SERIES 5600 GENERAL PURPOSE FLOW SWITCH

DESCRIPTION

The flow switch is a high-low flow sensing unit which can be used variously for a single low or high flow warning, both low and high warnings, or two low or two high flow warnings, a second one backing up the first. It is adjustable without interruption of the process flow and normally mounts on the flow-meter frame oriented 180 degrees from the readout. The flow switch operates on a magnetic field principle—a rotatable magnet is locked into the field of the flow-meter float magnet, responding to the float magnet's rise and fall with changes in flowrate. The electrical circuit is actuated by an encapsulated reed switch. Bias magnets, adjacent to the switch, interact with the rotating magnet to strengthen or weaken the field which passes through the reed switch, thus governing its opening or closing in a positive manner. The flow switch is housed in a general-purpose enclosure.

<u>WARNING</u>: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT THROUGH MISUSE, THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION BOOK WHICH SHOULD BE THOROUGHLY REVIEWED AND UNDERSTOOD PRIOR TO INSTALLING AND OPERATING THE EQUIPMENT.

TECHNICAL DATA

Switch Type	Hermetically sealed reed type
Range	0 to 100% of flow range
Electrical Rating (Relay Contacts)	10 amp @ 120 Vac or 28 Vdc
Enclosure	Nema 4

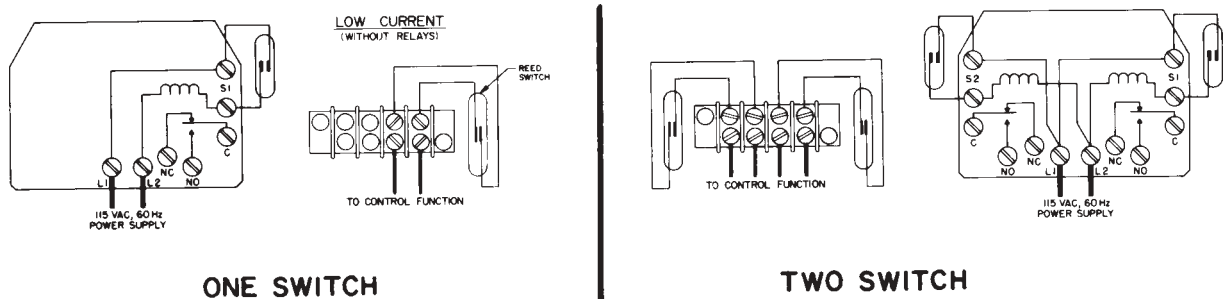


Figure 1 - Flow Switch Wiring Arrangements

INSTALLATION

The flow switch is normally furnished mounted on a Flowmeter or Varea-meter. Wiring to the switch must conform to applicable local codes and, when used with Straight-Through Varea-meters, must be flexible enough to permit vertical adjustment of the meter. When relays are not included in the flow switch, the contacts are rated at 250 mA (at 48 Vdc or 120 Vac resistive) or 50 mA (at 48 Vdc or 120 Vac inductive). When relays are included in the flow switch, 120 volts 50/60 Hz power is required. Either one or two switches, may be furnished, with or without relays.

WARNING: TO ENSURE PROPER AND SAFE OPERATION OF THIS EQUIPMENT, USE ONLY USF/W&T LISTED PARTS EXCEPT COMMERCIALLY AVAILABLE PARTS AS IDENTIFIED BY COMPLETE DESCRIPTION ON PARTS LIST. THE USE OF UNLISTED PARTS CAN RESULT IN EQUIPMENT MALFUNCTIONS CAUSING POSSIBLE SEVERE PERSONAL INJURY.

PREPARATION FOR OPERATION (PRIOR TO INSTALLATION OF FLOW SWITCH)

NOTE: The standard operating mode for the flow switch is to open its switch with decreasing flow. An increasing flow will close the switch. The rate of flow at which the switch actuates is normally adjusted prior to installation. It is adjustable for specific settings when installed, without disassembly or interruption of flow. The flow switch is convertible from an opening of its switch to a closing of its switch upon a decreasing flow. The following procedure covers adjustment of either switch when used in the standard mode. The following adjustments may be made before the flow switch is installed or, after installation with the float raised or lowered by throttling the flow. Refer to the wiring drawings for the switching variations that may be used.

Adjusting Switch Actuation Point of Flow Switch

The flow switch may be set to actuate at any point between 0 to 100% of flowrate, as indicated on the flowmeter dial or scale. The actuation point is adjusted by rotating the switch holders, which are located on either side of the flow switch. These switch holders (10, 500.000.000.002) are rotated clockwise or counterclockwise using a coin or similar object. In the Two-Switch arrangement, each switch holder contains one switch, which can be independently set. In the One-Switch arrangement, only one of the switch holders contains a switch.

