

# Position Indicating Switches

For Hydraulic and Pneumatic Cylinders

aerospace climate control electromechanical filtration fluid & gas handling hydraulics pneumatics process control sealing & shielding

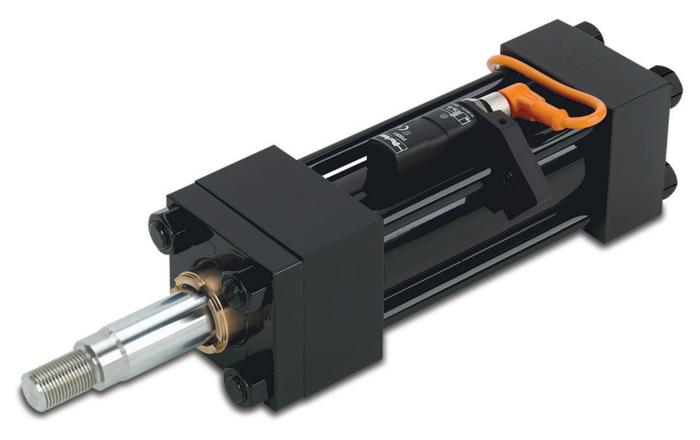


ENGINEERING YOUR SUCCESS.

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## Our New and Exclusive - ALS Switch

Position Sensing with a Magnetic Piston and Standard Steel Tube! Tie rod mounted switch available in both PNP and NPN outputs – See ALS Switch pages for details.



In line with our policy of continuing product improvement, specifications and information contained in this catalog are subject to change.

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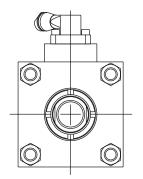


www.parker.com/cylinder WWW.COMOSO.COM Parker Hannifin Corporation Industrial Cylinder Division Des Plaines, Illinois USA

## Choose the style that's right for your needs -

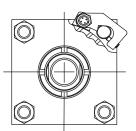
Tie Rod Mounted Switches - actuated by a magnetic piston

- Can be positioned at any location along the cylinder to indicate end-of-stroke or midstroke locations.
- Allow multiple switches to be installed with numbers only restricted by available tie rod mounting space.



Head or Cap Mounted Switch

- Are non-intrusive and maintain pressure envelope integrity.
- Available for Series 2H in 1.50" 6.00" bores. Series 3L and 2A in 1.00" - 4.00" bores.



Tie Rod Mounted Switch

## Tie rod mounted switches are lower profile than head and cap mounted styles.

#### ALS Switch -

Innovative sensor exclusive to Parker detects a magnetic piston through a *standard steel tube*. They are an economical alternative to Global Switches for long stroke applications that require a stainless steel tube.

#### Global Solid State and Reed Switches -

Require a non-ferrous tube; stainless steel material in 2H and 3L maintain standard envelope pressure rating; aluminum tube in 3L offers economy with a reduction in envelope pressure rating (see Standard Specifications).

## **Head and Cap Mounted Switches**

- Fixed mount design is actuated by proximity (without contact) of cushion sleeve or spear
- Provide an end-of-stroke signal with or without functional cushion

#### **EPS Inductive Switches –**

Are suitable for general industrial as well as automotive applications requiring weld field immunity.

• Available up to 10.00" bore Series 2A and 8.00" bore Series 3L & 3H

#### **CLS Magnetic Principal Switches –**

Are contact type switches with no leakage current and are better suited for series wiring, higher load current requirements and have higher temperature resistance.

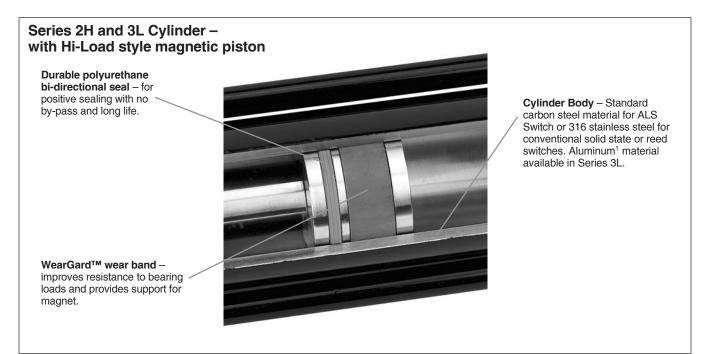


# Switches mounted on Parker hydraulic cylinders add value to your machine design

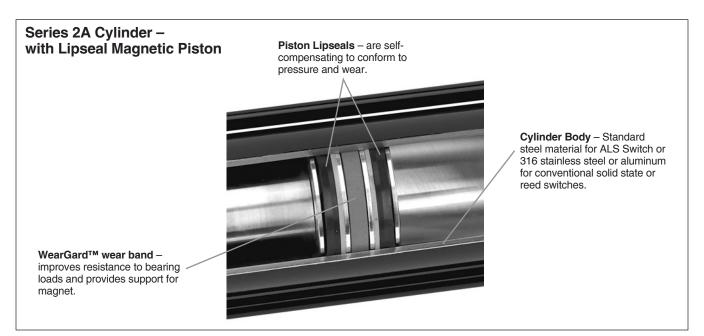
- Switches and cylinder combine to form a compact package
- Tie rod switches are easily adjustable along cylinder stroke length
- Low profile switches are less prone to mechanical damage

