

496 Series

Masoneilan* Rotary Electric Switch Instruction Manual



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Safety Information

Important - Please Read Before Installation

Masoneilan model 496 Series Rotary Electric Switch instructions contain **DANGER**, **WARNING**, and **CAUTION** labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully **before** installing and maintaining your control valve. **DANGER** and **WARNING** hazards are related to personal injury. **CAUTION** hazards involve equipment or property damage. Operation of damaged equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all **DANGER**, **WARNING**, and **CAUTION** notices is required for safe operation.



This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



When used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Note: Indicates important facts and conditions.

About this Manual

- The information in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without Masoneilan's written permission.
- Please report any errors or questions about the information in this manual to your local supplier.
- These instructions are written specifically for the 496 Series Rotary Electric Switch, and do not apply for other valves outside of this product line.

Warranty

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This instruction manual applies to the Masoneilan 496 Series Rotary Electric Switch.

The rotary electric switch **MUST BE:**

- Installed, put into service and maintained by qualified and competent professionals who have undergone suitable training.
- Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death.
- Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the product.
- All surrounding pipe lines must be thoroughly flushed to ensure all entrained debris has been removed from the system.

1. Introduction

Series 496 rotary switches are used for electrically indicating one or two predetermined positions in the stroke of a control valve. They may be connected to audible alarms or signal lights for warning of valve or system malfunction. These switches may also be used to actuate solenoids, relays and other electrical devices.

Basic switches (4) in the unit are single pole, double throw snap acting and are individually adjusted by cams (13) on the rotating shaft (11). Vernier adjustment is made by means of locking type set screws (Nylock) (2) in the cams and these screws actuate the switches by contacting the switch spring levers. The spring levers provide overtravel protection and allow maintained contact when required. The Series 496 is available with either one or two switches, each with an adjustable cam to actuate it.

The housing and cover are made of anodized aluminum and are explosion proof. In addition, O-ring seals (7 and 10) in the cover and rotary shaft, make the switch waterproof.

Series 496 switches may be mounted on the 35002 Series Camflex, 30000 Series Varimax, 36002 Series Control Ball and 37002 Series MiniTork Butterfly valves. Also, the addition of a standard back lever and linkage permits its use with the 10000 and 21000 Series and linear motion valves.

For complete parts list for the Series 496 switch refer to Parts Supplement FS7000.

2. Operation

The motion of the control valve turns by means of a back lever (or coupling) the switch shaft (11). Cams (13), fastened to the shaft by screws (1), actuate microswitches (4) by pushing levers (5). Each switch may be wired to either open or close the circuit when the lever is depressed.

3. Installation

Only two couplings are used to connect the switch shaft (11) to the valve; a strip type coupling (Ref. 9, Figure 3) for rotating shaft valves and a back lever (Ref. 9, Figure 6) for linear motion valves. Each is fastened to the switch shaft (11) with a spring washer and cap screw. Refer to Figures 3 through 7 for mounting details.

Microswitches are rated at 10, 15 or 20 amps at 115 or 230 volts dc. Check the rating printed on each switch. Each microswitch has three terminals. The lower one is common, the middle terminal is for normally open circuit; the top terminal is for normally closed circuit. Pass wiring through the 3/4" NPT port in the bottom of the case.

4. Adjustments

The Series 496 switch is normally mounted and adjusted on a control valve at the factory. To adjust the instrument in the field, proceed as follows:

- A. The concave part of the levers (5) should be exactly concentric with the cams (13) with the switch actuated. This is an important step to assure that once the lever is depressed, it stays depressed during overtravel (if any). If not, loosen screws (3 and 17) and slide the levers up or down slightly. Tighten screws (3).
- B. Unscrew slightly the cam locking screws (1) using a 3/32" Allen wrench.
- C. Actuate the valve to the desired position (usually the full opened or full closed position).
- D. It is important to note that the cam operating the right-hand switch should make contact with lever (5) **only at the end of a counterclockwise rotation**. This assures that when the valve is throttling, the screw (2) is completely free of the lever. The concave part of the lever is only to maintain contact during over-travel (if any). Similarly, the cam operating the left-hand switch should make contact with lever (5) only at the **end of a clockwise rotation**. If there is only one switch (Model 496-1) it may be necessary to reverse the position of the switch from left to right or vice versa depending on the rotation and stroke position.
- E. Turn the cam (13) on the shaft until the switch is a voltmeter.) Lock the cam (13) with screw (1).
- F. Make a fine adjustment with screw (2) using a 1/16" Allen wrench. The screw (2) must extend out from the cam far enough to assure sufficient depression of lever (5).

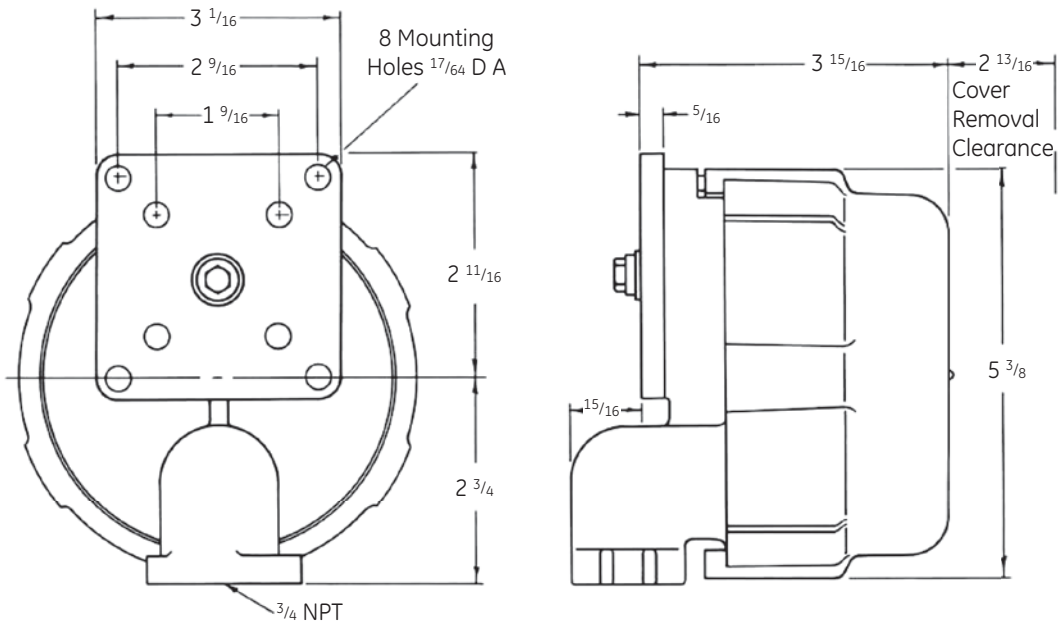


Figure 1
Dimensions

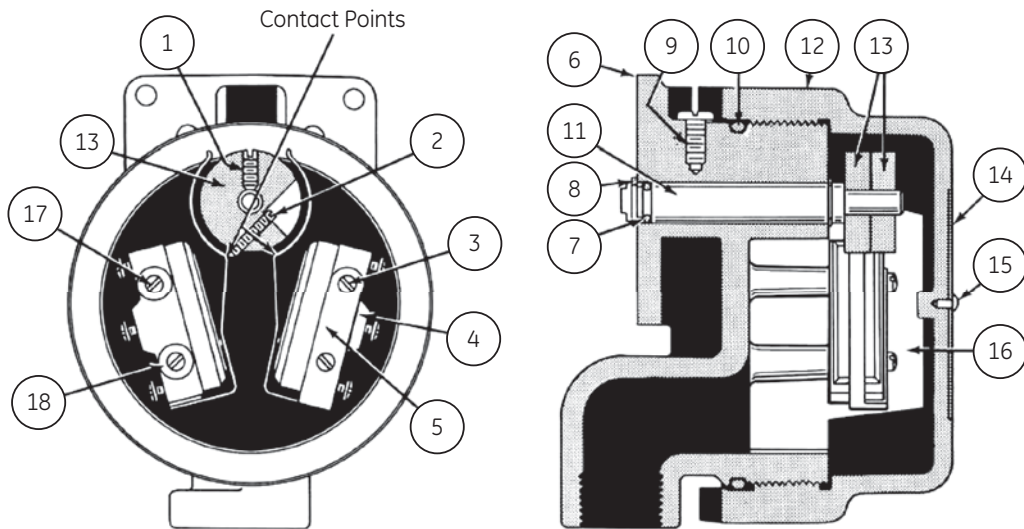


