Masoneilan®

496 Series
Switches and Position Transmitters

Specification Data

CS 7050 E

06/03

DRESSER

Table of Contents

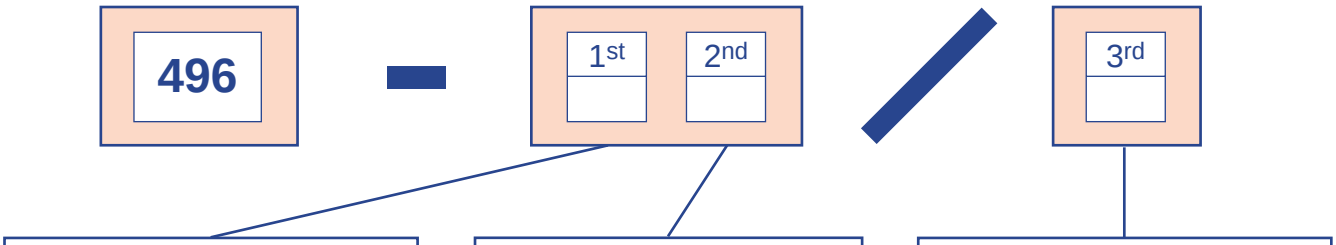
General Description

The 496 Series devices are used for indicating positions in the stroke of a control valve on which they are mounted. The detection can be either on-off (the housing is fitted with microswitches or proximity detectors) or continuous (the housing is fitted with an opto-electronic unit). Both functions, on-off and continuous, can be combined.

These devices may be mounted on rotary valves such as Camflex® II, MiniTork® II, Paramax or on linear motion valves such as the series 21000, 41005, etc... The body and cover are made of epoxy-painted anodized aluminium. 0-ring seals between the housing and cover, as well as on the rotary shaft, make these devices explosionproof, dust and water tight in accordance with ATEX Directive. Some of them are intrinsically safe (see the following pages for details). The absence of mechanical contact in the proximity detectors and the opto-electronic position transmitters ensures :

- almost complete insensitivity to vibrations and electrical interference,
- very low operating friction,
- practically infinite lifetime,
- easily achievable intrinsic safety.

Numbering System



Instrument Type

1 One electromechanical switch single pole, double throw
2 Two electromechanical switches single pole, double throw
4 One proximity detector switch
5 Two proximity detector switches
6 One electromechanical switch double pole, double throw
7 Two electromechanical switches double pole, double throw
8 Opto-electronic position transmitter

Protection

55 Weatherproof (E)
56 Weatherproof and cleaned for oxygen environment (E)
57 Explosionproof, dust tight and weatherproof (E)
58 Intrinsically safe, dust tight and weatherproof (E)

These two digits are used only for European protection standards (E)

Without indication, the instrument is explosionproof and weatherproof (US).

E = European standards
US = American standards

Additional Switch (if any)

1 One electromechanical switch single pole, double throw
2 Two electromechanical switches single pole, double throw
4 One proximity detector switch
5 Two proximity detector switches
6 One electromechanical switch double pole, double throw
7 Two electromechanical switches double pole, double throw

This single digit, together with the oblique stroke preceding it, is only used in the case of **transmitters provided with additional on-off indication.**

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

Electromechanical Switches - Specification

Materials

Body and cover : anodized aluminium, epoxy painted.
Shaft : stainless steel.
0-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 through a linkage.
Rotary or linear travel to be specified when ordering separate instruments.

Ratings

Temperature : -50°C to +80°C

Enclosure Rating :
IP 65 / IP 67 according to EN 60529

ATEX Approvals (94/9/EC Directive)

Explosionproof :
II 2 G/D EEx d IIC
T6 (Tamb. = -55°C to +70°C)
T5 (Tamb. = -55°C to +80°C)
IP 65 / IP 67 T100 (Ta +80°C)
N° INERIS 02 ATEX 0080 X

Intrinsic Safety :
Suitable for 496-1 & 496-2 models only
II 1 G EEx ia IIC
T6 (Tamb. = -55°C to +80°C)
IP 65 / IP 67
N° INERIS 02 ATEX 0023

Also available according to American standards.