#### Magnetic Piston option for 1.50"-6.00" bore Series 2H and 1.00"-4.00" bore Series 3L cylinders

- Non-intrusive design eliminates the possibility of oil leakage
- Non-ferrous tube material for conventional solid state and reed switches
- Standard carbon steel tube for the ALS Switch

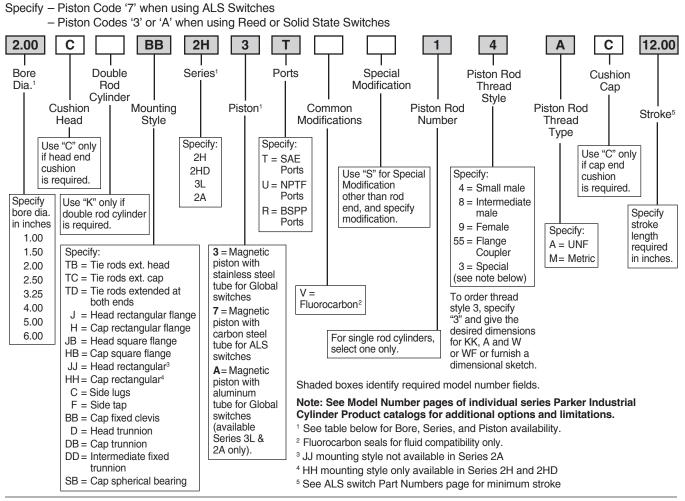


<sup>1</sup>Reduced pressure ratings apply for aluminum body in Series 3L. See Standard Specifications page for ratings by bore size.





#### Model Ordering Code for Cylinders with Magnetic Piston



#### **Standard Specifications**

- Bore diameters 1.00" to 6.00". See table below for Series, Bore, and Piston availability.
- Strokes up to 120" (Contact factory for longer strokes.)
- Piston rod diameters 0.500" to 4.000"
- Temperature range -10°F (-23°C) to +250°F (+121°C) (depending on seal class).
- · Switch position may be restricted on mounting style DD.
- · Working pressure series and tube material dependent

## Maximum Pressure Rating for 3L Cylinder with Aluminum Tube

Bore Ø	Pressure Rating (psi) <sup>6</sup>
1.00	1900
1.50	1500
2.00	1100
2.50	950 <sup>7</sup>
3.25	750
4.00	600

<sup>6</sup> When using Series 3L cylinders with aluminum bodies, do not introduce any shock or high inertia loading conditions. Pressure spikes must be avoided.

<sup>7</sup> Maximum pressure for aluminum tube in 2.50" bore with code 7 rod is 700 psi.

## 2H & 2HD – 3000 psi with either carbon steel or stainless steel tube

**3L** – 1000 psi nominal (dependent on bore size) with either carbon steel or stainless steel tube; reduced pressure with aluminum tube per table.

#### 2A - 250 psi regardless of tube material

Additional product specifications, application information and safety guidelines are available in Parker Industrial Cylinder Product catalogs.

#### Series, Bore, Piston Code Availability

Bore	Available Piston Code		
Ø	2H	3L	2A
1.00 <sup>8</sup>	None	3, A	3, A
1.50	3, 7	3, 7, A	3, 7, A
2.00	3, 7	3, 7, A	3, 7, A
2.50	3, 7	3, 7, A	3, 7, A
3.25	3, 7	3, 7, A	3, 7, A
4.00	3, 7	3, 7, A	3, 7, A
5.00	7	None	None
6.00	7	None	None

<sup>8</sup> Global Reed Switch cannot sense end of stroke on 1.00" bore. When positioned up against the head or cap approx. 0.200" stroketo-go results after switch provides output. Global Solid State switch stroke-to-go is approx. 0.030".



## ALS Switch

- For magnetic piston sensing through steel tube material
- Cost effective alternative to stainless steel tube for longer strokes
- 4 wire DC connection

#### Switch Operation

The switch detects a change in polarity of the magnetic field as a piston with magnet moves through the cylinder.

#### Formatting

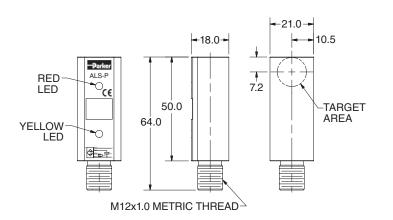
Before the switch is used for the first time, the piston with magnet should be run in and out of the cylinder to format the cylinder tube. The switch will detect the polarity of the residual magnetic field created by the movement of the magnetic piston during formatting.

#### **Field Direction with Magnetic Piston**

Single rod end cylinders are assembled with the piston magnet's North Pole facing the rod end. As the magnetic piston moves through the cylinder, it creates a stronger field opposite in polarity to the residual magnetism in the cylinder tube. As it moves under the switch, the change in polarity of the magnetic field in the cylinder tube is detected.

#### Switch Zone

Switch actuation occurs as the piston enters a switching 'zone'. The switching point is highly repeatable, in either direction, under conditions of constant piston speed and operating temperature.



