

Sensors & Transducers

Features & Benefits

Strokemaster™ Inductive Sensors

Flexible Solutions for an Often Inflexible World

IMI Bimba's Strokemaster® cylinder-piston sensors provide precision end-of-stroke sensing for hydraulic cylinders. It also eliminates post-installation cable management problems with 304° of rotational freedom on the connector.

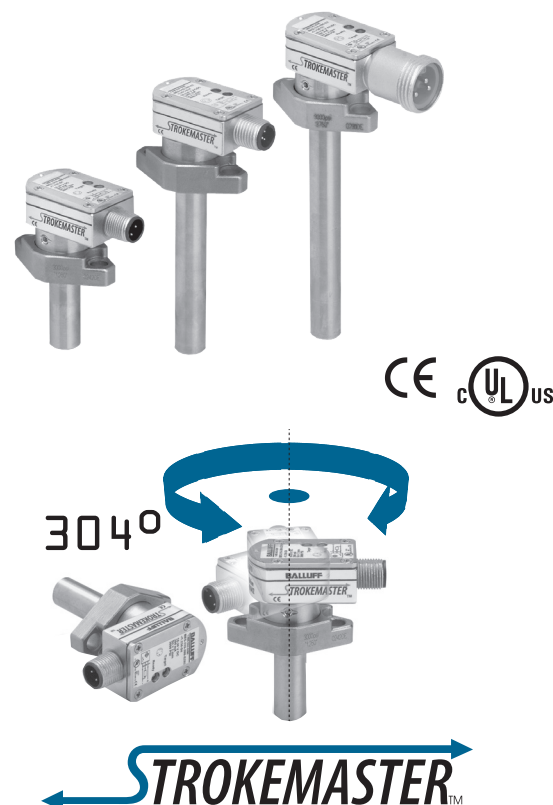
Strokemaster® sensors allow infinitely adjustable and lockable cable positioning anytime after mounting to the cylinder. Without breaking the seal, Strokemaster® enables quicker installation of the sensor and neat cable runs.

A high-pressure, inductive proximity switch, the Strokemaster® sensor provides a 2mm (0.8") sensing range to pick up the spud of hydraulic 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" (16mm) high housing exposed outside. The rotating housing can be locked in the desired position with either one of two set screws.

Strokemaster® sensors are available in 3-wire or 4-wire DC and 3-wire AC/DC versions, mini or micro connectors. Switching frequency is 50 Hz in the AC/DC versions. All units are weld-field immune and 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), along with available custom probe lengths and spacers. Probes are made of stainless steel with a ceramic face. Both DC and AC/DC sensors have all metal housings.

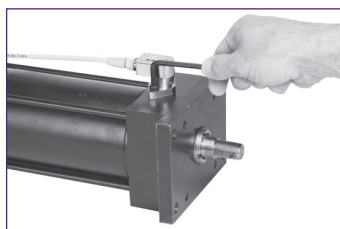
Strokemaster® is CE-certified, and its housing is sealed to IP67 requirements.

Inductive cylinder switch for piston position feedback in cylinders.

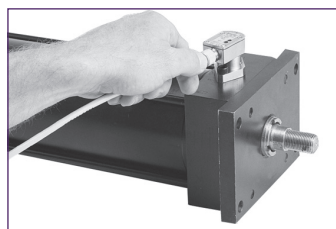


Features/Advantages

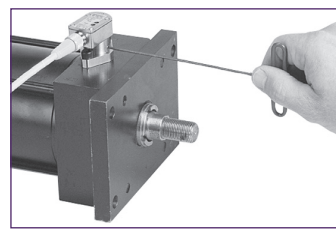
- Magnetic field immune, for use with welding equipment
- Available in DC or all current (AC/DC) versions
- Easy installation - sensor mounts to cylinder with two fasteners
- Sealed directly at flange, connector can be oriented after installation
- Various lengths available for different cylinder sizes



Bolt sensor to cylinder.



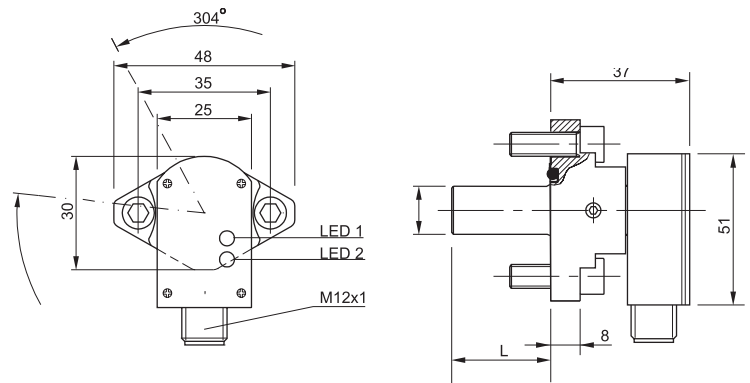
Position cable to desired orientation (even over mounting bolts).



