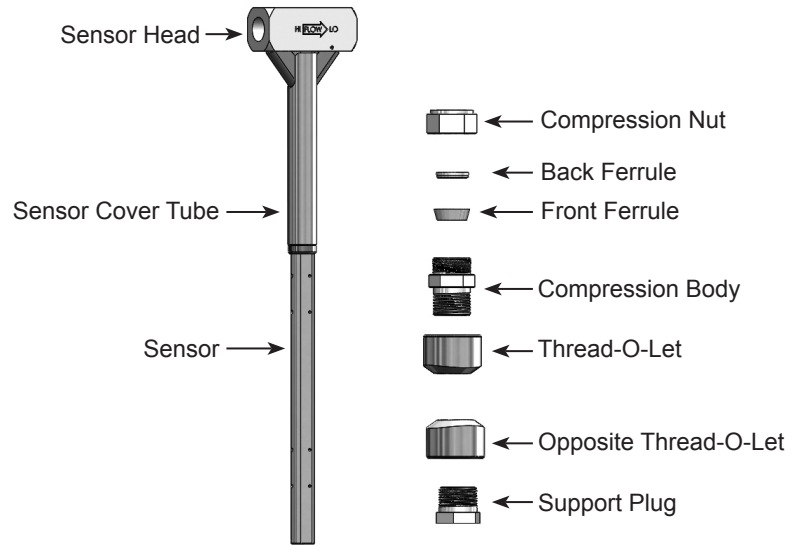


Figure 2. Verabar® Model V110 Assembly

- Using the appropriate weld gap (1/16" [1.5mm] typical), tack weld the thread-o-let into position (Figure 3). Assemble the support plug into the opposite end thread-o-let (hand tight) and tack weld the opposite end thread-o-let into position, using the tip of the sensor for alignment.

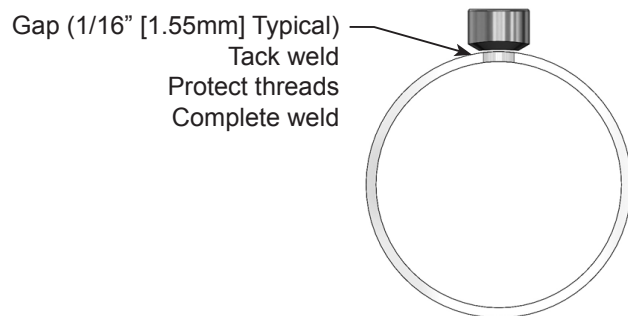


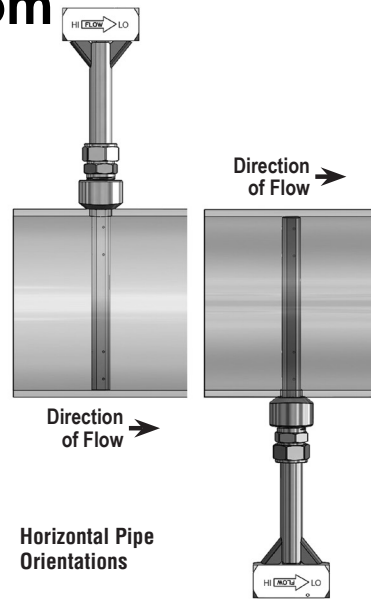
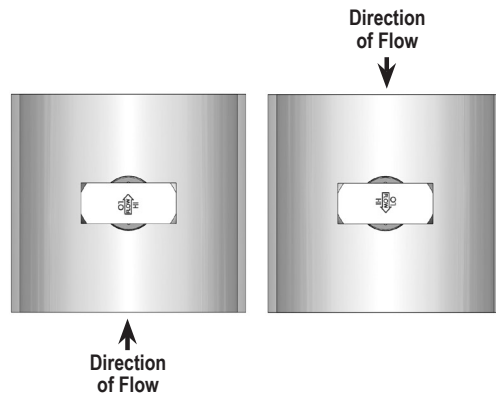
Figure 3. Weld Gap

- Remove the sensor and opposite end support plug, protect threads on the thread-o-lets and finish welding the thread-o-lets to the pipe per applicable piping codes.