ALS Switch output states may be influenced by an external magnetic field. Care must be taken to avoid external magnetic field exposure.

- PNP and NPN versions can be wired N.O. or N.C.
- The ALS Switch is not designed for use with non-ferrous tubes

The switching zone may be up to 21mm wide depending on tube wall thickness and piston speed.

#### **LED Indicators**

There are two LED's (yellow and red) to indicate that the piston is inside or outside the switching zone. The sequence of the LED's is determined by the orientation of the north pole of the magnet system (rod end side of single rod end cylinders) to the connector.

When the ALS switch connector faces the rod side of single rod end cylinders the red LED turns ON when the piston is within the switching zone. The yellow LED is ON otherwise.

When the ALS switch connector faces the cap side of single rod end cylinders the yellow LED turns ON when the piston is within the switching zone. The red LED is ON otherwise.

#### Performance

Specifications

Parker Industrial Cylinder Division ALS Switches have been designed to operate at a maximum piston speed of 0.5m/s, and a maximum cylinder operating temperature of 85°C.

Switching Output:	PNP or NPN
Hysteresis <sup>1</sup> :	5mm
Repeatability <sup>1</sup> :	0.5mm
Load Current:	100mA
Leakage Current:	<u>≺</u> 10µA
Voltage Drop:	≤ 1.5 VDC
Short Circuit and Overload Protection:	Yes
Reverse Polarity Protection:	Yes
Supply Voltage:	10 - 30 VDC
LED(s):	Yes (2)
Current Consumption:	<u>&lt;</u> 30 mA
Operating Temperature Range:	-25°C to +85°C (-13°F to +185°F)
Housing Material:	Black Polyamide (PA)
Enclosure Rating:	IP67
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<sup>1</sup>Hysteresis and repeatability based on measurements with a cylinder outer diameter of 46mm, wall thickness of 3mm and piston speed of 0.5m/s.





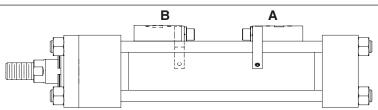
## **ALS Switch**

Because the ALS switch detects change in polarity as the magnet moves through the cylinder, wiring connections are dependent on switch mounting orientation to the magnet's North Pole. The two possible orientations are:

- A connector facing toward the rod end (rod end 1 if K-type)
- B connector facing toward the cap end (rod end 2 if K-type)

#### **Switch Orientations**

Connections to Pin 1 (+VDC) and Pin 3 (-VDC) are the same for either switch orientation. But, as outlined in the table and wiring schematic diagrams below, the normal output state of Pins 2 & 4 flip between mounting orientations A & B. Note that to sense the fully retracted position of the cylinder the cap end switch must be mounted in orientation A, and to sense the fully extended position of the cylinder the rod end switch must be mounted in orientation B.

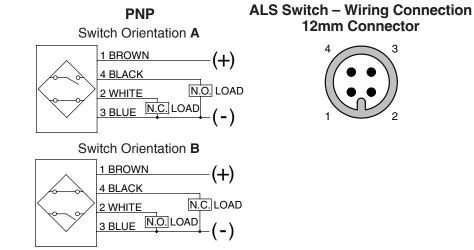


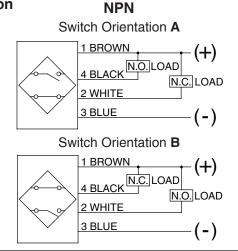
**Example:** An application requires that ALS switches sense the full retract and extend positions of the cylinder with normally closed logic at both ends. How would the switches be wired?

**Answer:** The two switches would not be installed or wired the same way. The cap end switch would be installed in orientation A with Pin 1 (+VDC), Pin 2 (Load), Pin 3 (-VDC), Pin 4 (not used). The rod end switch would be installed in orientation B with Pin 1 (+VDC), Pin 2 (not used), Pin 3 (-VDC), Pin 4 (Load).

#### LED Function and Pin Wiring

Switch Mounting	Facing	nector Toward	LED indicator (on/off) when magnet is:		Pin	Wire	Function				
Orientation	Single Roa	Double Rod	Out of S	Out of Switch Zone		ne In Switch Zone					
	Cylinder	Cylinder	Red	Yellow	Red	Yellow					
							1	Brown	+VDC		
٨	Rod End	Rod End #1	off	off on		<b>~</b> "	2	White	N.C.		
A	Rou Ena				on	off	3	Blue	-VDC		
							4	Black	N.O.		
							1	Brown	+VDC		
В	Con End	Dod End #0	on		n off off	on off off on			2	White	N.O.
В	Cap End	Rod End #2		on on			on	3	Blue	-VDC	
							4	Black	N.C.		





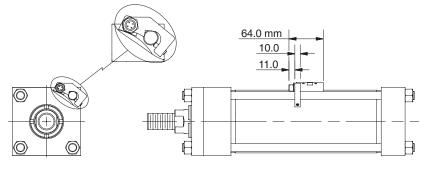


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#### **ALS Switch Part Numbers**

All switches are packaged with tie rod mounting bracket and have a 4-pin male M12x1 threaded connector.

