

cylinders

EQ Series

OEM Aluminum NFPA Interchangeable Cylinder Line



NUMATICS

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The **EQ Series** combines cost-effectiveness with proven dependability. It is a repairable OEM NFPA Interchangeable cylinder line that was specially designed to give our customers an economical alternative. This Non-Lube air cylinder offers elasticity to tight design budgets without sacrificing quality.

Tube

The **tube** is hard coat anodized. The hard coating is an electro-chemical process, which produces a very dense surface of aluminum oxide. This surface has extreme hardness (60 RC.), excellent wear and corrosion resistance, and low coefficient of friction.

End Caps

The **end caps** are accurately machined from (6061-T6) solid aluminum bar stock. They are anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

Rod Bushing

The A Series includes a graphite filled, cast iron **rod bushing** that is extra long in length. Graphite offers the best bearing surface when using a hard chrome plated piston rod. Cast iron provides maximum resistance against wear. The added length adds superior alignment and support of the piston rod as well as provides maximum load bearing support.

Rod Seal

The nitrile, rounded lip design ensures proper sealing and long life.

Rod Wiper

The standard **rod wiper** construction is a highly durable polyurethane.

Piston Rod

High strength steel (100,000 psi minimum yield) **piston rod** has a ground, polished, and chrome plated surface. This surface provides maximum life for both the rod bushing and the seals.

Bushing Retainer

The **bushing retainer** allows cartridge removal (cylinder repair) without complete disassembly.

Tie-Rods

The **tie rods** are 100,000 psi minimum yield steel for maximum holding power. They are roll formed for superior strength and engagement.

Piston Seal

The **piston seal** is a nitrile over-sized o-ring seal.

Wear Band

The **wear band** is a stable, lubricating strip located on the piston. We separated the load bearing points by locating the wear band at the rear of the piston. This maximizes column strength at full extension.

Reference the A Series section for drawings and dimensional information.



Piston

The solid aluminum alloy **piston** is strong and durable.

Cushion Seal

The floating **cushion seal** design enables rapid stroke reversal by providing instantaneous full flow to the piston. Each cushion has a flush, retained adjustment needle.

Tube End Seal

The **tube end seals** are compression type and reusable.

Ports

Our enhanced **port** design enables the cylinder to work more efficiently. Through the use of precise machining depths and tool shape, we are able to smooth the flow path into and out of the cylinder.

Standard Specifications:

- Meets NFPA specifications
- Bore sizes from 1-1/2" through 6"
- Piston rod diameters from 5/8" to 1-3/4"
- Nominal pressure rating is 250 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)
- NPTF ports
- Multitude of mounting options



EQ Series OEM Aluminum NFPA Interchangeable

How to Order - EQ Series Cylinder

X0 EQ L-04 A 1 D - C AA 0

Cylinder Mounting

- X0 = Basic No Mount
- SN = Head Sleeve Nut
- F1 = Front Flange
- F2 = Rear Flange
- P1 = Fixed Clevis
- P2 = Detachable Clevis
- P3 = Fixed Eye
- P4 = Detachable Eye
- S1 = Angle Mount
- S2 = Side Lug
- S4 = Bottom Tapped
- T6* = Head Trunnion
- T7* = Cap Trunnion
- T8* = Mid Trunnion
- X1 = Extended Tie Rods (Both Ends)
- X2 = Cap Ext. Tie Rods
- X3 = Head Ext. Tie Rods

*Removable Trunnion Ears

Cylinder Type

- EQ = Type "EQ" Cylinder

Cylinder Bore

- K = 1-1/2" R = 4"
- L = 2" T = 5"
- M = 2-1/2" U = 6"
- P = 3-1/4"

Full Inches of Stroke

- 00 = 0" Stroke
- 01 = 1" Stroke
- 02 = 2" Stroke
- 03 = 3" Stroke
- 48* = 48" Stroke (Maximum)

*Consult factory for strokes greater than 48".

Fractional Inches of Stroke

- A = 0" G = 3/8" M = 3/4"
- B = 1/16" H = 7/16" N = 13/16"
- C = 1/8" I = 1/2" O = 7/8"
- D = 3/16" J = 9/16" P = 15/16"
- E = 1/4" K = 5/8"
- F = 5/16" L = 11/16"

Rod Code

- 1 = Style #1 Standard Male Threads
- 2 = Style #2 Optional Male Threads
- 3 = Style #3 Standard Female Threads
- 4 = Special Rod End Standard Rod Diameter (must specify threads)
- 5 = Special Oversize Rod Diameter (must specify threads)
- 6 = Style #1 Oversize Rod Diameter
- 7 = Style #2 Oversize Rod Diameter
- 8 = Style #3 Oversize Rod Diameter
- U = Male Coupling Rod End
- V = Male Coupling Rod End Oversize Rod Diameter

