FLOW METER

INSTALLATION

FLOW METER

GENERAL

The accuracy of flow measurement for all flow measuring devices is highly dependent on proper location of the sensor in the piping system. Irregular flow velocity profiles caused by valves, fittings, pipe bends, etc. can lead to inaccurate overall flow rate indications even though local flow velocity measurement may be accurate. A sensor located in the pipe where it can be affected by air bubbles, floating debris, or sediment may not achieve full accuracy and could be damaged. Calsense flow sensors are designed to operate reliably under adverse conditions, but the following recommendations should be followed to ensure maximum system accuracy:

- Choose a location along the pipe where 10 pipe diameters upstream and 5 pipe diameters downstream of the sensor provide no flow disturbance. Pipe bends, valves, other fittings, pipe enlargements and reductions should not be present in this length of pipe.
- The preferred location around the circumference of a horizontal pipe is on top. If trapped air or debris will interfere, then the sensor should be located further around the pipe from the top but not more than 45 degrees from top dead center. The sensor should never be located at the bottom of the pipe, as sediment may collect there. Locations off top dead center cause the impeller friction to increase, which may affect performance at low flow rates. Any circumferential location is correct for installation in vertical pipes.
- Alignment of the sensor to ensure that impeller rotation is parallel to flow is important.

PHYSICAL INSTALLATION

- The Flow meter is installed after the water meter or backflow device.
- The Master Valve can be installed on either side of the Flow Meter.
- The mainline pipe is usually sized down during the installation to accommodate the fitting of the Flow Meter.
- Note the intended direction of the flow as indicated by an arrow on top of the Flow Meter.
- There must be free, unrestricted pipe of the same size as the Flow Meter, with a length of at least 10 times the flow meter size upstream, and 5 times the flow meter size downstream of the Flow Meter tee. This should apply to distance from any valve, fitting, meter, or backflow device.
- The Flow Meter shall be easily accessible, housed in a rectangular valve box, and marked ‘FM’.
- There should be 8” of pea gravel beneath the Flow Meter in the valve box.
- Maximum Wire length should not exceed 2000 feet..

TO ENSURE PROPER INSTALLATION

- Remove the clevis pin and remove the Flow Insert from the tee by pulling gently up on the lip of the Flow Meter.
- Properly clean the pipe ends and tee sockets.
- Solvent cement the pipe to the tee.
- Reinstall the Flow Insert in the tee as follows:
    - Align the arrow on top of the insert in the direction of the flow.
    - Carefully press the Meter straight into the tee.

CAUTION:

The impeller may strike sides of the tee if miss-aligned, causing damage to the impeller or shaft.

- Install the clevis pin through the tee and meter.
- Insert the locking ring.

ELECTRICAL INSTALLATION

- Wires from the Flow Meter to the irrigation controller should consist of one (1) BLACK and one (1) RED standard #14 AWG irrigation wire.
- The Flow Meter has two wire leads, one (1) BLACK, and one (1) RED.
- At the controller, the BLACK wire in the BLACK harness is connected to the BLACK Flow Meter wire, and the RED wire in the BLACK wire harness is connected to the RED Flow Meter wire.
- The Calsense Flow Meter operates at 9.0 volts DC.
- The flow meter wires should be separated from other control wires when pulled up at the irrigation controller site.

CAUTION:

If 24 volts AC is used to test field wires when determining proper sequencing, and is applied to the Flow Meter wires, the sensing unit in the Flow Meter could **be** damaged.

- It is very important that all electrical connections are tight and dry.
- Any water leaking into a connection will cause flow meter problems.
- Additionally, there should never be any buried splices between the flow meter and the irrigation controller.
- Use only Calsense recommended electrical connections.

FMBX INSTALLATION

The Calsense Model FMBX Flow Meter is deigned to be used for mainline pipe ranging from 2 ½" to 40". It is mounted to the pipe using a pipe saddle or Welded-on threaded fitting (which are not included with the FMBX Flow Meter). It is constructed of brass and bronze hardware, and is provided with a bronze 2" NPT externally threaded hex adapter for mounting (Figure 1).

The accuracy of flow measurement is highly dependent on proper location of the sensor. IT should be positioned on top of a horizontal pipe, and located along the pipe where 10 times the pipe diameter upstream and 5 tines the pipe diameter downstream of the flow meter provide no flow disturbances. There should be no pipe bends, fittings, or valves within these minimum distances.

