

# Masoneilan Models 496-1 and 496-2 Rotary Electric Switches Instructions



**Masoneilan**

**DRESSER**

# description and operation

## Description (Figure 2)

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 (5).

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 of anodized aluminum, epoxy painted.

Series 496 switches may be mounted on the CamflexII rotary valves (35002 Series) or Varimax (30000 Series), Control BallIII valves (36002 Series), butterfly valves as MiniTork II (37002 Series) or HPBV (39002 Series) valves.

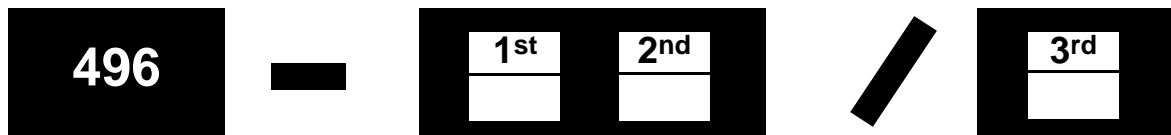
Also, they may be used on valves as the 11 000, 21000 and 41000 Series and all other linear motion valves. A parts list for the Series 496 switch appears in page 4.

## Operation (Figure 2)

The motion of the control valve turns (by means of a linkage 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.

## NUMBERING SYSTEM OF THE 496 SERIE



Instrument Type
1. Mechanical switch with one single pole, double throw contact arrangement
2. Mechanical switch with two single poles, double throw contact arrangement
3. Potentiometric Position Transmitter
4. Electronic switch with one proximity detector
5. Electronic switch with two proximity detectors
6. Mechanical switch with one double pole, double throw contact arrangement
7. Mechanical switch with two double poles, double throw contact arrangement
8. Optoelectronic Position Transmitter

Protection
55. Weatherproof (E)
56. Weatherproof, oxygen environment (E)
57. Explosionproof and weatherproof (E)
58. Intrinsically safe and weatherproof (E)
These two digits are used only when European standards are concerned. Otherwise the instrument is explosionproof and weatherproof (US)

E= European standards

Additional Switch* (if any)
1. Mechanical switch with one single pole, double throw contact arrangement
2. Mechanical switch with two single poles, double throw contact arrangement
4. Electronic switch with one proximity detector
5. Electronic switch with two proximity detectors
6. Mechanical switch with one double pole, double throw contact arrangement
7. Mechanical switch with two double poles, double throw contact arrangement

\* This digit and its oblique bar is only used when the transmitter is provided with an auxiliary switch

Caution: Electrical protection of some of the above mentioned equipment combinations, can be not in accordance with all protection standards. Consult Masoneilan.

# installation and adjustments

## Installation

### Electrical Protection

The microswitches and other parts are protected by a **flameproof housing**

#### EN 50014 & 50018

EExdIICT6 (ambient temperature 70°C)

EExdIICT5 (ambient temperature 80°C)

Beside, a **tight degree** up to IP65 following to standard CEI 144 and IP657 following to standard NFC20.010 is ensured by the O-rings (7 & 10) located between body and cover and on the switch shaft.

Installation of the rotary limit switches into **intrinsic safety circuit** according to following European standards (CENELEC):

#### EN 50014 & 50020

EExialICT6 (ambient temperature -55°C +80°C)

**Note : The load must be controlled through a certified transistorized relay located outside the hazardous area.**

### Electrical Connection-Wiring (Figure 1)

A cable entry is integrated at the bottom of the housing and includes a cable clamping device. Different leakproof packings allow the adaptation of diameters of unarmed cables from 6 to 15mm.

The cable entry is also available in 3/4" NPT threaded connection form. This can be designed to answer most of the customer requests.

Each microswitch has three terminals ("common", "normally open" and "normally closed"), (See Figure 3). Electrical rating of switches is stamped on serial plate.

The installation in hazardous locations should be according to the regulations in force concerning flameproof material.

### Coupling

The coupling of the switch shaft to the valve is made by means of a back lever and a motion linkage proper to each valve configuration. The back lever is fastened to the switch shaft (11) with a washer and a hex. head screw. Figures 3 to 6 show installation details on the various valves.