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

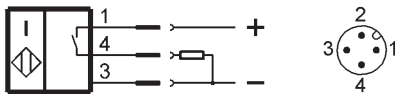
Technical Data – DC Inductive Sensor

PNP Normally-Open	BES 516-300-S 295-S 4
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 _r d./und.	< 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
Frequency of operating cycles f	10 Hz
Utilization categories	DC 13
Function/Operating voltage indication	Yes/Yes
Degree of protection per IEC 529	IP 67/connector IP 65
Housing material	Stainless steel/aluminum
Material of sensing face	Ceramic
Connection	Micro connector
Approvals	cULus
High pressure rated up to	207 bar (3000 PSI)
Recommended connector	BCC M415-0000-1A-003-VX44T2-050



Micro M12DC Connector

Wiring Diagram – PNP Normally Closed

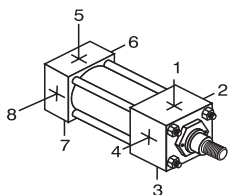


IMI Bimba will supply the correct length probe and spacer combination (if required) for each cylinder. Using the combination of standard probe lengths and spacers will give the appropriate .030" gap between sensor and cylinder spud. The spacers supplied have the same base profile as the sensor.

Material: Stainless Steel

How To Order

Cylinders with Strokemaster® Inductive Sensors



Standard Locations

Ports at 1 and 5
Cushions at 2 and 6
Sensors at 4 and 8

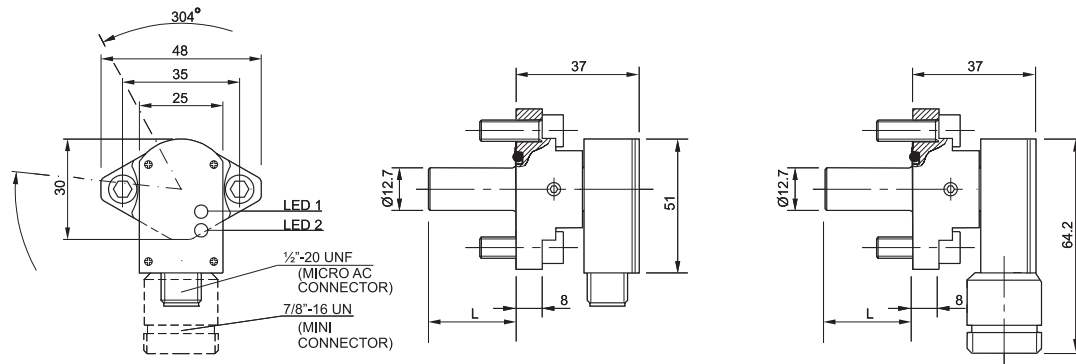
Specify non-standard locations

Cylinder Model Number:	HH-MS4-325x6-H2C6-100-KK1-P15=N500-SSSS
Sensor Model (Head):	BES 516-300-S 295-S4 (Head)
Sensor Model (Cap):	BES 516-300-S 295-S4 (Cap)
Include ALL Sensor Positions:	Sensors at 4 & 8

Note: IMI Bimba will include the Strokemaster® probe length on your order and any sensor spacers required.

Example: HH-MS4-325x6-H2C6-100-KK1-P15=N500-SSSS-BES 516-300-S4 /1.025-S21 (Head) -BES 516-300-S4 /1.75-S21 (Cap) - Sensors at 4 & 8.

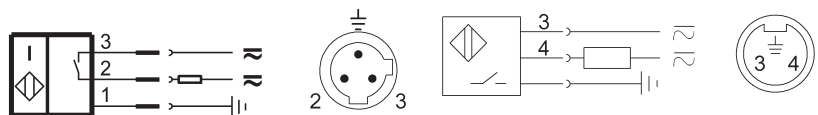
Technical Data – AC/DC Inductive Sensor



Normally-open	BES 516-200-S 2-S21	BES 516-200-S 2-S5
Rated operational voltage U _e	110 VAC	110 VAC
Supply voltage U _B	20-250 V AC/DC	20-250 V AC/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 @ 110 VAC	< 1.7 mA @ 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
Frequency of operating cycles 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)
Recommended connector	BCC A213-0000-1C-123-EX43T2-050	BCC A313-0000-10-071-VX43W6-050