- The insertion depth and alignment of the sensor assembly are critical to the accuracy of the flow measurement.
- The flat end of the sensor tube assembly must be installed 1 1/2" from the inside wall of the pipe.
- Install the 2" NPT adapter provided, using the thread sealant to prevent leakage.
- Tighten as necessary.
- Data Industrial insert style sensors are calibrated with the sensor inserted 1 1/2 " into the pipe flow.
- To determine the proper insertion depth, proceed as follows:
    - Apply Anti-seize thread lubricant, supplied with the sensor, to the threaded studs of the mounting adaptor.
    - Insert the depth gauge into the mounting adapter and set it against the inside wall of the pipe (as shown in Figure 2).

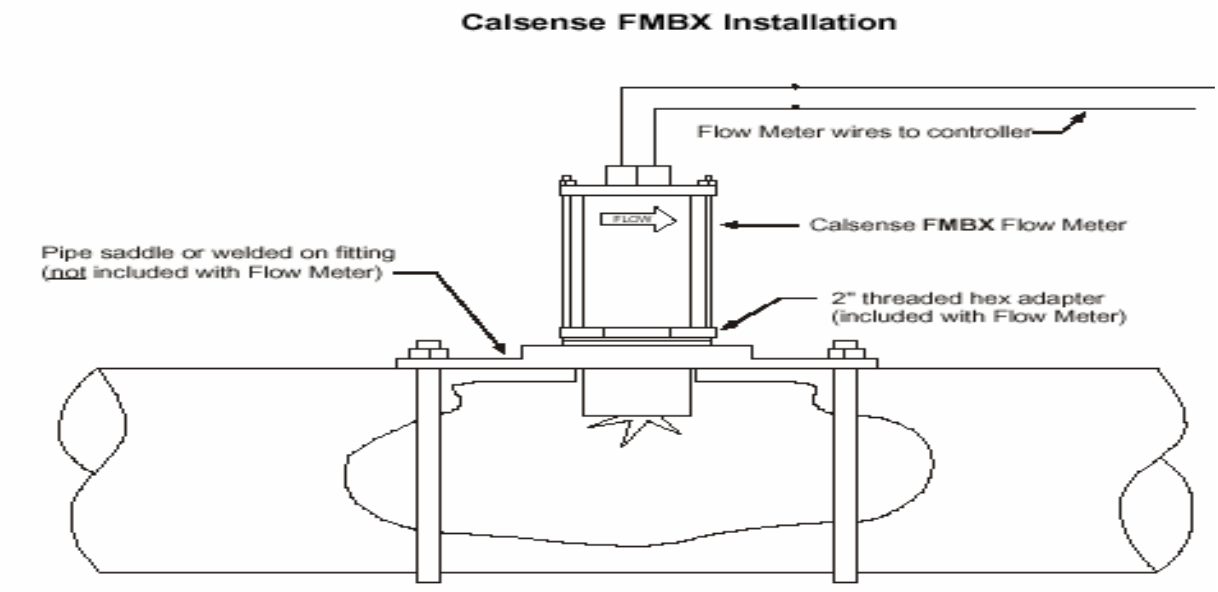


Figure 1

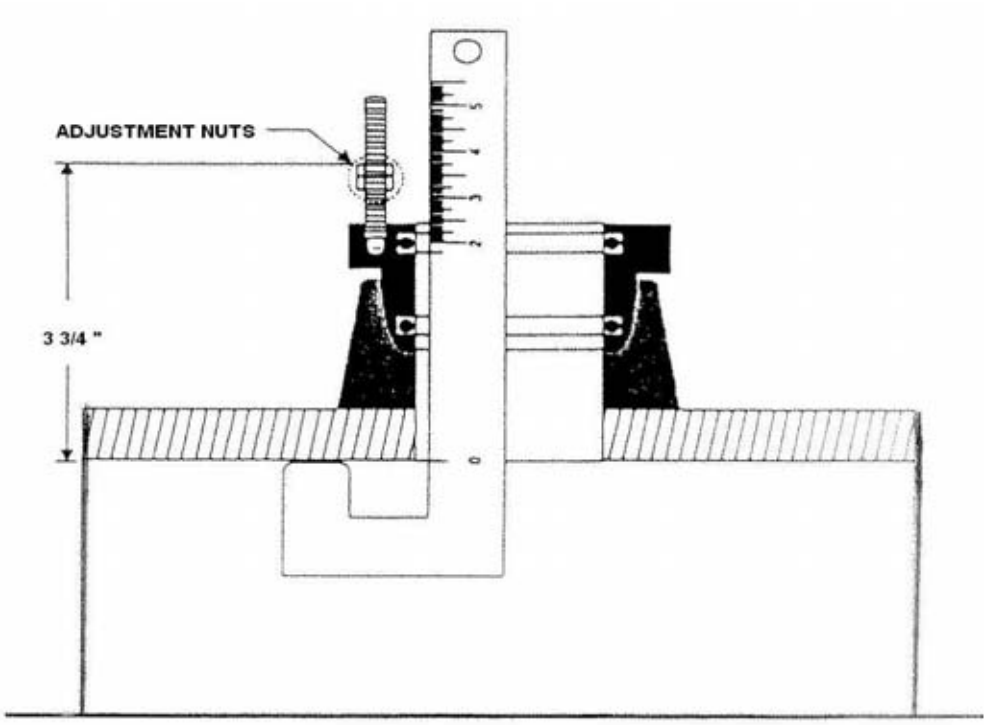


Figure 2

- Set the top of the upper adjusting nut on the same stud.
- Repeat for the other 3 adjacent nuts.

Note: For 220PVS: set nuts 6.5" above inside wall of pipe.

- Clean O-Ring and Flow Sensor sleeve.
- Lubricate O-Ring with silicone grease from the packet provided or some other acceptable lubricant.

Note: Take care not to get any grease on the impellor or bearing.

- Insert the Flow Sensor into the 2" NPT adapter so that the mounting holes in the positioning collar fit over the studs on the adapter.
- Lower the sensor onto the previously adjusted nuts.
- Install the lock nuts on top of the positioning collar and tighten.
- Now tighten the lower jam nuts firmly against the upper adjusting nuts to secure them for future removal of the sensor for inspection or service.

ALIGNMENT OF FLOW METER

- Loosen positioning collar set screws with a 3/32” Allen wrench.
- Place the alignment rod through the sight holes in the Flow Sensor.
- Using the alignment rod as a guide, align the flow sensor so that the flow label arrow matches pipe flow direction and so that alignment rod is exactly parallel to the pipe. (Refer to Figure 3).