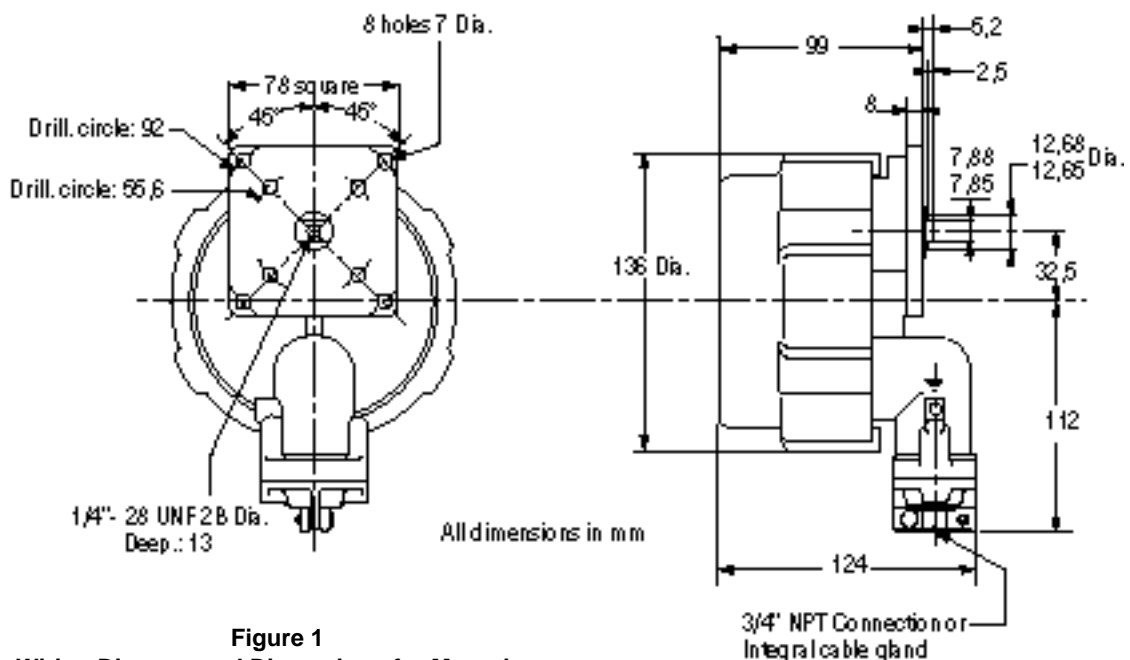
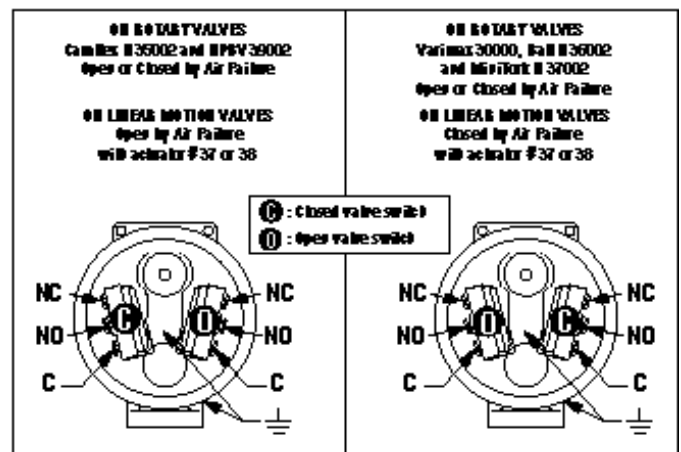


Figure 1  
Wiring Diagram and Dimensions for Mounting

## 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:

1. **The concave part of the levers (5) should be exactly concentric with the cams (13) when the switch is actuated.**

This is an important step to assure that once the lever is depressed, it stays depressed when the screw (2) is completely free.

If not, loosen screws (3 and 17) and slide the levers up or down slightly. Tighten screws.

2. Unscrew slightly the cam locking screws (1) using a 3/32" Allen wrench.
3. Actuate the valve to the desired position (usually the full opened or full closed position).
4. 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.** (Refer to detail of the Figure 2).

This assures that when the valves 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.** (Refer to face view of the Figure 2).

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.

5. Turn the cam (13) on the shaft until the switch is activated. (If the click switch cannot be heard, use a voltmeter). Lock the cam (13) with screw (1).
6. 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).

