

Force Measurement Solutions



Mechanical
Hydraulic Load Cells

Electronic
Load Pins
Tension & Compression
Transducers
S-Type Tension & Compression
Transducers
Custom Force Sensors

Test Kits

Digital Indicators

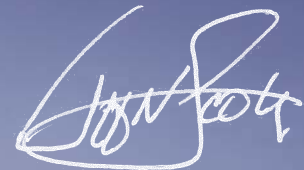


At NOSHOK, we pride ourselves on being innovators in the industry by continually offering the latest technology and measurement solutions, and providing the best customer support in the marketplace.

Established in 1967, NOSHOK was one of the first companies to offer liquid filled pressure gauges. We also took a bold step by backing our quality gauges with an extended 3-year warranty. That unwavering standard of quality has endured for over 45 years, and as we have expanded our product offering we continue to provide industry-leading warranties. NOSHOK also leads the industry as one of the first companies to offer corrosion-resistant zinc nickel plating standard on our carbon steel valves.

We have the capacity to put together special requirements which are so often hard to find. If you do not find what you need in this catalog, chances are we can still put a solution together.

NOSHOK is committed to providing excellence on every level. Thank you for choosing NOSHOK products.



Jeff N. Scott
President



NOSHOK Corporate Headquarters
Your Single Source Instrumentation Company

NOSHOK is a member and actively supports:



NOSHOK is an ISO 9001:2008 registered company.

WARRANTY INFORMATION

NOSHOK's **One Year Warranty** applies to all NOSHOK force measurement products, and all options & accessories listed in this catalog.

NOSHOK guarantees all products to be free from defects in material and workmanship and to operate within the catalogued performance specifications. These products must be operated within the catalogued environmental and application parameters. Determination of failure will be made by NOSHOK, Inc.'s equipment and personnel or a certified test facility specializing in this type of evaluation. Instrument failures determined to be caused by over-range, incompatibility with environment or product media and abuse will not be considered under this warranty. NOSHOK, Inc. will, at its discretion, repair or replace the working parts of the damaged gauge without cost to the customer.

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In keeping with and for purpose of product and/or manufacturing process improvements, NOSHOK, Inc. reserves the right to make design changes without prior notice.

6 cm² Nominal Diameter Hydraulic Load Cell



1000 SERIES

- Compact flat body design for compression force measurement
- Ranges from 150 lb_f to 7,000 lb_f
- Accuracy levels range from $\pm 0.125\%$ full scale (BFSL) to $\pm 1.5\%$ full scale, depending on the measuring instrument
- Durable stainless steel housing and piston provide exceptional corrosion resistance and durability
- A high quality NOSHOK 300 Series pressure gauge or 100, 200 or 615 Series transducer is directly mounted to the load cell for precise measurement indication
- Operates without an external power supply when using a pressure gauge for indication
- Provides an extremely high degree of accuracy because the load cell is vacuum filled and sealed, eliminating the error that can be caused by entrapped air
- Steel jacketed flexible tubing and capillary systems are offered to accommodate applications that require remote mounting of the gauge or transducer
- An optional liquid filled gauge dampens the effects of pulsation, vibration and shock, and lubricates the gauge internals for extended service life
- Various output signals available in transducer models that are CE compliant

APPLICATIONS

- Spot welding
- Control the forces of the stamp on printing machines
- Control the forces between rollers on printing equipment
- Measure and control the forces between welding tongs on spot welding machines
- Control systems
- Robotic equipment
- Production lines
- Testing equipment

SPECIFICATIONS

Nominal diameter	ND 6
Load cell housing	Stainless steel
Piston	6 cm ² Stainless steel Optional plastic for welding brackets
Max piston stroke	0.02" (0.5 mm)
Connecting type	Connecting spacer, 50 mm - standard Connecting spacer, 100 mm - optional Flexible tubing with spiral steel jacket - optional (Max. length 1 m)
Gauge fill fluid	Glycerine Others available upon request
Load cell fill	Silicone
Operating temperature	14 °F to 122 °F (-10 °C to 50 °C)
Ambient temperature	-4 °F to 140 °F (-20 °C to 60 °C)

ORDERING INFORMATION			
LOAD CELLS	106P ND 6 - Compression - plastic piston	106S ND 6 - Compression - stainless steel piston	
MEASURING RANGES	150A 150 lb _f	900A 900 lb _f	4800A 4,800 lb _f
	400A 400 lb _f	1400A 1,400 lb _f	7000A 7,000 lb _f
	750A 750 lb _f	2800A 2,800 lb _f	
	Other ranges available, please consult factory.		
INSTRUMENTS	1 25-300 Series gauge	7 200 Series transducer	
	6 100 Series transmitter	8 615 Series transducer	
INSTRUMENT ORIENTATIONS	A Bottom connection	C Right side connection	
	B Top connection	D Left side connection	
25-300 SERIES GAUGE OPTIONS	100 SERIES TRANSMITTER OPTIONS	200 SERIES TRANSDUCER OPTIONS	615 SERIES TRANSDUCER OPTIONS
0 No options 1 Dry gauge 2 Maximum indicating pointer 3 Set pointer 4 Rubber case protector 5 Glass overlay 6 Safety glass overlay	Accuracy	Accuracy	Accuracy
	1 0.50%	1 0.50%	1 0.25%
	2 0.25%	2 0.25%	2 0.125%
	Output	Output	Output
	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	1 4 mA to 20 mA
	Electrical Connection	3 1 Vdc to 5 Vdc	2 0 Vdc to 5 Vdc
	1 Option 7 with 36" cable	5 0 Vdc to 10 Vdc	3 1 Vdc to 5 Vdc
	3 6-pin Bendix	Electrical Connection	5 0 Vdc to 10 Vdc
	6 1/2" NPT conduit w/ 6" cable	1 Option 7 with 36" cable	Electrical Connection
	7 Mini-Hirschmann	3 6-pin Bendix	1 Option 8 with 36" cable
	25 M12 x 1 (4-pin)	6 1/2" NPT conduit w/36" cable	3 6-pin Bendix
		7 Mini-Hirschmann	6 1/2" NPT conduit w/ 36" cable
		25 M12 x 1 (4-pin)	8 Hirschmann
			25 M12 x 1 (4-pin)
CONNECTING TYPES	1 50 mm SS spacer	3 Capillary w/ spiral protective sleeve	
	2 100 mm SS spacer		
CAPILLARY LENGTH	## Specify in feet (for options 3 and 4)		

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: Separate multiple options with forward slash "/"

EXAMPLE - With Pressure Gauge

Load cell..... 1000 Series ND 6
 Measuring range..... 2,800 lb_f
 Instrument..... 25-300 Series gauge
 Instrument orientation..... Bottom connection
 Options..... Dry gauge, set pointer, RCP
 Connecting type..... 50 mm stainless steel spacer

