

# Masoneilan™ 496 Series

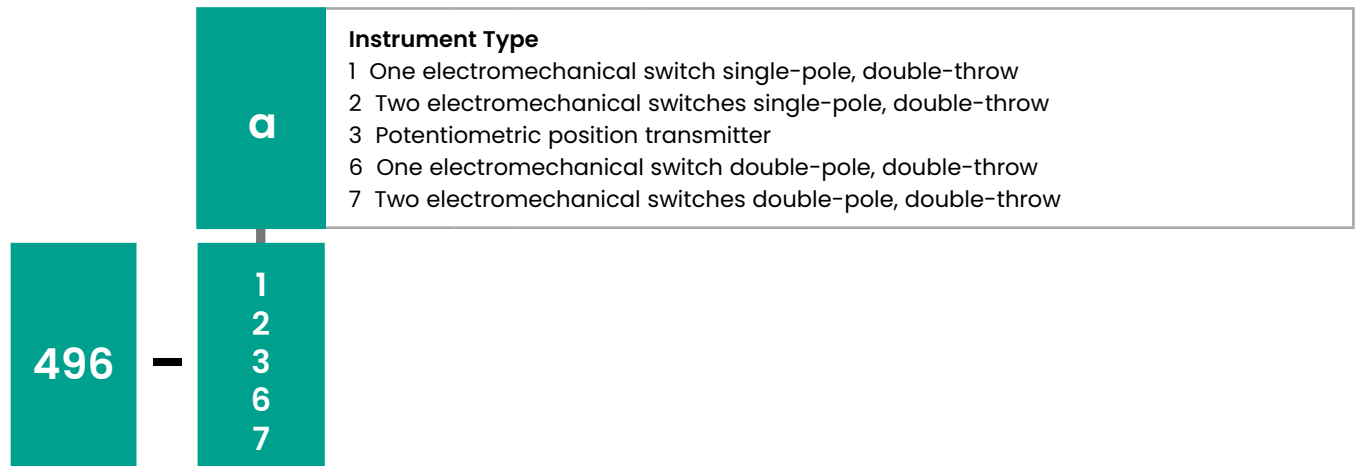
## Position Switches and Transmitters



# Numbering System

US design

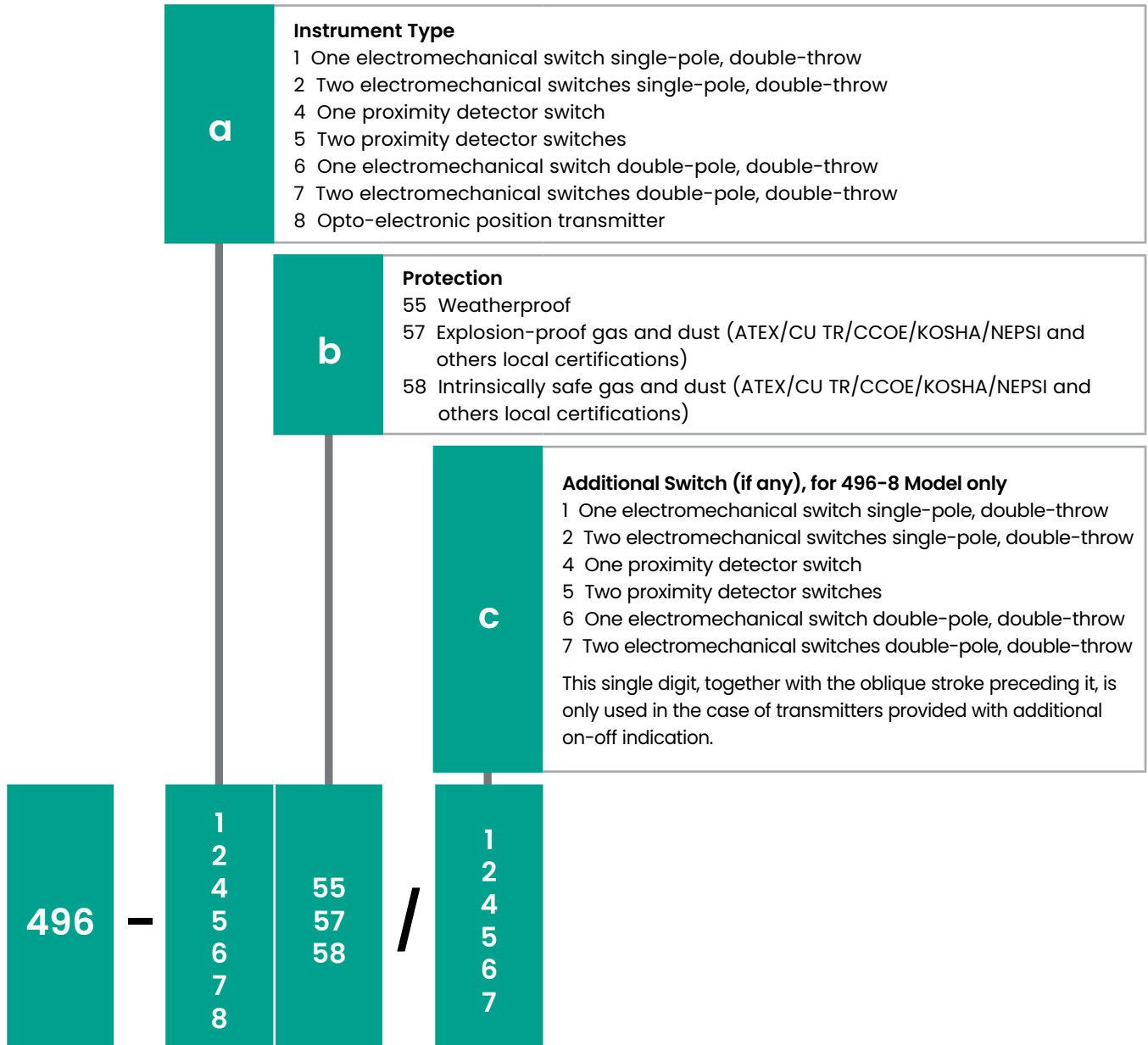
Series Identification 496-a



# Numbering System

## European design

## Series Identification 496-ab/c



Note: Among the numerous combinations mentioned above, some may not be available or have a level of protection conforming to all the standards. Consult Baker Hughes for confirmation.

# Electromechanical Switches

# 496-1 & 496-2 496-6 & 496-7

## Material

**Body and cover:** Aluminum with anti-corrosion treatment, epoxy or polyurethane painted.

Option: 316L type Stainless Steel with passivation.

**Shaft:** stainless steel.

**O-ring seals:** Buna® N.

No part made of copper or copper bearing alloy is exposed to the atmosphere.

## Stroke

**Maximum rotary travel:** 90°

**Linear travel:** 12 mm to 102 mm (1/2" – 4") through a linkage. Rotary or linear travel to be specified when ordering separate instruments.

## Electrical Data

**Microswitches:** single pole, double throw, silver plated contacts, individually actuated by an adjustable cam. One, two or four microswitches can be used.

**Ratings:** Suitable for explosionproof and weatherproof models only.

Circuit type	Voltage	Current
Resistive load	110/125 VDC	0.24 A
	220 VDC	
	24/30 VDC	1.2 A
	48 VDC	1 A
	115 VAC	
	250 VDC	
	125 VDC	10 A
28 VDC	25 A	
Inductive load	110/125 VDC	0.018 A
	220 VDC	
	24/30 VDC	0.6 A
	48 VDC	0.5 A
	115 VAC	1 A
	28 VDC	10 A
	125 VAC	
	250 VAC	
	480 VAC	
250 VAC	15 A	
Motor (US model only)	28 VDC	5 A