Part Number		Switch Bracket Usage
PNP	NPN	
ALS-PL	ALS-NL	Series 3L & 2A 1.50 – 4.00 Bore
ALS-PH	ALS-NH	Series 2H 1.50 – 4.00 Bore
ALS-PHA	ALS-NHA	Series 2H 5.00 - 6.00 Bore



Note: Specify piston code '7' in cylinder model number when using ALS Switches.

#### **Minimum Stroke for ALS Switch**

Bore Ø	3L & 2A	2H		
1.50	3.13	3.00		
2.00	3.13	3.00		
2.50	3.13	2.88		
3.25	3.13	2.75		
4.00	3.13	2.63		
5.00	N/A	2.38		
6.00	N/A	2.19		

ALS Switches allow a .38 - .50 inch stroke-to-go piston travel for end-of-stroke mounting locations.

### 12mm Cordset for ALS & Global Switches

12mm Cordset with Female Quick Connect

M12 Straight Connector			
Cable Length	Part Number		
5 meters	9126487205		
2 meters 9126487202			

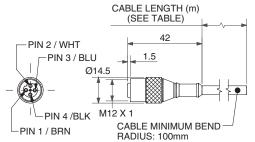
A female connector is available for all switches with the male 12mm quick connect option. The cordsets are available with a right angle or straight connector. Cordset part numbers are listed above.

### **Cordset Specifications**

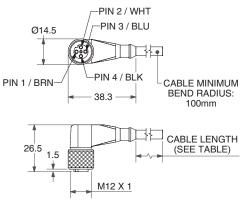
Connector Polyvinylchloride (PVC) body material, PVC contact carrier, spacing to VDE 0110 Group C, (250VAC / 300VDC)
Contacts Gold Plated Copper Tin (CuSn), stamped from stock.
Coupling Method Threaded nut: Chrome plated brass.
Cord Construction PVC non-wicking, non-hygroscopic 250VAC / 300VDC. Cable end is stripped.
Conductors Extra high flex stranding with PVC insulation
Temperature13°F to 158°F (-25°C to 70°C)
Protection NEMA 1, 3, 4, 6P and IEC 1P67
Cable Length 6.56 ft (2m) or 16.4 ft (5m)

M12 Right Angle Connector		
Cable Length Part Number		
5 meters	9126487305	
2 meters	9126487302	

#### **Straight Connector**



#### **Right Angle Connector**





Notes



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## Global Drop-In Solid State Switches ( ( UL)

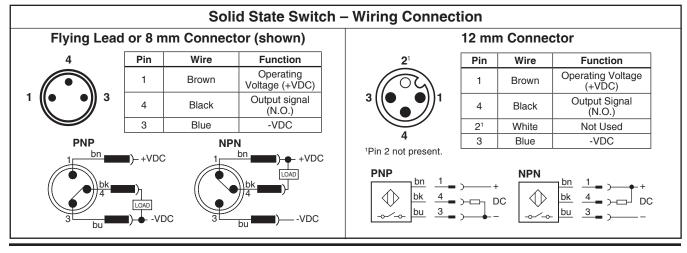
Wiring	PNP Switch	NPN Switch	PNP Switch ATEX Certified	PNP Switch High Temperature
3m Flying Leads	P8S-GPFLX	P8S-GNFLX	P8S-GPFLX/EX1	P8S-GPFLH <sup>2</sup>
10m Flying Leads	P8S-GPFTX	P8S-GNFTX		
0.3m Lead with 8mm Connector	P8S-GPSHX	P8S-GNSHX	N/A	N/A
0.3m Lead with 12mm Connector	P8S-GPMHX	P8S-GNMHX		IN/A
1m Lead with 8mm Connector	P8S-GPSCX	P8S-GNSCX		

<sup>1</sup> ATEX switch is supplied with 2m Flying Leads. <sup>2</sup> High Temperature switch is not UL Listed.

#### Specifications

Switch Classification	Standard PNP or NPN	ATEX Certified PNP	High Temperature PNP
Туре	Electronic	Electronic	Electronic
Output Function	Normally Open	Normally Open	Normally Open
Switch Output	PNP/NPN	PNP	PNP
Operating Voltage	10 - 30VDC	18 - 30VDC	10 - 30VDC
Continuous Current	100 mA max.	70 mA max.	200 mA max.
Response Sensitivity	28 Gauss min.	28 Gauss min.	25 Gauss
Switching Frequency	5 KHz	1 KHz	10 KHz
Power Consumption	10 mA max.	10 mA max.	15 mA max.
Voltage Drop	2.5 VDC max.	2.5 VDC max.	3.1 VDC max.
Ripple	10% of Operating Voltage	10% of Operating Voltage	15% of Operating Voltage
Hysteresis	1.5 mm max.	1.5 mm max.	1.5 mm max.
Repeatability	0.1 mm max.	0.1 mm max.	0.1 mm max.
EMC	EN 60 947-5-2	EN 60 947-5-2	EN 60 947-5-2
Short-circuit Protection	Yes	Yes	Yes
Power-up Pulse Suppression	Yes	Yes	Yes
Reverse Polarity Protection	Yes	Yes	Yes
Enclosure Rating	IP68	IP68	IP67
Shock and Vibration Stress	30g, 11 ms, 10 to 55Hz, 1 mm	30g, 11 ms, 10 to 55Hz, 1 mm	30g, 11 ms, 10 to 55Hz, 1 mm
Operating Temperature Range	-25°C to +75°C (-13°F to +167°F)	-20°C to +45°C (-4°F to +113°F)	-25°C to +105°C (-13°F to +221°F)
Housing Material	PA 12 Black	PA 12 Black	Aluminum
Connector Cable	PVC	PVC	PUR
Connector	PUR		-
Approval for ATEX	-	3D/3G	-

Global solid state switch outputs may be influenced by an external magnetic field. Care must be taken to avoid external magnetic field exposure.