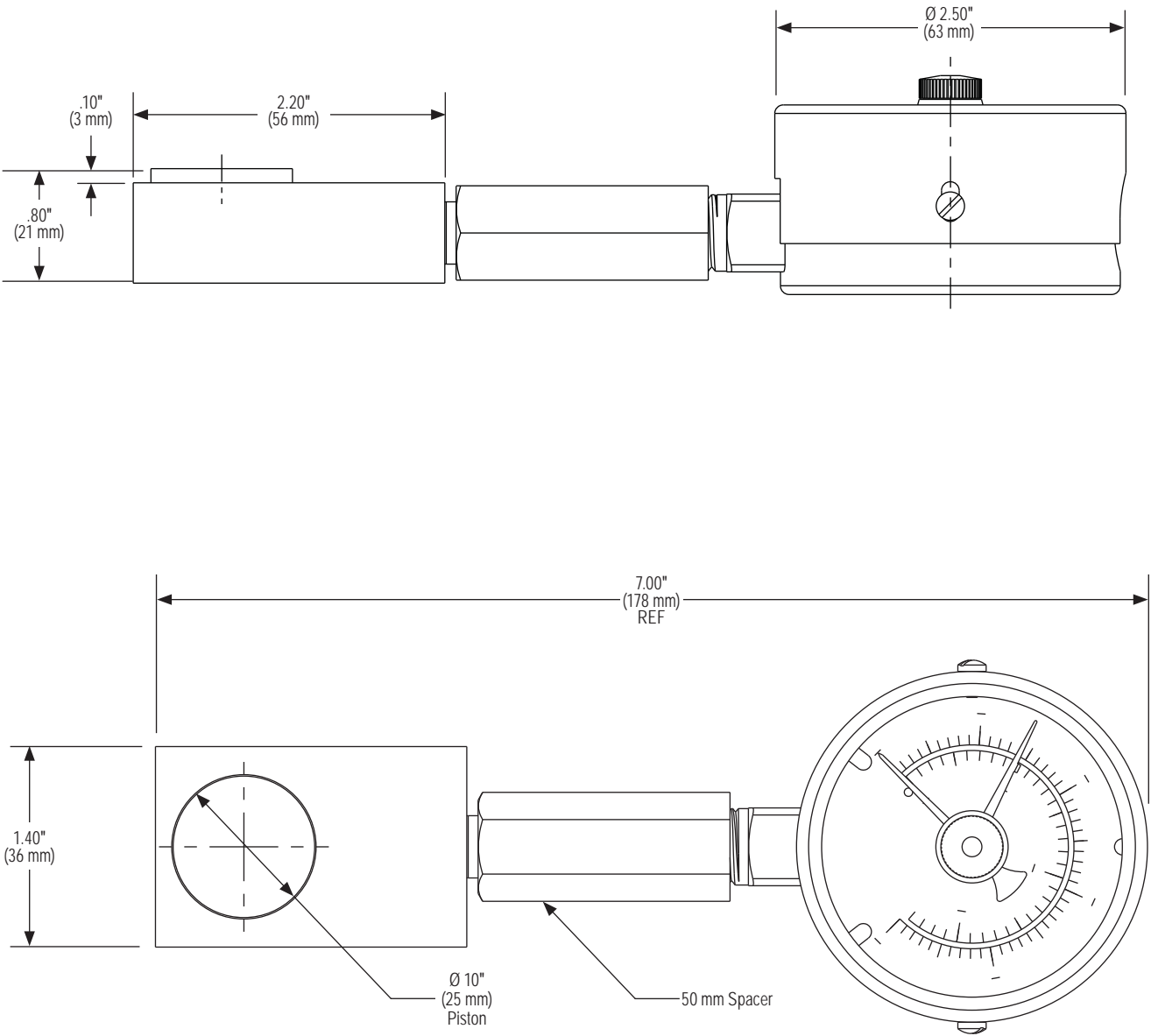
106S - 2800A - 1 - A - 1/3/4 - 1

EXAMPLE - With Pressure Transducer

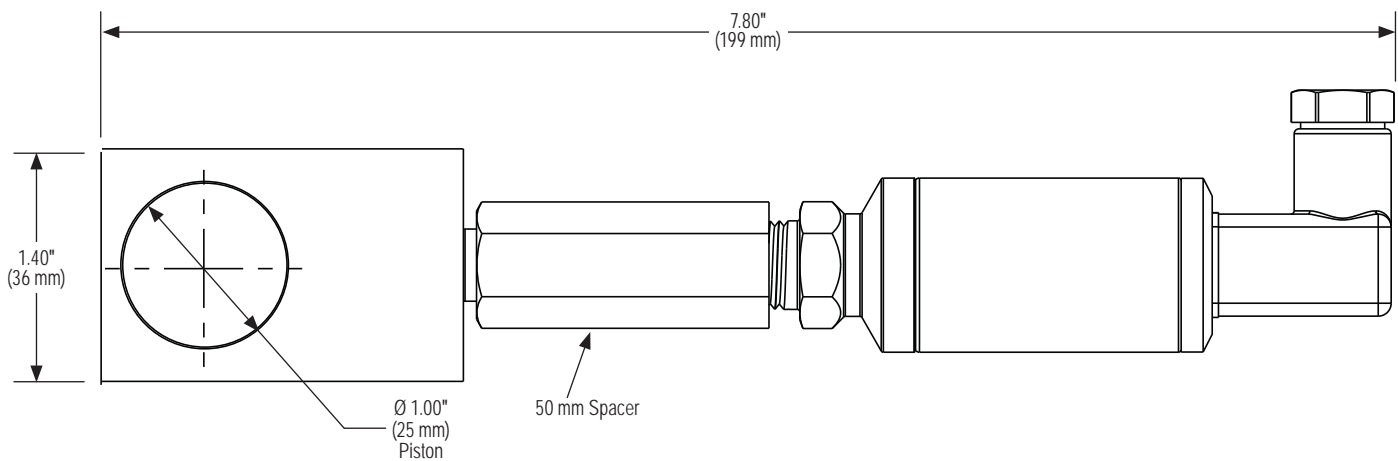
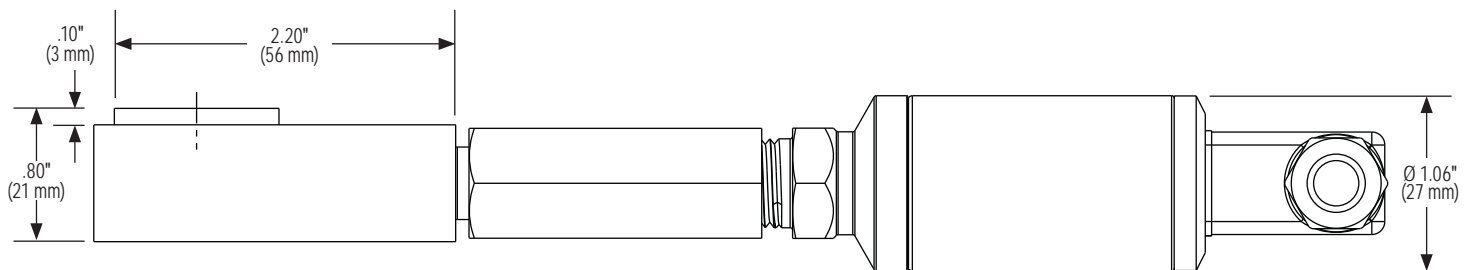
Load cell..... 1000 Series ND 6
 Measuring range..... 7,000 lb_f
 Instrument..... 615 Series transducer
 Instrument orientation..... Bottom connection
 Options..... 0.25% accuracy, 0 Vdc to 5 Vdc, M12 x 1 (4-pin)
 Connecting type..... Capillary w/ spiral protective sleeve
 Capillary length..... .5'

106S - 7000A - 8 - A - 1/2/25 - 3 - 5

With 25-300 Series Pressure Gauge



With 100/200 Series Transducer



Mechanical Force Measurement

20 cm² Nominal Diameter Hydraulic Load Cell



2000

SERIES

- Designed for measuring axial loads and bearing forces
- Standard or ring design fits most applications
- Ranges from 90 lb_f to 22,000 lb_f
- Accuracy levels range from ±0.125% full scale (BFSL) to ±1.5% full scale, depending on the measuring instrument
- Durable stainless steel housing and piston provide exceptional corrosion resistance and durability
- A high quality NOSHOK 300 or 901 Series pressure gauge or 100, 200 or 615 Series transducer is directly mounted to the load cell for precise measurement indication
- Operates without an external power supply when using a pressure gauge for indication
- Provides an extremely high degree of accuracy because the load cell is vacuum filled and sealed, eliminating the error that can be caused by entrapped air
- Steel jacketed flexible tubing and capillary systems are offered to accommodate applications that require remote mounting of the gauge or transducer
- An optional liquid filled gauge dampens the effects of pulsation, vibration and shock, and lubricates the gauge internals for extended service life
- Various output signals available in transducer models that are CE compliant

APPLICATIONS

- Turning and drilling machines
- Extruders
- Measuring and test equipment
- Production lines
- Overload protection
- Vices
- Control systems and machine tools