Lamp (US model only)	28 VDC	3 A

**Connections:** 3/4" NPT

Other connection types allowed using adaptors or reducers.

In case of separate cables requested with additional functions, a 3 outputs cable output type Y237 is available.

## Ratings

**Temperature range:** -55°C to +85°C (-67°F to +185°F), upon the type of switch. The range can be limited for used in explosible areas.

**Enclosure Rating:** IP 66 / IP 67 according to EN 60529

## Approvals

**ATEX Approvals** (2014/34/EU Directive)

**Explosionproof:**

**II 2 G/D**

- Ex db IIC T5 Gb Ta -55°C, +85°C  
Ex tb IIIC T100°C Db IP66/67 Ta\*
- Ex db IIC T6 Gb Ta -55°C, +75°C  
Ex tb IIIC T85°C Db IP66/67 Ta\*

(\*)The ambient temperatures range for the classification T6, T5 are linked to internal components. See ATEX instruction manual Ref.31058.

**Intrinsic Safety:**

Suitable for 496-1 & 496-2 models only

**II 1 GD**

- Ex ia IIC T6, T5 or T4\* Ga Tamb\*
- Ex ia IIIC T85°C or T100°C\* Da Tamb\*

(\*)The ambient and surface temperatures range for the classification T6, T5 and T4 are linked to internal components. See ATEX instruction manual Ref.31058.

## FM Approvals

**Explosionproof:**

Class I, Div 1, Groups B, C and D

**Dust Ignition:**

Class II, III, Div 1, Groups E, F and G

## CSA Approvals

Class I, Groups B, C and D

Class II, Groups E, F and G

Class III

Suitable for 496-1 & 496-2 models only

Class I, Div 2, Groups A, B, C and D

## Others Local approvals available

Please consult Baker Hughes

## Performance

**Differential gap** (percent of full scale):

Rotary valves: 1.5 percent

Linear motion valves:

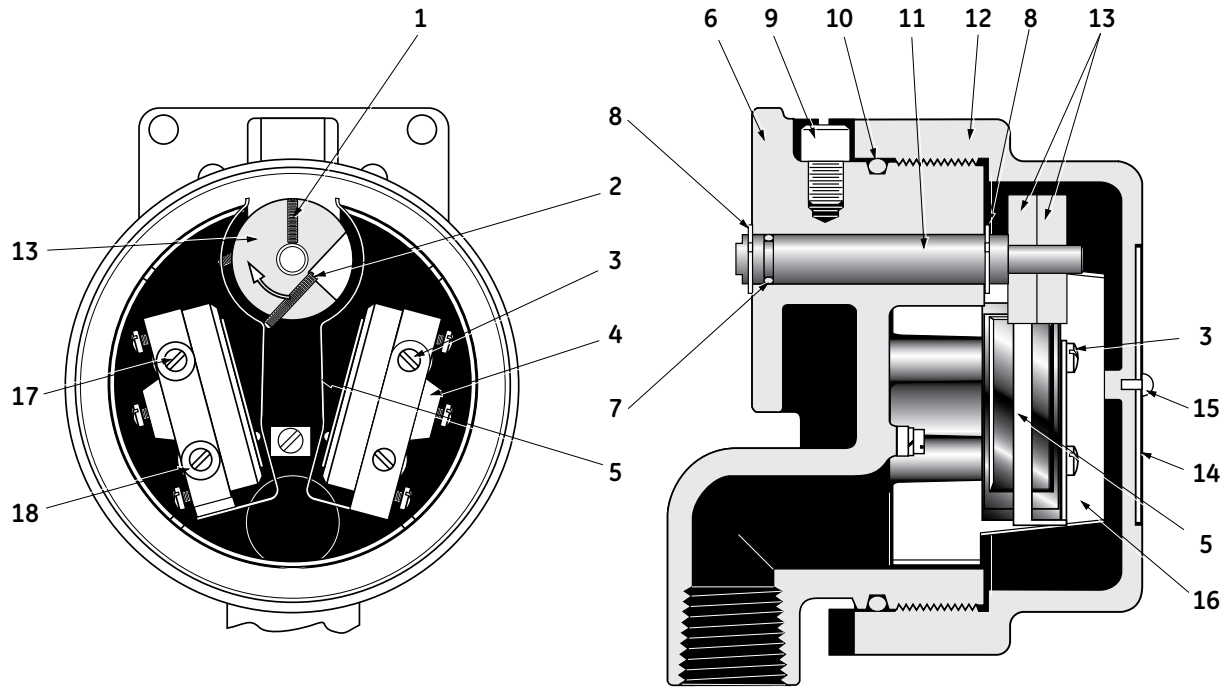
Travel	Differential gap
12 mm (1/2")	4 percent
25 mm (1")	3 percent
50 mm (2")	1.5 percent
100 mm (4")	1.5 percent

**Repeatability:** 0.2 percent

# Electromechanical Switches

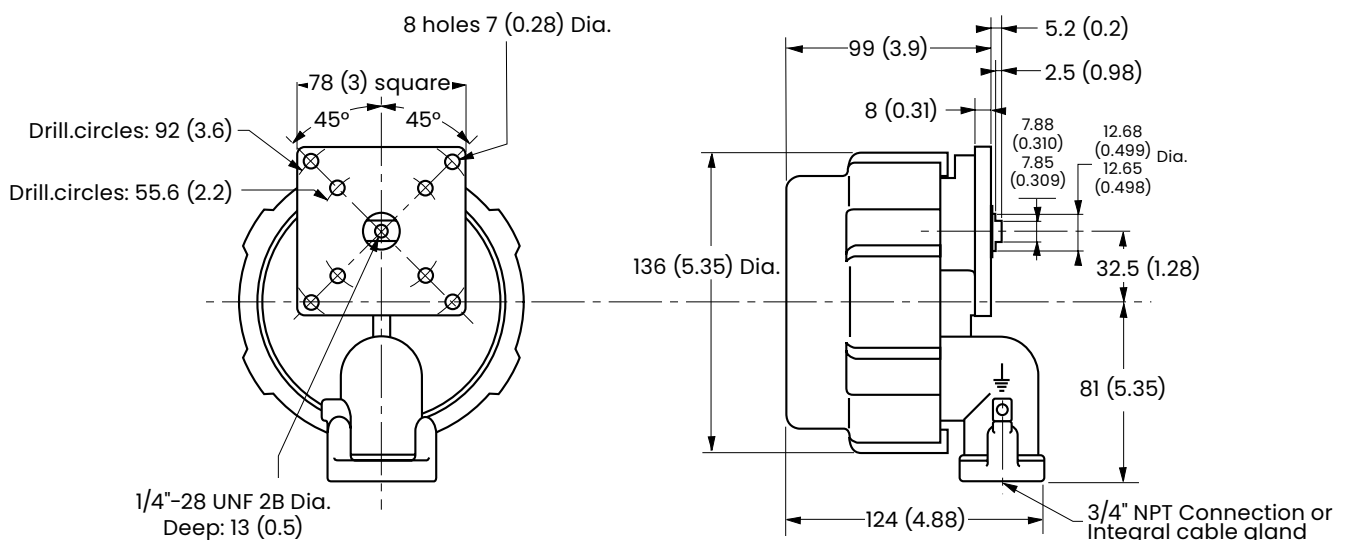
# 496-1 & 496-2 496-6 & 496-7

## Part Reference



Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name
1	Grub screw	6	Housing	11	Shaft	16	Insulator
2	Adjusting screw	7	O-Ring	12	Cover	17	Fixing screw
3	Fixing screw	8	Circlip	13	Cam	18	Washer
4	Microswitch	9	Security screw	14	Serial plate	19	Spacer (not shown)
5	Lever	10	O-Ring	15	Drive screw		

## Dimensions - mm (inches)



## Material

**Body and cover:** Anodized aluminum, epoxy or polyurethane painted.

**Shaft:** stainless steel.

**O-ring seals:** Buna® N.

No part made of copper or copper bearing alloy is exposed to the atmosphere.