## 5.3 Sensor Insertion

- Using appropriate pipe thread sealant, install (completely tighten) the compression body into the thread-o-let.
- Slide the compression nut, back ferrule, then front ferrule, onto the covertube. **The back and front ferrules must be in proper sequence and orientation as shown in Figure 2.** The back ferrule must be next to the compression nut with the tapered end pointing toward the front ferrule. The tapered end of the front ferrule must point toward the compression body.
- Slide the sensor, with compression nut and ferrule attached, into the compression body (do not tighten).
- Align the head of the sensor so that the arrow labeled "Flow" on the instrument head is in the direction of the flow in the pipe within 3 degrees (Figure 4). Maintain the head in this position for the remainder of the operations.
- Slide the sensor into the pipe until "Y" dimension (as shown in Figure 5) is per the following table:

Sensor Size	"Y" Dimension
V110-05	4.00" (100mm)
V110-10	5.50" (140mm)

**Vertical Pipe Orientations****Horizontal Pipe Orientations****Figure 4. Orientation of Flow Arrow**

- While maintaining the “Y” dimension, tighten the compression nut 1-1/4 turns past hand tight. Verify the alignment of the sensor such that the arrow labeled “flow” on the head is in the direction of the flow in the pipe to within 3° (Figure 4). A crescent wrench or pipe wrench can be applied to the head of the sensor to make alignment adjustments.
- Install (completely tighten) the support plug into the opposite end thread-o-let. Use appropriate pipe thread sealant. The tip of the sensor should protrude into the bore of the support plug.

**5.4.1 Valves**

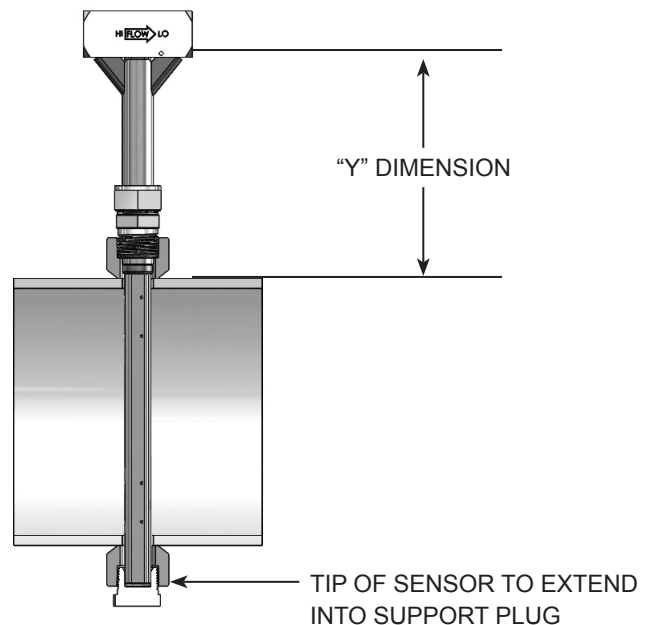
- If the Verabar® does not have a valve head, install instrument valves using proper thread sealant. Be sure instrument shut-off valves are installed and shut prior to re-pressurizing the pipe.

**5.4.2 Manifold**

- If the Verabar® has a direct or integral manifold, be sure the high and low pressure block valves are shut off prior to re-pressurizing the pipe.

**Section 6 Proper Installation**

The Verabar is now properly installed (Figure 5).

**Figure 5. Installed V110****Section 7 Periodic Maintenance**

- The assembly should be checked periodically. Verify that no leaks are present.
- Inspect sensor for wear or damage.
- **Note:** Different threads require different maintenance requirements.

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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:

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](http://armstronginternational.com) for up-to-date information.*



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