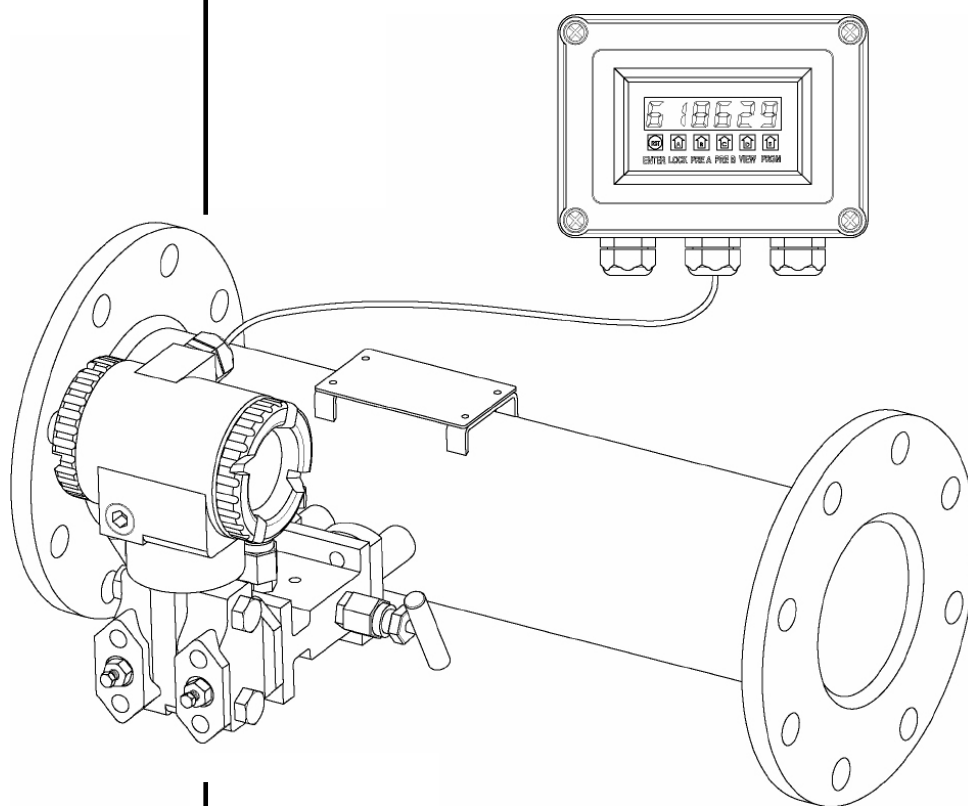


*Flow
measurement
solutions for
water & waste
water*

$\sqrt{2}$ System™
The Space Saver Solution



**Installation, Operation
& Maintenance Manual**
Models: V2150
V2300

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SECTION 1 – INTRODUCTION

The V2 System™ Water and Waste Water Flow Meter System consists of a flanged Flow Tube, Flow Transmitter and Flow Indicator. The Flow Transmitter detects flow and transmits a 4-20mA signal proportional to the flow rate. The Flow Indicator converts the signal into a flow Rate and Total, displayed on an LED display. The Flow Indicator is mounted remote from the meter body. The Flow Indicator outputs an auxiliary 4-20 mA signal and an open collector transistor alarm pulse assignable to Rate or Total. A 3-way-valve isolation manifold is standard.