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 :

Circuit type	Voltage	Current
resistive load	220 V dc	0.24 A
resistive load	48 V dc	1 A
inductive load	220 V dc	0.018 A
inductive load	48 V dc	0.5 A
inductive load	250 V ac	15 A

Refer also to the marking limitations in hazardous area.

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 :

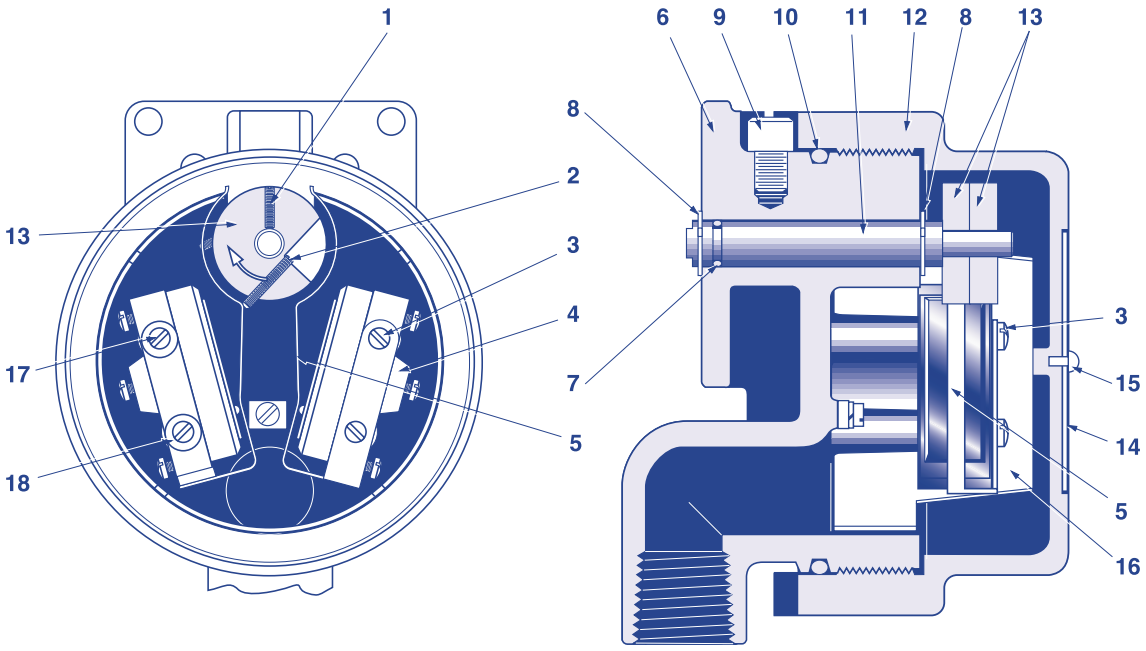
- threaded inlet for unarmoured cables of 15 to 17 mm diameter.
- threaded inlet for armoured cables (consult Masoneilan giving details of the cable dimensions).

Performance

Differential gap (% of full scale) :
Rotary valves : 1.5%
Linear motion valves :