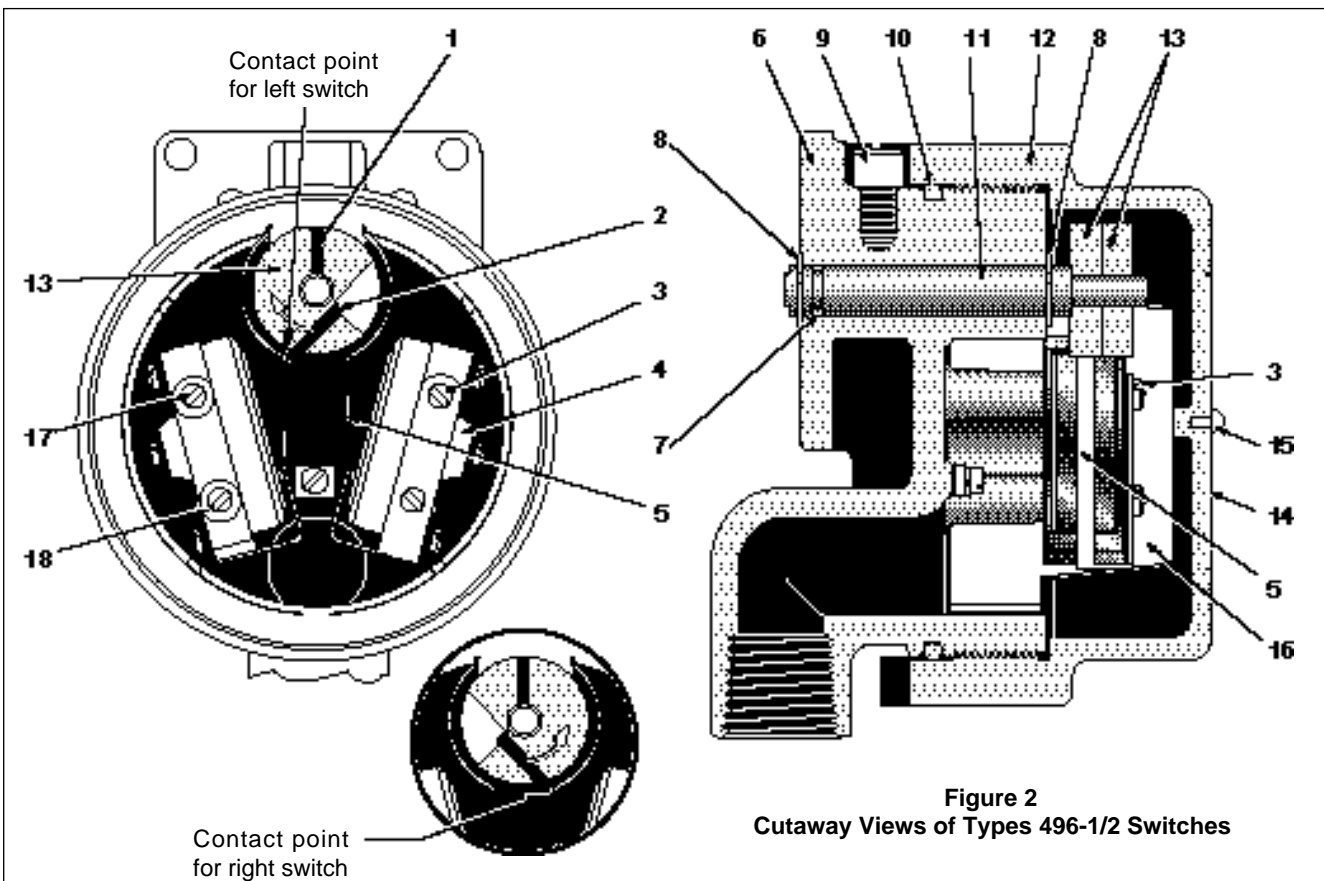


Figure 2  
Cutaway Views of Types 496-1/2 Switches

## PARTS REFERENCE

Ref.	Part Name	Ref.	Part Name	Ref.	Part Name
1	Screw	8	Snap Ring	15	Drive Screw
2	Screw	9	Screw	16	Insulator
3	Fastening Screw (only one switch)	● 10	O-Ring	17	Fastening Screw (second switch on 496-2)
4	Microswitch	11	Shaft	18	Washer
5	Lever	12	Cover	*19	Spacer (Not shown)
6	Body	13	Cam		
● 7	O-Ring	14	Serial Plate		