Parker Hannifin Corporation Industrial Cylinder Division Des Plaines, Illinois USA

## Hydraulic and Pneumatic Cylinders **Position Indicating Switches**

L = 300

Sensing Face Center

000

**Reed Switch – Wiring Connection** Flying Lead or 8 mm Connector

Wire

Brown

Black

Blue

Wire

Brown

White

Blue

Black

12 mm Connector

Pin

1

4

3

Pin

1

2<sup>2</sup>

3

4

3

<sup>1</sup>8mm connector rated for 50 VAC max.

14

Function Operating

Voltage (+V)

Not Used

**Output Signal** 

(-V or Ground)

Function Operating Voltage (+V)

Not Used

**Output Signal** 

(-V or Ground)

Not Used

31.5

36

4.3

#### ( E (\u03cb) **Global Drop-In Reed Switches**

Wiring	Reed Switch
3m Flying Leads	P8S-GRFLX
10m Flying Leads	P8S-GRFTX
0.3m Lead with 8mm Connector	P8S-GRSHX
0.3m Lead with 12mm Connector	P8S-GRMHX
1m Lead with 8mm Connector	P8S-GRSCX

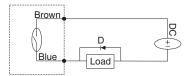
### Specifications

Туре	2-Wire Reed
Output Function	Normally Open
Operating Voltage	
	10 - 30 VDC
Switching Power	6 W/VA
Continuous Current	100 mA max.
Response Sensitivity	30 Gauss min.
Switching Frequency	400 Hz
Voltage Drop	2.5 V max.
Ripple	10% of Operating Voltage
Hysteresis	1.5 mm max.
Repeatability	0.2 mm max.
EMC	EN 60 947-5-2
Reverse Polarity Protection	Yes
Enclosure Rating	IP 68
	30g, 11 ms, 10 to 55 Hz, 1 mm
	25°C to +75°C (-13°F to 167°F)
Housing Material	PA 12, Black
Connector Cable	PVC
Connector	PUR cable with 8 or
	12 mm connector

Global Reed Switch output may be influenced by external magnetic fields. Care must be taken to avoid external magnetic field exposure. See Parker Industrial Cylinder Catalogs and Cylinder Safety Guide 0800.01-T1 for additional product application information.

#### Circuit for Switching Contact Protection (Inductive Loads) (Required for proper operation 24V DC)

Put Diode parallel to loads following polarity as shown below.



D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

Typical Example—100 Volt, 1 Amp Diode CR: Relay coil (under 0.5W coil rating)

#### A Caution

- Use an ampmeter to test reed switch current. Testing devices such as incandescent light bulbs may subject the reed sensor to high in-rush loads.
- NOTE: When checking an unpowered reed switch for continuity with a digital ohmmeter the resistance reading will change from infinity to a very large resistance (2 M ohm) when the sensor is activated. This is due to the presence of a diode in the reed switch.
- Anti-magnetic shielding is recommended for reed switches exposed to high external RF or magnetic fields.
- The magnetic field strength of the piston magnet is designed to operate with our switches. Other manufacturers' switches may not operate correctly in conjunction with these magnets.
- Use relay coils for reed switch contact protection.

### (Recommended for longer life 120 VAC)

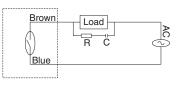
Put a resistor and capacitor in parallel with the load. Select the resistor and capacitor according to the load.

#### **Typical Example:**

CR: Relay coil (under 2W coil rating) R: Resistor 1 K $\Omega$  - 5 K $\Omega$ , 1/4 W

<sup>2</sup>Pin 2 not present.

- Capacitor 0.1 ΩF, 600 V C:

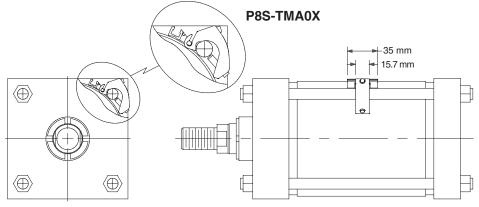


- The operation of some 120 VAC PLC's (especially some older Allen-Bradley PLC's) can overload the reed switch. The switch may fail to release after the piston magnet has passed. This problem may be corrected by the placement of a 700 to 1K OHM resistor between the switch and the PLC input terminal. Consult the manufacturer of the PLC for appropriate circuit.
- Switches with long wire leads (greater than 15 feet) can cause capacitance build-up and sticking will result. Attach a resistor in series with the reed switches (the resistor should be installed as close as possible to the switches). The resistor should be selected such that R (ohms) >E/0.3.
- Global reed switch outputs may be influenced by an external magnetic field. Care must be taken to avoid external magnetic field exposure.