Figure 2
Cutaway Views

| Ref. No. | Description | Ref. No. | Description | Ref. No. | Description |
|----------|-------------|----------|-------------|----------|--------------------|
| 1 | Screw | 8 | Snap Ring | 14 | Serial Plate |
| 2 | Screw | 9 | Screw | 15 | Drive Screw |
| 3 | Screw | 10 | O-Ring | 16 | Insulator |
| 4 | Microswitch | 11 | Shaft | 17 | Screw |
| 5 | Lever | 12 | Cover | 18 | Washer |
| 6 | Body | 13 | Cam | 19 | Spacer (not shown) |
| 7 | O-Ring | | | | |

5. Mounting Arrangements

A. 35002 Series Camflex II 30000 Series Varimax

When mounting a Series 496 Switch on a Camflex II or Varimax valve:

1. Remove shaft cover, or if equipped with a positioner, remove positioner and mounting plate.
2. Remove bottom cover.
3. Install mounting bracket (3) using two flat head screws (7).
4. Screw pin (12) to switch lever (10) [Varimax lever (10a)].
5. Remove cap screw (11) [Varimax set screw (11a)] from switch lever (10) [Varimax lever (10a)] slide switch lever

onto shaft behind the main lever. Position switch lever in line with main lever. Replace and tighten cap screw (11) [Varimax set screw (11a)].

6. Mount switch (1) on bracket (3) using cap screws (4) and hex nuts (8).
7. Place slotted end of the back lever (9) over pin (12) on the switch lever. Secure with washer (13) and clip (14).
8. For 3" valve and larger slip bottom cover over the linkage and push in place.
9. Attach the back lever to the switch using lock washer (5) and cap screw (6).
10. Refer to adjustments (Page 2) to adjust switches.