## Stroke

**Maximum rotary travel:** 133°

**Linear travel:** 12 mm to 102 mm (1/2" – 4") through a linkage. Rotary or linear travel to be specified when ordering separate instruments.

**Direction of rotation:** clockwise or counter-clockwise.

## Ratings

**Temperature range:** -15°C to +40°C (5°F to +104°F)

**Enclosure Rating:** NEMA 4X

## Approvals

### FM Approvals

**Explosionproof:** Class I, Div 1, Groups B, C and D

**Dust Ignition:** Class II, III, Div 1, Groups E, F and G

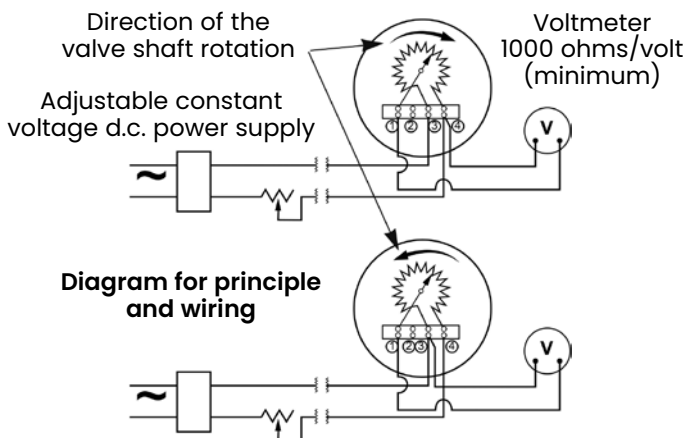
### CSA Approvals

Class I, Groups B, C and D

Class II, Groups E, F and G

Class III

## Operational Diagram



## Electrical Data

**Potentiometer:** Electrical angle: 320°

Total resistance: 1000 Ohms ±10 percent

**Voltage gain:** Variable depending on the type of valve and travel.

**Maximum supply voltage:** 30 VDC

**Connections:** The standard cable inlet is integral with the body and includes a clamping device suitable for unarmoured cables of 6 to 15 mm diameter.

3/4" NPT is available on request, with the following options:

- Threaded inlet for unarmoured cables of 15 to 17 mm diameter
- Threaded inlet for armoured cables (Consult Baker Hughes giving details of the cable dimensions)

## Performance

**Accuracy:** ±1 percent of output span, for a 50° nominal input angle, including combined effects of linearity, hysteresis and deadband.

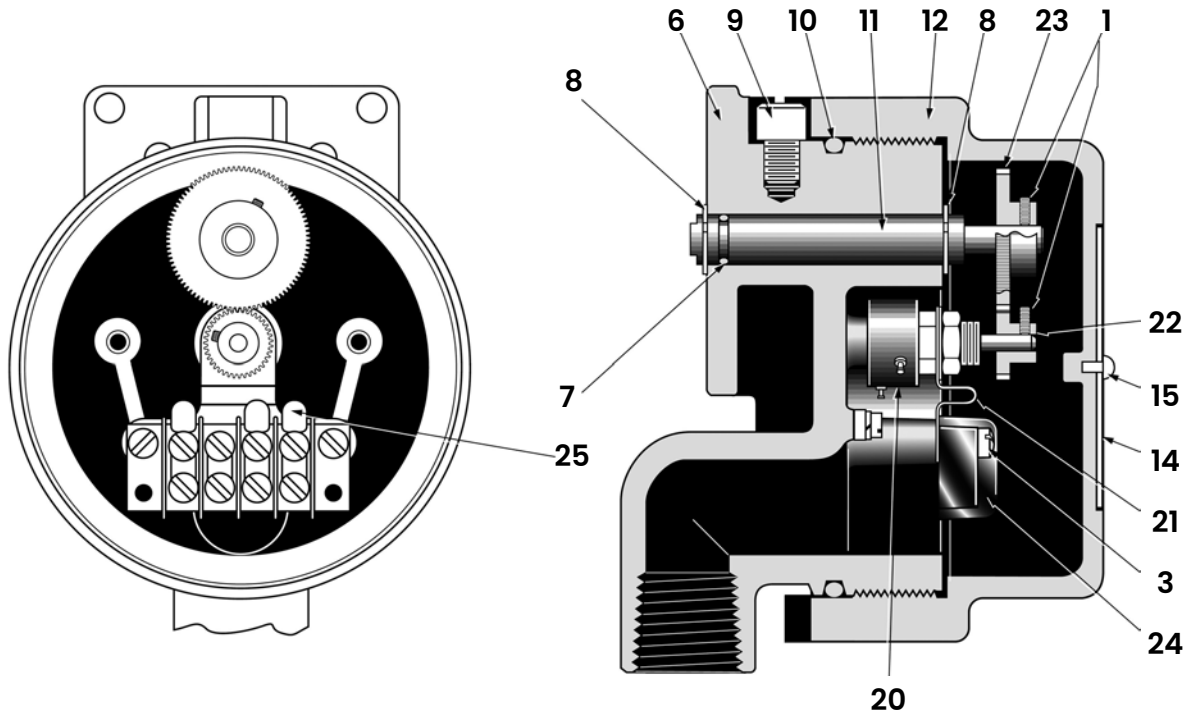
**Temperature drift:** 0.04 percent of output span per degree Celsius.