SPECIFICATIONS

Nominal diameter	ND 20
Load cell housing	Stainless steel
Piston	20 cm ² stainless steel
Max piston stroke	0.02" (0.5 mm)
Connecting type	Direct (standard) Flexible tubing with spiral steel jacket - optional (max. length 2 m) Capillary restrictor (optional)
Gauge fill fluid	Glycerine Others available upon request
Load cell fill	Silicone
Operating temperature	-4 °F to 140 °F (-20 °C to 60 °C)
Ambient temperature	-4 °F to 140 °F (-20 °C to 60 °C)

ORDERING INFORMATION									
LOAD CELLS		2020 ND 20 - Compression - standard design				2120 ND 20 - Compression or tension - ring design			
MEASURING RANGES		90A 90 lb _f		900A 900 lb _f		2500A 2,500 lb _f		9000A 9,000 lb _f	
		300A 300 lb _f		1200A 1,200 lb _f		3000A 3,000 lb _f		15000A 15,000 lb _f	
		600A 600 lb _f		1500A 1,500 lb _f		4500A 4,500 lb _f		22000A 22,000 lb _f *	
Other ranges available, please consult factory.									
INSTRUMENTS		1 25-300 Series gauge		6 100 Series transmitter		8 615 Series transducer			
		4 40-901 Series gauge		7 200 Series transducer					
INSTRUMENT ORIENTATIONS		A Bottom connection		B Top connection		C Right side connection		D Left side connection	
25-300 SERIES GAUGE OPTIONS		40-901 SERIES GAUGE OPTIONS		100 SERIES TRANSMITTER OPTIONS		200 SERIES TRANSDUCER OPTIONS		615 SERIES TRANSDUCER OPTIONS	
0 No options		0 No options		Accuracy		Accuracy		Accuracy	
1 Dry gauge		1 Dry gauge		1 0.50%		1 0.50%		1 0.25%	
2 Max. indicating pointer		2 Max. indicating pointer		2 0.25%		2 0.25%		2 0.125%	
3 Set pointer		3 Set pointer		Output		Output		Output	
4 Rubber case protector		4 Rubber case protector		1 4 mA to 20 mA		2 0 Vdc to 5 Vdc		1 4 mA to 20 mA	
5 Glass overlay		6 Safety glass		Electrical Connection		3 1 Vdc to 5 Vdc		2 0 Vdc to 5 Vdc	
6 Safety glass overlay		7 Adjustable pointer		1 Option 7 with 36" cable		5 0 Vdc to 10 Vdc		3 1 Vdc to 5 Vdc	
		8 SS rear flange		3 6-pin Bendix		Electrical Connection		5 0 Vdc to 10 Vdc	
		9 Spacer plate		6 1/2" NPT conduit w/ 36" cable		1 Option 7 with 36" cable		Electrical Connection	
				7 Mini-Hirschmann		3 6-pin Bendix		1 Option 8 with 36" cable	
				25 M12 x 1 (4-pin)		6 1/2" NPT conduit w/ 36" cable		3 6-pin Bendix	
						7 Mini-Hirschmann		6 1/2" NPT conduit w/ 36" cable	
						25 M12 x 1 (4-pin)		8 Hirschmann	
								25 M12 x 1 (4-pin)	
CONNECTING TYPES		0 Direct		2 100 mm SS spacer					
		1 50 mm SS spacer		3 Capillary w/ spiral protective sleeve					
CAPILLARY LENGTH		## Specify in feet (for options 3 and 4)							

* For 2120 only.

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: Separate multiple options with forward slash "/"

EXAMPLE - With Pressure Gauge

Load cell..... 2000 Series ND 20
 Measuring range..... 1,200 lb_f
 Instrument..... 40-901 Series gauge
 Instrument orientation..... Top connection
 Options..... Dry gauge, set pointer, adjustable pointer
 Connecting type..... Direct

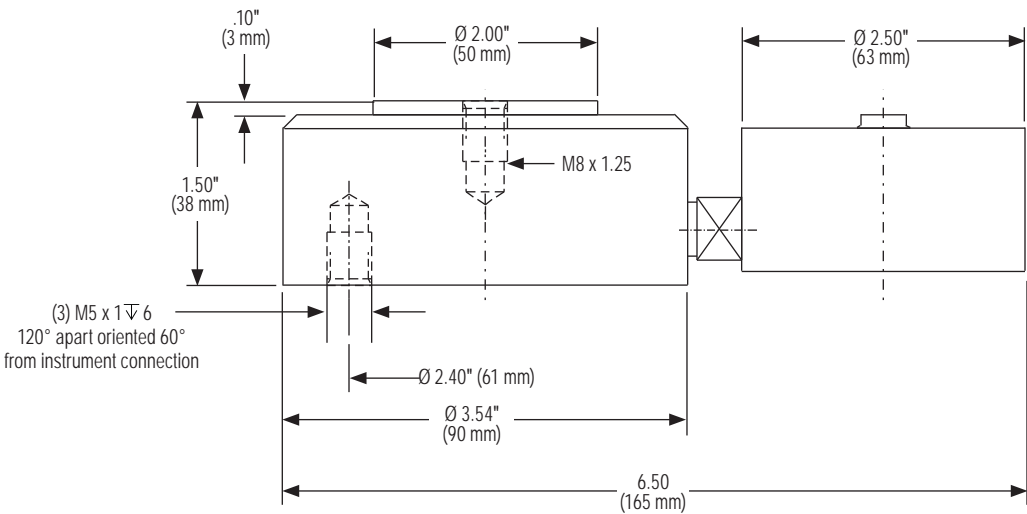
2020 - 1200A - 4 - B - 1/3/7 - 0

EXAMPLE - With Pressure Transducer

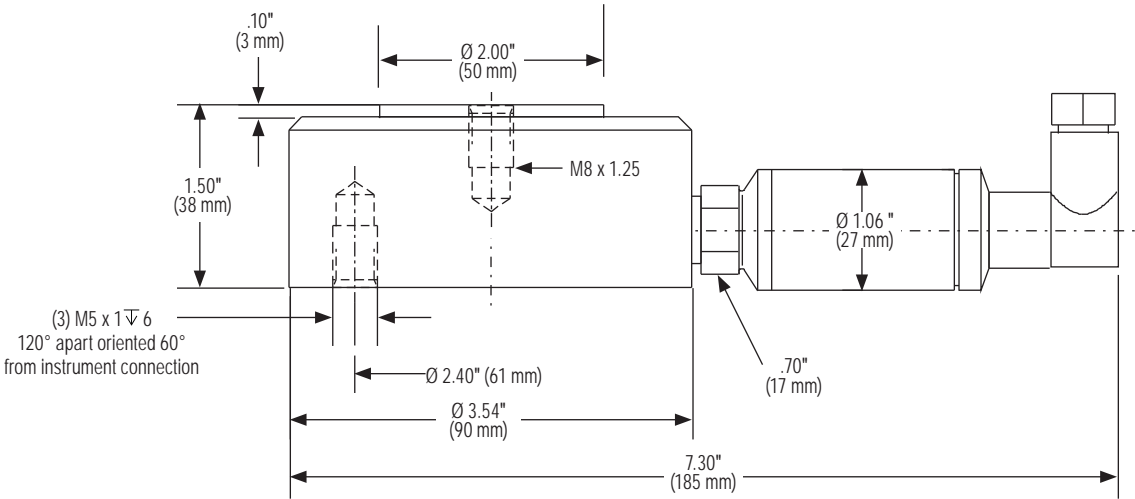
Load cell..... 2000 Series ND 20
 Measuring range..... 15,000 lb_f
 Instrument..... 615 Series transducer
 Instrument orientation..... Bottom connection
 Options..... 0.125% accuracy, 1 Vdc to 5 Vdc, 1/2" NPT w/36" cable
 Connecting type..... Capillary w/spiral protective sleeve
 Capillary length..... 5'