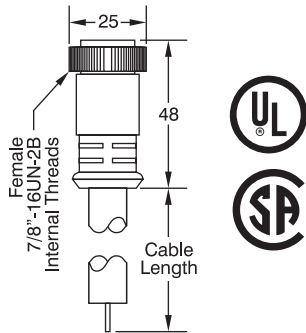
IMI Bimba will supply the correct length probe and spacer combination (if required) for each cylinder. Using the combination of standard probe lengths & spacers will give the appropriate .030" gap between sensor and cylinder spud. The spacers supplied have the same base profile as the sensor

Material: Stainless Steel

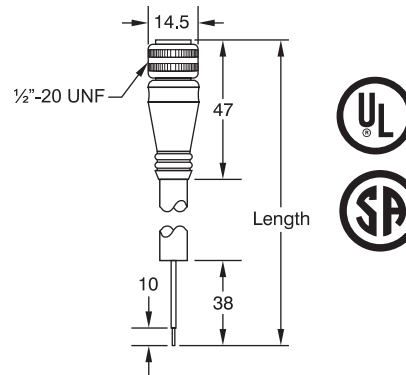


Technical Data – Cable Connectors

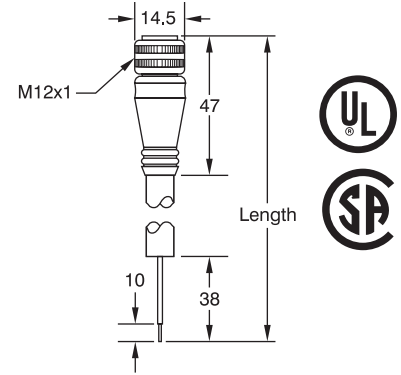
S5 - Mini Connectors
7/8"-16 UNF Threads



S21 - Micro Connectors
1/2"-20 UNF Threads



S4 - Micro Connectors
M12x1 Metric Threads



Recommended Connector	BCC A313-0000-10-071-VX43W6-050
Connector	3-5 Pole Mini
Style	Mini Size A
Configuration	Straight Female

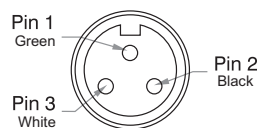
Recommended Connector	BCC A213-0000-1C-123-EX43T2-050
Connector	Micro AC 1/2" x 20 UNF
Style	3 Pin Dual Keyway
Configuration	Straight Female

Recommended Connector	BCC M415-0000-1A-003-VX44T2-050
Connector	Micro
Style	M12 DC Single Keyway
Configuration	Straight Female

	Order Number
3 Pole	BCC A313-0000-10-071-VX43W6-050
Voltage Rating	300 V AC/DC
Current	10 A
Wire Gauge	16 AWG
Jacket	PVC
Coupling Nut	Black Epoxy Coated Zinc
Protection	IP68 / NEMA 6P
Ambient Operating Temp.	-4°F - 221°F (-21°C - 105°C)
UL Listed	Yes
CSA Certified	Yes

For 3 pole versions only

Female 3-pin - Face view

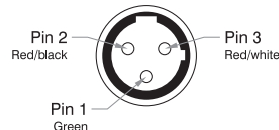


	Order Number
3 Pin Dual Keyway	BCC A213-0000-1C-123-EX43T2-050
Voltage Rating	250 V AC/DC
Current	4 A
Wire Gauge	22 AWG
Jacket	TPE
Coupling Nut	Black Epoxy Coated Zinc
O-Ring	FKM
Overmold Head	TPE
Protection	IP68 / NEMA 6P
Ambient Operating Temp.	-4°F - 221°F (-21°C - 105°C)
UL Listed	Yes
CSA Certified	Yes

Note: 15 ft (5 m) cable is standard (other lengths available - consult factory)

For 3 pole versions only

Female - Face view

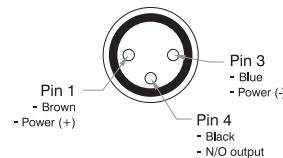


Note	Order Number
3 Wire DC	
3 Wire Normally Open, non-LED	BCC M415-0000-1A-001-*X43T2-050
3 Wire Normally Open PNP w/ LED	BCC M415-0000-1A-004-*X43T2-050
4 Wire DC (NO/NC)	
4 Wire, non-LED	BCC M415-0000-1A-003-*X44T2-050
4 Wire PNP w/LED	BCC M415-0000-1A-008-*X44T2-050
Voltage Rating	10 - 30 VDC
Current	4 A
Wire Gauge	22 AWG
Jacket	Yellow PVC or TPE
Coupling Nut	Black Epoxy Coated Zinc
Protection	IP68 / NEMA 6P
Ambient Operating Temp.	-4°F - 221°F (-21°C - 105°C)
UL Listed	Yes
CSA Certified	Yes

