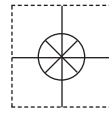


1 YEAR
WARRANTY



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FSW-160 **Fluid Flow Switches**



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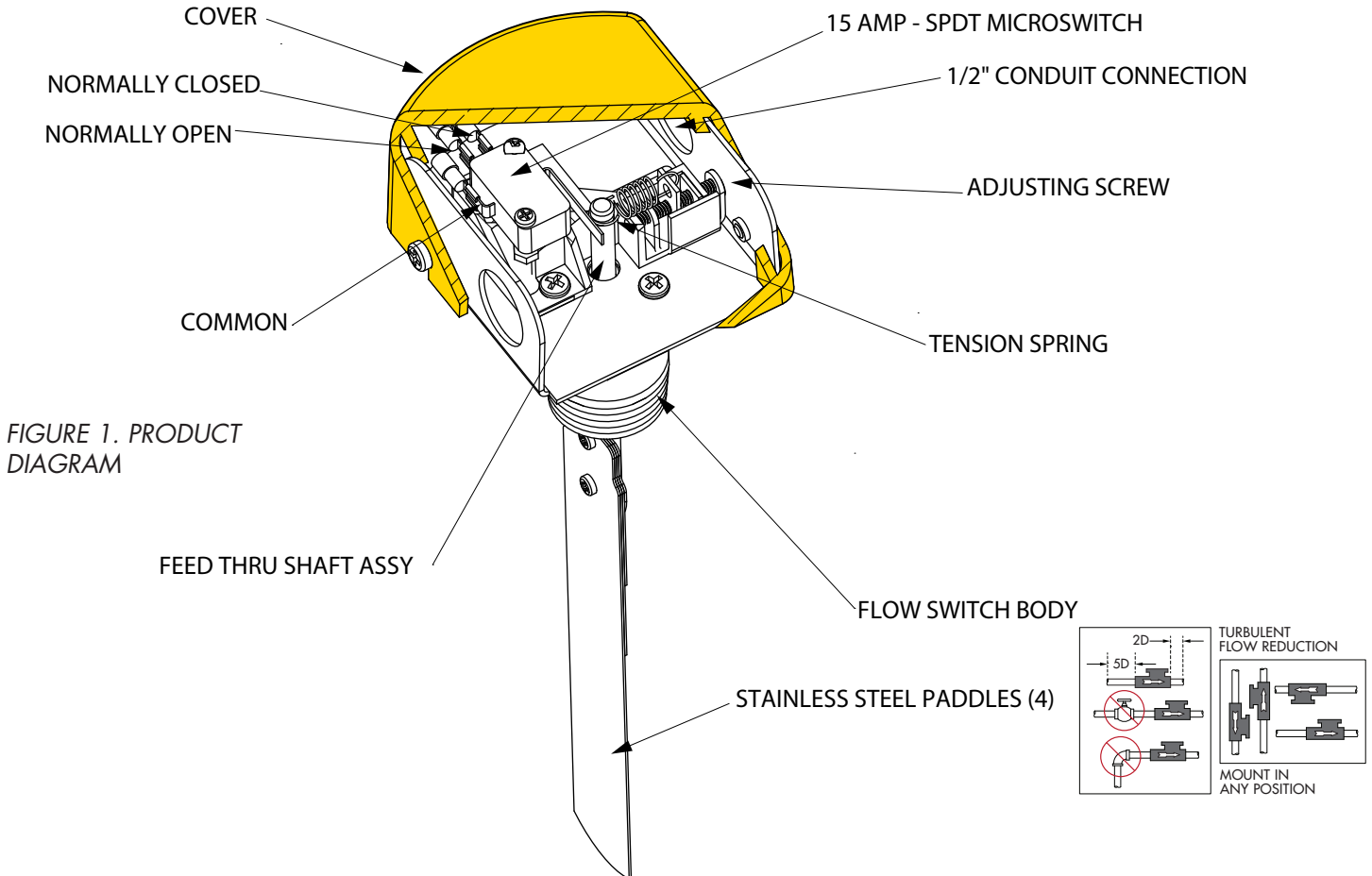
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MODEL FSW-160

INSTALLATION INSTRUCTION SHEET

Ω Ω Omega Model FSW-160 fluid flow switch is intended for use in flow lines with fluids not harmful to brass, stainless steel, and EPDM. The switch is used to signal, start, or stop electrically operated equipment when flow or no-flow conditions occur.