**Zero** is set by orientation of large gear on the rotary shaft from the position of the potentiometer shaft corresponding to the selected zero.

**Span** is set either by adjusting the supply voltage to the desired value or by putting an adjustable resistance into one of the supply leads of the transmitter (or of each of position transmitter if several devices are connected to a single non-adjustable power supply).

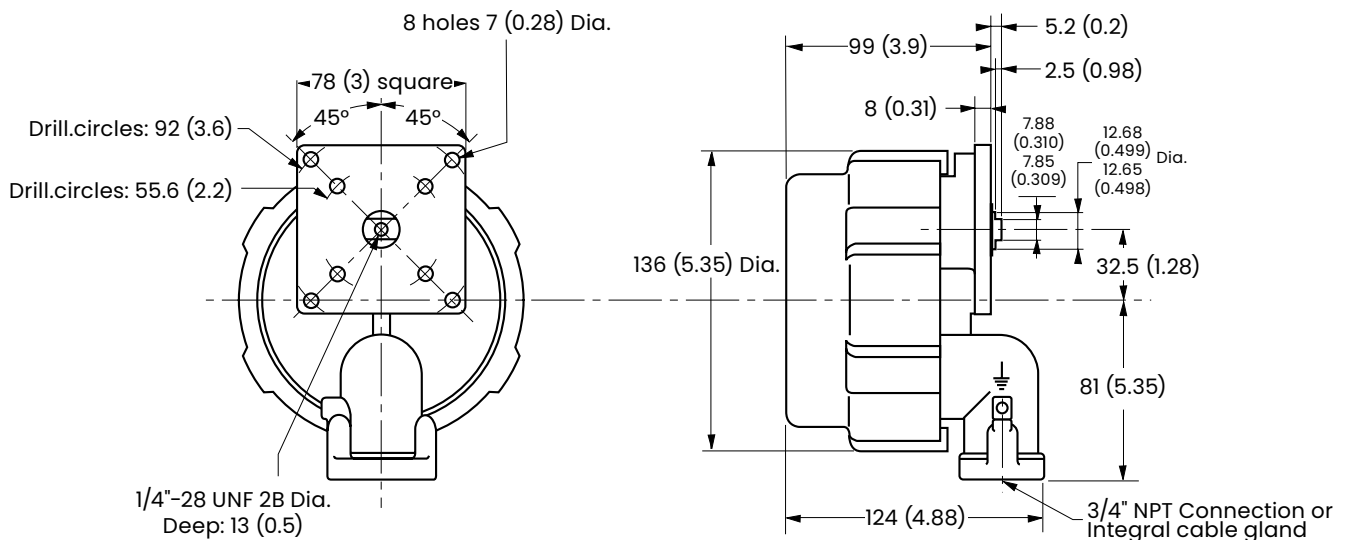
**Reversal of action** is carried out by changing over the output terminal from 3 to 4 and vice versa.

## Part Reference



Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name
1	Grub screw	9	Security screw	15	Drive screw	24	Terminal Strip
3	Fixing screw	10	O-Ring	20	Potentiometer	25	Connections
6	Housing	11	Shaft	21	Bracket		
7	O-Ring	12	Cover	22	Pinion		
8	Circlip	14	Serial plate	23	Pinion		

## Dimensions - mm (inches)



## Material

**Body and cover:** Aluminum with anti-corrosion treatment, epoxy or polyurethane painted.

Option: 316L type stainless steel with passivation.

**Shaft:** stainless steel.

**O-ring seals:** Buna® N.

No part made of copper or copper bearing alloy is exposed to the atmosphere.

## Stroke

**Maximum rotary travel:** 90°

**Linear travel:** 25 mm to 102 mm (1" – 4") through a linkage. Rotary or linear travel to be specified when ordering separate instruments.

## Ratings

**Temperature range:** upon the type of switch and the approval used.

**Enclosure Rating:** IP 66 / IP 67 according to EN 60529

## Approvals

### ATEX Approvals (2014/34/EU Directive)

#### Explosionproof:

##### II 2 G/D

- Ex db IIC T5 Gb Ta -55°C, +85°C  
Ex tb IIIC T100°C Db IP66/67 Ta\*
- Ex db IIC T6 Gb Ta -55°C, +75°C  
Ex tb IIIC T85°C Db IP66/67 Ta\*

(\*)The ambient temperatures range for the classification T6, T5 are linked to internal components. See ATEX instruction manual Ref.31058.

#### Intrinsic Safety:

##### II 1 GD or II 1 G or II 2 G

- Ex ia IIC T6, T5 or T4\* Ga Tamb\*
- Ex ia IIIC T85°C or T100°C\* Da Tamb\*

(\*)The ambient and surface temperatures range for the classification T6, T5 and T4 are linked to internal components. See ATEX instruction manual Ref.31058.

### Others Local approvals available

Please consult Baker Hughes.

## Electrical Data

**Detector:** By flux variation actuating a power relay located outside the hazardous area, by means of an oscillator and an amplifier.

One or two detectors can be used.

**Ratings:** Determined by the power relay selected, not supplied with the device.

**Connections:** 3/4" NPT

Other connection types allowed using adaptors or reducers. In case of separate cables requested by additional functions, a 3 outputs cable output type Y237 is available.