Magnetic Piston

- 0 = No Magnet
- 2 = Reed Magnet

Options

- AA = No Option
- BA*** = Bumpers, Both Ends
- BC*** = Bumper, Cap Only
- BH*** = Bumper, Head Only
- BZ = Bronze Bushing
- CT = Composite Tube
- DA = Double Rod End
- EB = Silencer Bumpers
- LP = Profile Tubing
- MA = Metallic Rod Scraper
- MB = Rear Metallic Rod Scraper
- SA = Stainless Rod
- SS = Stainless Rod & Tie Rods
- ST = Stainless Tie Rods
- VA = High Temperature Seals
- 1A* = Rod Extension
- *1B = Rear Rod Extension
- *2B = Rear Thread Extension
- 3B = Rear Rod Stud
- 2A* = Thread Extension
- 3A = Rod Stud

*Specify Length

***Bumpers add .062" to OAL (per bumper)

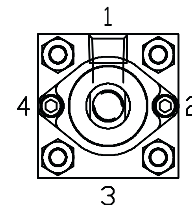
Adjustable Cushions

Position	1	2	3	4	Fixed
No Cushions	A	A	A	A	A
Head & Cap	B	C	D	E	Y
Head Only	F	G	H	J	W
Cap Only	K	L	M	N	V

Ports

Size Code

Position	1/8"	1/4"	3/8"	1/2"	3/4"
1	B	C	D	E	F
2	H	I	J	K	L
3	N	O	P	Q	R
4	T	U	V	W	X



Reference the A Series section for drawings and dimensional information.



How to Order - EQ Series Piston Rod Assembly

EQ92 - K 1 N 0 -01 A - AA

Type
EQ92 = EQ Series Piston Rod Assembly

Bore
K = 1-1/2"
L = 2"
M = 2-1/2"
P = 3-1/4"
R = 4"
T = 5"
U = 6"

Rod Code
1 = Style # 1 Standard Rod Diameter
2 = Style # 2 Standard Rod Diameter
3 = Style # 3 Standard Rod Diameter
4 = Special Rod End Standard Rod Diameter (must specify threads)
5 = Special Rod End Oversize Rod Diameter (must specify threads)
6 = Style # 1 Oversize Rod Diameter
7 = Style # 2 Oversize Rod Diameter
8 = Style # 3 Oversize Rod Diameter
U = Male Coupling Rod End Oversize Rod Diameter
V = Male Coupling Rod End Oversize Rod Diameter

Cushion
N = No Cushion
B = Both Ends Cushioned
H = Head End Cushioned
C = Cap End Cushioned

Magnet
0 = No Magnet
2 = Reed Magnet

Option

AA = No Option
BC = Bumpered Cap End
BH = Bumpered Head End
DA = Double Rod
EB = Silencer Bumpers
SA = Stainless Rod
VA = Viton Seals
1A* = Rod Extension
1B* = Rear Rod Extension
2A* = Thread Extension
2B* = Rear Thread Extension
3A = Rod Stud
3B = Rear Rod Stud
* = must specify length

Fractional Inches of Stroke

A = 0" E = 1/4" I = 1/2" M = 3/4"
B = 1/16" F = 5/16" J = 9/16" N = 13/16"
C = 1/8" G = 3/8" K = 5/8" O = 7/8"
D = 3/16" H = 7/16" L = 11/16" P = 15/16"

Full Inches of Stroke

00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke
05 = 5" Stroke
48 = 48" Stroke (Maximum)

Note: Options listed are ones that apply to a piston rod assembly only. Model number is set up to use option code supplied with original cylinder or with any above.

Rod End Styles, Diameters and Threads

Diameter	Style #1 Standard Male	Style #2 Optional Male	Style #3 Optional Female
0.625	7/16-20	1/2-20	7/16-20
1.000	3/4-16	7/8-14	3/4-16
1.375	1-14	1 1/4-12	1-14
1.750	1 1/4-12	1 1/2-12	1 1/4-12

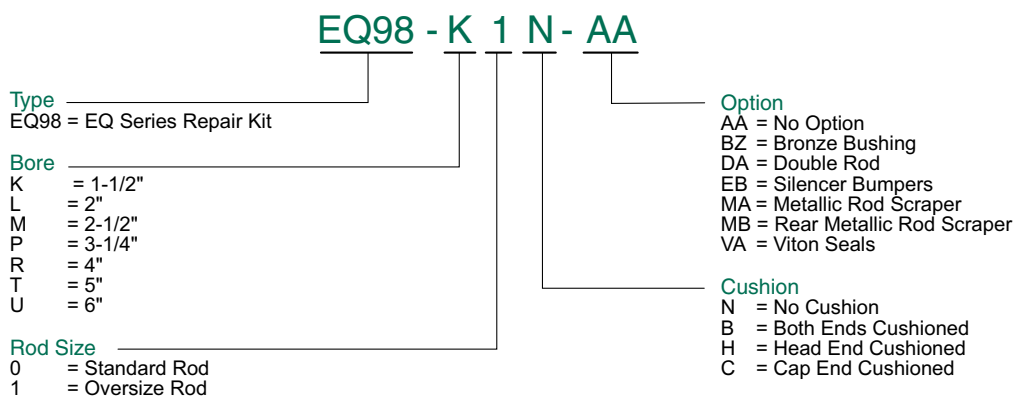
Rod Diameters by Bore Size

Bore	Standard Dia.	Oversized Dia.
1-1/2"	0.625	1.000
2"	0.625	1.000
2-1/2"	0.625	1.000
3-1/4"	1.000	1.375
4"	1.000	1.375
5"	1.000	1.375
6"	1.375	1.750