This device is designed for use only as an operating control. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add devices (safety, limit controls), or systems (alarm, supervisory systems) that protect against or that warn of, control failure.



WARNING

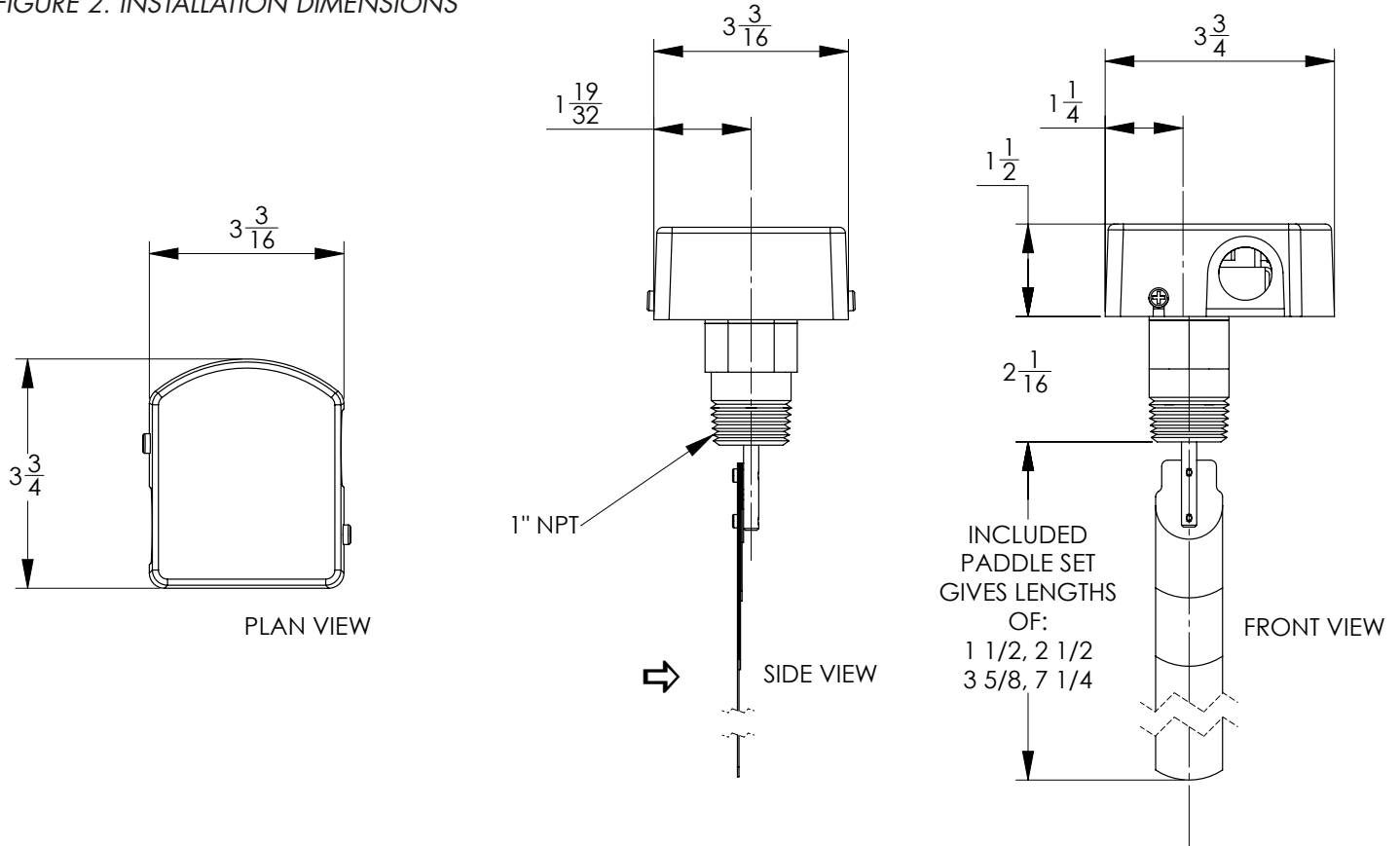
- Before using product, read and understand instructions.
- Please save these instructions for future use.
- All work must be performed by qualified personnel trained in the proper applications, installation, and maintenance of plumbing and electrical equipment in accordance with all applicable codes and ordinances.
- To prevent electrocution **DO NOT TOUCH** the switch terminals when electrical power is connected to the flow switch.
- Make sure flow switch cover is secured before turning on electric power.