## Performance

**Differential gap** (percent of full scale):

**Rotary valves:** 1.5 percent

**Linear motion valves:**

Travel	Differential gap
25 mm (1")	3 percent
50 mm (2")	1.5 percent
100 mm (4")	1.5 percent

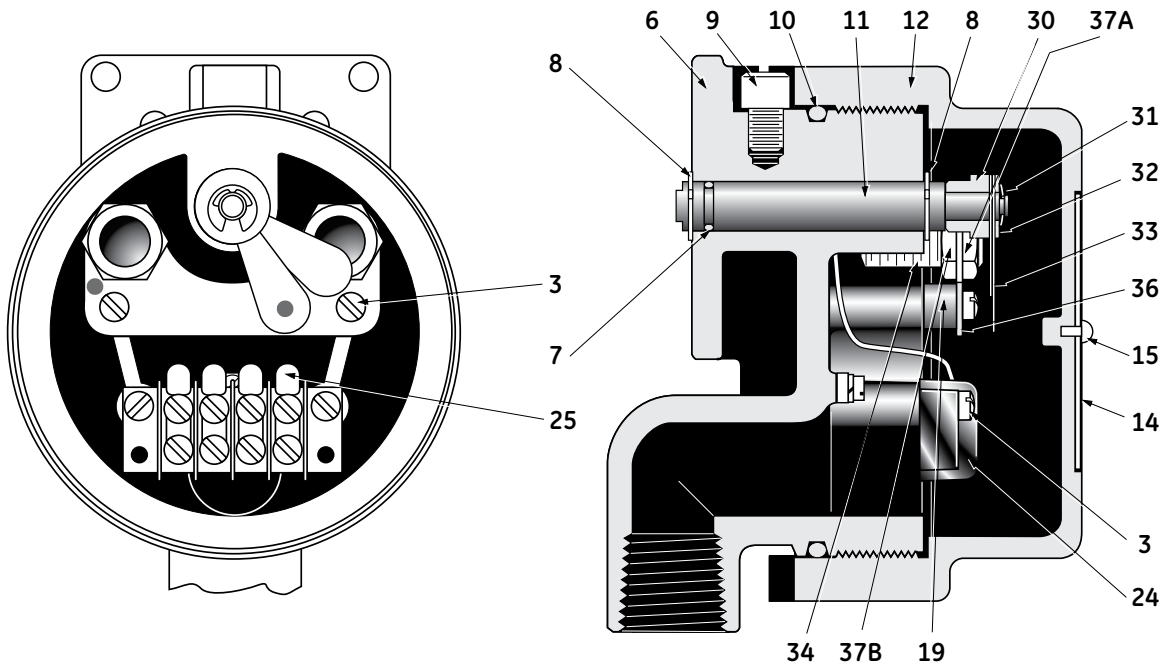
**Repeatability:** 0.3 percent



# Proximity Switches

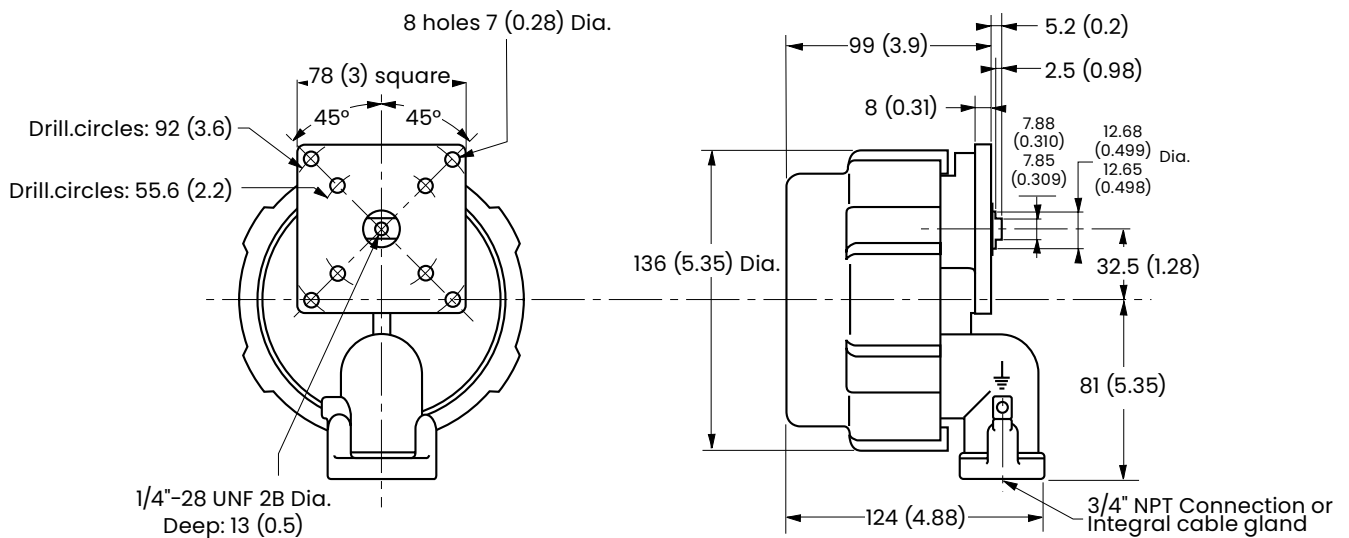
# 496-4 & 496-5

## Part Reference



Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name
3	Fixing screw	11	Shaft	25	Connections	34	Detector
6	Housing	12	Cover	29	Circlip	35	Spacer (not shown)
7	O-Ring	14	Serial plate	30	Spacer	36	Detector bracket
8	Circlip	15	Drive screw	31	Circlip		
9	Security screw	19	Spacer	32	Washer		
10	O-Ring	24	Terminal strip	33	Arm		

## Dimensions - mm (inches)



## Material

**Body and cover:** Aluminum with anti-corrosion treatment, epoxy or polyurethane painted.

Option: 316L type stainless steel with passivation.