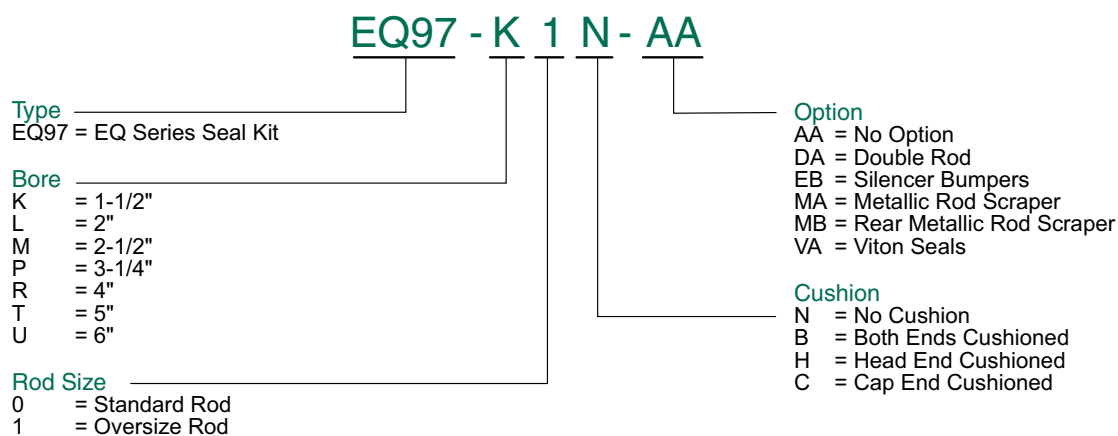
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How to Order - EQ Series **Repair Kit**



Note: Options listed are ones that apply to a repair kit only.
Model number is set up to use option code supplied with original cylinder or with any above.

How to Order - EQ Series **Seal Kit**



Note: Options listed are ones that apply to a seal kit only.
Model number is set up to use option code supplied with original cylinder or with any above.



Piston Rod Assembly Kit Removal/Installation Instructions

1. Loosen 4 Tie Rod Nuts (Part #18) to remove Piston/Rod Assembly (Part #15 & #16).
2. Carefully remove old seals and wearband. (Part #12 & #14). Any damage to the seals may result in leakage.
3. Lubricate piston seal(s) and wearband (Part #12) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
4. Install Piston Seal (Part #14). Make sure the piston seal is not twisted inside groove.
5. Install lubricated wearband onto piston. Sink piston/rod assembly into sinker tube. See Sinker Tube Part Numbers Chart.
6. Apply lube inside the cylinder tube.
7. Sink piston/rod assembly into cylinder tube.
8. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
9. Examine all seals before reassembling cylinder for any contamination. Contamination may cause leakage.
10. Lightly grease Rod Seal (Part #3) of Loaded Bushing before installing. This will ease the installation of the rod bushing over the rod.
11. Reassemble cylinder. Loosely torque tie rod nuts to allow head and cap to rotate slightly.
12. Before final torque, place cylinder on level surface. This will ensure that the cylinder head and cap are square. Torque tie rod nuts in a crisscross pattern. Use torque tolerance charts for tie rod nuts.
13. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 11 -13.

See Seal Installation Guide on page 9 for additional (visual) instructions.

Repair Kit and Seal Kit Removal/Installation Instructions

1. Loosen 2 or 4 Retainer Screws (Part #11) to remove Bushing Retainer (Part #10) and Loaded Bushing (Part # 9).
2. Loosen 4 Tie Rod Nuts (Part #18) to remove Head (Part #8) and Piston/Rod Assembly (Part #15 & #16).
3. Carefully remove old seals and wearband. (Part [#1, #2, #3 Seal Kit only], #5, #6, #7, #12, & #14) Any damage to the seal grooves may result in leakage.
4. Lubricate new seals with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Piston Seal (Part #14). Make sure the piston seal is not twisted inside groove.
6. Install lubricated Wearband (Part #12) onto piston. Sink piston/rod assembly into sinker tube. See Sinker Tube Part Numbers Chart.
7. Apply lube inside the cylinder tube.
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Place Tube End Seals (Part #6) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
11. Install Rod Wiper (Part #1), Bushing O-ring (Part #2), and Rod Seal (Part #3) into bushing (Seal Kit only). Lightly grease Rod Seal and Bushing O-ring after installation. This will ease the installation of the rod bushing over the rod and into the head.
12. Reassemble cylinder except for loaded rod bushing. First, loosely torque tie rod nuts to allow head and cap to rotate slightly. Carefully place bushing over the rod until getting interference. With a twisting motion, slide the bushing down onto the rod and into the bushing pocket on the head.
13. Place Bushing Retainer (Part #10). Lightly tighten retainer screws.
14. Before final torque, place cylinder on level surface to square head and cap. Torque tie rod nuts in a crisscross pattern. Use the torque tolerance chart for Tie Rod Nuts and Retainer Screws.
15. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

See Seal Installation Guide on page 9 for additional (visual) instructions.