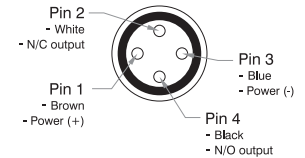
Note: 15 ft (5 m) cable is standard (other lengths available - consult factory)

* Insert V = PVC Cable
E = TPE Cable

Female - Face view



Female - Face view



Balluff Micropulse™ Linear Position Transducers

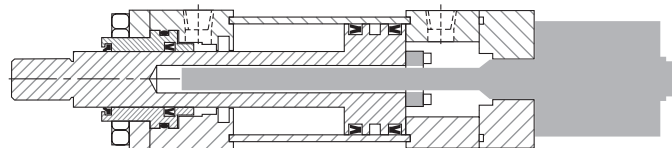
Transducers For Any Application

- Rod Styles
- Tubular Styles
- Embeddable Style
- Explosion-Proof Style (For J Series & Z-DEX Series, consult factory for details)

Internal Models – Z, W & K Series

- Not available on MP1 and MP2 Mounts. Consult factory for special applications.
- 1.50" to 8.00" Bores
- May require additional cap length
- Gun-drilled piston rod (Requires 1" piston rod or larger)
- Magnet (Installed on piston)

IMI Bimba will build your cylinder with the proper magnet, spacer plates (if required), drilling and tapping, intermediate supports (if required) and furnish the transducer as a complete unit. All cylinder/transducer assemblies are 100% tested at IMI Bimba before shipping (some exceptions apply).



Z Series Shown

How It Works

Enhanced Magnetostrictive Technology

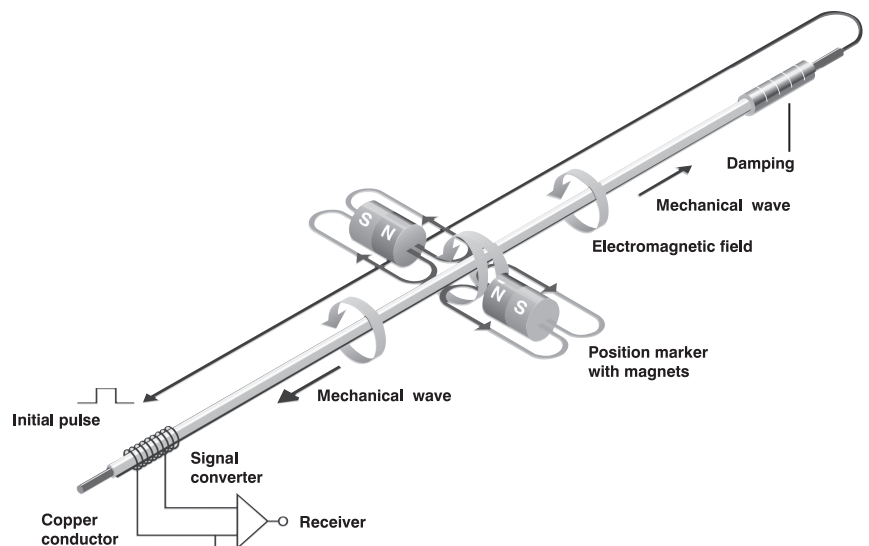
The waveguide consists of a special nickel-iron alloy with 0.7 mm O.D. and 0.5 mm I.D.

A copper conductor is introduced through the length of this tube. The start of measurement is initiated by a short current pulse. This current generates a circular magnetic field which rotates around the waveguide.

A permanent magnet at the point of measurement is used as the marker element, whose lines of field run at right angles to the electromagnetic field.

In the area on the waveguide where the two fields intersect, a magnetostrictive effect causes an elastic deformation of the waveguide, which propagates along the waveguide in both directions in the form of a mechanical wave.

The mechanical wave is converted to an electrical signal by the signal converter. The propagation time of the mechanical wave is determined by the position of the permanent magnet and can be determined to resolutions down to 5 μ m.



