

Flexible solutions for an often inflexible world

Balluff's Strokemaster® cylinder-position sensors provide precision end-of-stroke sensing for hydraulic/pneumatic cylinders. They also eliminate post-installation cable management problems with 304° of rotational freedom on the connector.

Strokemaster® sensors allow infinitely adjustable and lockable cable positioning anytime after mounting to the cylinder. Without breaking the seal, Strokemaster® enables quicker installation of the sensor and neat cable runs.

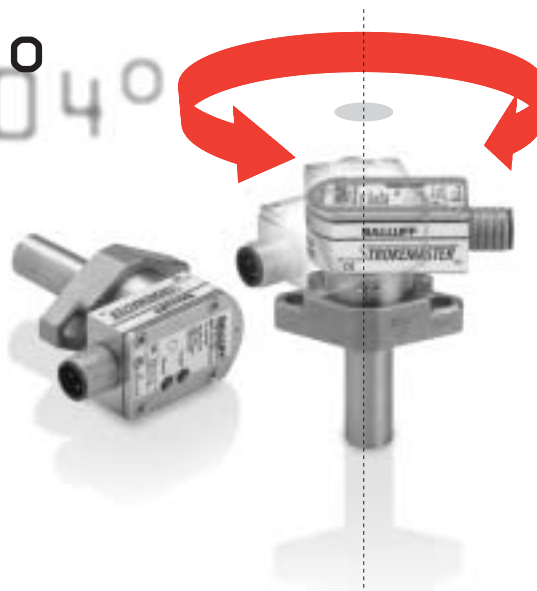
A high-pressure, inductive proximity sensor, the Strokemaster® provides a 2mm (0.08") sensing range to detect the "spud" of hydraulic/pneumatic cylinders and indicate fully retracted or extended position. It mounts with just two screws, and seals with an O-ring. Withstanding cylinder pressures to 3000 psi (207 BAR), the embeddable design keeps most of the switch protected within the cylinder, with only a 0.62" (16 mm) high housing exposed outside. The rotating housing can be locked in any desired position with either one of two set screws.

Strokemaster® sensors are available in 3-wire DC and 2-wire AC/DC versions, both with mini or micro connectors. Switching frequency is 50 Hz for the AC/DC versions. All units are weld-field immune, short-circuit and reverse-polarity protected. They fit all popular cylinder designs, with standard probe lengths of 0.912" - 4.560" (23.165mm - 115.8mm). Custom probe lengths can be achieved by using spacer kits. Probes are made of stainless steel with a ceramic face. Both DC and AC/DC sensors have all metal housings.

Strokemaster® is CE-certified, and its housing is sealed to IP67 requirements.



304°



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Strokemaster Cylinder Position Sensors

High Pressure Sensors

Power Clamp & Gripper

Valve Position Sensor

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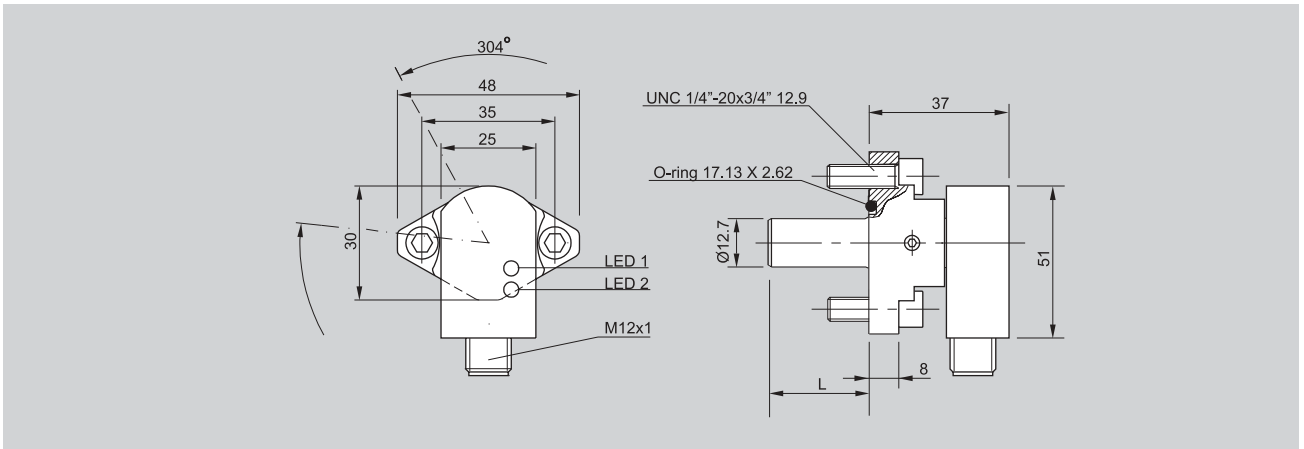
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Mounting	Flush
Rated operating distance s _n	2 mm
Assured operating distance s _a	0...1.6 mm