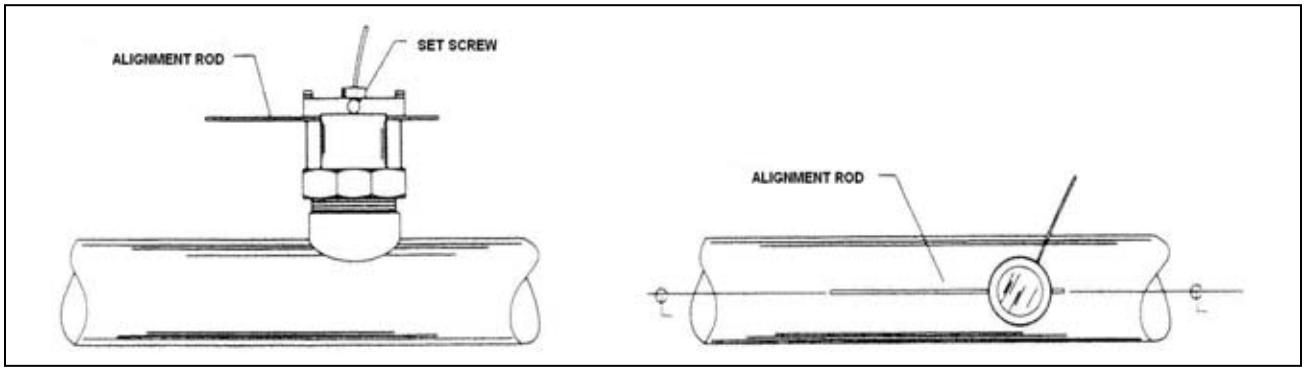
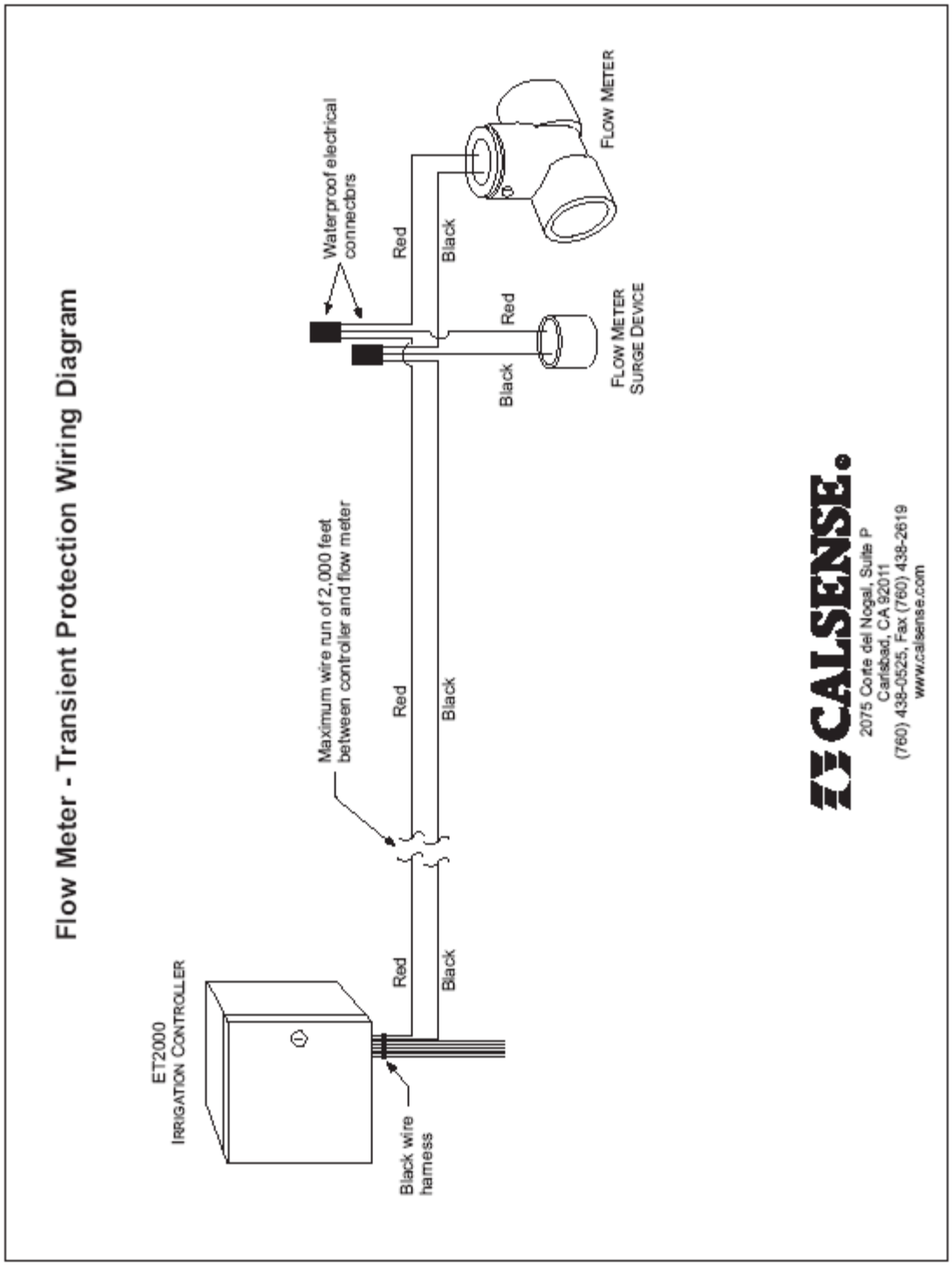