Technical Data - Transducer Rod Styles

Rod Style



Rugged, Compact Rod Style



Compact, Bolt-In Rod Style



– Z Series

- 3/4" x 16 UNF threads
- Pressure rated to 8700 PSI for use in hydraulic cylinders
- Replaceable electronics head
- Analog signal adjustable in field

– W Series

- Rugged all stainless steel housing
- Eliminates the need for protective cover
- Designed for demanding applications
- 3/4" - 16 UNF threads
- Pressure rated to 8700 PSI

– K Series

- Rugged all stainless steel housing
- Bolt in design
- Pressure rated to 8700 PSI
- Eliminates the need for protective cover

Sensor Output Options

Analog

0...10 V and 10...0 V	•	•	•
-5...+5 V and +5...-5 V	•	•	•
-10...+10 V and +10...-10 V	•	•	•
4...20 mA or 20...4 mA	•	•	•
0...20 mA or 20...0 mA	•	•	•

Digital

Start/Stop, RS422	•	•	•
Pulse-Width Modulated, RS422	•	•	•
PWM (w/ recirculation), RS422	•	•	•

Specialized

Synchronous Serial Interface*	•	•	•
CANopen	•		
Profibus DP	•		
Quadrature	•		

Resolution

0.1 mV (analog)		•	•
0.2 µA (analog)		•	•
16 bit (analog)	•		
Controller-dependent (Start/Stop & PWM)	•	•	•
1,2,3,5,10 µm selectable (Quadrature output)	•		
1,5,10,20,40 µm selectable (SSI output)	•	•	•
5 µm increments selectable (CANopen & Profibus)	•		

Stroke Length

Active measurement area: 1" to 156"	1" - 156"	1" - 156"	1" - 156"
(Consult factory for longer lengths)			

Wiring Options

Quick disconnect	•	•	•
Cable-out	•	•	•

Operating Voltage

24 V DC (±20%)	•	•	•
±15 V DC (±2%)	•	•	•

* 24 or 25 bit binary or gray code

Temposonics® Transducers

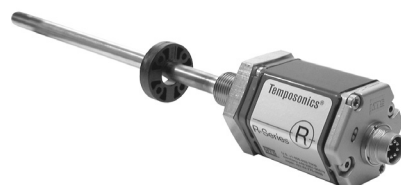
IMI Bimba will provide hydraulic cylinders built to your specifications and can incorporate Temposonics® Transducers in a wide variety of models.

Hydraulic/Pneumatic H Style

- Sensing element pressure housing threads into standard size port on cylinder end cap
- Industry standard for position feedback in fluid power cylinders
- Convenient sensor cartridge field replacement without need to break oil seal
- High pressure flange and isolation tube (5000 PSI static, 10,000 PSI spike)
- Additional output ranges available
- (2) Includes CANOpen and MTS multiple-magnet position, velocity and programmable limit switch output
- (3) R-Series SSI available with 0.001mm (0.00004 in.) resolution
- (4) Analog (Voltage or Current) resolution restricted by output ripple

Technical Data

R Series



A smart sensor for fast, high precision and synchronized position control applications.

G Series



Programmable sensors with built in diagnostics.

H Style – Hydraulic/Pneumatic Sensor Housing with Integral Electronics		
Direct Sensor Outputs	Voltage 0 to +10V, +10 to 0V -10 to +10V, +10 to -10V (1)	Voltage 0 to +10V, +10 to 0V -10 to +10V, +10 to -10V (1)
	Current 0 or 4 to 20 mA, 20 to 4 or 0 mA	Current 0 or 4 to 20 mA, 20 to 4 or 0 mA
	SSI, Synchronous Serial Interface, (absolute encoder format)	–
	Fieldbus - CANbus (2), DeviceNet, Profibus DP	–
	–	Digital Pulse Start/Stop or PWM
Stroke Length	50 to 7,620 mm (2 to 300 in.)	Voltage or Current 50 to 2,540 mm (2 to 100 in.) Digital Pulse 50 to 7,620 mm (2 to 300 in.)
Resolution	16 bit, as low as 0.01 mm (0.0004 in.) (Analog)	Infinite (6)
	as low as 0.002mm (0.00008 in.) (Digital) (5)	Controller Dependent (Digital Pulse)
Measurement Features	Position / Displacement	Position / Displacement
	Velocity	–
	Multiple magnets to 15	Multiple magnets to 15
	Analog Zero and Span Scale Adjustment	Analog Zero and Span Scale Adjustment
External Interfaces	–	TDU-200 Digital Display (for digital pulse outputs)
	–	MK-292 (Parallel 24 Bit Binary, BCD or Gray Code)