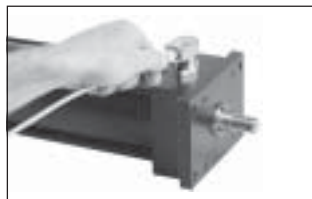
Mounting	Flush
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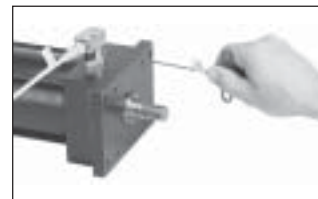
PNP	Normally-open \odot	BES 516-300-S 295/0.912"...4.560"-S4
Rated operational voltage U _e		24 Vdc
Supply voltage U _B		10...30 Vdc
Voltage drop U _d at I _e		≤ 2.5 V
Rated insulation voltage U _i		75 Vdc
Rated operational current I _e		200 mA
No-load supply current I _o damped/undamped		≤ 18 mA/≤ 10 mA
Off-state current I _r		≤ 80 μA
Protected against polarity reversal		yes
Short circuit/overload protected		yes/yes
Load capacitance		≤ 1.0 μF
Repeat accuracy R		≤ 5 %
Ambient temperature range T _a		-25...+70 °C
Operating frequency f		10 Hz
Utilization categories		DC 13
Function/Operating voltage indication		yes/yes
Degree of protection per IEC 529		IP 67
Housing material		stainless steel/aluminum
Material of sensing face		ceramic
Connection		micro connector
Approvals		cULus
High pressure rated up to		207 bar (3000 psi)
Standard lengths (L)		see chart on page 4.42
Recommended connector		C04 AEL-00-VY-050M



Bolt sensor to cylinder.



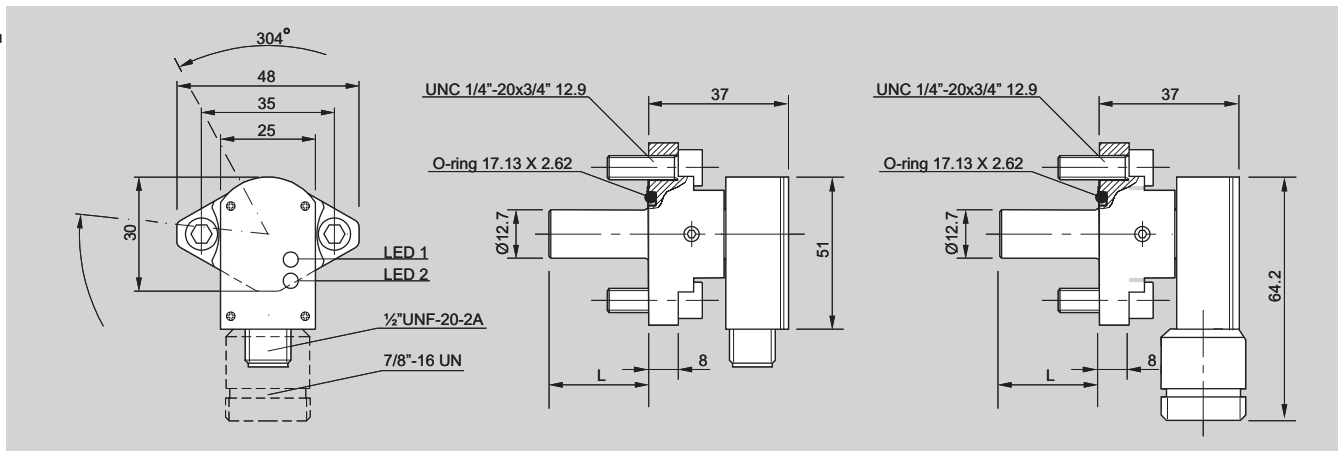
Position cable to desired orientation (even over mounting bolts).