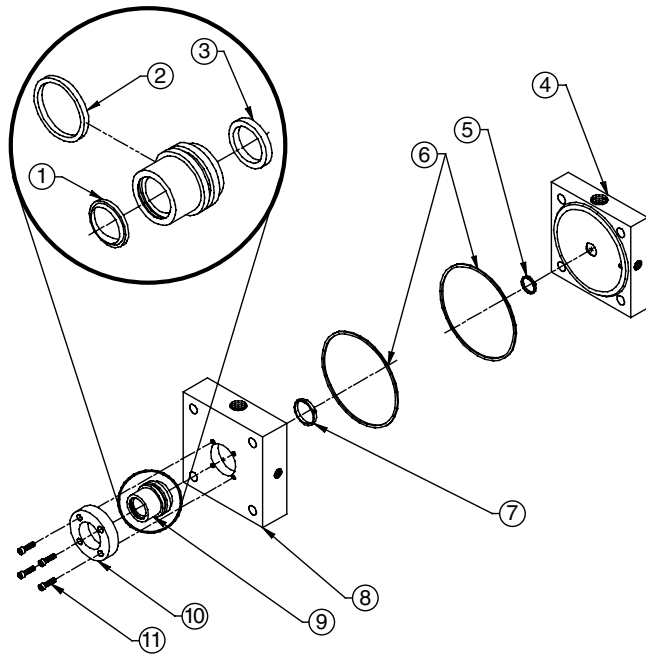


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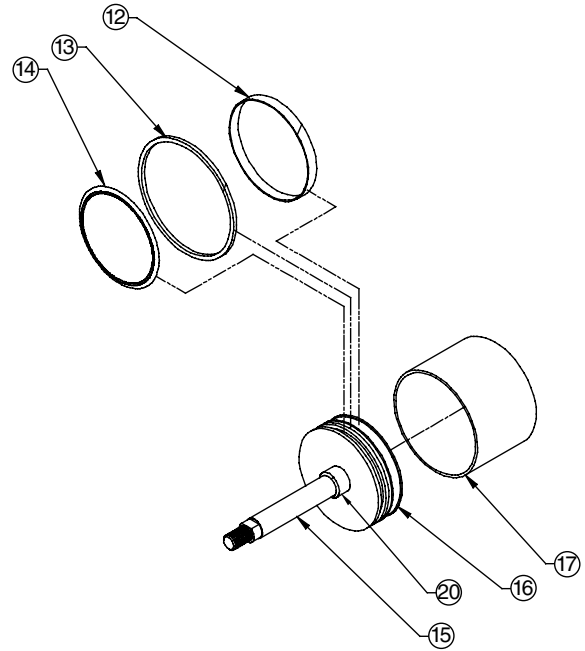
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Diagrams

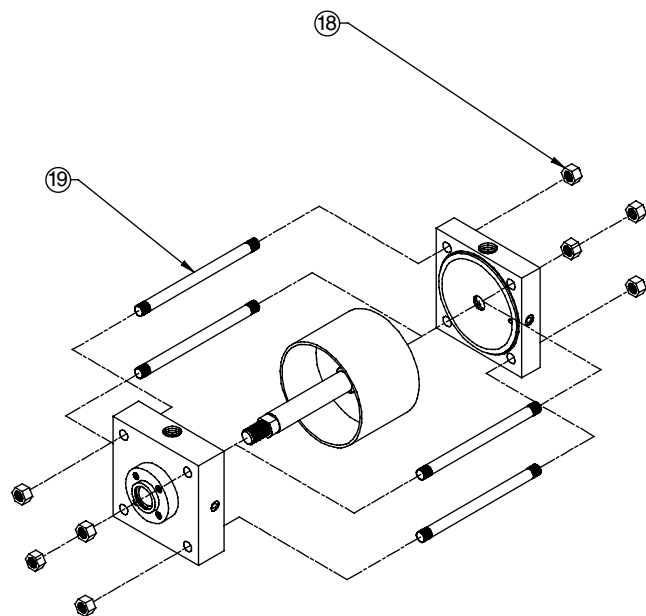
Pneumatic Service Temperatures:
Nitrile Seals: -10°F (-23°C) to 165°F (74°C)
Viton® Seals: 0°F (-17°C) to 400°F (204°C)