SPECIFICATIONS

ACCURACY: Up to $\pm 1\%$ of Rate

HEAD LOSS: Typical ≤ 2 psi at Full Scale

PRESSURE RATING: Model V2150 - 150 psi

Model V2300 - 300 psi

RANGE: See Dimension Chart Below

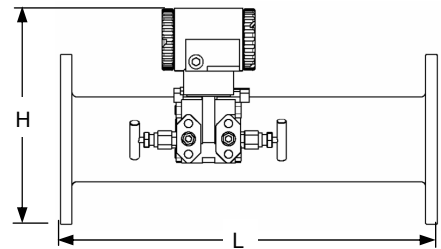
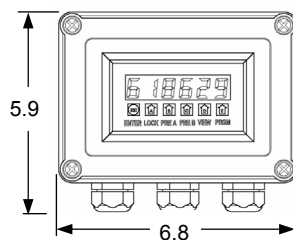
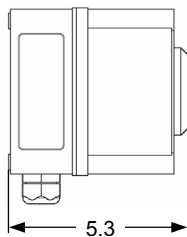
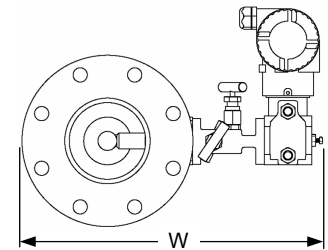
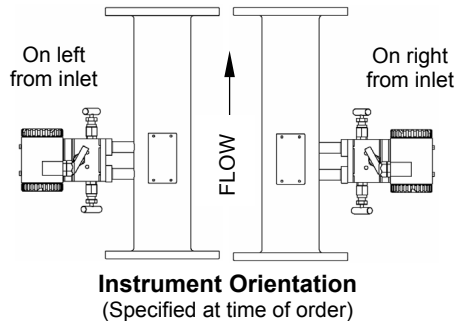
MAX TEMPERATURE: 180°F Constant

OUTPUTS: 4-20 mA Analog and Transistor Pulse (Alarm)

TRANSMITTER/INDICATOR HOUSINGS: NEMA 4X Protection

BODY: Fusion-bonded Epoxy coated carbon steel and 304 stainless steel

END CONNECTIONS: Model V2150 Carbon Steel AWWA Class D Model V2300 Carbon Steel AWWA Class F



McCrometer reserves the right to change design specifications without notice.

V2150 / V2300	DIMENSIONS							
Meter and Nominal Pipe Size	4	6	8	10	12	14	16	18
Standard Flow Ranges (GPM)	40-400	80-800	100-1000	120-1200	160-1600	200-2000	270-2700	300-3000
	60-600	120-1200	150-1500	180-1800	250-2500	300-3000	400-4000	500-5000
	90-900	180-1800	225-2250	270-2700	375-3750	450-4500	600-6000	750-7500
V2150				V2150				
Approx. Shipping Weight-lbs.	54	115	135	197	325	465	530	744
W (width - inches)	17.75	20	22	24.5	27	28.5	30.75	32.5
H (height - inches)	13	14	15.4	16.6	19	21	23.5	25
L (length - inches)	20	28	34	38	42	44	46	50
No. of Bolts per Flange	8	8	8	12	12	12	16	16
V2300				V2300				
Approx. Shipping Weight-lbs.	90	145	220	340	430	650	820	1315
W (width - inches)	18.25	21	23	25.25	27.75	29.5	31.75	34
H (height - inches)	13.8	15	16.3	17.5	20.5	23	25.5	28
L (length - inches)	20	28	34	38	42	44	46	50
No. of Bolts per Flange	8	12	12	16	16	20	20	24

Note: Available on request: Smaller and larger meter sizes, special laying lengths, other flow ranges.