- Detection of switch operation is accomplished by connecting an ohmmeter across the leads of the reed switch. For accurate setting of switch actuation points, the flow switch should be upright in its installed position while making any adjustments.

  As a starting point reference, if the raised arrow on the end of the switch holder is pointing horizontally, the flow switch will close when the flowmeter indicates approximately 50% of maximum flowrate. See Figure 2.

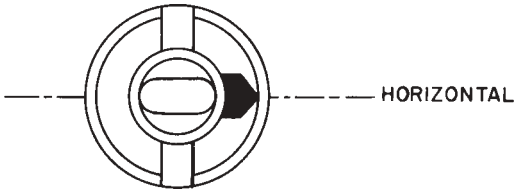


Figure 2 - Switch Holder

- The flow switch deadband causes the switch to actuate at a different point on increasing flow than it will on decreasing flow. For best accuracy, when setting the switch actuation point, the direction of float travel should always be in the direction of final operation. For switch operation on decreasing flow, start the float above the desired actuation setpoint and then slowly move the float down toward the desired actuation setpoint. For switch operation on increasing flow, start the float below the desired actuation setpoint and slowly move the float up toward the desired actuation setpoint. To move the setpoint, rotate the switch holder, as required, until flow switch actuation occurs at the desired flowrate.

DISASSEMBLY - REASSEMBLY (SEE DWG. 500.000.000.002)

CAUTION: Shut off power to flow switch before any disassembly is begun. Use care to avoid damage to the reed switches and their leads when the switches are removed from their holders, as well as during reassembly of these parts.

a. Remove the two nuts (6) which secure the front housing to the rear housing.

b. Remove the terminal strip or relay circuit board (1, 8, Dwg. 500.000.001.002) by removing attaching nuts and washers (6, 7) after identifying and disconnecting terminal leads.

c. Rotate the switch holders so that open side of their flanges faces toward you. Compress springs (12, Dwg. 500.000.000.002) by pressing switch holders (10) away from each other. This allows magnet sleeve cover (9), caps (11) and magnet holder (8) to be lifted out as ‘ an assembly. Disassemble further by pulling off sleeve cover caps and removing magnet and holder.

d. Remove switch holders (10) and springs (12) from housing. To remove switch from holder, unscrew set screw (7). Remove spring (13) and bias magnets (14) by shaking them out of holder. Carefully pull switch (15) out of holder.

e. To reassemble the flow switch, reverse the above steps while observing the following instructions.

   (1) Install the reed switch with glass tube in larger hole, wire in small hole. Install switch from side shown in Figure 3.

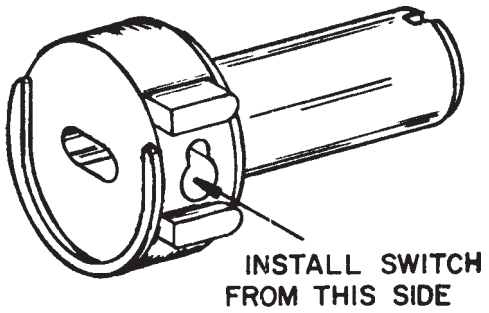


Figure 3 - Switch Installation

CAUTION: Do not tighten set screw excessively; turn only until it reaches end of its thread, otherwise, switch may be broken.

(2) When installing bias magnets, they Must be parallel and attracted to each other. Ensure that they are in contact with the switch before installing spring and set screw. Apply Loctite Sealant E1124 to set screw (7) before installing screw. Spring end should be about 1/2 inch deep in holder when magnets are fully seated. Switch should be maintained in approximate center of its holder so that proper effect of magnetic fields will occur.

(3) Be sure that the rotating magnet turns freely in the sleeve and cap ends and that the magnet holder pivots are not bent.

CAUTION: Use care in assembling to avoid damage.

(4) Slip the switch leads (twisted with three to five twists) through middle coil of spring (12) before connecting it to the terminal strip or relay circuit board (1, 8, Dwg. 500.000.001.002).

(5) Inspect O-rings (2) . If O-rings are swollen, cracked or hardened, discard and replace with new parts. Apply a thin coating of silicone grease U10242 to the O-rings and switch holders (10) to facilitate reassembly of O-ring and switch holders into rear housing (1).

Converting Flow Switch From Open Upon Decreasing Flow to Closed Upon Decreasing Flow

This procedure may be accomplished without removing the installed flow switch. Figure 4 shows the standard for assembling the bias magnets.