Travel	Differential gap
12 mm	4 %
25 mm	3 %
50 mm	1.5 %
100 mm	1.5 %

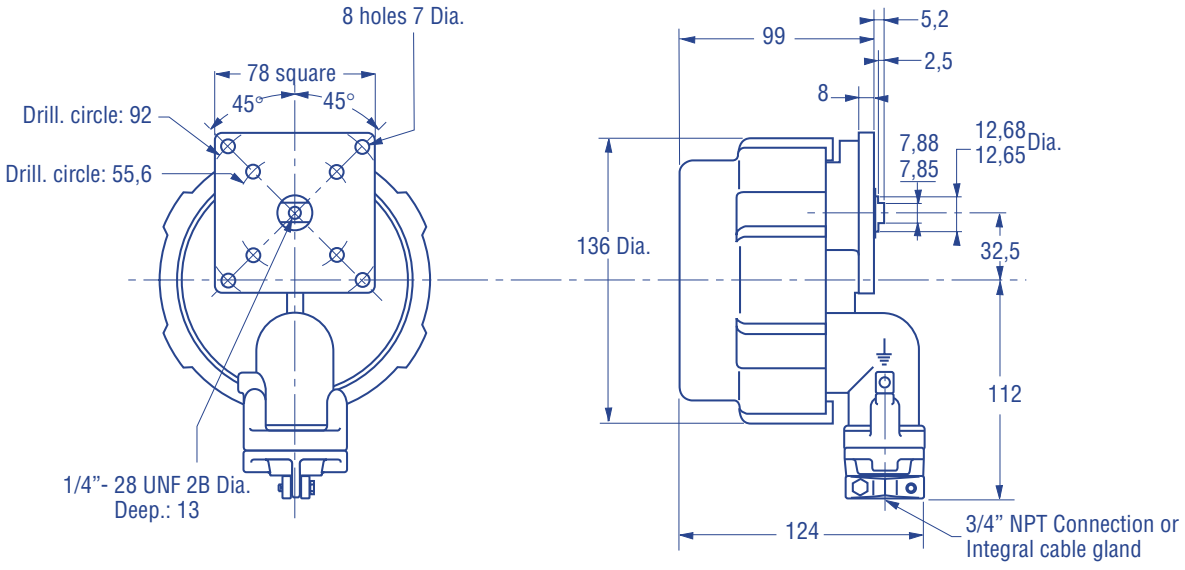
Repeatability : 0.2%



Parts 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)



Proximity Switches - Specification

Materials

Body and cover : anodized aluminium, epoxy painted.
Shaft : stainless steel.
0-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 through a linkage.
Rotary or linear travel to be specified when ordering separate instruments.

Ratings

Temperature : -25°C to +100°C

Enclosure Rating :
IP 65 / IP 67 according to EN 60529

ATEX Approvals (94/9/EC Directive)

Explosionproof :
II 2 G/D EEx d IIC
T6 (Tamb. = -55°C to +70°C)
T5 (Tamb. = -55°C to +80°C)
IP 65 / IP 67 T100 (Ta +80°C)
N° INERIS 02 ATEX 0080 X

Intrinsic Safety :
II 2 G EEx ia IIC
T6 (Tamb. = -55°C to +51°C
or +62°C)
Maximum temperature depends upon the type of proximity switch used.
IP 65 / IP 67
N° INERIS 02 ATEX 0023

Also available according to American standards.

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.

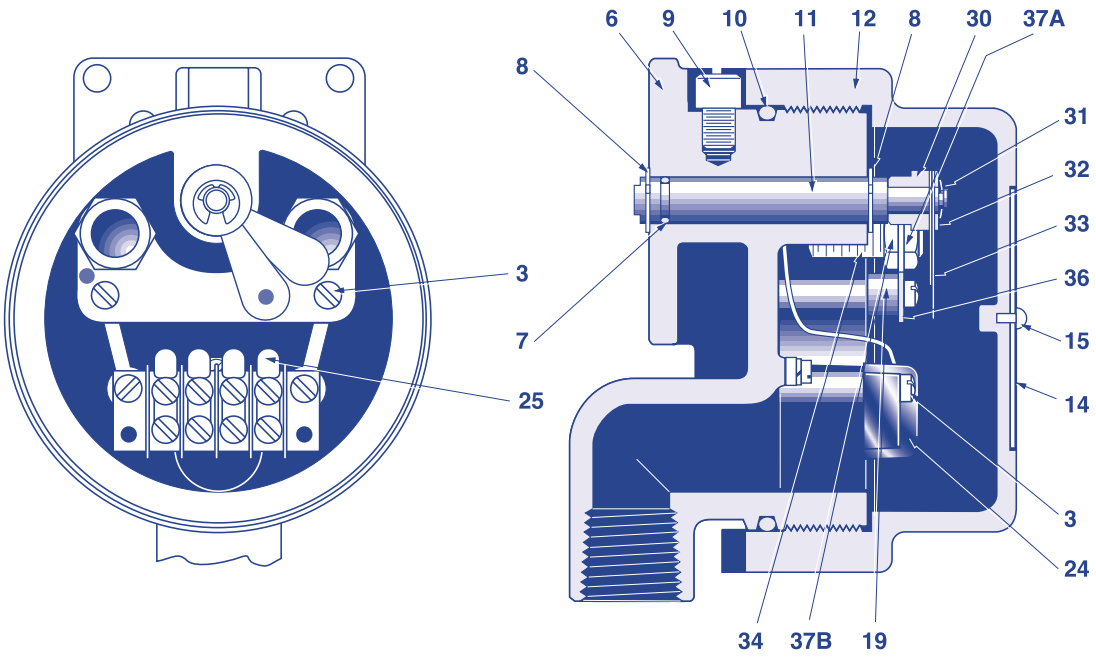
Connections : the standard cable inlet is integral with the body and includes a clamping device suitable for unarmoured cables of 6 to 15 mm diameter.
3/4" NPT is available on request, with the following options :
- threaded inlet for unarmoured cables of 15 to 17 mm diameter.
- threaded inlet for armoured cables (consult Masoneilan giving details of the cable dimensions).