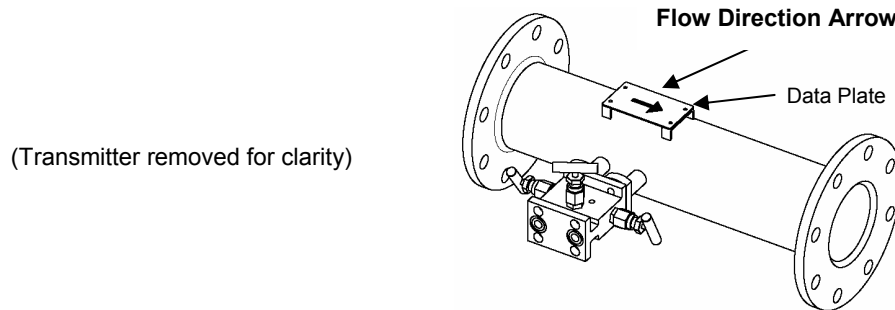
SECTION 2 – INSTALLATION

WARNING

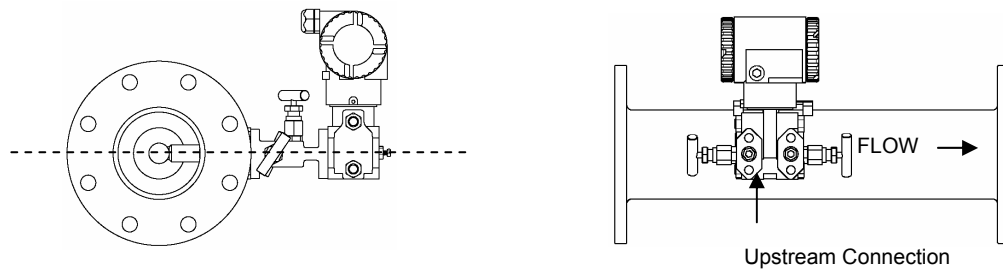
SERIOUS INJURY CAN RESULT FROM WORKING ON A LINE UNDER PRESSURE. SHUT OFF THE WATER AND RELIEVE THE PRESSURE FROM THE LINE BEFORE ATTEMPTING TO INSTALL, REMOVE OR SERVICE THE FLOW TUBE AND/OR THE 3-WAY-VALVE MANIFOLD.

FLOW TUBE INSTALLATION

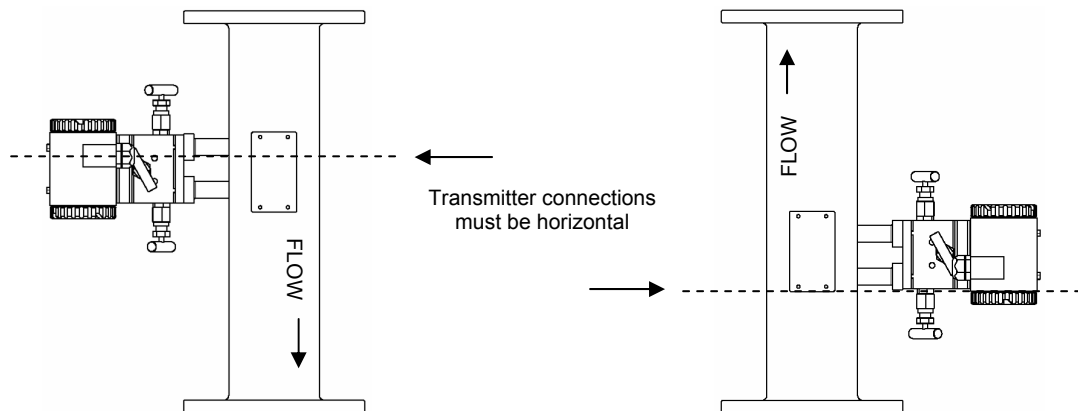
- 1) Provide an adequate opening for the flow tube and gaskets. Allow enough room around the flow tube to access the instrumentation. Use only installation hardware that is appropriate for the process fluid, temperature and pressure.
- 2) Match the flow tube direction with the system flow – a Flow Direction Arrow is indicated on the flow tube Data Plate.



- 3) The meter body is always installed with the **Transmitter** connections on the side of the meter body kept in a horizontal orientation (**see below**).



HORIZONTAL FLOW



VERTICAL FLOW

DOWNFLOW

UPFLOW

SECTION 2 - INSTALLATION (continued)

UPSTREAM PIPING

Some flow meter installations require longer upstream runs of straight pipe to lessen the effects of upstream turbulence. Turbulence can be caused by a variety of upstream conditions. Proper upstream straight pipe lengths (dimension D, below) will ensure accurate flow measurement. Refer to the guide below for recommended upstream runs of straight pipe.

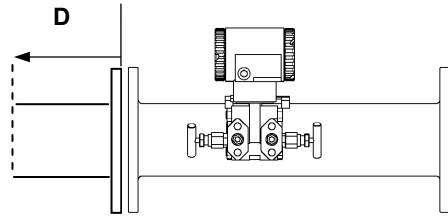
Acceptable Direct Upstream Pipe Connections:

- Transitions from upstream pipe (schedules 10 to 80)
- Single Elbows
- Double Elbows
- Fully open Gate Valve
- Transitions from pipe inside diameters smaller than schedule 80; typically concrete lined pipe

Provide up to 3 Diameters Upstream Straight Pipe if any of these conditions exist:

- Pumps
- Butterfly Valves
- Partially open Gate Valves
- Check Valves
- Strainers and Sand Separators

Example: A 6" diameter meter with a butterfly valve upstream may need as much as 18" of straight pipe ("D") before the meter to ensure meter accuracy.