#### **Tie Rod Bracket Assembly Part Number and Dimensions**

Global switch bracket fits 1.00" - 4.00 bore cylinders. Global switches and bracket assembles must be ordered separately.



#### Cordsets - 8mm Cordset for Global Switches 8mm Cordset with Female Quick Connect

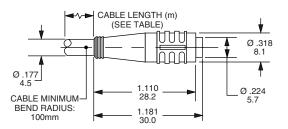
A female connector is available for all sensors with the male 8mm quick connect option. The male plug will accept a snap-on or threaded connector. Cordset part numbers are listed below.

Cable Length	Threaded Connector	Snap On Connector
5 meters	086620T005	086620S005
2 meters	086620T002	086620S002

### **Cordset Specifications**

Connector	Oil resistant polyurethane body material, PA 6 (Nylon) contact carrier, spacings to VDE 0110 Group C, (150 AC/DC)
Contacts	Gold plated beryllium copper, machined from solid stock
Coupling Method	Snap-Lock or chrome plated brass nut
Cord Construction	Oil resistant black PUR jacket, non- wicking, non-hygroscopic, 300V. Cable end is stripped and tinned.
Conductors	Extra high flex stranding, PVC insulation
Temperature	40 to 194°F (-40 to 90°C)
Protection	NEMA 1, 3, 4, 6P and IEC 1P67
Cable Length	6.56 ft (2m) or 16.4 ft (5m)

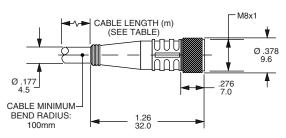
#### **Snap-On Straight Connector**



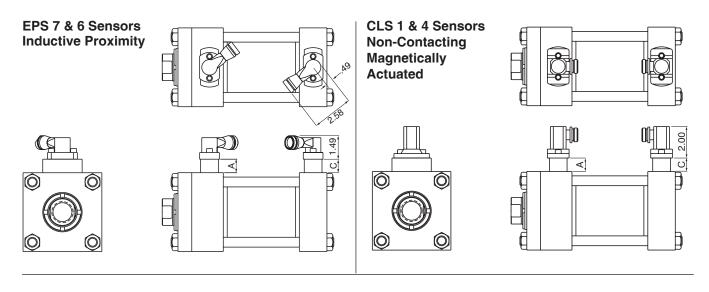
#### 12mm Cordset for Global Switches

- See ALS Switch Part Number page for 12mm cordsets.

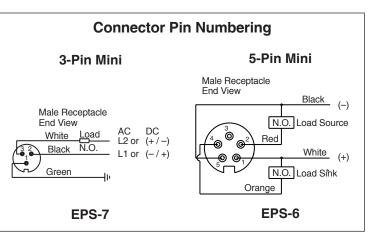
#### **Threaded Straight Connector**







Series	A max.	C max.
2H	.86"	1.75"
3L	1.55"	1.05"
2A	1.55"	1.30"
HMI	1.19"	1.05"



#### **Series and Parallel Wiring**

When Parker Industrial Cylinder EPS-6 or 7 proximity switches are used as inputs to programmable controllers the preferred practice is to connect each switch to a separate input channel of the PLC. Series or parallel operations may then be accomplished by the internal PLC programming.

EPS-6 or 7 switches may be hard wired for series operation, but the voltage drop through the switches (see specifications) must not reduce the available voltage below what is needed to actuate the load.

EPS-6 or 7 switches may also be hard wired for parallel operation. However, the leakage current of each switch will pass through the load. The total of all leakage currents must not exceed the current required to actuate the load. When wiring EPS-6 sensors in parallel it is recommended that decoupling diodes be used.

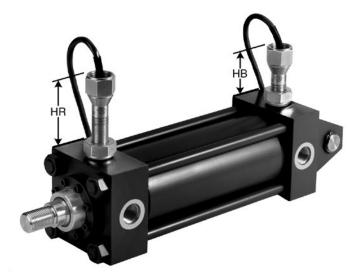
#### **Minimum Stroke**

The minimum stroke for EPS-6 or 7 and CLS-1 or 4 sensors, utilizing standard components, is the cushion sleeve or spear length for the cylinder series in which the sensor is installed. See the individual Industrial Cylinder series catalog for cushion length details. Contact the factory if a shorter stroke is required.



#### **CLS-2 Threaded Style Switches**

Spacers are not required. Threaded switches can be adjusted for small changes to end of stroke position sensing.



As shown in the illustrations below, these switches are magnetically operated. Dual magnets provide a dependable "snap action" for positive position sensing.

In the "Unoperated" position, the magnet assembly is attracted in the opposite direction of the arrow, causing a finely ground stainless steel connecting rod to hold the contacts open.