● Recommended Spare Parts

\* Only on 496-2 Model

# Mounting arrangements

## On 35002 Series Camflex II Valves (Figure 3):

1. Remove shaft cover, or if equipped with a positioner, remove positioner and mounting plate.
2. Remove bottom cover (2).
3. Install mounting bracket (3) using two flat head screws (7).
4. Screw pin (12) to switch lever (10).
5. Remove cap screw (11) from switch lever (10) and slide switch lever onto shaft, behind the main lever of the valve. Position switch lever (10) in line with main lever. Replace and tighten cap screw (11).
6. Mount switch (1) on bracket (3) using the four cap screws (4) and the four hex. nuts (8).
7. For 3" (80mm) valve and larger, slip slotted bottom cover (2) over the lever (10) and push in place.
8. Place slotted end of the back lever (9) over pin (12) of the switch lever (10). Secure with washer (13) and clip (14).
9. Attach the back lever (9) to the switch shaft using lock washer (5) and cap screw (6).
10. Refer to pages 3 & 4 to proceed with wiring and adjusting switches.

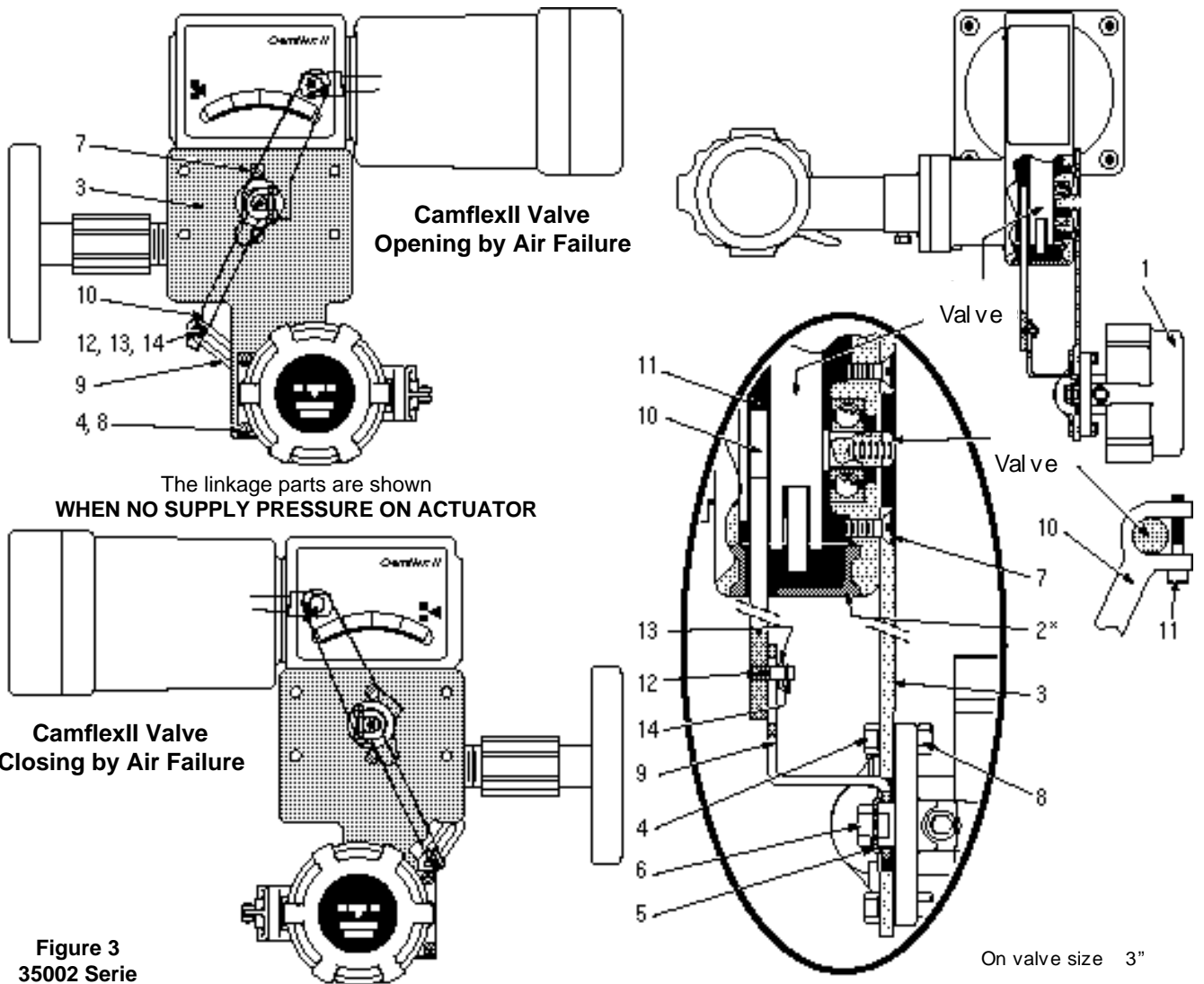


Figure 3  
35002 Serie  
Camflex II Valve

## PARTS REFERENCE

Ref.	Part Name	Ref.	Part Name	Ref.	Part Name
1	496 Rotary Switch	6	Cap Screw	11	Cap Screw (Switch Lever)
2	Bottom Cover	7	Flat Head Screw	12	Lever Pin
3	Mounting Bracket	8	Hex. Nut	13	Washer
4	Cap Screw	9	Back Lever	14	Retaining Clip
5	Lock Washer	10	Switch Lever		

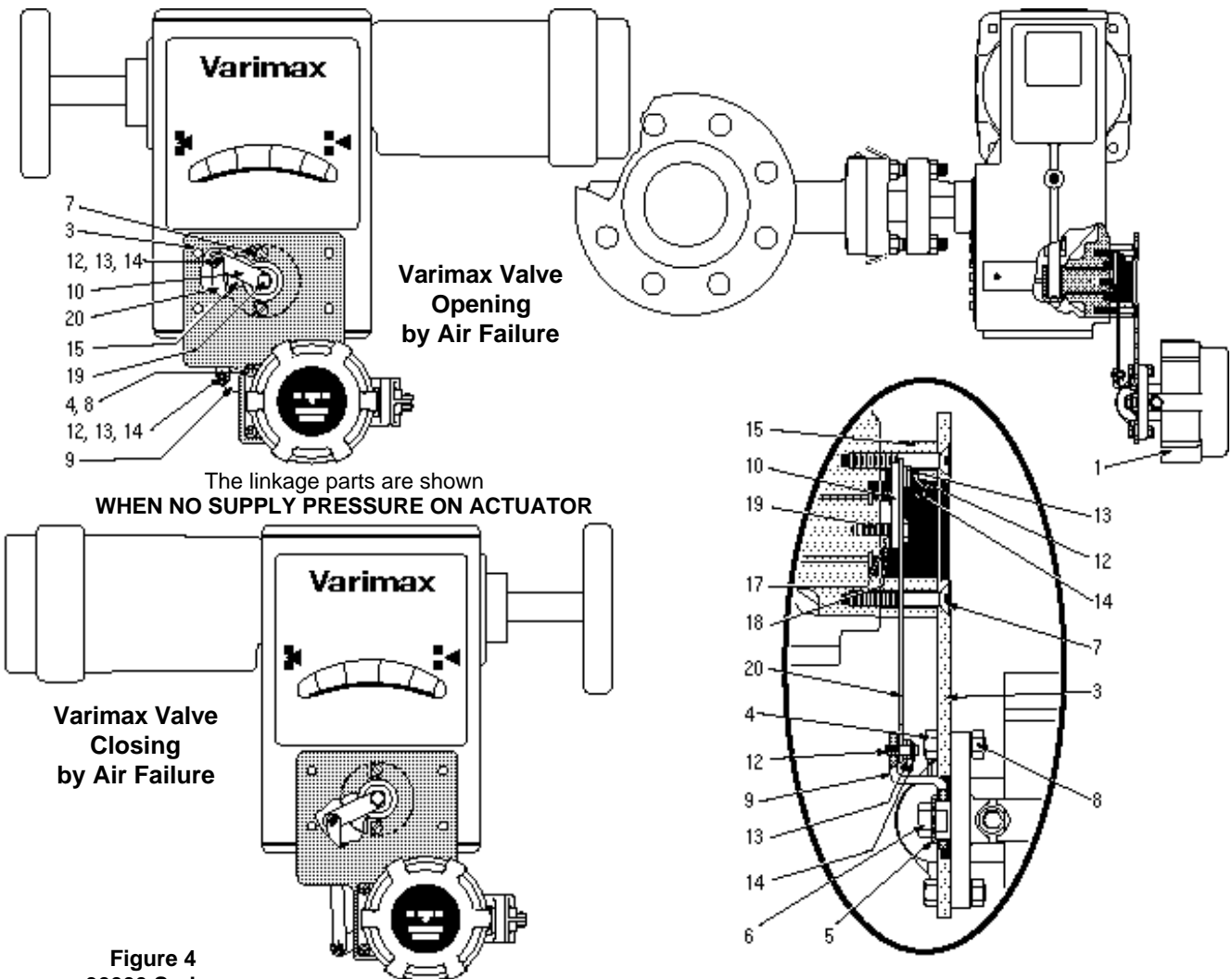
**On 30000 Series Varimax Valves (Figure 4):**