Performance

Differential gap (% of full scale) :
Rotary valves : 1.5%
Linear motion valves :

Travel	Differential gap
25 mm	3 %
50 mm	1.5 %
100 mm	1.5 %

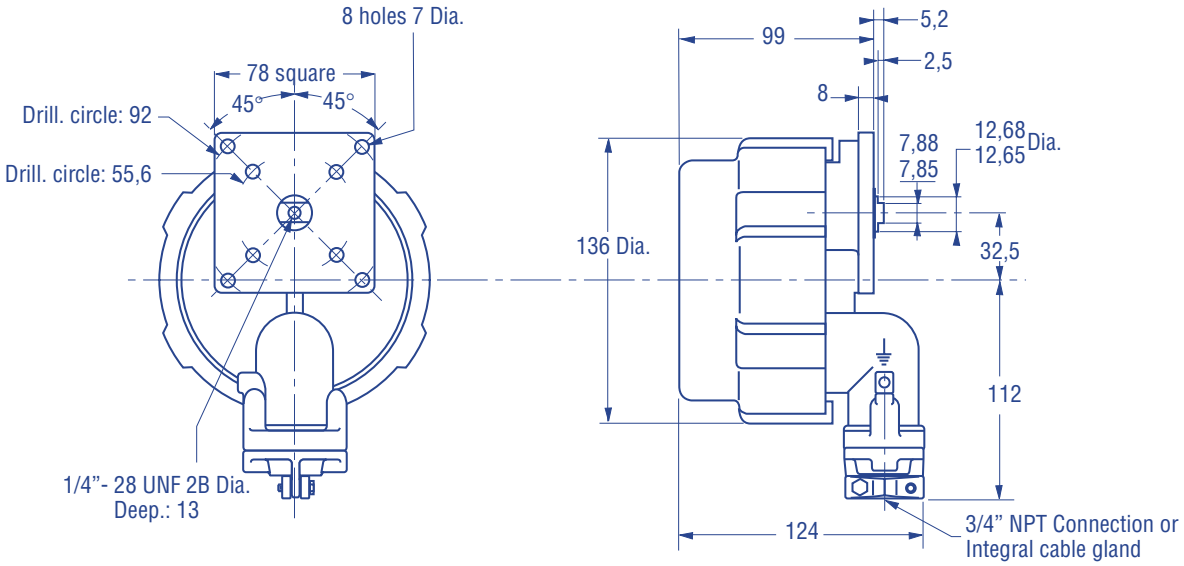
Repeatability : 0.3%



Parts 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
8	Circlip	15	Drive Screw	31	Circlip		Bracket
9	Security Screw	19	Spacer	32	Washer		
10	O-Ring	24	Terminal Strip	33	Arm		

Dimensions (mm)



Opto-electronic Position Transmitters - Specification

Materials

Body & cover : anodized aluminium, epoxy painted.
Shaft : stainless steel.
0-ring seals : Buna® N.
No part made of copper or copper bearing alloy is exposed to the atmosphere.