Lock chosen position with one or both of the two integral set screws.

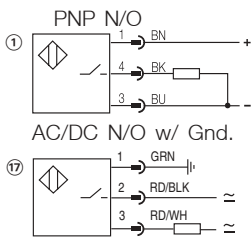
Note: Some DC units are also available with S5 Mini connector. Consult factory for sensor and cable part numbers.

Mounting	Flush	Flush
Rated operating distance s _n	2 mm	2 mm
Assured operating distance s _a	0...1.6 mm	0...1.6 mm



AC/DC	Normally-open $\overline{0}$	BES 516-200-S 2/0.912"...4.560"-S 21	BES 516-200-S 2/0.912"...4.560"-S5
Rated operational voltage U _e		110 Vac	110 Vac
Supply voltage U _B		20...250 Vac/dc	20...250 Vac/dc
Voltage drop U _d at I _e		≤ 6 V	≤ 6 V
Rated insulation voltage U _i		250 Vac	250 Vac
Rated operational current I _e		500 mA	500 mA
Minimum operational current I _m		5 mA	5 mA
Off-state current I _r		≤ 1.7 mA at 110 Vac	≤ 1.7 mA at 110 Vac
Inrush current I _k (t = 20 ms)		3 A max./1 Hz	3 A max./1 Hz
Protected against polarity reversal		yes	yes
Short circuit protected		yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %
Ambient temperature range T _a		-25...+70 °C	-25...+70 °C
Operating frequency f		≤ 50 Hz	≤ 50 Hz
Utilization categories		AC 140/DC 13	AC 140/DC 13
Function/Operating voltage indication		yes/yes	yes/yes
Degree of protection per IEC 529		IP 67	IP 67
Insulation class		1	1
Housing material		stainless steel/aluminum	stainless steel/aluminum
Material of sensing face		ceramic	ceramic
Connection		micro connector	mini connector
Approvals		cULus	cULus
High pressure rated up to		207 bar (3000 psi)	207 bar (3000 psi)
Standard lengths (L)		see chart on page 4.42	see chart on page 4.42
Recommended connector		C21 AE3-00-VY-150F	C05 AE1-00-VY-150F

Wiring Diagrams



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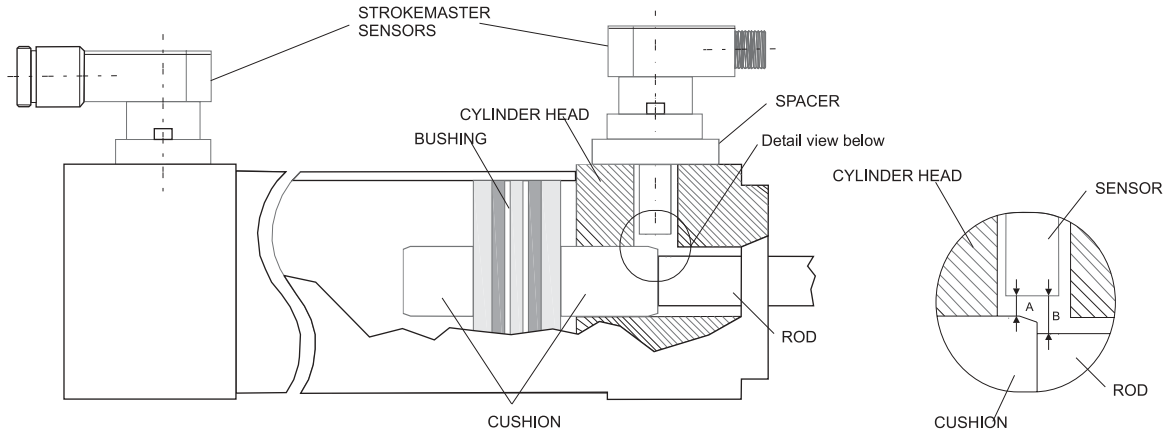
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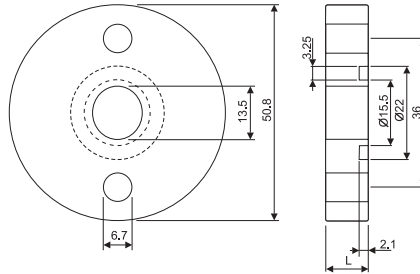
Strokemaster Installation