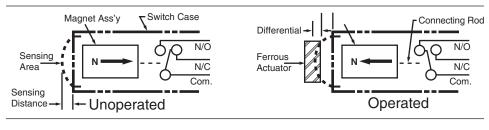
In the "Operated" position a ferrous part (cushion or piston) enters the sensing area and attracts the magnet assembly which causes the rod to draw the contacts together.

#### Switch Height – Series 3L & 2A

Bore Ø	HR Max.	HB Max	Bore	HR Max.	HB Max
1.50	3.00	2.63	5.00	2.81	1.94
2.00	2.94	2.38	6.00	3.44	3.06
2.50	2.94	2.13	7.00 <sup>1</sup>	3.44	2.56
3.25	3.19	2.81	8.00	3.38	2.06
4.00	3.13	2.44			

<sup>1</sup>7.00 bore not available in Series 3L

## **Operating Principle**



### Switch Height – Series 2H

Bore Ø	$\operatorname{\textbf{Rod}}\nolimits \varnothing$	HR	HB
1.50	0.625	2.56	3.31
1.50	1.000	2.75	5.51
0.00	1.000	2.56	3.25
2.00	1.375	2.69	5.25
	1.000	2.31	
2.50	1.375	2.50	2.94
	1.750	2.69	
	1.375	2.94	
3.25	1.750	3.13	2.56
	2.000	3.31	
	1.750	2.88	
4.00	2.000	3.06	2.44
	2.500	2.50	
	2.000	2.31	
5.00	2.500	2.63	0.01
5.00	3.000	2.88	2.31
	3.500	3.13	
	2.500	2.13	
0.00	3.000	2.38	
6.00	3.500	2.63	3.00
	4.000	2.88	
	3.000	3.38	
	3.500	2.13	]
7.00	4.000	2.38	2.69
	4.500	2.63	]
	5.000	3.00	
8.00	3.500	3.13	
	4.000	3.38	
	4.500	2.13	2.25
	5.000	2.50	]
Ī	5.500	2.69	]

#### Sensing gap: .030" to .060"

**Trip point:** Factory set with piston bottomed out.

**Release point:** Approx. 0.25" piston travel.

Minimum cylinder stroke is .50" on 1.50" & 2.00" bores; and .75" on 2.50" bore and larger.

See the CLS Specification table for additional details.



### **Specifications – EPS Limit Switches**

Switch Type:	Inductive Proximity		
Style:	EPS-7	EPS-6	
Code Designator:	Н	D	
Description:	Economical, General Purpose, 2 wire device, primarily for AC applications. (Not suitable for 3 wire 24 volt Sinking or Sourcing applications.) Also for automotive industry applications.	Economical General Purpose, 3 wire DC sensor, dual output: sinking and sourcing.	
Supply Voltage:	20 to 250 VAC/DC	10 to 30 VDC	
Load Current, min.:	8 mA	NA	
Load Current, max.:	300 mA	200 mA	
Leakage Current:	1.7 mA max.	10 micro amps max.	
Voltage Drop:	7 V, max.	2 VDC max.	
Operating Temperature:	-14° to +158° F	-14° to +158° F	
Switch Type:	Inductive proximity	Inductive proximity	
Part Number:	148897	148896	
4 Digit Part Number Suffix:	Add 4-digit part number suffix to indicate probe length: 0125=1.25", 0206=2.06", 0288=2.875", 0456=4.562"		
Connection:	3 pin mini	5 pin mini	
Enclosure Rating:	IEC IP67	IEC IP67	
LED Indication:	Yes	Yes	
Short Circuit Protection:	Yes	Yes	
Weld Field Immunity:	Yes	Yes	
Output:	2 wire, Normally Open with leakage current	Dual output: DC Sinking and DC Sourcing, user selectable via wiring	
Approvals/Marks:	CE, UL, CSA	CE, UL, CSA	
Make/Break Location:	0.13" from end of stroke, typi	ical. Tolerance is +0/13"	
Wiring Instructions:	Pin 1: AC Ground (Green) Pin 2: Output (Black) Pin 3: AC Line (White)	Pin 1) +10 to 30 VDC (White) Pin 2) Sourcing Output (Red) Pin 3) Grounded (not connected or required Pin 4) Sinking Output (Orange) Pin 5) DC Common (Black)	
Standard Cable: 6' Standard Cable: 12' Cable: 6', Right Angle	0853550006 0859170006   0853550012 0859170012		