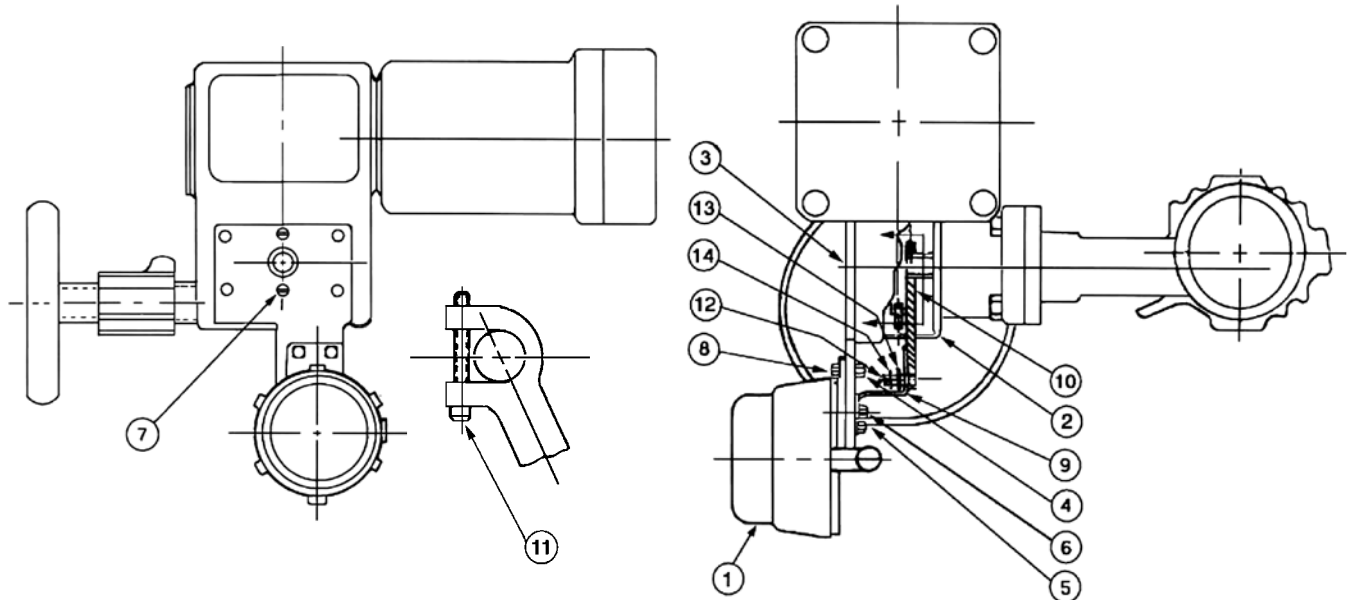


Figure 3
35002 Series Camflex II

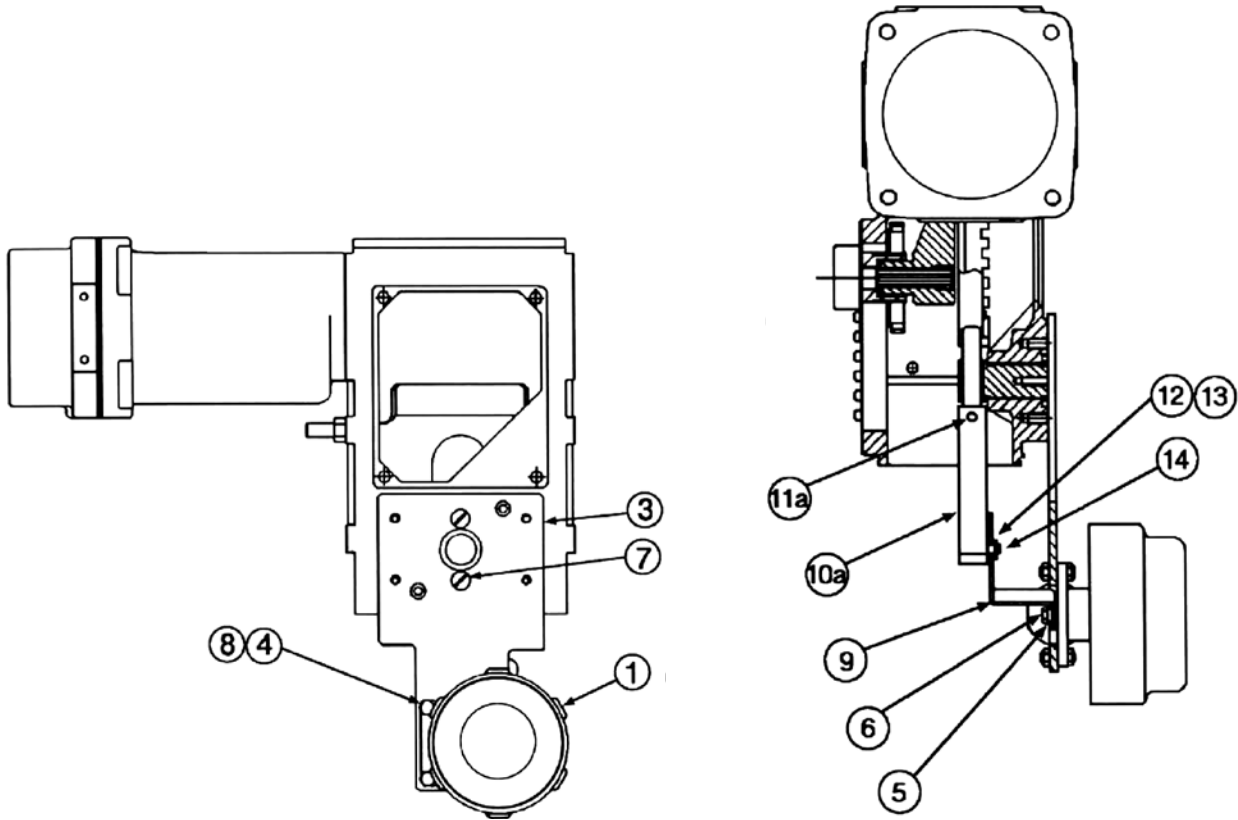


Figure 4
35002 Series Camflex II
30000 Series Varimax

| Ref. No. | Description | Ref. No. | Description | Ref. No. | Description |
|----------|-------------------|----------|-----------------|----------|----------------|
| 1 | 496 Rotary Switch | 7 | Flat Head Screw | 11 | Cap Screw |
| 2 | Bottom Cover* | 8 | Hex Nut | 11a | Set Screw |
| 3 | Mounting Bracket | 9 | Back Lever | 12 | Lever Pin |
| 4 | Cap Screw | 10 | Lever | 13 | Washer |
| 5 | Lock Washer | 10a | Lever | 14 | Retaining Clip |
| 6 | Cap Screw | | | | |

*Used with 7" Actuator only

**B. 36002 Series Control Ball II
37002 Series MiniTork II
39002 Series High Performance Butterfly**

496 Series Rotary Switch mounted on 36002, 37002 and 39002 valves:

1. Remove shaft cover or if equipped with a positioner remove positioner and mounting plate.
2. Remove plastic panels for access, bottom front and side.
3. Remove pivot pin (8) stroke air to open valve to remove the load from the pin.
4. Replace pin (8) with switch mounting pivot pin.
5. Assemble take off link (6), locknut (9) and turnbuckle (10), slide assembly over pivot pin (8) and push on retaining clip (7).

6. Install front cover.
7. Install mounting plate (3) using flat head screws (1).
8. Mount switch (2) to plate (3) using cap screws (5) and nuts (12).
9. Assemble back lever (14) to the switch using cap screw (15) and lock washer (16).
10. Assemble clevis (11) to back lever (14) using clevis pin (13) and retaining clip (7).
11. Replace bottom cover (4).
12. Connect the turnbuckle (10) and clevis (11). Rotate the turnbuckle to equalize threaded ends and lock the locknut.
13. Refer to adjustments (Page 2) to adjust switches.