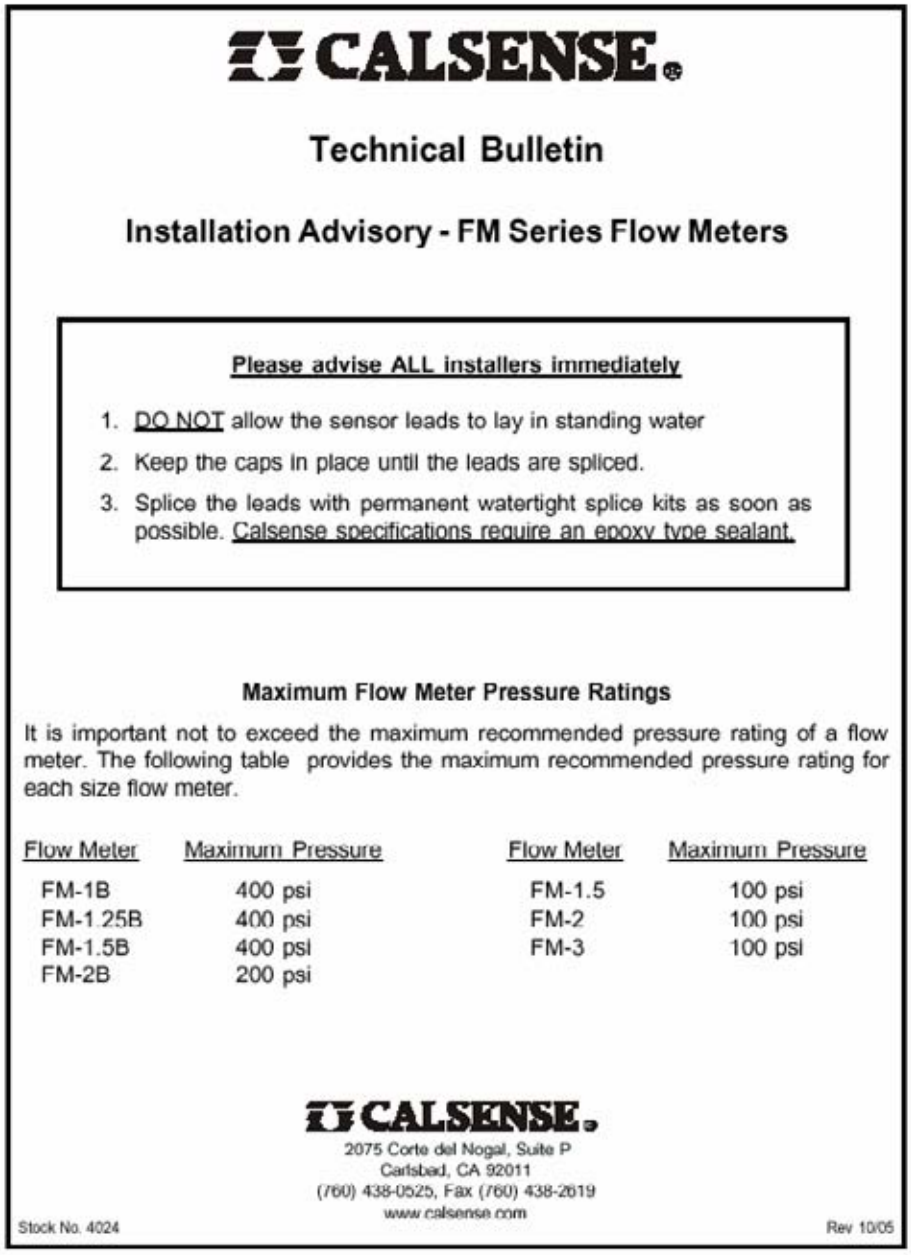
Figure 3

- This procedure aligns the impeller into the fluid flow.
- As a backup to the flow label, there is a small hole next to the larger sighting hole of the upstream side. With a 3/32” Allen wrench, tighten positioning collar screws.
- Double check that the sighting holes in the sleeve to make sure they are parallel down the pipe and that the flow arrow label matches pipe liquid flow direction.
- Cable routing: the positioning collar is threaded for connection of a standard ½” electrical conduit (Flex cable) or a wire strain relief.
- Route cable as required.
- Be sure to leave enough flex in cable or conduit to allow future removal of sensor for service or cleaning if necessary.

FLOW METER TRANSIENT PROTECTION FOR LIGHTNING PRONE AREAS.



TECHNICAL BULLETIN



CALSENSE®

Technical Bulletin

Installation Advisory - FM Series Flow Meters

Please advise ALL installers immediately

1. DO NOT allow the sensor leads to lay in standing water
2. Keep the caps in place until the leads are spliced.
3. Splice the leads with permanent watertight splice kits as soon as possible. Calsense specifications require an epoxy type sealant.

Maximum Flow Meter Pressure Ratings

It is important not to exceed the maximum recommended pressure rating of a flow meter. The following table provides the maximum recommended pressure rating for each size flow meter.

Flow Meter	Maximum Pressure	Flow Meter	Maximum Pressure
FM-1B	400 psi	FM-1.5	100 psi
FM-1.25B	400 psi	FM-2	100 psi
FM-1.5B	400 psi	FM-3	100 psi
FM-2B	200 psi		

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