MODEL FSW-160

INSTALLATION INSTRUCTION SHEET

SPECIFICATIONS

FIGURE 2. INSTALLATION DIMENSIONS



Liquid Temperature Range	32° - 250°F (0° - 121°C)
Ambient Temperature Range	32° - 150°F (0° - 66°C)
Maximum Service Pressure	250 psi
Electrical Enclosure Rating	NEMA Type 1 (Not for use in hazardous locations.)
Process Connection	1" NPT
Conduit	One opening for $\frac{1}{2}$ " conduit
Usage	1" Pipe and Larger

ELECTRICAL RATING

Single-Pole-Double-Throw (SPDT)

Contact Rating: 15A, $\frac{1}{2}$ hp; 125, 250, 277VAC
 $\frac{1}{2}$ A, 125VDC; $\frac{1}{4}$ A, 250VDC

MODEL FSW-160

INSTALLATION INSTRUCTION SHEET

FIGURE 3. FLOW RANGE TABLE

Pipe Size NPT	Switchpoint Range (GPM)				Paddle Size (inches)
	Min. Adjust.		Max. Adjust.		
	ON	OFF	ON	OFF	
1"	4	2	8	7	1.30"
1½"	7	5	13	11	1.85"
2"	12	7	27	26	2.30"
2½"	18	12	35	32	2.83"
3"	27	19	52	49	3.40"
4"	63	50	123	120	4.50"
5"	125	100	238	232	5.50"
6"	190	158	350	338	6.50"

Consult the factory for larger pipes and additional switch points.

FIGURE 4. PADDLE SIZES

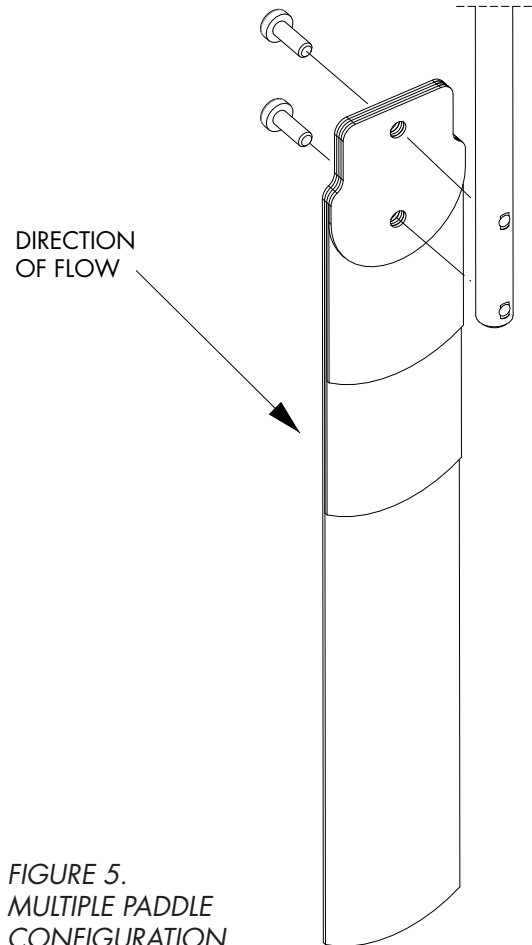
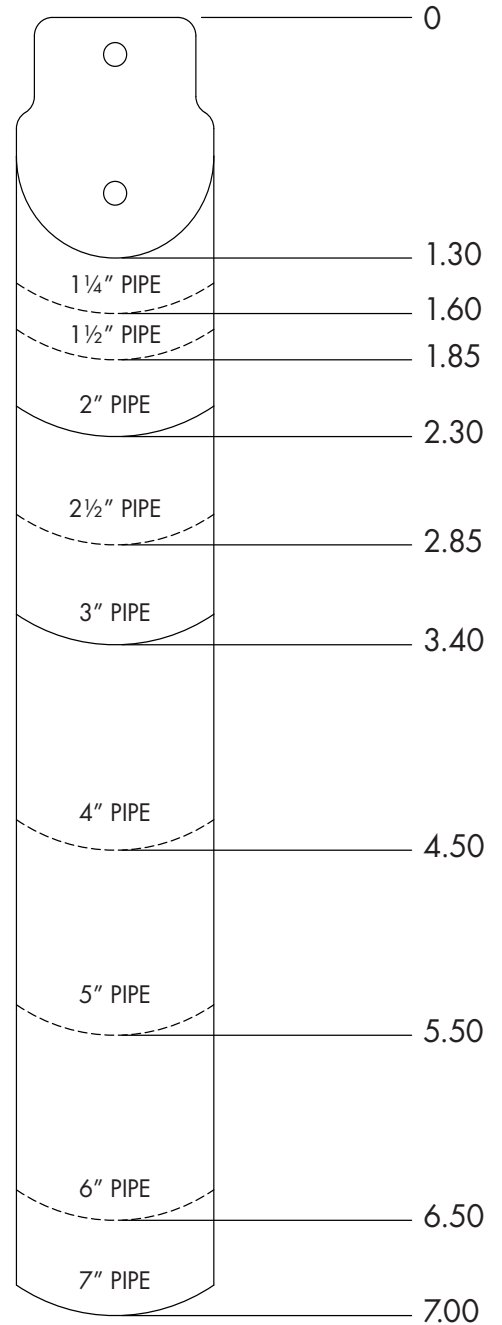