1. Remove shaft cover, or if equipped with a positioner, remove positioner and mounting plate.
2. Screw the index-screw (17), with its lock washer (18), into one of the two threaded holes of the switch lever (10).

*Note: The head of the index-screw (17) will be engaged in the slot located on the valve shaft end to ensure the proper position of the switch lever (10). The proper hole to be used can be easily identified referring to the below Figure 4 and presenting the lever in the shown position.*

3. By means of the hex. head screw (19), fit the switch lever (10) on the valve shaft end in the proper position relating to the valve operating way.

4. Install the mounting bracket (3) by means of the spacer (15) and the two flat head screws (7).
5. Mount switch (1) on bracket (3) using the four cap screws (4) and the four hex. nuts (8).
6. Attach the back lever (9) to the switch shaft using lock washer (5) and hex. head screw (6).
7. Connect the back lever (9) to the switch lever (10) by means of link (20), two driving pins (12), four washers (13) and two retaining clips (14).
8. Refer to pages 3 & 4 to proceed with wiring and adjusting switches.



**Figure 4**  
**30000 Series**  
**Varimax Valves**

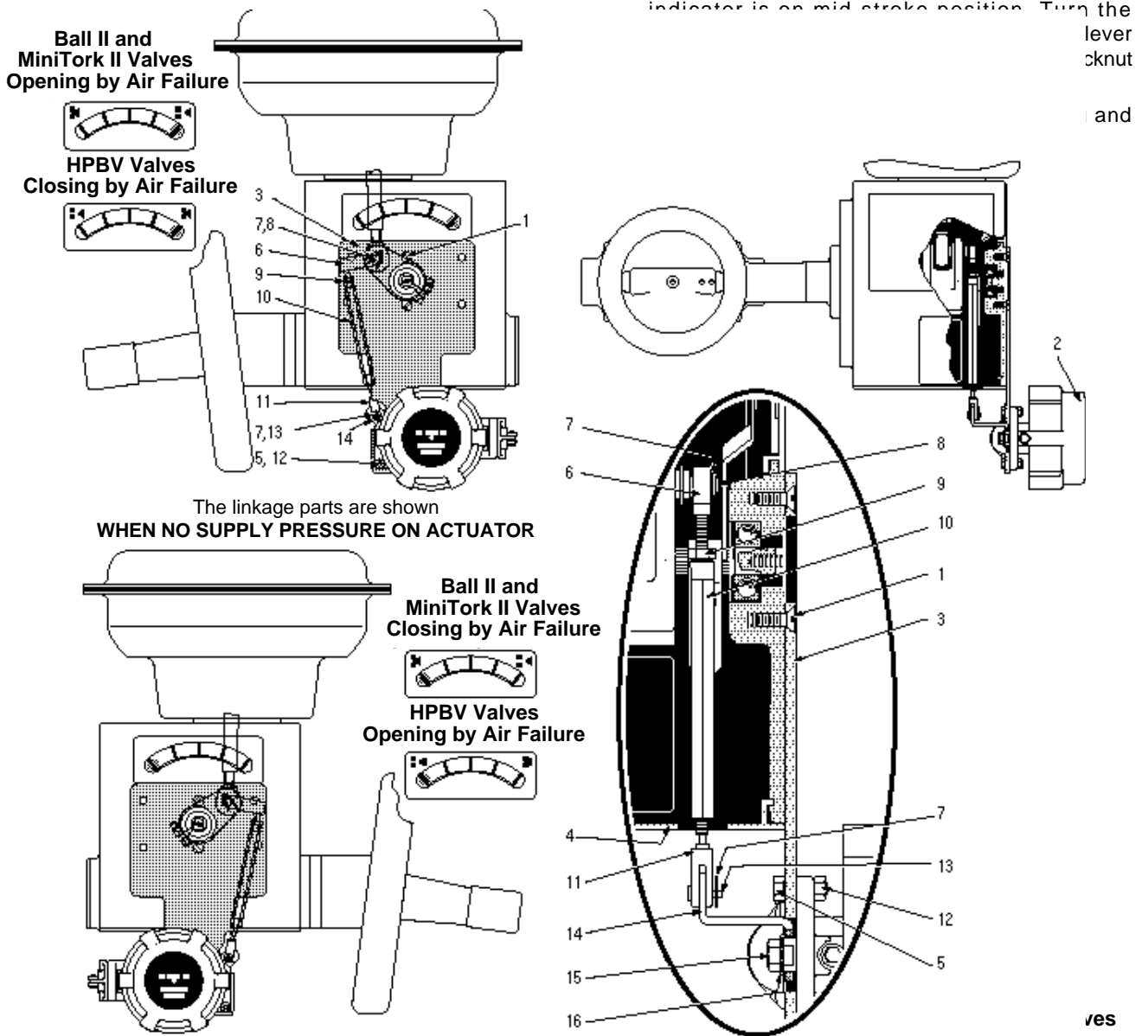
**PARTS REFERENCE**

Ref.	Part Name	Ref.	Part Name	Ref.	Part Name
1	496 Rotary Switch	8	Hex. Nut	15	Spacer (Mounting Bracket)
3	Mounting Bracket	9	Back Lever	17	Index-screw (Switch Lever)
4	Cap Screw	10	Switch Lever	18	Lock Washer
5	Lock Washer	12	Lever Pin	19	Hex. Head Screw
6	Hex. Head Screw	13	Washer	20	Link
7	Flat Head Screw	14	Retaining Clip		