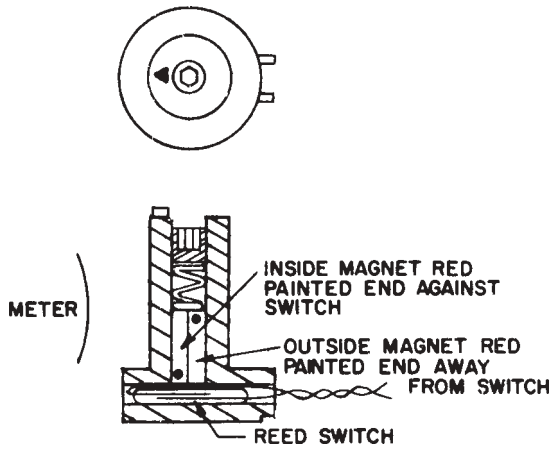


Figure 4 - Standard Operating Mode - Open Switch With Decreasing Flow

a. Remove the set screw. Pull out the spring with a hook or similar tool. Magnets may come out with spring; if not, pull out magnets with iron or steel rod or nail.

b. Reinstall magnets opposite to manner pictured in the drawing; that is, with the inside magnet red-painted end away from switch and outside magnet red-painted end against switch.

c. Carefully insert spring in switch holder. Spring end should be about 1/2-inch deep in holder when magnets are fully seated. Install set screw using Loctite Sealant E1124 but do not overtighten; stop when end of thread is reached.

ORDERING INFORMATION

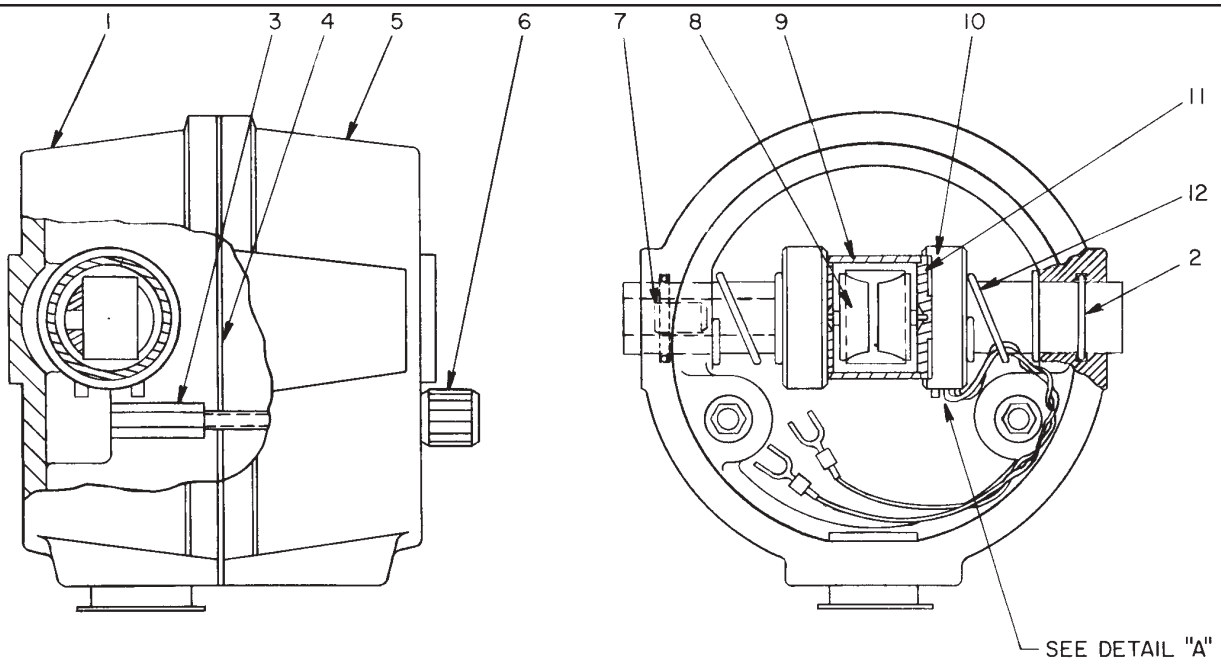
In order for us to fill your order immediately and correctly, please order material by description and part number, as shown in this book. Also, please specify the serial number of the equipment on which the parts will be installed.