Stroke

Rotary travel : 25° ± 10% or 50° ± 10%
Linear travel : 12 mm to 102 mm through a linkage.
Rotary or linear travel to be specified when ordering separate instruments.
Direction of rotation : clockwise or counter-clockwise.

Ratings

Temperature : -20°C to +70°C
Enclosure Rating :
IP 65 / IP 67 according to EN 60529

ATEX Approvals (94/9/EC Directive)

Explosionproof :
II 2 G/D EEx d IIC
T6 (Tamb. = -20°C to +70°C)
IP 65 / IP 67 T85 (Ta +75°C)
N° INERIS 02 ATEX 0080 X

Intrinsic Safety :
II 1 G EEx ia IIC
T6 (Tamb. = -20°C to +70°C)
Excepted 496-858/4 and 496-858/5 models
II 2 G EEx ia IIC
T6 (Tamb. = -20°C to +51°C or +62°C)
Maximum temperature depends upon the type of proximity switch used.
IP 65 / IP 67
N° INERIS 02 ATEX 0023

Also available according to American standards.

Performance

Accuracy : ±1% of output span, for a 50° nominal input angle, including combined effects of linearity, hysteresis and deadband.
Temperature drift : 0.03% /°C of output span.

Accessories

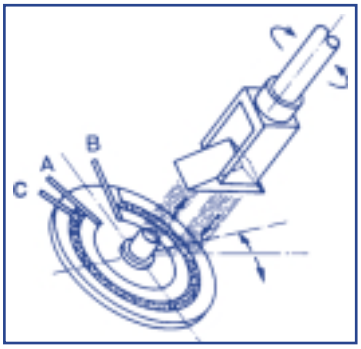
The body can optionally be equipped either with one or two microswitches or with one or two proximity detectors as described on pages 4 & 6.

Electrical Data

2-wire instrument
Output signal : 4-20 mA.
Supply voltage : 12.5 V to 40 V dc (explosionproof).
12.5 V to 28 V dc (intrinsic safety).
Maximum load impedance : 1300 Ω for supply under 40 V.
Zero and span settings : by auxiliary internal potentiometers.
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 :

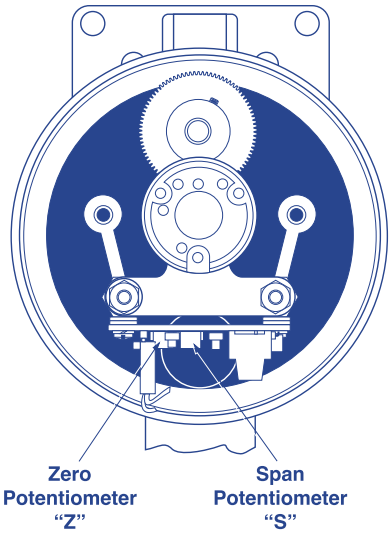
- threaded inlet for unarmoured cables of 15 to 17 mm diameter.
- threaded inlet for armoured cables (consult Masoneilan giving details of the cable dimensions).