**On 36002 Series Ball II, 37002 Series MiniTork II and 39002 Series HPBV Valves (Figure 5):**

1. Remove shaft cover, or if equipped with a positioner, remove positioner and mounting plate.
2. Remove plastic panels for access, bottom, front and sides.
3. Admit supply pressure on actuator until the actuator pivot pin (8) is in intermediate position, such that every load is removed from the pin.
4. Remove existing pivot pin and install special pin (8) with switch mounting pivot pin.
5. Assemble take off link (6), locknut (9) and turnbuckle (10), without tighten. Slide assembly over pivot pin (8) and push on retaining clip (7).

6. Install front cover.
7. Install mounting plate (3) using the two flat head screws (1).
8. Mount switch (2) to plate (3) using the four hex. head screws (5) and four nuts (12).
9. Assemble back lever (14) to the switch shaft using cap screw (15) and lock washer (16).
10. Replace the bottom cover (4) having proper holes.
11. Screw the clevis (11) on the turnbuckle (10). Rotate clevis to equalize the length of two engaged threaded ends.
12. Insert the clevis (11) through the proper hole of bottom cover (4) and connect to back lever (14) using clevis pin (13) and retaining clip (7).
13. Admit supply pressure on actuator until the travel indicator is in a mid-stroke position. Turn the lever clockwise until the locknut is tight and the indicator is in the mid-stroke position.



**PARTS REFERENCE**

Ref.	Part Name	Ref.	Part Name	Ref.	Part Name
1	Flat Head Screw	7	Retaining Clip	13	Clevis Pin
2	496 Rotary Switch	8	Pivot Pin (Actuator)	14	Back Lever
3	Mounting Bracket	9	Locknut	15	Hex. Head Screw
4	Bottom Cover (Actuator)	10	Turnbuckle	16	Lock Washer
5	Hex. Head Screw	11	Clevis		
6	Take Off Link	12	Hex. Nut		