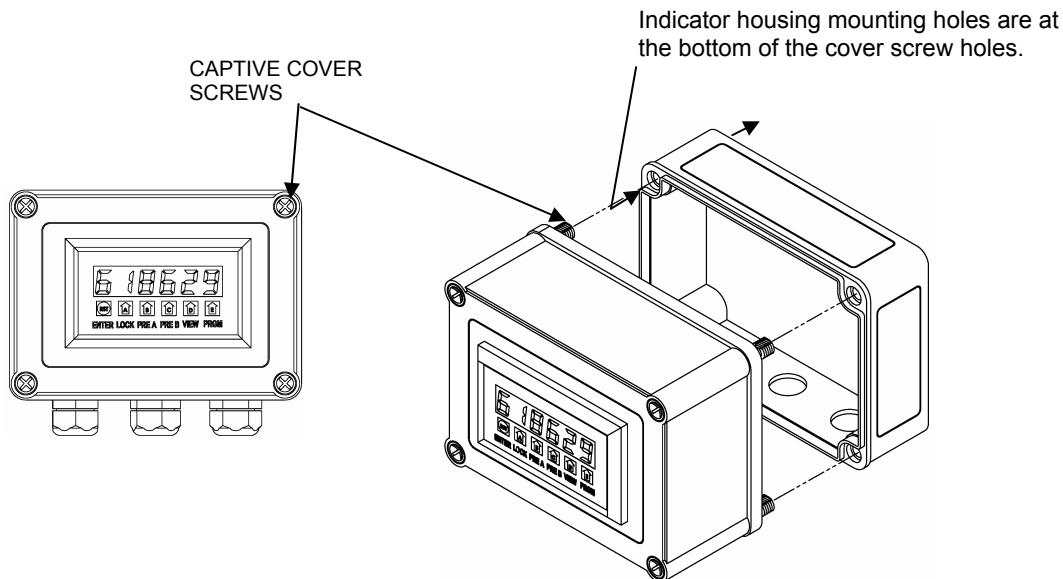


STRAIGHTENING VANES

In extreme conditions, accessory straightening vanes are available in a variety of designs for bolt-in, weld-in, or between-flange installations.

FLOW INDICATOR INSTALLATION

Mount the Flow Indicator housing in a location that provides access, viewing, and is suitable for a NEMA 4X rated device. The Indicator is prewired to the Flow Meter Transmitter with 50 feet of cable for remote mounting. The housing mounting holes are located at the bottom of the indicator housing base, beneath the cover screws.

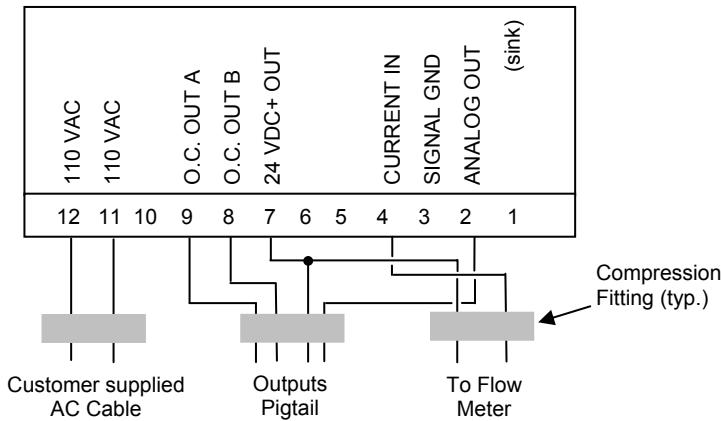


SECTION 2 – INSTALLATION (continued)

WIRING

CAUTION: Do not perform any wiring without first disconnecting the power source.

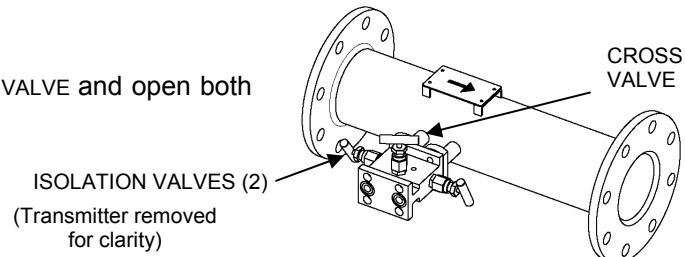
The flow meter is pre-wired to the Flow Indicator, and a “pigtail” is provided for the Outputs. The cable for the A/C power input should have an outside dimension (OD) at least as large as the provided cables to ensure proper sealing in the compression fitting.