FIGURE 5.
MULTIPLE PADDLE
CONFIGURATION

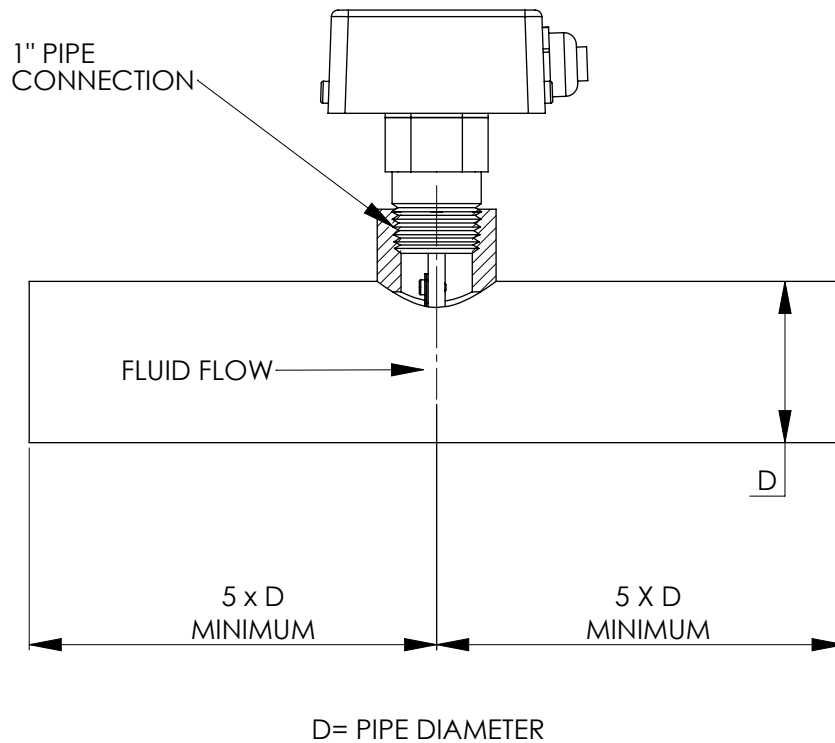
MODEL FSW-160

INSTALLATION INSTRUCTION SHEET

INSTALLATION

The Model FSW-160 should be mounted on the top of a horizontal section of pipe. If it is mounted in a vertical pipe, the switch points will deviate from those published. If the flow is DOWNWARD, switch points will be LOWER than published. If flow is UPWARD, switch points will be HIGHER than published.

FIGURE 6. FSW-160 IN PIPE



The flow switch should be located in a straight run of at least 5 pipe diameters.

1. Determine the proper paddle length from the chart next to the "Flow Range" Table [FIGURE 3]. For intermediate sizes, trim the next largest paddle to the correct length. The paddle must not touch the inside of the pipe. If more than one paddle is being installed, stack one on top of the other with the larger ones first in line with the flow. [FIGURE 5.]
2. Use a reducing tee for pipe sizes larger than 1" to provide adequate paddle length in the liquid flow. A weldolet or half coupling may also be used. If a reducing tee is not available, use a bushing to reduce the tee outlet to 1" pipe thread.
3. Be sure the flow switch is mounted such that the flow direction is perpendicular to the paddle and that it activates the flow switch when there is flow and de-activates at rest when there is no flow.