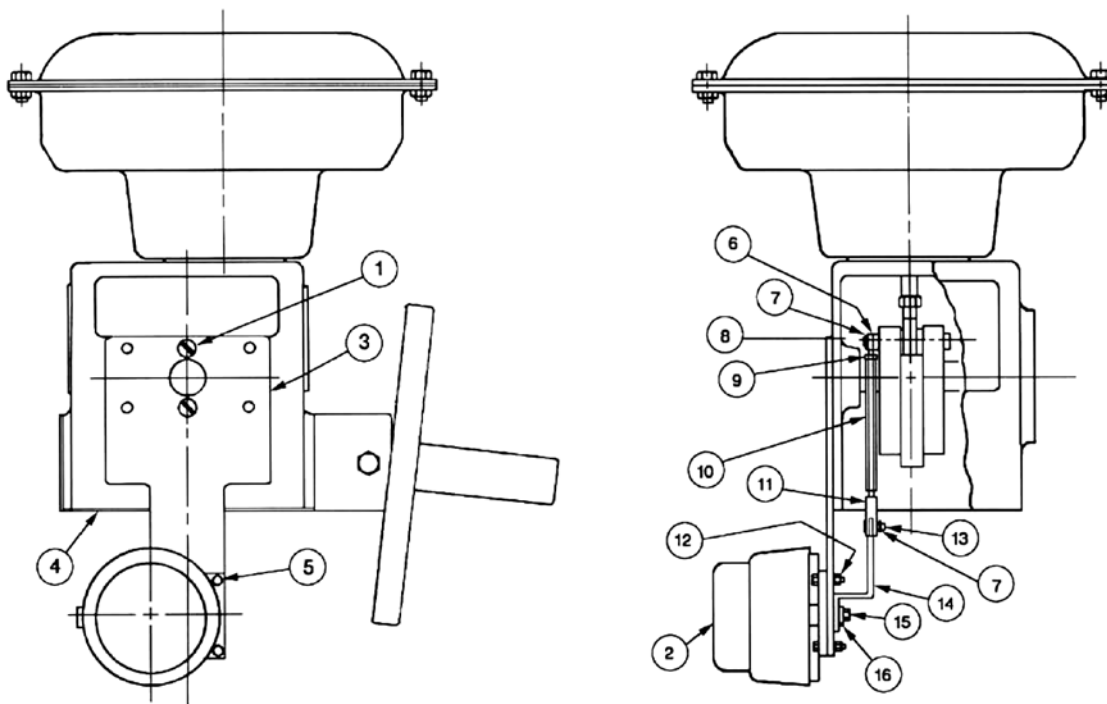


Figure 5
36002 Series Control Ball II, 37002 Series MiniTork II, 39002 Series HPBV

| Ref. No. | Description | Ref. No. | Description | Ref. No. | Description |
|----------|-------------------|----------|----------------|----------|-------------|
| 1 | Flat Head Screw | 7 | Retaining Clip | 12 | Hex Nut |
| 2 | 496 Rotary Switch | 8 | Pivot Pin | 13 | Clevis Pin |
| 3 | Mounting Plate | 9 | Hex Jam Nut | 14 | Back Lever |
| 4 | Bottom Cover | 10 | Turnbuckle | 15 | Cap Screw |
| 5 | Cap Screw | 11 | Clevis | 16 | Lock Washer |
| 6 | Take Off Link | | | | |

*Used with 7" Actuator only

C. 37/38 Diaphragm Actuators

The 496 switch is rigidly mounted on the spring barrel of the diaphragm actuator by means of a bracket (7) fastened to the mounting pad with cap screws (8). The back lever (9) is fastened to the end of the switch shaft with spring washer (15) and cap screw (17).

The take off linkage must be adjusted before adjusting the switches. Apply air pressure to the actuator until the actuator stem has traveled exactly half the rated stroke. Loosen locknut (5) and turn the turnbuckle (6) until the back lever (9) is level. Tighten locknut (5) and adjust switches according to instructions on Page 2.