**Shaft:** stainless steel.

**O-ring seals:** Buna® N.

No part made of copper or copper bearing alloy is exposed to the atmosphere.

## Stroke

**Rotary travel:** 25° to 90°

**Linear travel:** 12 mm to 102 mm (1/2" – 4") through a linkage. Rotary or linear travel to be specified when ordering separate instruments.

**Direction of rotation:** clockwise or counterclockwise.

## Ratings

**Temperature range:** -40°C to +80°C (-40°F to +176°F). The range can be limited for used in explosible areas.

**Enclosure Rating:** IP 66 / IP 67 according to EN 60529

## Approvals

### ATEX Approvals (2014/34/EU Directive)

#### Explosionproof:

##### II 2 G/D

- Ex db IIC T5 Gb Ta -40°C, +80°C  
Ex tb IIIC T100°C Db IP66/67 Ta -40°C, +80°C
- Ex db IIC T6 Gb Ta -40°C, +75°C  
Ex tb IIIC T85°C Db IP66/67 Ta -40°C, +75°C

#### Intrinsic Safety:

##### II 1 GD or II 1 G or II 2 G

- Ex ia IIC T6, T5 or T4 \* Ga Tamb\*
- Ex ia IIIC T85°C or T100°C\* Da Tamb\*

(\*)The ambient and surface temperatures range for the classification T6, T5 and T4 are linked to internal components. See ATEX instruction manual Ref.31058.

### Others Local approvals available

Please consult Baker Hughes.

## Performance

### Linearity:

- ≤ 0.5 percent (rotary angle from 25° to 60°)
- ≤ 0.3 percent (rotary angle from 60° to 90°)

**Hysteresis:** ≤ 0.1 percent

**Dead band:** ≤ 0.1 percent

**Repeatability:** ≤ 0.1 percent

**Accuracy:** ≤ 0.5 percent

## Accessories

The body can optionally be equipped either with one or two micro-switches or with one or two proximity detectors as described on pages 2 & 3.

## Electrical Data

### 2-wire instrument

**Output signal:** 4-20 mA

**Supply voltage:** 9 to 36 VDC (explosion-proof)  
9 to 28 VDC (intrinsic safety)

### Maximum load impedance:

1350 Ω for supply under 36 V  
950 Ω for supply under 28 V

### Zero and span settings:

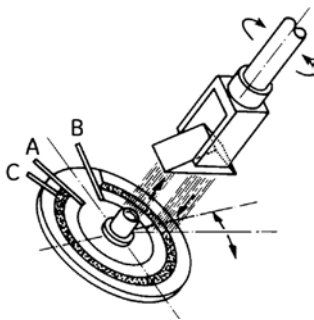
By auxiliary internal potentiometers.

**Connections:** 3/4" NPT

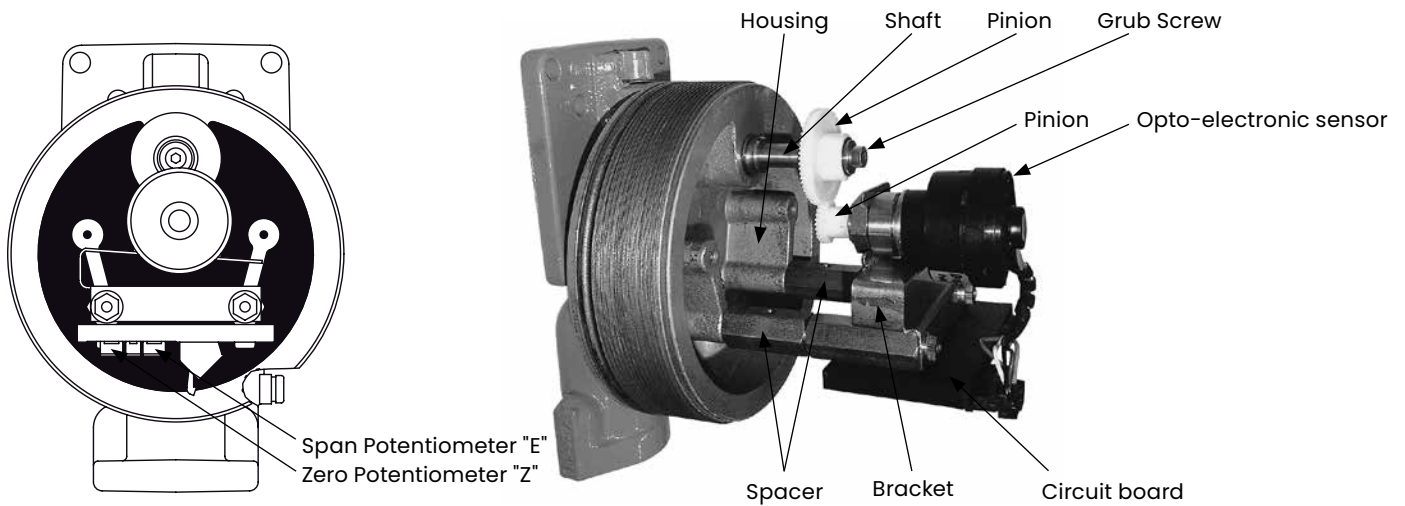
Other connection types allowed using adaptors or reducers.