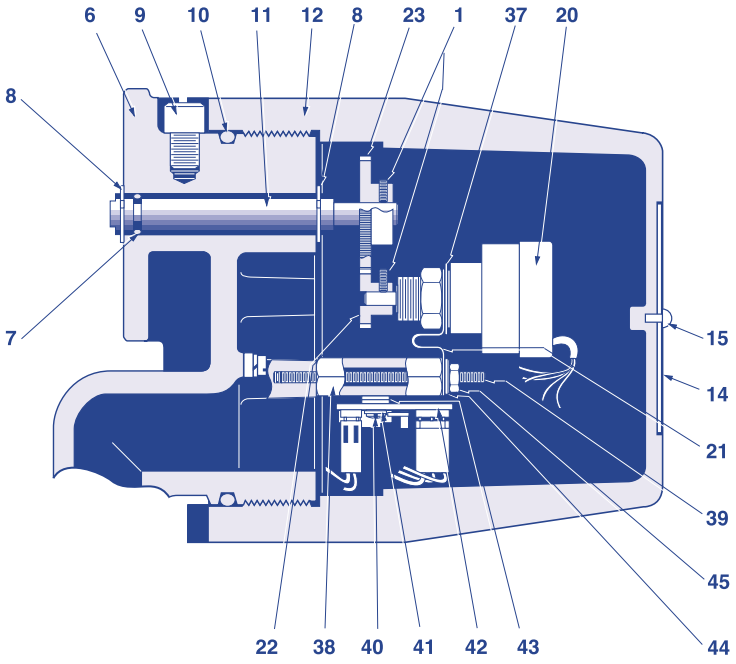
Operational diagram



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 L.E.D, 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 photosensitive track. The light beam reflected onto the photosensitive 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 lifespan.

Opto-electronic Position Transmitters

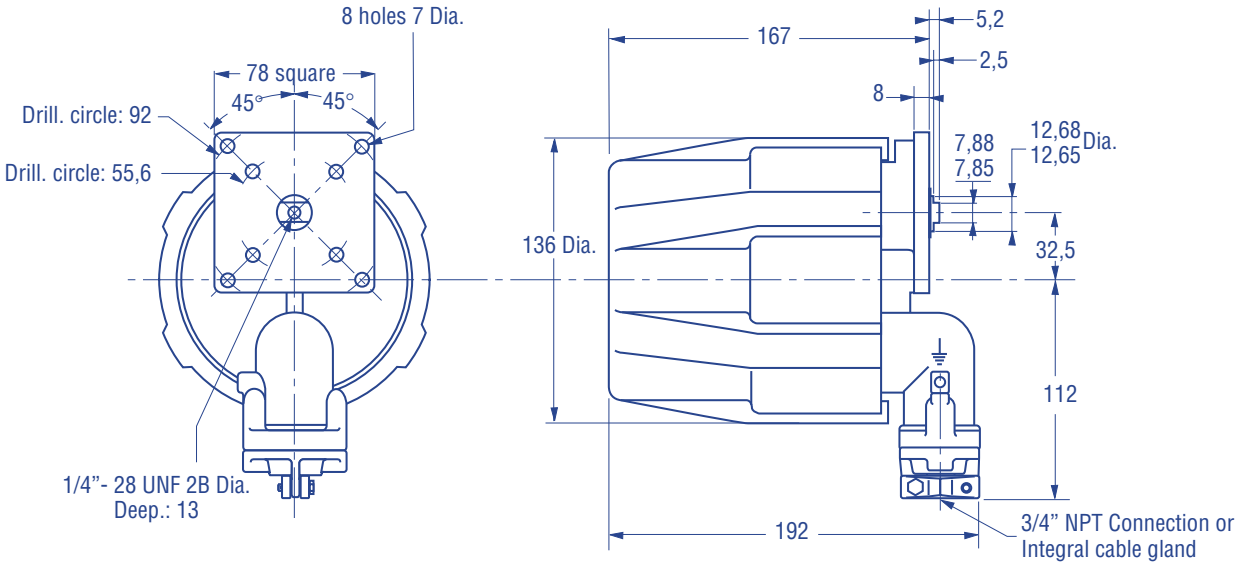




Parts Reference

Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name	Ref. N°.	Part Name
1	Grub Screw	11	Shaft	21	Bracket	40	Screw
6	Housing	12	Cover	22	Pinion	41	Lockwasher
7	O-Ring	14	Serial Plate	23	Pinion	42	Circuit Board
8	Circlip	15	Drive Screw	37	Circlip	43	Insulating Washer
9	Security Screw	20	Opto-electronic	38	Spacer	44	Washer
10	O-Ring		Device	39	Threaded Rod	45	Rod Nut

Dimensions (mm)



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