Head, Cap, and Bushing Assembly



Piston/Rod Assembly



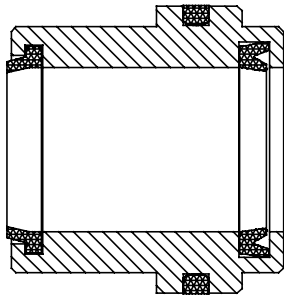
Cylinder Assembly and Tie Rod Torque

EQ Series

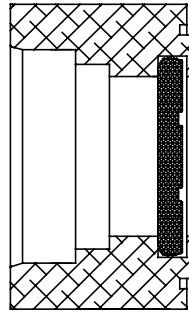
Part #	Description	Parts included in:		
		Seal Kit	Repair Kit	Piston/Rod Assembly
1	Rod Wiper	X		
2	Bushing O-ring	X		
3	Rod Seal	X		
4	Cap			
5	Cap Cushion Seal	X	X	
6	Tube End Seals	X	X	
7	Head Cushion Seal	X	X	
8	Head			
9	Loaded Bushing Assembly		X	
10	Bushing Retainer			
11	Retainer Screws			
12	Wearband	X	X	
13	Magnet			X
14	Piston Seal	X	X	
15	Rod			X
16	Piston			X
17	Tube			
18	Hex Nuts			
19	Tie Rods			
20	Head Cushion Spear			X



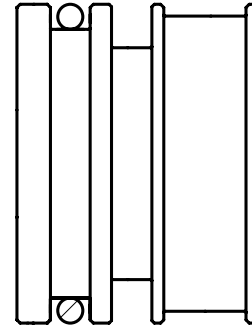
Seal Installation Guide



Loaded Bushing



Cushioned Head or Cap



O' Ring Piston

Torque Tolerances (lbs-ft) Tie Rod Nut Part #19

Bore	Min.	Max.
1-1/2"	8	10
2"	15	20
2-1/2"	15	20
3-1/4"	23	30
4"	23	30
5"	50	60
6"	50	60

Retainer Screws Torque Tolerances (lbs-ft) Part #11

Size	Min.	Max.
#10-32	1	1.5
1/4-28	5	7
5/16-24	10	12

Note: Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

Sinker Tube Part Numbers

Bore	Min.
1-1/2"	A06-K91
2"	A06-L91
2-1/2"	A06-M91
3-1/4"	A06-P91
4"	A06-R91
5"	A06-T91
6"	A06-U91



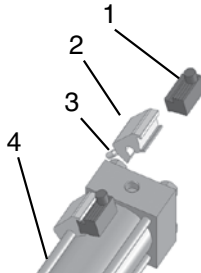
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EQ Series Switch Information

EQ Series World Switch Application Detail

Round Tube and Tie Rod Detail

1. World Switch
2. Tie Rod Bracket
3. Adjustment Screw
4. Cylinder Tie Rod



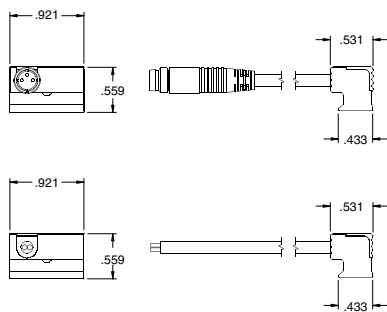
EQ Series World Switch Bracket

Cylinders	Bore	Part Number
EQ series Tie Rod	1 1/2"	SB6-K01
EQ series Tie Rod	2"-2 1/2"	SB6-L01
EQ series Tie Rod	3 1/4"-4"	SB6-P01
EQ series Tie Rod	5"-6"	SB6-T01

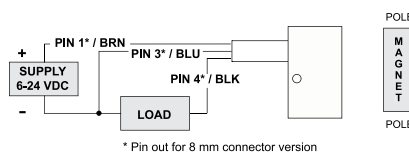
EQ series World Switch Hall Effect Part Numbers

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SH6-031	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-021	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-032	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-022	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts

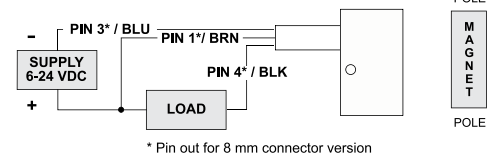
Hall Effect Switch



PNP Sourcing



NPN Sinking

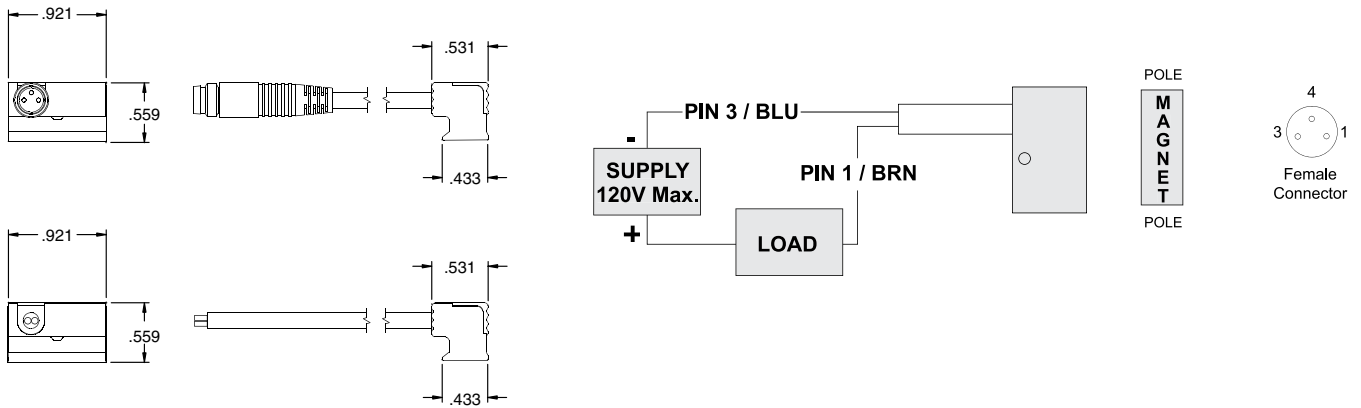




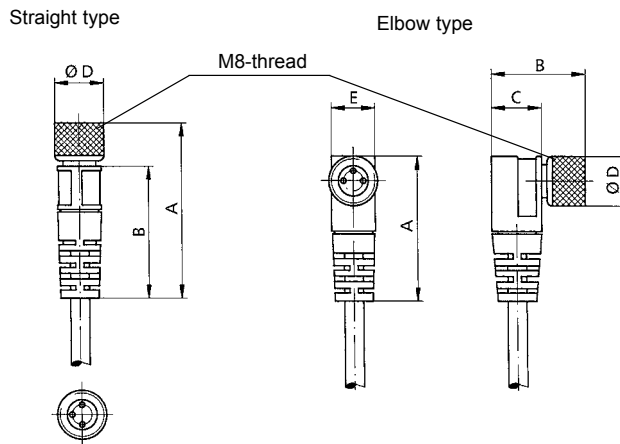
EQ Series World Switch Reed Switch Part Numbers

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SR6-002	3m Wire Version	Reed Switch, LED	SPST Normally Open	5 -120V AC/DC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	3.5 Volts
SR6-004	3m Wire Version	Reed Switch, LED & MOV	SPST Normally Open	5 -120V AC/DC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts
SR6-021	8mm Pigtail	Reed Switch	SPST Normally Open	0 -120V AC/DC	0.5 Amps Max.	10 Watts Max.	0 Volts
SR6-022	8mm Pigtail	Reed Switch, LED	SPST Normally Open	5 -120V AC/DC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	3.5 Volts
SR6-024	8mm Pigtail	Reed Switch, LED & MOV	SPST Normally Open	5 -120V AC/DC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts

Reed Switch - Normally Open Type SR6



Cords M8-thread for Switches and Sensors with Connector



Dimensions (mm)

Type		A	B	C	D	E	Weight (approx. kg)	Order Code
Straight with 5m-cable	(3x0.25 mm ²)	32.3	24.4	—	9.0	—	0.143	SC6-001
Elbow with 5m-cable	(3x0.25 mm ²)	26.3	17.1	9.2	9.0	8.0	0.145	SC6-002



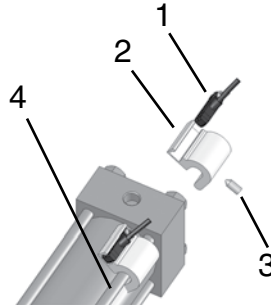
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EQ Series Global Application Detail

Round Tube and Tie Rod Detail

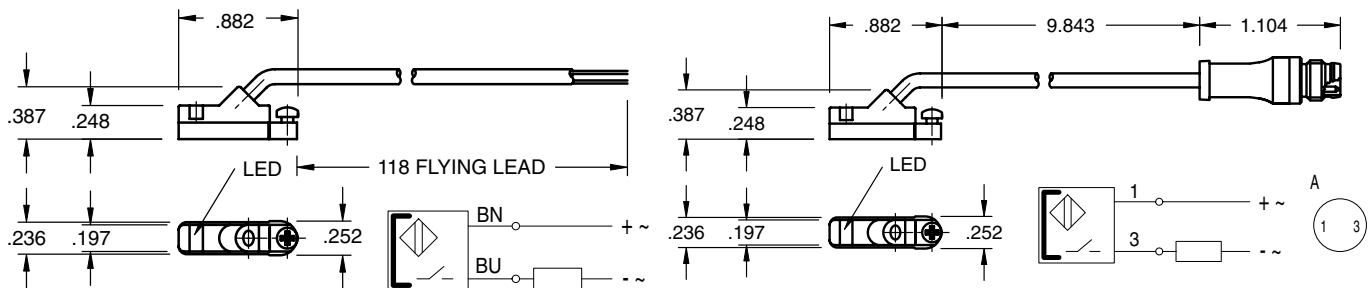
1. Global Switch
2. Tie Rod Bracket
3. Adjustment Screw
4. Cylinder Tie Rod