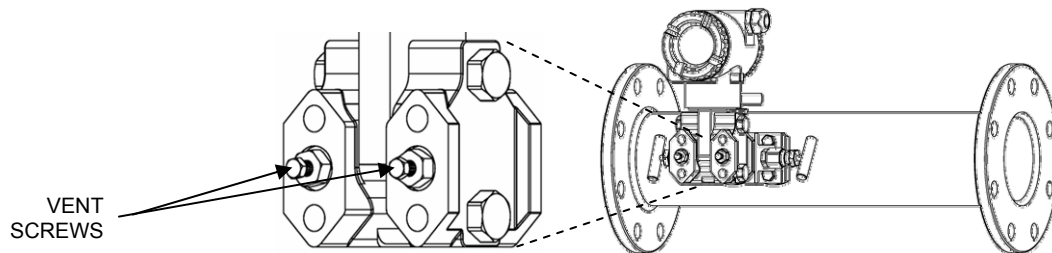
WIRE COLOR	
FLOW METER	
RED	(+)
BLACK	(-)
WHITE	(not used)
GREEN	(not used)
OUTPUTS	
RED	Analog (+)
BLACK	Signal common (-)
WHITE	Preset A
GREEN	Preset B
BLACK	Signal common (-)
INPUTS	
110 VAC inputs are not polarized.	

SECTION 3 - START-UP

- 1) Close the 3-way-valve manifold CROSS VALVE and open both ISOLATION VALVES (right.)



- 2) Power the Flow Indicator.
- 3) Start the flow. **Check all connections for leaks and correct as necessary before continuing.**
- 4) Press the Flow Indicator VIEW key until the display shows an “r” to the left of the display (the current flow rate will be indicated on the right of the display.)
- 5) Open each VENT SCREW (below) to purge any air from the system, then close the VENT SCREWS. Leave the ISOLATION VALVES open.



- 6) Check the Flow Indicator for the proper flow rate. Shut off the flow and verify a “ZERO” flow reading.
- 7) Check function of the Outputs if used.

SECTION 4 - TROUBLESHOOTING

CHANGES IN FLOW ACCURACY OR METER OPERATION:

TUBE

1. Debris in the tube. Repeat the purging procedure (**PURGING THE SYSTEM**, page 4) to remove any dirt and/or air from the flow transmitter and manifold. Trash or debris may be caught inside the meter – removal and inspection of the interior of the meter body may be required.
2. Verify that the flow tube was designed for the expected flow rates (see **SPECIFICATIONS**, page 1.)
3. Less-than-full pipe. Verify the pipe remains full at all times. Modify the piping or relocate the flow tube.

NO CHANGE IN FLOW MEASUREMENT OR FLOW READING INACCURACY:

3-WAY VALVE MANIFOLD

1. One or both ISOLATION VALVES not open. Keep them **fully open** during operation.
2. The cross VALVE is not closed. Keep it **fully closed** during operation.
3. Debris in the manifold. Repeat the purging procedure (**PURGING THE SYSTEM**, page 4).

INACCURATE OR ERRATIC FLOW READINGS: FLOW TRANSMITTER

1. Debris in the transmitter. Repeat the purging procedure (**PURGING THE SYSTEM**, page 4). Debris in the transmitter may damage and/or permanently change its calibration.
2. Improper transmitter programming. Verify that the flow transmitter is on the correct meter.

The flow transmitter is programmed by the factory for the flow rate specified by the customer. An Operation, Configuration and Calibration manual is shipped with the V2 System, and is also available from the manufacturer's website at www.foxboro.com. The document is #MI 020-366, titled "**I/A Series Intelligent Pressure Transmitters.**" **Changes to programming are done using HART interface.**