CAUTION: DO NOT TIGHTEN BY GRASPING THE SWITCH ENCLOSURE. USE THE HEX FLATS AND WRENCH.

MODEL FSW-160

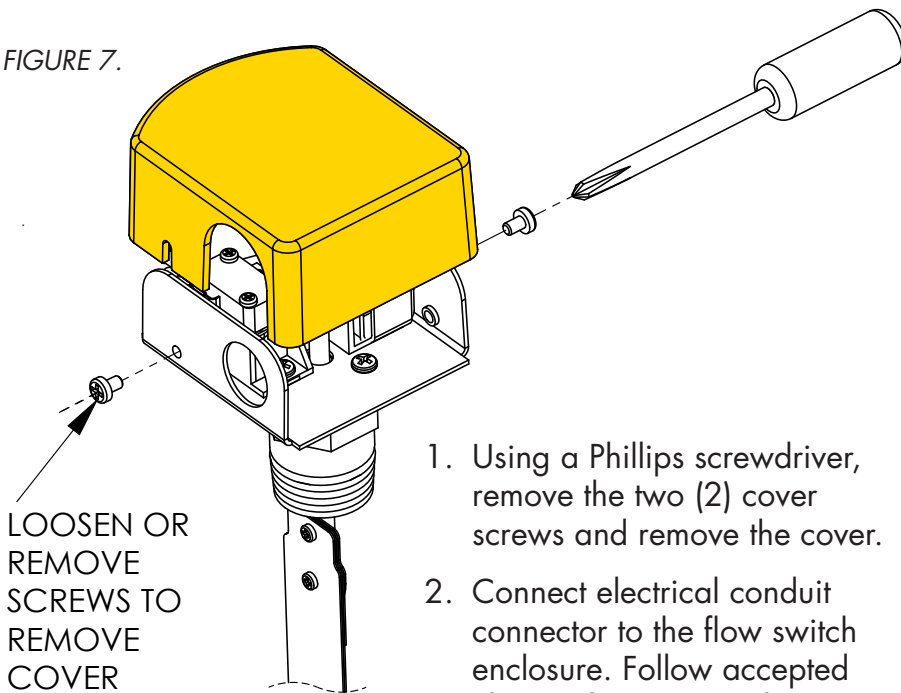
INSTALLATION INSTRUCTION SHEET

ELECTRICAL WIRING

⚠ WARNING

- To prevent electrical shock, turn off the electrical power before making electrical connections.
- To prevent electrocution, do not touch the terminals when electrical power is connected to the flow switch.
- To prevent an electrical fire or equipment damage, use properly temperature-rated supply wire for the anticipated temperature.
- Make all electrical connections in accordance with the National Electrical Code and local regulations.

FIGURE 7.



1. Using a Phillips screwdriver, remove the two (2) cover screws and remove the cover.
2. Connect electrical conduit connector to the flow switch enclosure. Follow accepted electrical practices when installing fittings and making connections. Refer to, and

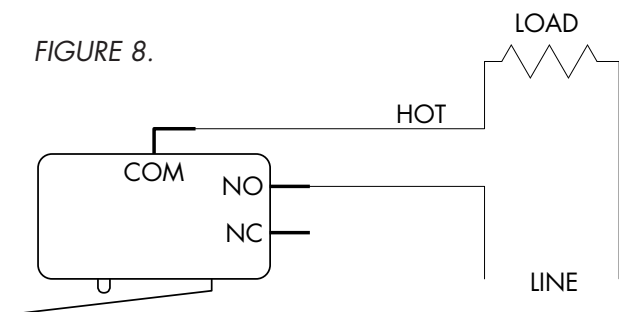
follow, local codes and standards when selecting the types of electrical fittings and conduit to connect to flow switch.

3. Determine which switch action is required for the flow switch.
4. Using a scissor-style crimping tool (3M TH-450 or equivalent), crimp 14 gage wire to the female flag disconnect terminals (3M 752-187) included with the switch.