2120 - 15000A - 8 - A - 2/3/6 - 3 - 5

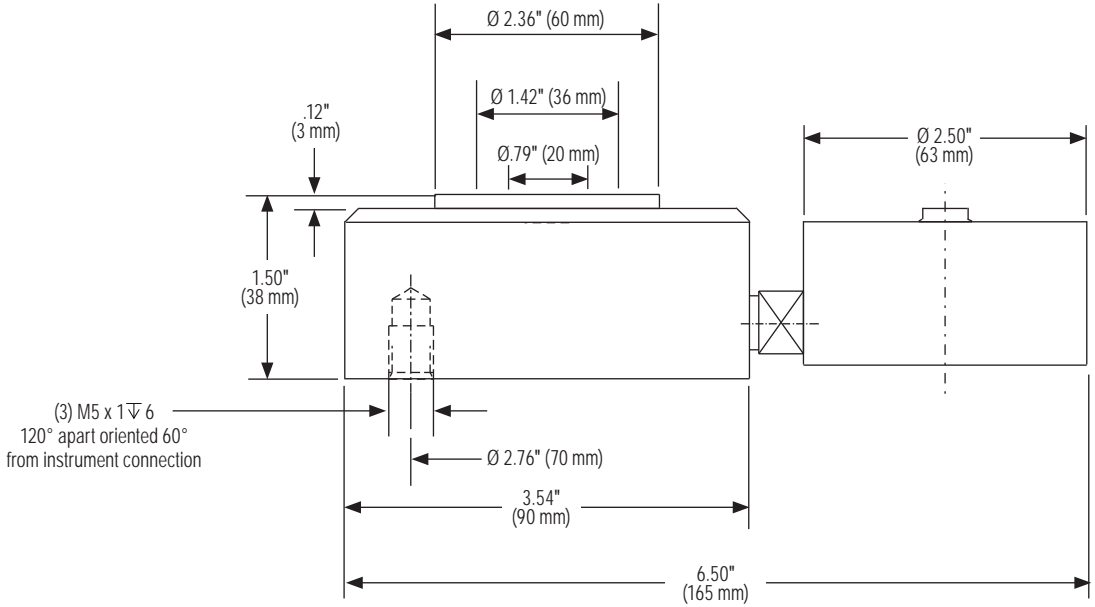
With 25-300 Series Pressure Gauge



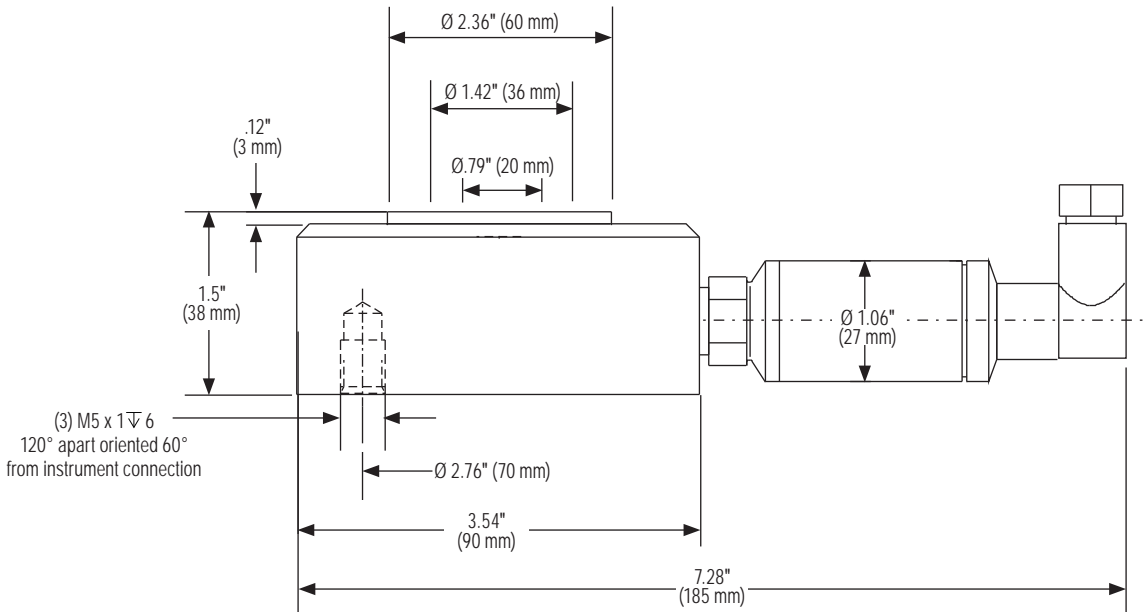
With 100/200 Series Pressure Transducer



Ring Design With 25-300 Series Pressure Gauge



Ring Design With 100/200 Series Pressure Transducer



80 cm² Nominal Diameter Hydraulic Load Cell



3000 SERIES

- Designed for measuring axial loads and bearing forces
- Ranges from 360 lb_f to 70,000 lb_f
- Lateral forces with an angle of $\pm 3^\circ$ can be regarded as negligible which allows the 3000 Series to provide the highest degree of accuracy
- Accuracy levels range from $\pm 0.125\%$ full scale (BFSL) to $\pm 1.5\%$ full scale, depending on the measuring instrument
- Various flexible and rigid tubing options allow easy installation in challenging application environments
- Durable stainless steel housing and self adapting piston provide exceptional corrosion resistance and durability
- A high quality NOSHOK 300 or 901 Series pressure gauge or 100, 200 or 615 Series transducer is directly mounted to the load cell for precise measurement indication
- Operates without an external power supply when using a pressure gauge for indication
- Provides an extremely high degree of accuracy because the load cell is vacuum filled and sealed, eliminating the error that can be caused by entrapped air
- Steel jacketed flexible tubing and capillary systems are offered to accommodate applications that require remote mounting of the gauge or transducer
- An optional fluid filled gauge dampens the effects of pulsation, vibration and shock, and lubricates the gauge internals for extended service life
- Various output signals available in transducer models that are CE compliant

APPLICATIONS

- Turning and drilling machines
- Extruders
- Measuring and test equipment
- Production lines
- Overload protection
- Vices
- Control systems and machine tools

SPECIFICATIONS

Nominal diameter	ND 80
Load cell housing	Stainless steel
Piston	80 cm ² stainless steel
Max piston stroke	0.02" (0.5 mm)
Connecting type	Direct (standard) Flexible tubing with spiral steel jacket - optional (max. length 2 m) Capillary restrictor (optional)
Gauge fill fluid	Glycerine Others available upon request
Load cell fill	Silicone
Operating temperature	-4 °F to 140 °F (-20 °C to 60 °C)
Ambient temperature	-4 °F to 140 °F (-20 °C to 60 °C)