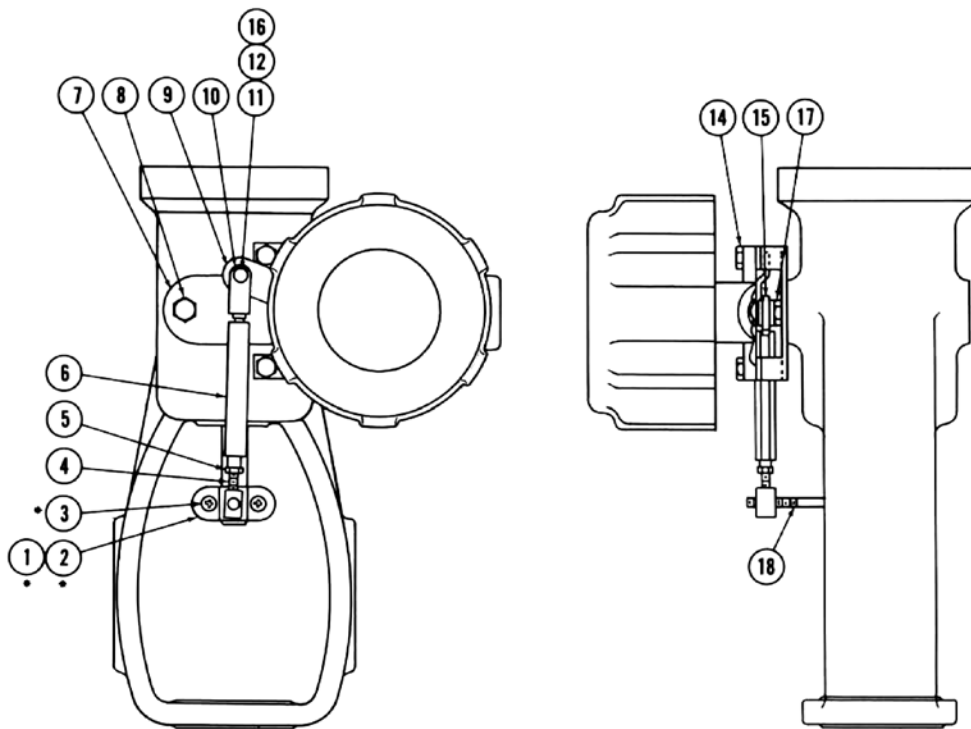


Figure 6
37/38 Spring Diaphragm Actuator

| Ref. No. | Description | Ref. No. | Description | Ref. No. | Description |
|----------|------------------|----------|------------------|----------|---------------|
| *1 | Clamp | 7 | Mounting Bracket | 14 | Cap Screw |
| *2 | Clamp | 8 | Cap Screw | 15 | Spring Washer |
| *3 | Machine Screw | 9 | Back Lever | 16 | Washer |
| 4 | Turnbuckle Screw | 10 | Clevis | 17 | Cap Screw |
| 5 | Locknut | 11 | Clip | 18 | Clamp Rod |
| 6 | Turnbuckle | 12 | Pin | | |

*Used with size 9, 11 and 13 actuators only.

D. 87/88 Spring Diaphragm Actuators

Series 87/88 Actuators 496 Switch installation

1. Mount bracket (13) to yoke using cap screws (17) and lock washers (18).
2. Attach the back lever (7) to the switch using cap screw (11) and spring washer (12).
3. Mount switch on bracket (13) using cap screws (15) and lock washers (16).
4. Screw locknut (3) onto clamp rod (2) install clamp rod into split clamp and tighten locknut.
5. Attach clevis (6) to back lever (7) using clevis pin (9) washer (10) and retaining clip (8).
6. Screw turnbuckle screw (1) onto clamp rod (2) until it lines up with clevis (6).
7. Apply air pressure to the actuator until the actuator stem has traveled exactly half the rated stroke.
8. Install and adjust the turnbuckle until the back lever is horizontal. Tighten locknut.
9. Refer to adjustments (Page 2) to adjust the switches.