**On No 37 and 38 Spring Diaphragm Actuators (Figure 6):**

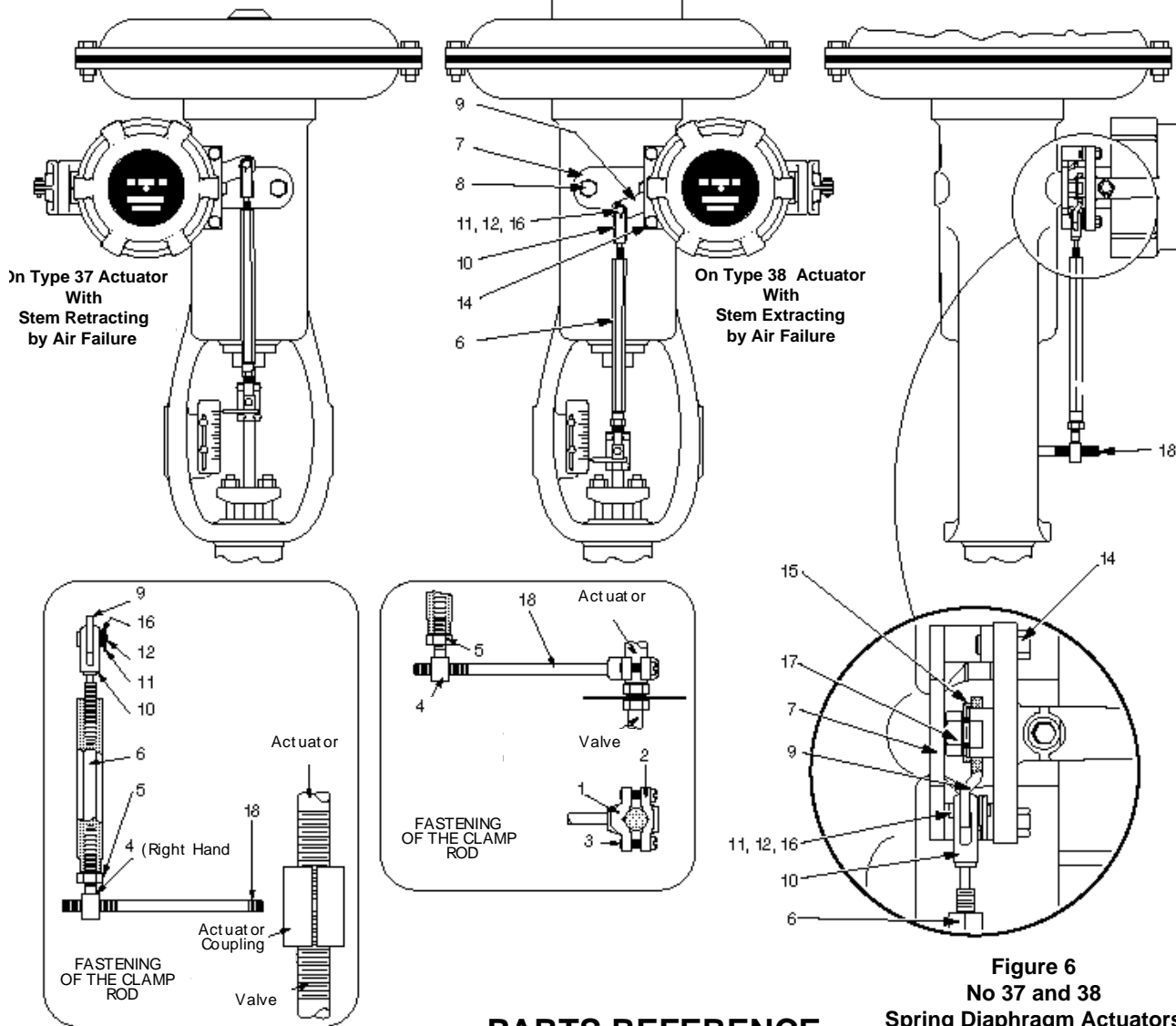
The 496 switch is rigidly mounted on the spring barrel of the diaphragm actuator by means of a bracket (7) fastened to the mounting pad with cap screws (8).

The back lever (9) is fastened to the end of the switch shaft with spring washer (15) and cap screw (17).

The turnbuckle (6) must be adjusted before adjusting the switches. Apply air pressure to the actuator until the actuator stem has traveled exactly half the rated stroke.

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The linkage parts are shown  
**WHEN NO SUPPLY PRESSURE  
ON ACTUATOR**



**Figure 6**  
**No 37 and 38**  
**Spring Diaphragm Actuators**

**PARTS REFERENCE**

Ref.	Part Name	Ref.	Part Name	Ref.	Part Name
1	Clamp	7	Mounting Bracket	14	Hex. Head Screw
2	Clamp	8	Hex. Head Screw	15	Lock Washer
3	Screw	9	Back Lever	16	Washer
4	Turnbuckle Screw	10	Clevis	17	Hex. Head Screw
5	Locknut	11	Retaining Clip	18	Clamp Rod
6	Turnbuckle	12	Clevis Pin		



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