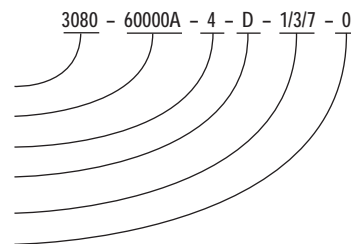
ORDERING INFORMATION									
LOAD CELL	3080 ND 80 - Compression - standard design								
MEASURING RANGES	360A	360 lb _f	2500A	2,500 lb _f	6000A	6,000 lb _f	18000A	18,000 lb _f	
	700A	700 lb _f	3500A	3,500 lb _f	9000A	9,000 lb _f	36000A	36,000 lb _f	
	2000A	2,000 lb _f	5000A	5,000 lb _f	10000A	10,000 lb _f	70000A	70,000 lb _f	
Other ranges available, please consult factory.									
INSTRUMENTS	1	25-300 Series gauge		6	100 Series transmitter		8	615 Series transducer	
	4	40-901 Series gauge		7	200 Series transducer				
INSTRUMENT ORIENTATIONS	A Bottom connection		B Top connection		C Right side connection		D Left side connection		
25-300 SERIES GAUGE OPTIONS	40-901 SERIES GAUGE OPTIONS		100 SERIES TRANSMITTER OPTIONS		200 SERIES TRANSDUCER OPTIONS		615 SERIES TRANSDUCER OPTIONS		
0 No options	0 No options		Accuracy		Accuracy		Accuracy		
1 Dry gauge	1 Dry gauge		1 0.50%		1 0.50%		1 0.25%		
2 Max. indicating pointer	2 Max. indicating pointer		2 0.25%		2 0.25%		2 0.125%		
3 Set pointer	3 Set pointer		Output		Output		Output		
4 Rubber case protector	4 Rubber case protector		1 4 mA to 20 mA		2 0 Vdc to 5 Vdc		1 4 mA to 20 mA		
5 Glass overlay	6 Safety glass		Electrical Connection		3 1 Vdc to 5 Vdc		2 0 Vdc to 5 Vdc		
6 Safety glass overlay	7 Adjustable pointer		1 Option 7 with 36" cable		5 0 Vdc to 10 Vdc		3 1 Vdc to 5 Vdc		
	8 SS rear flange		3 6-pin Bendix		Electrical Connection		5 0 Vdc to 10 Vdc		
	9 Spacer plate		6 1/2" NPT conduit w/ 36" cable		1 Option 7 with 36" cable		Electrical Connection		
			7 Mini-Hirschmann		3 6-pin Bendix		1 Option 8 with 36" cable		
			25 M12 x 1 (4-pin)		6 1/2" NPT conduit w/ 36" cable		3 6-pin Bendix		
					7 Mini-Hirschmann		6 1/2" NPT conduit w/ 36" cable		
					25 M12 x 1 (4-pin)		8 Hirschmann		
							25 M12 x 1 (4-pin)		
CONNECTING TYPES	0 Direct		2 100 mm SS spacer						
	1 50 mm SS spacer		3 Capillary w/ spiral protective sleeve						
CAPILLARY LENGTH	## Specify in feet (for options 3 and 4)								

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: Separate multiple options with forward slash "/"

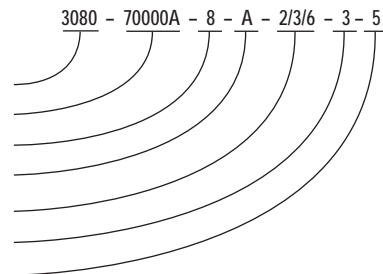
EXAMPLE - With Pressure Gauge

Load cell..... 3000 Series ND 80
 Measuring range..... 60,000 lb_f
 Instrument..... 40-901 Series gauge
 Instrument orientation..... Left side connection
 Options..... Dry gauge, set pointer, adjustable pointer
 Connecting type..... Direct

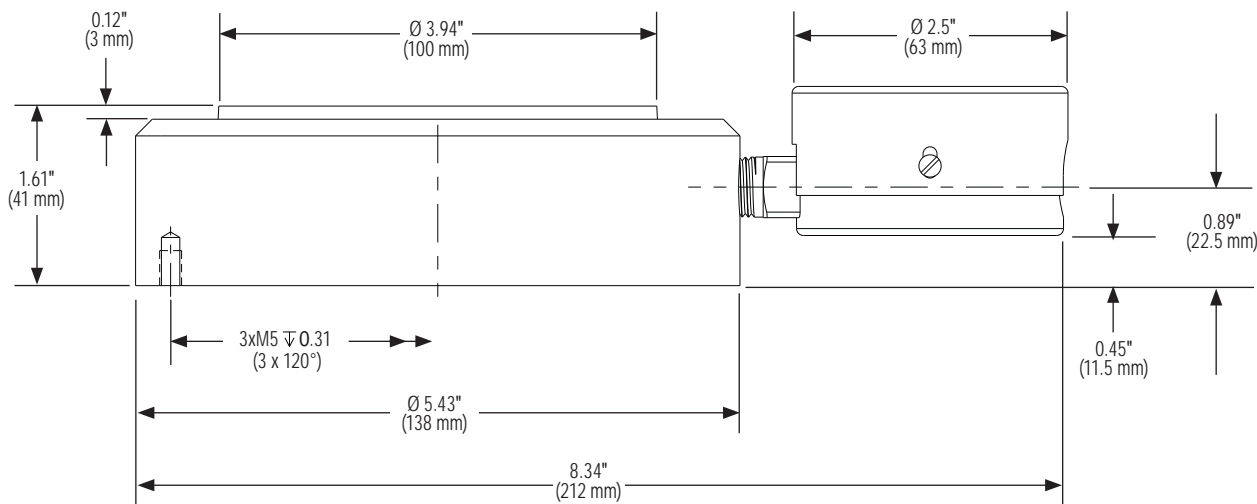


EXAMPLE - With Pressure Transducer

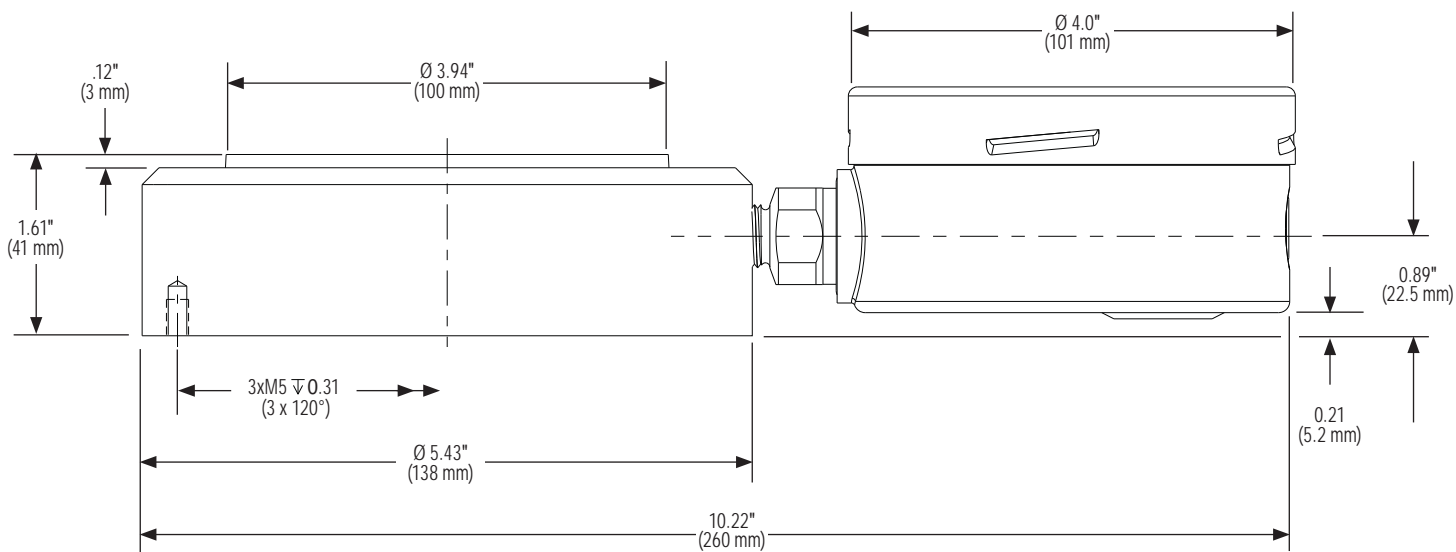
Load cell..... 3000 Series ND 80
 Measuring range..... 70,000 lb_f
 Instrument..... 615 Series transducer
 Instrument orientation..... Bottom connection
 Options..... 0.125% accuracy, 1 Vdc to 5 Vdc, 1/2" NPT w/36" cable
 Connecting type..... Capillary w/spiral protective sleeve
 Capillary length..... 5'