Note: Spacer may be required to elevate cylinder sensor to position sensing face in optimal position. Balluff recommends the following guidelines when mounting our Strokemaster sensors:

- A - Recommended to allow for mechanical wear (0.025" to 0.047")
- B - This dimension must be large enough to allow the sensor to turn off when the rod is present (0.110" to 0.118")

Strokemaster Spacers



Below is a table to help you pick out a spacer for custom lengths needed with STROKEMASTER Sensors:

	Z/Spacers (inches)													
	0.180	0.188	0.225	0.307	0.372	0.375	0.500	0.544	0.562	0.600	0.684	0.712	0.810	0.937
0.912	0.732	0.724	0.687	0.605	0.540	0.537	0.412	0.368	0.350	0.312	0.228	0.200	0.102	—
1.025	0.845	0.837	0.800	0.718	0.653	0.650	0.525	0.481	0.463	0.425	0.341	0.313	0.215	0.088
1.13	0.95	0.942	0.905	0.823	0.758	0.755	0.630	0.586	0.568	0.530	0.446	0.418	0.320	0.193
1.25	1.07	1.062	1.025	0.943	0.878	0.875	0.750	0.706	0.688	0.650	0.566	0.538	0.440	0.313
1.35	1.17	1.162	1.125	1.043	0.978	0.975	0.850	0.806	0.788	0.750	0.666	0.638	0.540	0.413
1.5	1.32	1.312	1.275	1.193	1.128	1.125	1.000	0.956	0.938	0.900	0.816	0.788	0.690	0.563
1.75	1.57	1.562	1.525	1.443	1.378	1.375	1.250	1.206	1.188	1.150	1.066	1.038	0.940	0.813
1.875	1.695	1.687	1.650	1.568	1.503	1.500	1.375	1.331	1.313	1.275	1.191	1.163	1.065	0.938
2.062	1.882	1.874	1.837	1.755	1.690	1.687	1.562	1.518	1.500	1.462	1.378	1.350	1.252	1.125
2.375	2.195	2.187	2.150	2.068	2.003	2.000	1.875	1.831	1.813	1.775	1.691	1.663	1.565	1.438
2.775	2.595	2.587	2.550	2.468	2.403	2.400	2.275	2.231	2.213	2.175	2.091	2.063	1.965	1.838
2.875	2.695	2.687	2.650	2.568	2.503	2.500	2.375	2.331	2.313	2.275	2.191	2.163	2.065	1.938
3.775	3.595	3.587	3.550	3.468	3.403	3.400	3.275	3.231	3.213	3.175	3.091	3.063	2.965	2.838
4.56	4.38	4.372	4.335	4.253	4.188	4.185	4.060	4.016	3.998	3.960	3.876	3.848	3.750	3.623

Example: Need probe length of 1.125" combine sensor BES-516-200-S2-1.35-S21 with a 0.225" spacer. (1.35" tube length - 0.225" spacer = 1.125" adjusted length)

- Note: A difference of 0.005" will still have to be carefully considered when sizing a spacer and sensor to the cylinder.
- Spacer kits include a spacer, "O" ring, and appropriate mounting screws.
 - Other spacer kits may be available: consult factory.

To order a spacer kit:

Use part number BESA-516-200-KIT-* (X.XXX) *measured in inches
(For both DC and AC/DC devices - there is no difference in flange dimensions)