## **Specifications – CLS Limit Switches**

Switch Type:	Non-Contacting Magnetically Actuated			
Style:	CLS-1	CLS-4	CLS-2	
Code Designator:	F	В	G	
Description:	For applications where the customer needs NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style.	For applications where the customer needs NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style.	For applications where the customer needs NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS style. Threaded style permits small adjustability of make/break location.	
Supply Voltage:	24 to 240 VAC/DC	24 to 240 VAC/DC	24 to 240 VAC/DC	
Load Current, min.:	NA	NA	NA	
Load Current, max.:	4 AMPS @ 120 VAC 3 AMPS @ 24 VDC	4 AMPS @ 120 VAC 3 AMPS @ 24 VDC	4 AMPS @ 120 VAC 3 AMPS @ 24 VDC	
Leakage Current:	None	None	None	
Voltage Drop:	None	None	None	
Operating Temperature:	-40° F to +221° F	-40° F to +400° F	-40° F to +221° F	
Switch Type:	Non-contacting magnetically actuated	Non-contacting magnetically actuated	Non-contacting magnetically actuated	
Part Number:	148275	149109	117000, 117017, 117034	
4 Digit Part Number Suffix:	Add 4-digit part number suffix to indicate probe length: 0125=1.25", 0206=2.06", 0288=2.875", 0456=4.562"		Switch selection is application dependent – Contact Factory	
Connection:	3 pin mini	144" PTFE Coated Flying Leads with 1/2" conduit hub	36" Potted-in PVC cable (most sizes also with 1/2" conduit hub)	
Enclosure Rating:	NEMA 1, 2, 3, 4, 4X, 5, 6, 6P, 11, 12, 12K, 13	NEMA 1, 2, 3, 4, 4X, 5	NEMA 4, 4X, 6, 6P, 7, 9	
LED Indication:	No	No	No	
Short Circuit Protection:	No	No	No	
Weld Field Immunity:	Yes	Yes	Yes	
Output:	SPDT (Single Pole Double Throw), Normally Open/Normally Closed, Form C	SPDT (Single Pole Double Throw), Normally Open/Normally Closed, Form C	SPDT (Single Pole Double Throw), Normally Open/Normally Closed, Form C	
Approvals/Marks:	UL or CSA <sup>1</sup>	UL or CSA <sup>1</sup>	UL or CSA <sup>1</sup>	
Make/Break Location:	0.13" fro	m end of stroke, typical. Tolerance is -	+0/13"	
Wiring Instructions:	Pin 1: Common (Green) Pin 2: Normally Closed (Black) Pin 3: Normally Open (White)	Common (Black) Normally Open (Blue) Normally Closed (Red)	Common (Black) Normally Open (Blue) Normally Closed (Red)	
Standard Cable: 6' Standard Cable: 12' Cable: 6', Right Angle	0853550006 0853550012 0875470006			

<sup>1</sup> CSA available upon request – consult factory



#### How to Specify EPS & CLS Switches

Parker Industrial Cylinder EPS & CLS proximity switches may be ordered on Series 2A, 3L, 2H, 3H and HMI cylinders as follows:

- 1) Complete the basic model number
- 2) Place an "S" in the model number to denote switches and/or special features.
- 3) Mounting styles D, DB, JJ, J, and H should be used with caution because of possible mounting interferences.
- 4) Special modifications to cylinders other than switches must have a written description.
- 5) Specify letter prefix "H" for EPS-7, "D" for EPS-6, "F" for CLS-1, "B" for CLS-4, or "G" for CLS-2, then fill in the four blanks specifying port location, switch orientation and actuation point for both head and cap. If only one switch is used, place "XXXX" in the unused blanks.
- Example = H13AGG-XXXX denotes a switch on the head end only, EPS-7
- Example = XXXX-B42AGG denotes a switch on the cap end only, CLS-4

Н	1	3	Α	GG
Specify: "H" = EPS-7 "D" = EPS-6 "F" = CLS-11 "B" = CLS-41 "N" = Prep for EPS-6 and EPS-7 switches "P" = Prep for CLS-1 and CLS-4 switches "T" = Prep for CLS-2 switch	Port Location See Figure 1.	Switch Location See Figure 1.	Switch Orientation See Figure 2 for CLS-1, CLS-4, EPS-6 and EPS-7 only.	Actuation Point GG = End of Stroke FF = Stroke to Go; See Bulletins 0840-G-E1, 2 or 3 for stroke remaining.

## Cap End

**Head End** 

Н	4	2	Α	GG
Specify: "H" = EPS-7 "D" = EPS-6 "F" = CLS-1 "B" = CLS-4 "N" = Prep for EPS-6 and EPS-7 switches "P" = Prep for CLS-1 and CLS-4 switches "T" = Prep for CLS-2 switch	Port Location See Figure 1.	Switch Location See Figure 1.	Switch Orientation See Figure 2 for CLS-1, CLS-4, EPS-6 and EPS-7 only.	Actuation Point GG = End of Stroke FF = Stroke to Go; See Bulletins 0840-G-E1, 2 or 3 for stroke remaining.

Note: All specified switch and port locations are as seen from rod end of cylinder.

<sup>1</sup>CLS-1 and CLS-4 proximity switches are not available on the head end of 1.50" bore with 1.00" rod and 2.00" bore with 1.375" rod

#### Figure 1

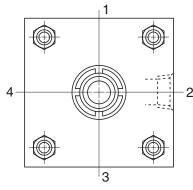
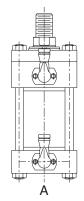


Figure 2





## Offer of Sale

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3. Delivery Dates: Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, itile to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

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7. <u>User Responsibility.</u> The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

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infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

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13. <u>Limitation on Assignment.</u> Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. <u>Force Majeure</u>. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. <u>Waiver and Severability</u>. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. <u>Termination</u>. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appointments a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. <u>Governing Law.</u> This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

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19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

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Aariculture

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**Key Products** 

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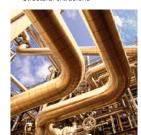
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