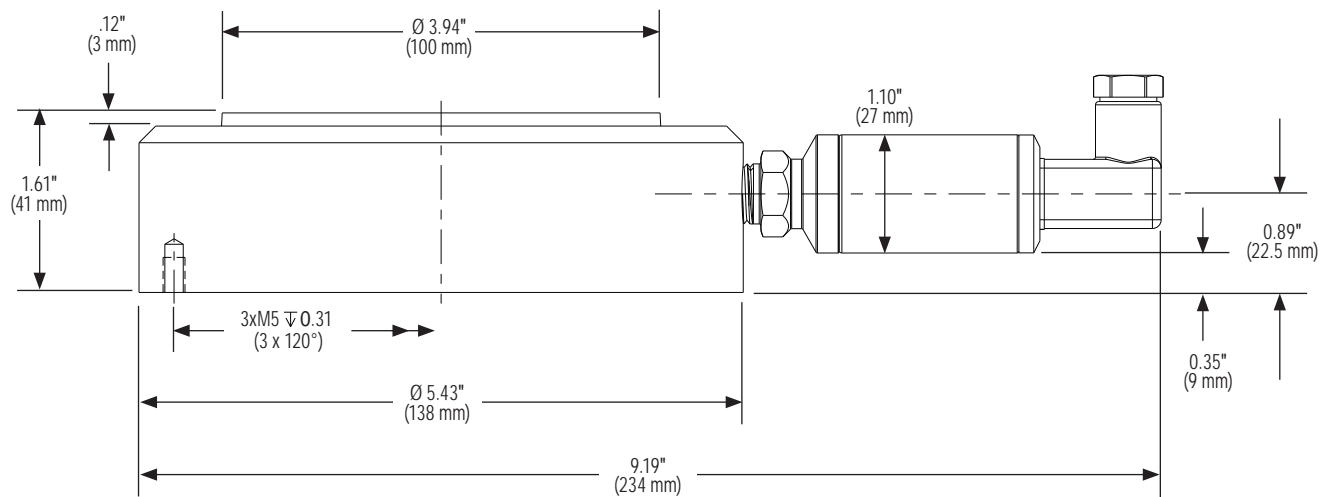
With 25-300 Series Pressure Gauge



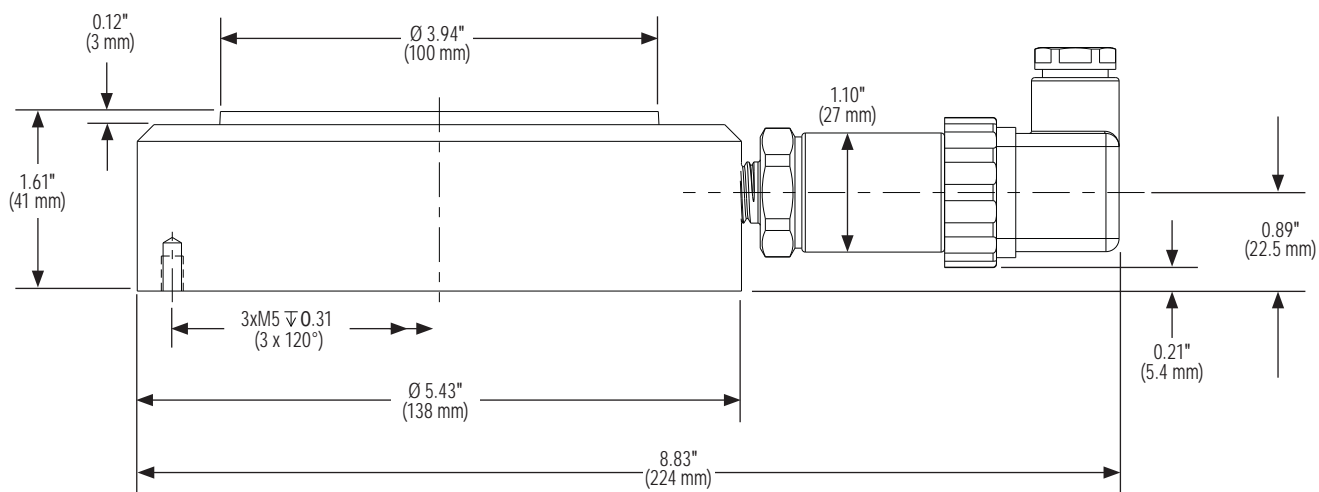
With 40-901 Series Pressure Gauge



With 100/200 Series Transducer



With 615 Series Transducer



Mechanical Force Measurement

10 cm² to 250 cm² Nominal Diameter Hydraulic Load Cell



4000

SERIES

- Engineered to provide superior performance in level measurement, rope and belt tension and torque measurement, bearing support forces on lifting equipment and other compression force measurement applications
- Ranges from 300 lb_f to 280 tons_f
- Accuracy levels range from ±0.125% full scale (BFSL) to ±1.5% full scale, depending on the measuring instrument
- Various flexible, rigid or capillary tubing connections combine versatility and strength to meet demanding application requirements
- Galvanized and chrome-plated steel housing with high grade stainless steel piston provides exceptional corrosion resistance and durability
- A high quality NOSHOK pressuring measuring instrument is directly mounted to the load cell for precise measurement indication – choose from an all stainless steel dry or liquid filled 400/500 Series pressure gauge, the 901 Series gauge with stainless steel housing, brass internals and liquid fill, or our 100, 200 or 615 Series transducers for highly accurate electronic measurement
- Operates without external power supply when using a pressure gauge for indication
- Various output signals available in transducer models that are CE compliant

APPLICATIONS

- Weight and level measurement: Content indication based on weight measurement for vertical and horizontal tanks and bulk containers
- Measurement of bearing and support forces for bridges, supporting framework and lifting gear
- Load measurement under railroad tracks
- Monitoring contents of bunkers and silos

SPECIFICATIONS

Nominal diameter	ND 10, ND 40, ND 100 or ND 250
Load cell housing	Galvanized and chrome-plated steel
Piston	100 cm² high grade stainless steel
Max piston stroke	0.03" (0.8 mm)
Connecting type	Rigid right angle tube, zinc-plated and chromated steel Rigid angled tube, zinc-plated and chromated steel Flexible tubing with 7 mm diameter spiral steel jacket Flexible tubing with 7 mm diameter spiral steel jacket and polyethylene jacket Capillary restrictor Bend with glands on the load cell
Gauge fill fluid	Glycerine Others available upon request
Load cell fill	Glycerine and water
Accessories	Ball and socket Round form load plate
Operating temperature	-13 °F to 194 °F (-25 °C to 90 °C)
Ambient temperature	-13 °F to 194 °F (-25 °C to 90 °C)

ORDERING INFORMATION												
LOAD CELLS		4010	ND 10 - Compression - standard design			4100	ND 100 - Compression - standard design					
		4040	ND 40 - Compression - standard design			4250	ND 250 - Compression - standard design					
MEASURING RANGES		4010 - ND 10			4040 - ND 40		4100 - ND 100		4250 - ND 250			
		300A	300 lb _f		5000A	5,000 lb _f		90000A	90,000 lb _f			
		600A	600 lb _f		6000A	6,000 lb _f		57F	57 tons _f			
		900A	900 lb _f		9000A	9,000 lb _f		75F	75 tons _f			
		1200A	1,200 lb _f		18000A	18,000 lb _f		110F	110 tons _f			
		1500A	1,500 lb _f		30000A	30,000 lb _f		Other ranges available, please consult factory.				
		3000A	3,000 lb _f		45000A	45,000 lb _f						
		4500A	4,500 lb _f		60000A	60,000 lb _f						
INSTRUMENTS		3	40-400 Series gauge			6	100 Series transmitter			8	615 Series transducer	
		5	60-400 Series gauge			7	200 Series transducer					
INSTRUMENT ORIENTATIONS		A Bottom connection			B Top connection			C Right side connection			D Left side connection	
40-400 SERIES GAUGE OPTIONS		60-400 SERIES GAUGE OPTIONS			100 SERIES TRANSMITTER OPTIONS			200 SERIES TRANSDUCER OPTIONS			615 SERIES TRANSDUCER OPTIONS	
0 No options		0 No options			Accuracy			Accuracy			Accuracy	
1 Glycerine filled		1 Glycerine filled			1 0.50%			1 0.50%			1 0.25%	
2 Max. indicating pointer		2 Max. indicating pointer			2 0.25%			2 0.25%			2 0.125%	
3 Set pointer		3 Set pointer			Output			Output			Output	
4 Rubber case protector		8 SS rear flange			1 4 mA to 20 mA			2 0 Vdc to 5 Vdc			1 4 mA to 20 mA	
6 Safety glass overlay					Electrical Connection			3 1 Vdc to 5 Vdc			2 0 Vdc to 5 Vdc	
7 Adjustable pointer					1 Option 7 with 36" cable			5 0 Vdc to 10 Vdc			3 1 Vdc to 5 Vdc	
8 SS rear flange					3 6-pin Bendix			Electrical Connection			5 0 Vdc to 10 Vdc	
					6 1/2" NPT conduit w/ 36" cable			1 Option 7 with 36" cable			Electrical Connection	
					7 Mini-Hirschmann			3 6-pin Bendix			1 Option 8 with 36" cable	
					25 M12 x 1 (4-pin)			6 1/2" NPT conduit w/ 36" cable			3 6-pin Bendix	
								7 Mini-Hirschmann			6 1/2" NPT conduit w/ 36" cable	
								25 M12 x 1 (4-pin)			8 Hirschmann	
											25 M12 x 1 (4-pin)	
CONNECTING TYPES		0	Direct			2	100 mm SS spacer					
		1	50 mm SS spacer			3	Capillary w/ spiral protective sleeve					
CAPILLARY LENGTH		## Specify in feet (for options 3 and 4)										