EQ Series Global Switch Bracket

Cylinders	Bore	Part Number
EQ series Tie Rod	1 1/2"-2 1/2"	N199-1017
EQ series Tie Rod	3 1/4"-4"	N199-1018
EQ series Tie Rod	5"-6"	N199-1019
EQ series Tie Rod	5"-6"	SB6-T01

Reed Switch (AC/DC NO), flying lead - RSS02, 8mm connector - RSQ02



Sensing Data

Ambient temperature range T_a	(°F/°C)	-4 to 176 (-20 to 80)
Frequency of operating cycles f at U_e	(kHz)	0.5
Turn on time t	(ms)	≤ 0.25
Turn off time t	(ms)	0.03
LED function indication		yes

Electrical Data

Rated operational voltage U_e	(V)	3...130 AC/DC
Supply voltage U_B	(V)	3...130 AC/DC
Voltage drop U_d at I_e Stat./dyn.	(V)	3.5
Rated insulation voltage U_i	(V)	2750 DC (EN 60335-1)
Rated supply frequency	(Hz)	AC/DC
Rated operational current I_e	(mA)	50 (10W max.)
No-load supply current I_o at U_e d./und.	(mA)	0

Observe polarity for correct LED function

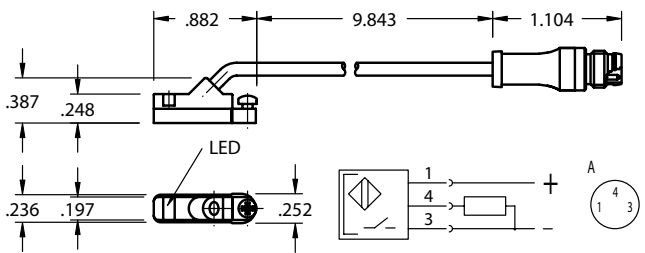
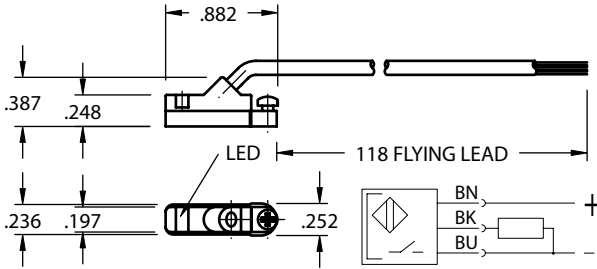
Mechanical Data

Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 50g, 11 ms	
Rated vibration environment: 10g, 10...2000 Hz, 90 min	





Electronic Switch (PNP NO), flying lead - HPNPS31, 8mm connector - HPNPQ31



Sensing Data

Ambient temperature range \varnothing	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of)	$\leq 0.3\%/^{\circ}\text{C}$
Frequency of operating cycles f at U_e	(kHz)	10
Turn on time t	(ms)	.05
turn off time t	(ms)	.05
Utilization categories		DC13
Function-/supply voltage indication		YES

Mechanical Data

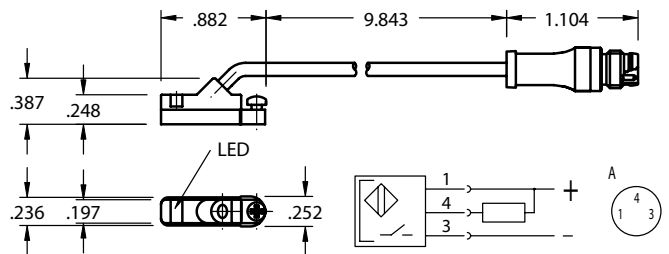
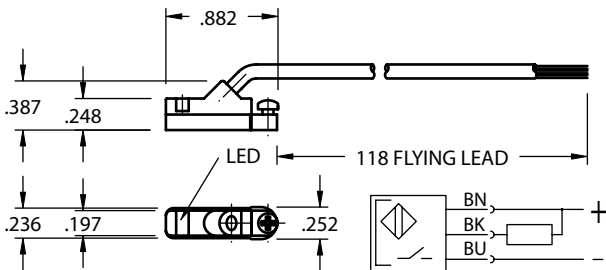
Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 30 g, 11 ms	
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30	

Electrical Data

Rated operational voltage U_e	(V)	24 DC
Supply voltage U_B	(V)	10...30 DC
incl. ripple	(% of U_e)	15
Voltage drop U_d at I_e Stat./dyn.	(V)	1/-
Rated insulation volatage U_i	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current I_e	(mA)	200
No-load supply current I_o at U_e d./und.	(mA)	25/13
Protected against polarity reversal		YES