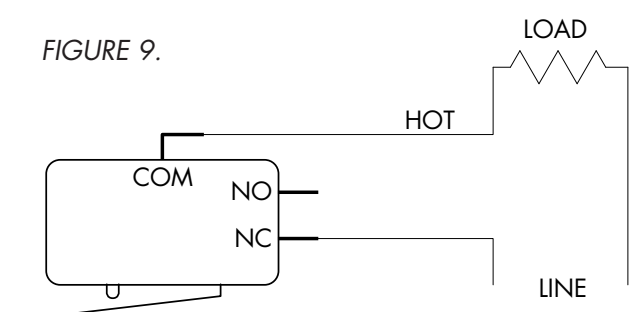
*Note: Use copper wire only

5. Attach ground wire to green grounding screw on flow switch base.

Power applied to load when flow is GREATER than set point, interrupted when flow is LESS than set point (normally open).



Power applied to load when flow is LESS than set point, interrupted when flow is GREATER than set point (normally closed).



MODEL FSW-160

INSTALLATION INSTRUCTION SHEET

SWITCH POINT ADJUSTMENT

1. TURN OFF POWER.
2. Remove cover.
3. Adjust fluid flow in system to desired rate **WITHOUT** regard to FSW-160 switch point setting.
4. The switch point adjusting mechanism consists of an adjusting screw, a "U" shaped nut, and a helical spring.

CLOCKWISE rotation of the adjusting screw changes the microswitch actuation point toward **HIGHER** flow rates.

NOTES: All FSW-160 units are factory set at the lower end of the flow range, e.g. the adjusting screw is set at the low flow counter-clockwise position.

The lead screw nut locks the adjusting screw in position, maintaining the flow switch set point under all environmental conditions.

5. Starting with the nut in low-flow position (tension spring relaxed), turn the adjusting screw in a clockwise direction until the microswitch is actuated, while maintaining the desired fluid flow rate in the system. Turn the adjusting screw **TWO (2)** additional turns in the clockwise direction and then slowly back off in a counter-clockwise direction, until the microswitch is de-actuated. The FSW-160 flow switch is now set at maximum sensitivity for detecting small flow changes.
6. When set at maximum sensitivity (100% point) as described above, flow turbulence may cause rapid on/off switching (dithering) of the microswitch contacts, resulting in reduced switch contact
7. Microswitch actuation point may be monitored during the adjustment procedure detail in steps 5 and 6 by an audible click, with an ohmmeter, or with other continuity tester before connecting line power to the microswitch.
8. If the system flow rate is changed, the FSW-160 can be adjusted to monitor the new flow rate by turning the adjusting screw in a counter-clockwise direction to the minimum flow position and then proceeding as in 5 and 6 above.
9. Place cover on the flow switch and turn on power.
10. Test the operation of the flow switch after each adjustment.

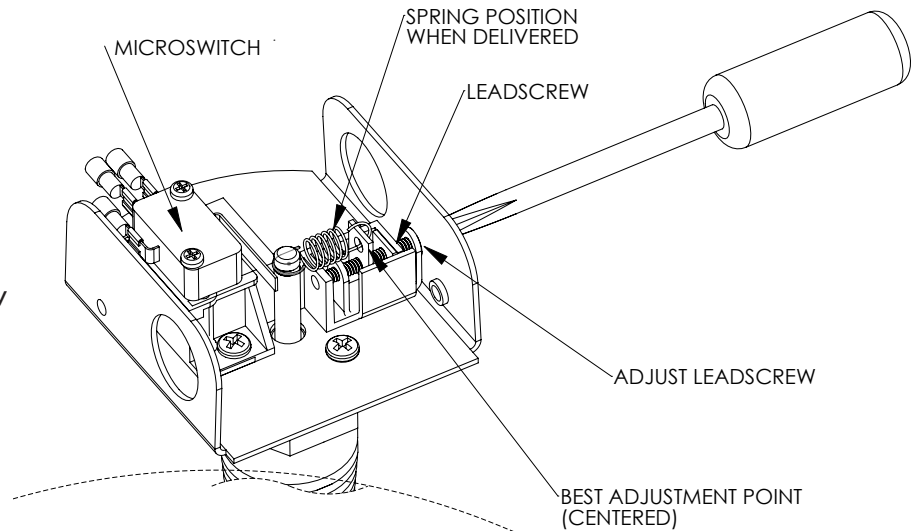


FIGURE 10.

TESTING

Place cover on flow switch and turn on power. Observe whether the flow switch is being activated by the flow. Turn off fluid flow to determine if the device is operating as required.

Repeat initiating and turning off fluid flow several times. If operating as required, put system into service. If not operating as required, flow switch may need to be adjusted.



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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