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: Separate multiple options with forward slash "/"

EXAMPLE - With Pressure Gauge

4100 - 110F - 5 - A - 3/8 - 3 - 10

Load cell.....4000 Series ND 100

Measuring range.....110 tons_f

Instrument.....60-400 Series gauge

Instrument orientation.....Bottom connection

Options.....Set pointer, SS rear flange

Connecting type...Capillary w/spiral protective sleeve

Capillary length.....10'

EXAMPLE - With Pressure Transducer

4100 - 90000A - 8 - A - 2/3/6 - 3 - 5

Load cell.....4000 Series ND 100

Measuring range.....90,000 lb_f

Instrument.....615 Series transducer

Instrument orientation.....Bottom connection

Options.....0.125% accuracy, 1 Vdc to 5 Vdc,
.....1/2" NPT conduit with 36" cable

Connecting type...Capillary w/spiral protective sleeve

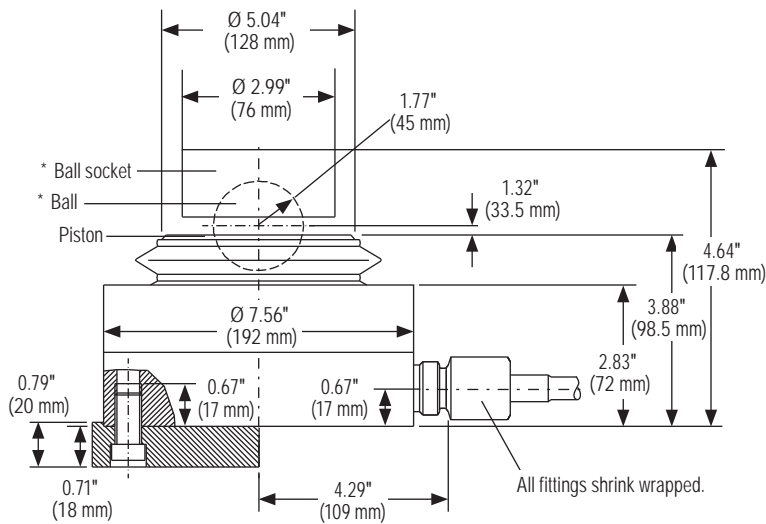
Capillary length.....5'

[illegible]

Position of the boring in the flange | Position of the threaded boring in the base of the casing

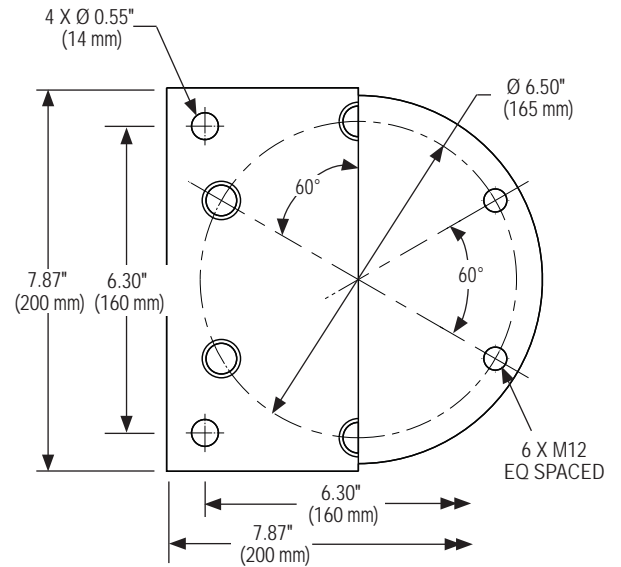
Position of the boring in the flange | Position of the threaded boring in the base of the casing

100 mm Load Cell



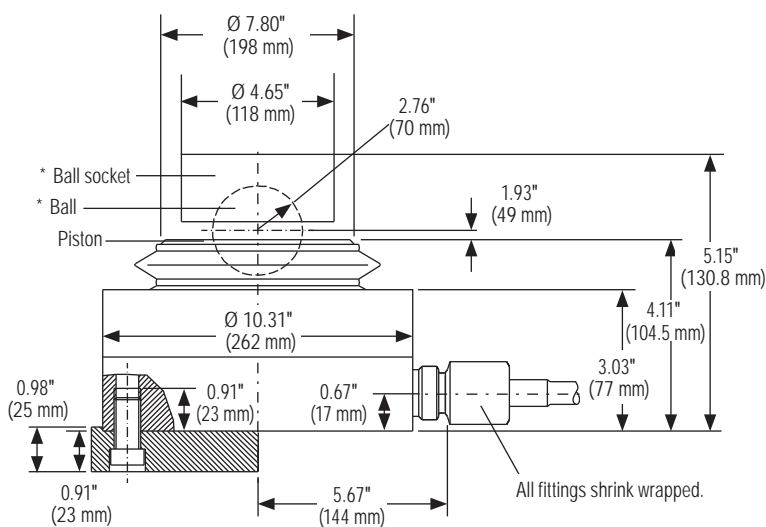
* Ball and ball socket for diameters 10 mm and 40 mm

**Round form load plate for diameters 100 mm and 250 mm



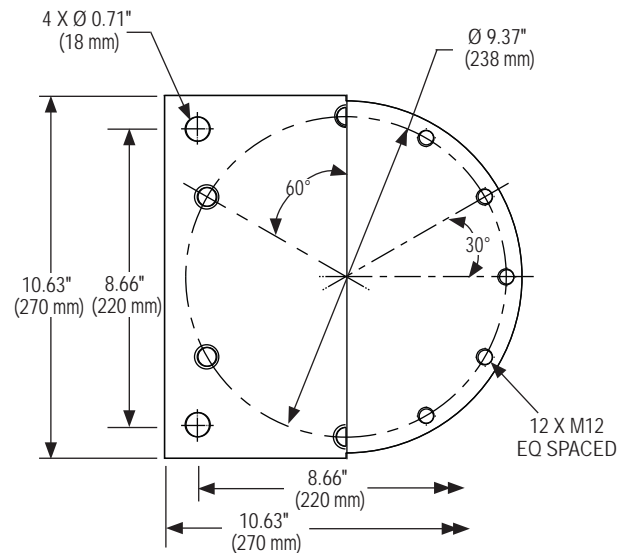
Position of the boring in the flange | Position of the threaded boring in the base of the casing

250 mm Load Cell



* Ball and ball socket for diameters 10 mm and 40 mm

**Round form load plate for diameters 100 mm and 250 mm



Position of the boring in the flange | Position of the threaded boring
in the base of the casing