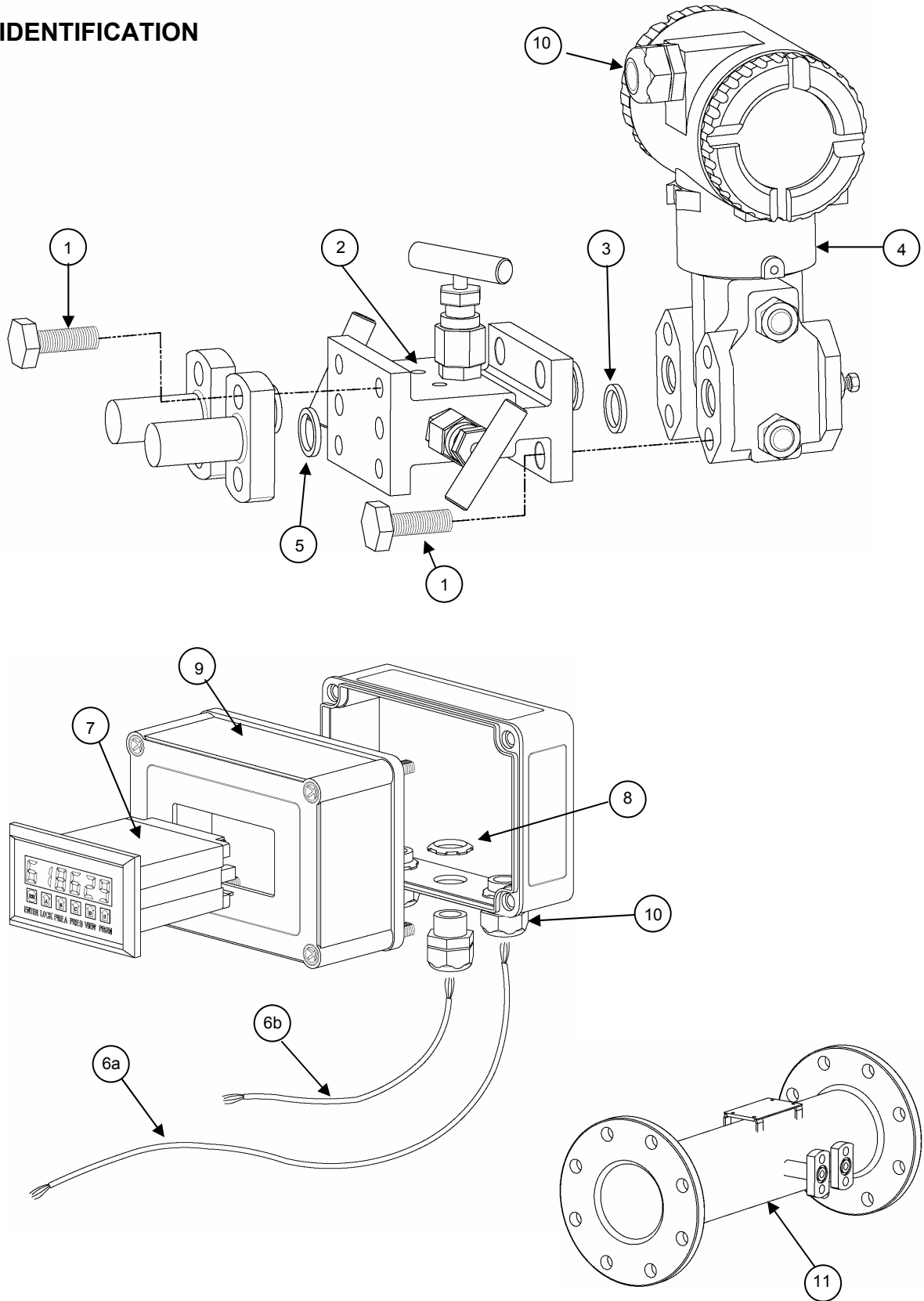
INACCURATE OR ERRATIC FLOW READINGS: FLOW INDICATOR

1. Changes to the original settings. Contact the factory for the proper programming data.
2. Loose or improper wiring. Check all connections and verify the correct source voltage.
3. Line noise or electrical interference. Locate the indicator away from power lines, protect from power surges.

The flow indicator is programmed by the factory for the flow rate and flow units specified by the customer. Flow Indicator program parameters are accessed after entering a factory default password of "1000". The user can verify and/or change the program parameters, assign a new password, and lockout the front panel to prevent further changes.

More Flow Indicator information can be found in the EA402 IOM manual (included with the V2 System), or from the McCrometer website at www.mccrometer.com. The document number is **24508-68**.