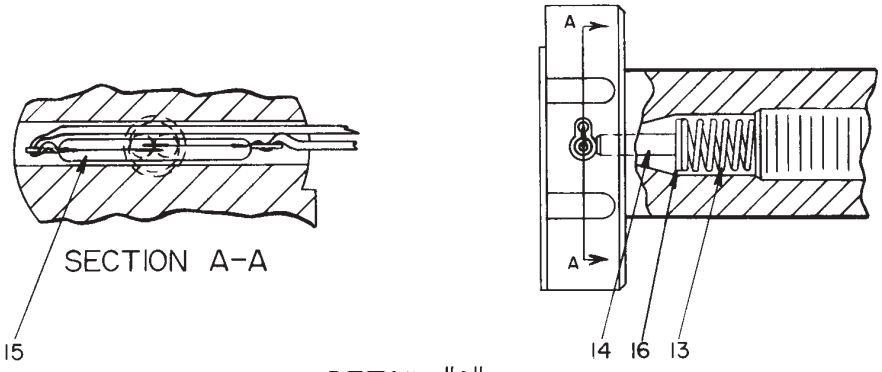
WARRANTY

Seller warrants for a period of one year after shipment that the equipment or material of its manufacture is free from defects in workmanship and materials. Corrosion or other decomposition by chemical action is specifically excluded as a defect covered hereunder, except this exclusion shall not apply to chlorination equipment. Seller does not warrant (a) damage caused by use of the items for purposes other than those for which they were designed, (b) damage caused by unauthorized attachments or modifications, (c) products subject to any abuse, misuse, negligence or accident, (d) products where parts not made, supplied, or approved by Seller are used and in the sole judgement of the Seller such use affects the products' performance, stability or reliability, and (e) products that have been altered or repaired in a manner in which, in the sole judgement of Seller, affects the products' performance, stability or reliability. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, AND THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS OF THE MATERIAL OR EQUIPMENT FOR ANY PARTICULAR PURPOSE EVEN IF THAT PURPOSE IS KNOWN TO SELLER. If Buyer discovers a defect in material or workmanship, it must promptly notify Seller in writing; Seller reserves the right to require the return of such defective parts to Seller, transportation charges prepaid, to verify such defect before this warranty is applicable. In no event shall such notification be received by Seller later than 13 months after the date of shipment. No action for breach of warranty shall be brought more than 15 months after the date of shipment of the equipment or material.

LIMITATION OF BUYER'S REMEDIES. The EXCLUSIVE REMEDY for any breach of warranty is the replacement f.o.b. shipping point of the defective part or parts of the material or equipment. Any equipment or material repaired or replaced under warranty shall carry the balance of the original warranty period, or a minimum of three months. Seller shall not be liable for any liquidated, special, incidental or consequential damages, including without limitation, loss of profits, loss of savings or revenue, loss of use of the material or equipment or any associated material or equipment, the cost of substitute material or equipment, claims of third parties, damage to property, or goodwill, whether based upon breach of warranty, breach of contract, negligence, strict tort, or any other legal theory; provided, however, that such limitation shall not apply to claims for personal injury.

Statements and instructions set forth herein are based upon the best information and practices known to Wallace & Tiernan, Inc., but it should not be assumed that every acceptable safety procedure is contained herein. Of necessity this company cannot guarantee that actions in accordance with such statements and instructions will result in the complete elimination of hazards and it assumes no liability for accidents that may occur.





DETAIL "A"

KEY NO.	PART NO.	QTY.	DESCRIPTION
1	NF 2691	1	REAR HOUSING
2	P 26784	2	O-RING (114) BUNA-N, 5/8"ID x 13/16"OD
3	NP 2693	2	MOUNTING STUD
4	NP 2134	1	GASKET
5	NP 2692	1	FRONT HOUSING
6	P 34555	2	10-24 PLASTIC NUT
7	PN 23070	2	SET SCREW (HEX. SOCKET, BRASS) 5/16-18 x 5/16" LG.
8	NU 1036	1	MAGNET HOLDER UNIT
9	NP 2126	1	MAGNET SLEEVE COVER
10	NP 2125	2	SWITCH HOLDER
11	NP 2127	2	MAGNET COVER CAP
12	NP 2128	2	SWITCH HOLDER SPRING
13	PXB 967	1	SPRING
14	NP 2132	2	BIAS MAGNET
15	NU 1037	1	REED SWITCH
16	P 5659	2	#3 WASHER (BRASS)