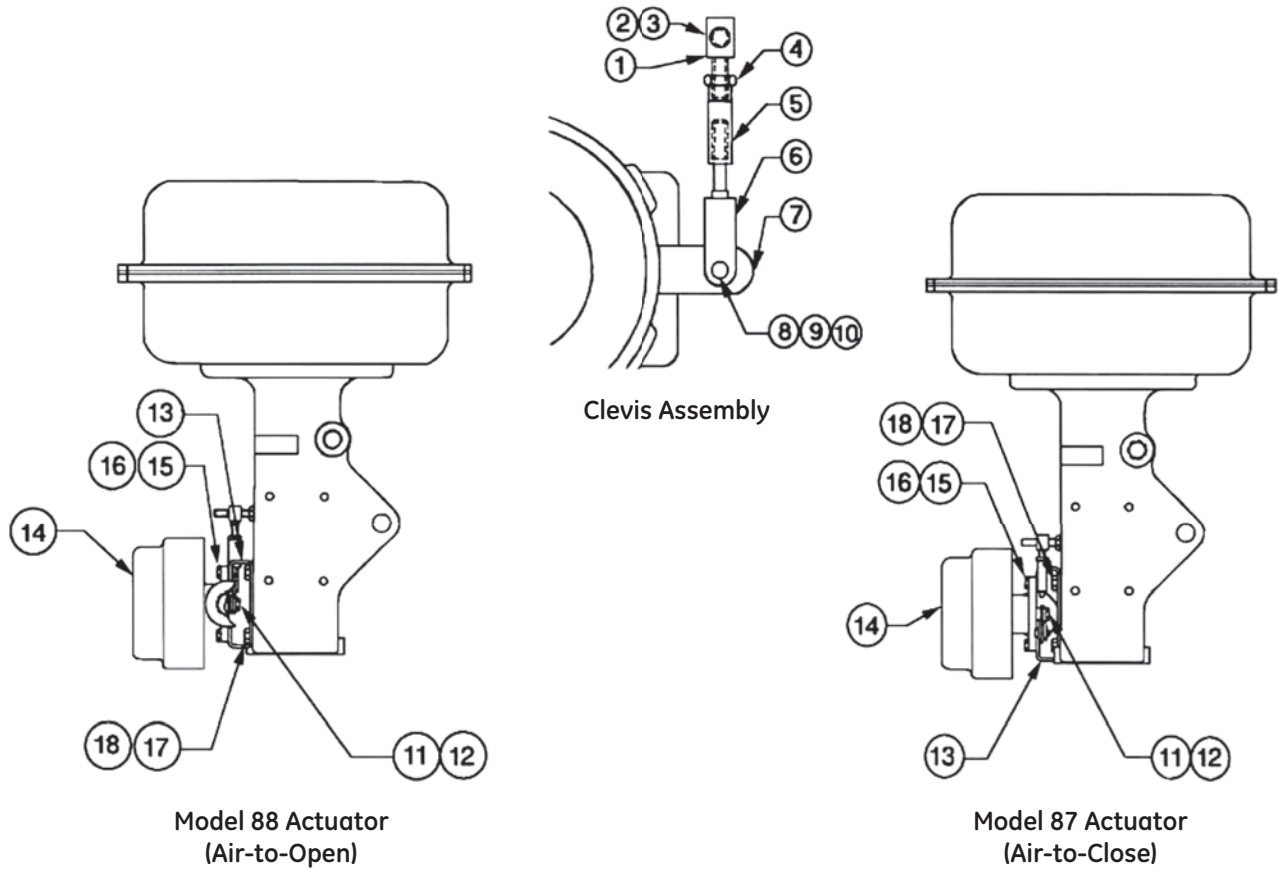


Figure 7
87/88 Spring Diaphragm Actuator

| Ref. No. | Description | Ref. No. | Description | Ref. No. | Description |
|----------|------------------|----------|----------------|----------|-------------------|
| 1 | Turnbuckle Screw | 7 | Back Lever | 13 | Mounting Bracket |
| 2 | Clamp Rod | 8 | Retaining Clip | 14 | 496 Rotary Switch |
| 3 | Locknut | 9 | Clevis Pin | 15 | Cap Screw |
| 4 | Locknut | 10 | Washer | 16 | Lock Washer |
| 5 | Turnbuckle | 11 | Cap Screw | 17 | Cap Screw |
| 6 | Clevis | 12 | Spring Washer | 18 | Lock Washer |

DISTRIBUTOR

E.P. & S. - FRANCE

24 bis rue de Picpus

75012 PARIS

Tel: +33 (0)9 83 01 21 01

ventes@fr-eps.com

E.P. & S. - CAMEROON

Immeuble Carré d'Or, Rue Njo-Njo

Bonapriso, DOUALA

Tel: +237 6 52 12 70 95

ventes@fr-eps.com

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