PARTS IDENTIFICATION



PARTS

Drawing Number	Part Number	Description	Quantity Required	Comments
1	10299	Bolt, 7/16-20 x 1", Grade 5	8	
2	F1131	3-way Valve Isolation Manifold	1	Includes two ring seals
3	10300	Seal, Transmitter-to-Manifold	2	Included with Flow Transmitter
4	DP124-xxx	Flow Transmitter	1	
5	10300	Seal, Manifold-to-Meter	2	Included with 3-way Valve Manifold
6a	EW550-00	Wire, 4-conductor Flow Meter-to-Flow Indicator	600"	Not to be used for A/C source voltage
6b	EW550-00	Wire, 4-conductor Outputs Pigtail	60"	Presets A, B and 4-20 mA Outputs
7	EA402-10	Flow Indicator	1	
8	EH445-00	Lock nut, 1/2" NPT	3	
9	EA402-50	Indicator Housing	1	Includes 3 each EH445-00 and EJ120-00
10	EJ120-00	Compression fitting, 1/2" NPT	4	
11	*	Flow tube	1	

* Part number varies by application flow rate and line size. Contact the factory for the correct part number.

CONTACT INFORMATION

Product information, pricing, and technical assistance is available from the McCrometer Customer Service Department at 951-652-6811.

Information on all McCrometer products is available on our website at www.mccrometer.com.

MANUFACTURER'S WARRANTY

This Warranty shall apply to and be limited to the original purchaser consumer of any McCrometer product. Meters or instruments defective because of faulty material or workmanship will be repaired or replaced, at the option of McCrometer, Inc., free of charge, FOB the factory in Hemet, California, within a period of one (1) year from the date of delivery.

Repairs or modifications by others than McCrometer, Inc. or their authorized representatives shall render this Warranty null and void in the event that factory examination reveals that such repair or modification was detrimental to the meter or instrument. Any deviations from the factory calibration require notification in writing to McCrometer, Inc. of such recalibrations or this warranty shall be voided.

In case of a claim under this Warranty, the claimant is instructed to contact McCrometer, Inc. 3255 West Stetson Ave., Hemet, California 92545, and to provide an identification or description of the meter or instrument, the date of delivery, and the nature of the problem.









The Warranty provided above is the only warranty made by McCrometer, Inc. with respect to its products or any parts thereof and is made expressly in lieu of any other warranties, by course of dealing, usages of trade or otherwise, expressed or implied, including but not limited to any implied warranties of fitness for any particular purpose or of merchantability under the uniform commercial code. It is agreed this warranty is in lieu of and buyer hereby waives all other warranties, guarantees or liabilities arising by law or otherwise. Seller shall not incur any other obligations or liabilities or be liable to buyer, or any customer of buyer for any anticipated or lost profits, incidental or consequential damages, or any other losses or expenses incurred by reason of the purchase, installation, repair, use or misuse by buyer or third parties of its products (including any parts repaired or replaced); and seller does not authorize any person to assume for seller any other liability in connection with the products or parts thereof. This Warranty cannot be extended, altered or varied except by a written instruction signed by seller and buyer.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

McCrometer, Inc. reserves the right to make improvements and repairs on product components which are beyond the warranty period at the manufacturer's option and expense, without obligation to renew the expired warranty on the components or on the entire unit. Due to the rapid advancement of meter design technology, McCrometer, Inc. reserves the right to make improvements in design and material without prior notice to the trade.

All sales and all agreements in relation to sales shall be deemed made at the manufacturer's place of business in Hemet, California and any dispute arising from any sale or agreement shall be interpreted under the laws of the State of California.

OTHER McCROMETER PRODUCTS INCLUDE:

	Magnetic Flowmeters
	Magnetic Flowmeters
	Magnetic Flowmeters
	Propeller Meters
	Propeller Meters
 <i>The Space Saver Solution</i>	Differential Pressure Flowmeters
	Differential Pressure Flowmeters
	Differential Pressure Flowmeters

Electronic Instrumentation for Remote Display and Control

FOR MORE INFORMATION CONTACT:

Represented by:



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Canadian Patent 1325113
Lit# 24509-06 Rev 2.6/04-09

European Patent 0277121

Printed in U.S.A.

U.S. Patents 4638672, 4812049, 5363699, 4944190 and 5,814,738
Japan patent 1,858,116

Other U.S. and Foreign patents pending
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