In case of separate cables requested by additional functions, a 3 outputs cable output type Y237 is available.

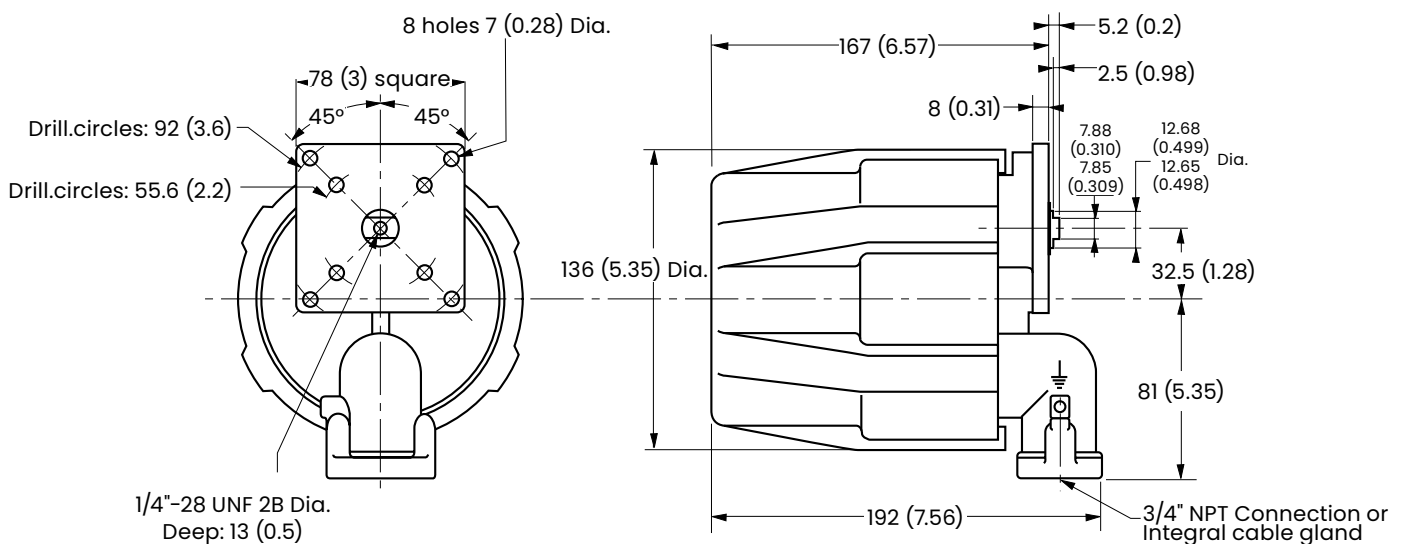
## Operational Diagram



A prism, mechanically driven by the valve plug, follows the plug displacement through a system of gears and (for a reciprocating valve) a linkage. A light beam, emitted by a LED, which is fixed to the housing, is reflected by the prism and impacts on a stationary disc. This disc is equipped with three tracks. One is resistive, another conductive, and in between is a photo-sensitive track. The light beam reflected onto the photo-sensitive track creates a bridge between the other two tracks and serves as a potentiometer slide by modulating the voltage at the point C for a supply voltage  $V_A - V_B$ . The variable voltage thus generated  $V_A - V_C$  is converted electronically to give a 4-20 mA signal. This type of detector is frictionless, non-sparking- and free from electrical noise. It is inherently intrinsically safe, insensitive to vibrations- and has an unequalled life span.



## Dimensions - mm (inches)



# Direct Sales Office Locations

## Australia

Brisbane  
Phone: +61-7-3001-4319

Perth  
Phone: +61-8-6595-7018

Melbourne  
Phone: +61-3-8807-6002

## Brazil

Phone: +55-19-2104-6900

## China

Phone: +86-10-5738-8888

## France

Courbevoie  
Phone: +33-1-4904-9000

## India

Mumbai  
Phone: +91-22-8354790

New Delhi

Phone: +91-11-2-6164175

## Italy

Phone: +39-081-7892-111

## Japan

Tokyo  
Phone: +81-03-6871-9008

## Korea

Phone: +82-2-2274-0748

## Malaysia

Phone: +60-3-2161-03228

## Mexico

Phone: +52-55-3640-5060

## Russia

Veliky Novgorod  
Phone: +7-8162-55-7898

Moscow

Phone: +7-495-585-1276

## Saudi Arabia

Phone: +966-3-341-0278

## Singapore

Phone: +65-6861-6100

## South Africa

Phone: +27-11-452-1550

## South & Central America and the Caribbean

Phone: +55-12-2134-1201

## Spain

Phone: +34-935-877-605

## United Arab Emirates

Phone: +971-4-8991-777

## United Kingdom

Phone: +44-7919-382-156

## United States

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