Electronic Switch (NPN NO), flying lead - HNPNS32, 8mm connector - HNPNQ32



Sensing Data

Ambient temperature range \varnothing	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of S_p)	$\leq 0.3\%/^{\circ}\text{C}$
Frequency of operating cycles f at U_e	(kHz)	10
Turn on time t	(ms)	.05
turn off time t	(ms)	.05
Utilization categories		DC13
Function-/supply voltage indication		YES

Mechanical Data

Housing material	Polyamide
Material of sensing face	Polyamide
Connection	PVC cable
Degree of Protection	IP 67
Rated shock: half-sinus, 30 g, 11 ms	
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30	

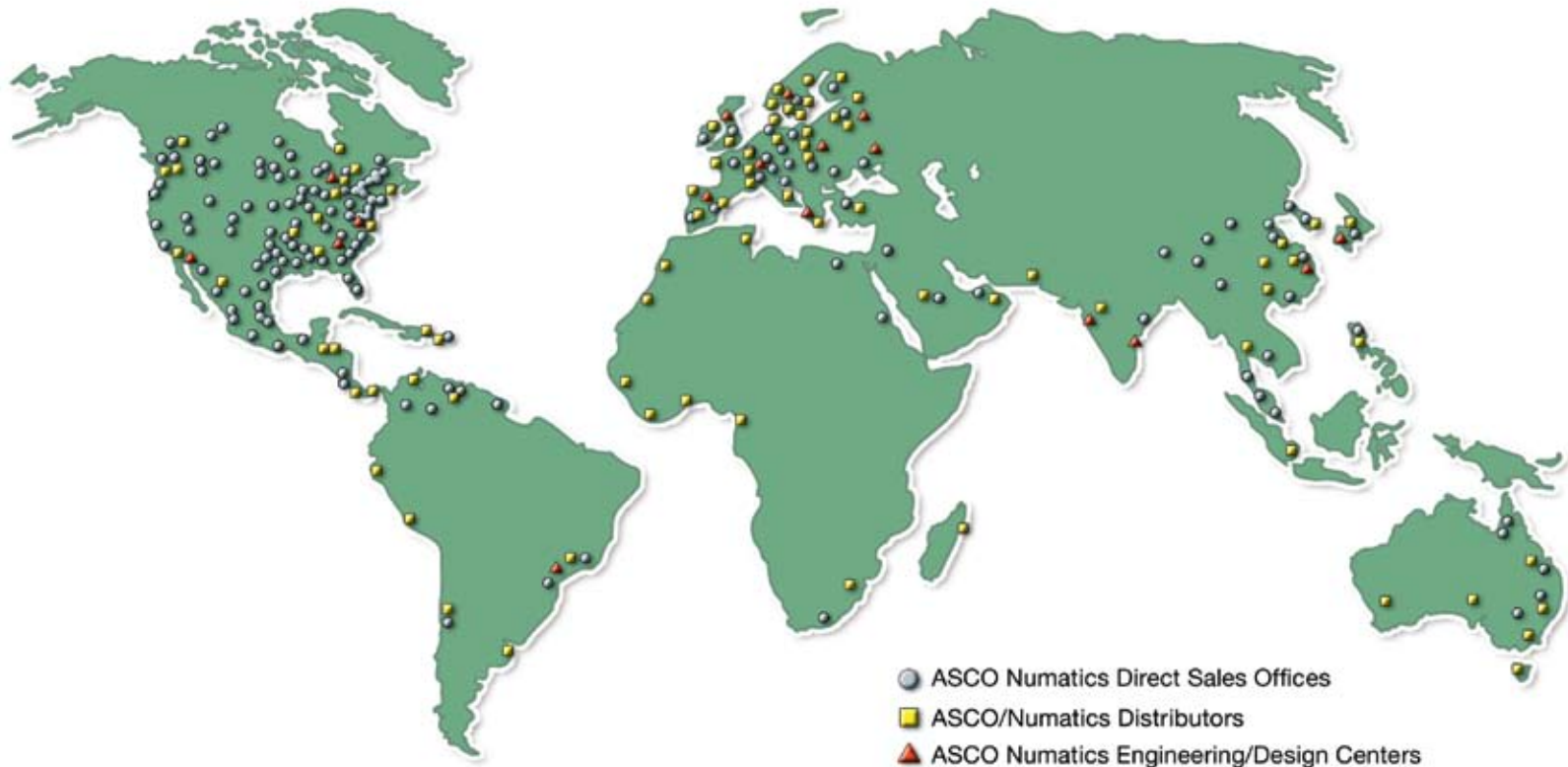
Electrical Data

Rated operational voltage U_e	(V)	24 DC
Supply voltage U_B	(V)	10...30 DC
incl. ripple	(% of U_e)	15
Voltage drop U_d at I_e Stat./dyn.	(V)	1/-
Rated insulation volatage U_i	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current I_e	(mA)	200
No-load supply current I_o at U_e d./und.	(mA)	25/13
Protected against polarity reversal		YES



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