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

NU1263 GENERAL PURPOSE FLOW SWITCH - PARTS
NEMA 4 Enclosure

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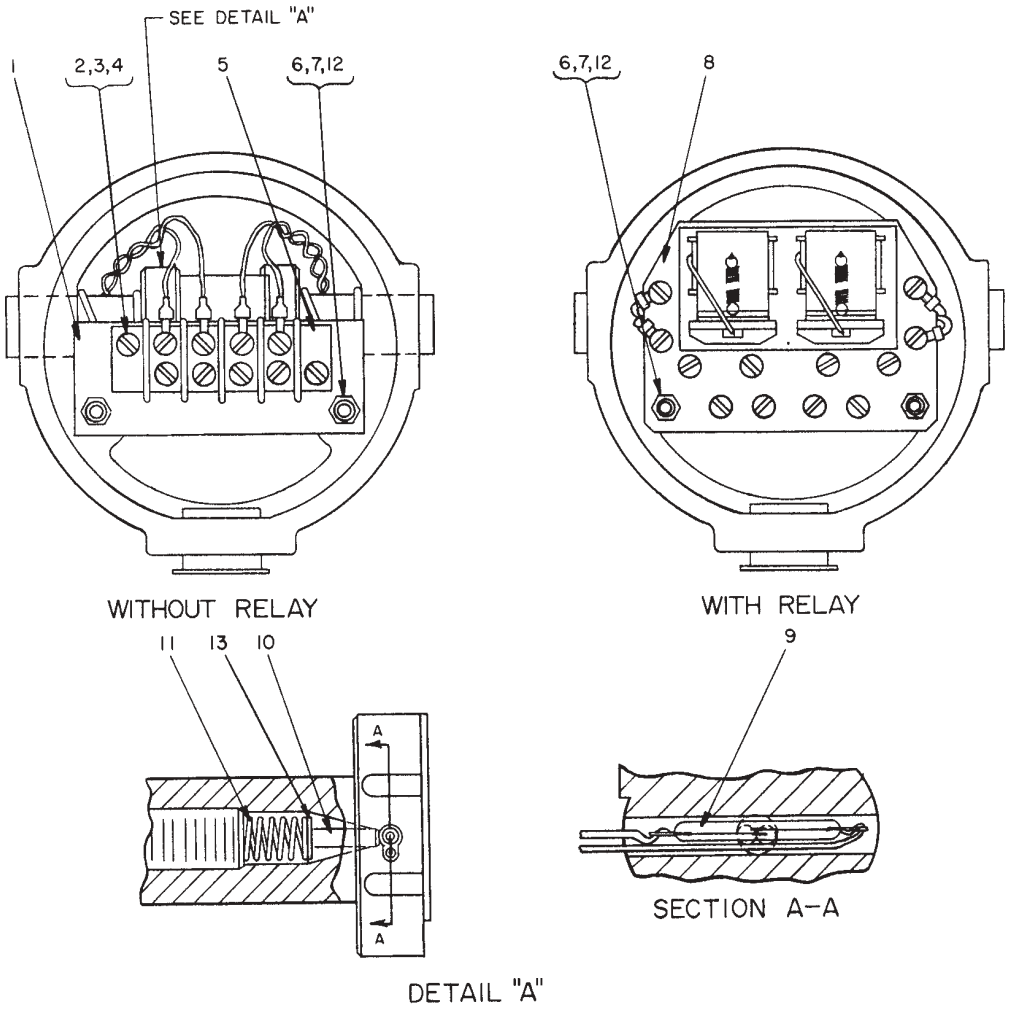

KEY NO.	PART NO.	QTY.	DESCRIPTION	WITHOUT RELAY		WITH RELAY	
				G 445 SINGLE SWITCH	G 446 DOUBLE SWITCH	G 1463 SINGLE SWITCH	G 1464 DOUBLE SWITCH
1	NP 2131	1	TERMINAL STRIP PLATE	■	■		
2	P 29495	2	MACH.SCREW (BINDING HD.,BRASS) #6-32 x 1/2"-LG.	■	■		
3	P 6362	2	#6 LOCKWASHER (SILICON BRONZE)	■	■		
4	P 896	2	HEX. NOT (BRASS) #6-32	■	■		
5	U 16794	1	TERMINAL STRIP	■	■		
6	P 13619	2	#10 LOCKWASHER (SS)	■	■	■	■
7	P 14725	2	HEX. NUT (BRASS) #10-24	■	■	■	■
8	NUXA 1264	1	RELAY CIRCUIT BOARD			■	
	OR						
	NUXB 1264	1	RELAY CIRCUIT BOARD				■
9	NU 1037	1	REED SWITCH		■		■
10	NP 2132	2	BIAS MAGNET		■		■
11	PXB 967	1	SPRING		■		■
12	P 5663	2	#10 WASHER (BRASS)	■	■	■	■
13	P 5659	2	#3 WASHER (BRASS)		■		■

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

SERIES 5600 GENERAL PURPOSE FLOW SWITCH - PARTS
Options

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