40 cm² to 410 cm² Nominal Diameter Hydraulic Load Cell

5000 SERIES



- Designed in a distinctive ring shape to provide superior performance in compression or tension force measurement applications
- Ranges from 900 lb_f to 315 tons_f
- Accuracy levels range from $\pm 0.125\%$ full scale (BFSL) to $\pm 1.5\%$ full scale, depending on the measuring instrument
- Various flexible, rigid or capillary tubing connections combine versatility and strength to meet demanding application requirements
- High grade stainless steel housing and piston provide exceptional corrosion resistance and durability
- A high quality NOSHOK pressuring measuring instrument is directly mounted to the load cell for precise measurement indication – choose from an all stainless steel dry or liquid filled 400/500 Series pressure gauge, the 901 Series gauge with stainless steel housing, brass internals and liquid fill, or our 100, 200 or 615 Series transducers for highly accurate electronic measurement
- Operates without external power supply when using a pressure gauge for indication
- Various output signals available in transducer models that are CE compliant

APPLICATIONS

- Injection molding machine screws, tailstock spindles, propeller shafts, rope and torque measurement
- Material handling and hoisting technology; measurement of tension force in cables and ropes on coal excavators and supervision of steel rope tension on cable railways
- Adjustment and monitoring of compression forces at rolling frames; mounted underneath the screw-down gear of the roller bearing
- Adjustment and monitoring at turning, milling and deep-hole boring machines; forward feed force measurement and overload detection (i.e. at tool breakage)
- Rock thrust measurement in fore poles in mines and tunnel construction

SPECIFICATIONS

Nominal diameter	ND 40, ND 60, ND 90, ND 160, ND 240 or ND 410
Load cell housing	160 cm ² high grade stainless steel
Piston	High grade stainless steel
Max piston stroke	0.03" (0.8 mm)
Connecting type	Rigid right angle tube, zinc-plated and chromated steel Rigid angled tube, zinc-plated and chromated steel Flexible tubing with 7 mm diameter spiral steel jacket Flexible tubing with 7 mm diameter spiral steel jacket and polyethylene jacket Capillary restrictor Bend with glands on the load cell
Standard lengths: 1 m, 2 m, 3 m, 4 m, 6 m Maximum: 16 m	
Gauge fill fluid	Glycerine Others available upon request
Load cell fill	Glycerine and water
Accessories	Ball and socket Round form load plate
Operating temperature	-13 °F to 194 °F (-25 °C to 90 °C)
Ambient temperature	-13 °F to 194 °F (-25 °C to 90 °C)

ORDERING INFORMATION						
LOAD CELLS	5040	ND 40 - Compression or tension - ring type design		5090	ND 90 - Compression or tension - ring type design	
	5060	ND 60 - Compression or tension - ring type design		5160	ND 160 - Compression or tension - ring type design	
MEASURING RANGES	5040 - ND 40	5060 - ND 60	5090 - ND 90	5160 - ND 160	5240 - ND 240	5410 - ND 410
	900A 900 lb _f	1500A 1,500 lb _f	2200A 2,200 lb _f	4000A 4,000 lb _f	6000A 6,000 lb _f	10000A 10,000 lb _f
	1200A 1,200 lb _f	3600A 3,600 lb _f	4200A 4,200 lb _f	10000A 10,000 lb _f	18000A 18,000 lb _f	25000A 25,000 lb _f
	3000A 3,000 lb _f	7000A 7,000 lb _f	8500A 8,500 lb _f	20000A 20,000 lb _f	30000A 30,000 lb _f	50000A 50,000 lb _f
	6000A 6,000 lb _f	9000A 9,000 lb _f	10500A 10,500 lb _f	50000A 50,000 lb _f	75000A 75,000 lb _f	85F 85 tons _f
	12000A 12,000 lb _f	18000A 18,000 lb _f	28000A 28,000 lb _f	75F 75 tons _f	110F 110 tons _f	160F 160 tons _f
	30000A 30,000 lb _f	45000A 45,000 lb _f	70000A 70,000 lb _f	125F 125 tons _f	180F 180 tons _f	315F 315 tons _f
	60000A 60,000 lb _f	90000A 90,000 lb _f	70F 70 tons _f			
	Other ranges available, please consult factory.					
	INSTRUMENTS	3	40-400 Series gauge		6	100 Series transmitter
5		60-400 Series gauge		7	200 Series transducer	
INSTRUMENT ORIENTATIONS	A Bottom connection		B Top connection		C Right side connection	
					D Left side connection	
40-400 SERIES GAUGE OPTIONS	60-400 SERIES GAUGE OPTIONS		100 SERIES TRANSMITTER OPTIONS		200 SERIES TRANSDUCER OPTIONS	
0 No options	0 No options		Accuracy		Accuracy	
1 Glycerine filled	1 Glycerine filled		1 0.50%		1 0.50%	
2 Max. indicating pointer	2 Max. indicating pointer		2 0.25%		2 0.25%	
3 Set pointer	3 Set pointer		Output		Output	
4 Rubber case protector	8 SS rear flange		1 4 mA to 20 mA		2 0 Vdc to 5 Vdc	
6 Safety glass overlay			Electrical Connection		3 1 Vdc to 5 Vdc	
7 Adjustable pointer			1 Option 7 with 36" cable		5 0 Vdc to 10 Vdc	
8 SS rear flange			3 6-pin Bendix		Electrical Connection	
			6 1/2" NPT conduit w/ 36" cable		1 Option 7 with 36" cable	
			7 Mini-Hirschmann		3 6-pin Bendix	
			25 M12 x 1 (4-pin)		6 1/2" NPT conduit w/ 36" cable	
					7 Mini-Hirschmann	
					25 M12 x 1 (4-pin)	
					8 Hirschmann	
					25 M12 x 1 (4-pin)	
CONNECTING TYPES	0	Direct connection		2	100 mm SS spacer	
	1	50 mm SS spacer		3	Capillary w/ spiral protective sleeve	
CAPILLARY LENGTH	## Specify in feet (for options 3 and 4)					

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: Separate multiple options with forward slash "/"

EXAMPLE - With Pressure Gauge

5410 - 160F - 5 - A - 3/8 - 3 - 10

Load cell.....5000 Series ND 410
Measuring range.....160 tons_f
Instrument.....60-400 Series gauge
Instrument orientation.....Bottom connection
Options.....Set pointer, SS rear flange
Connecting type...Capillary w/spiral protective sleeve
Capillary length.....10'

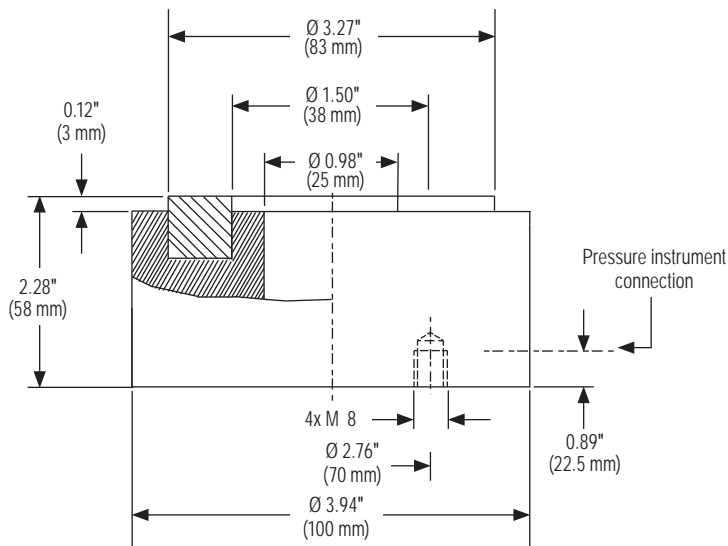
EXAMPLE - With Pressure Transducer

5090 - 70000A - 8 - A - 2/3/6 - 3 - 5

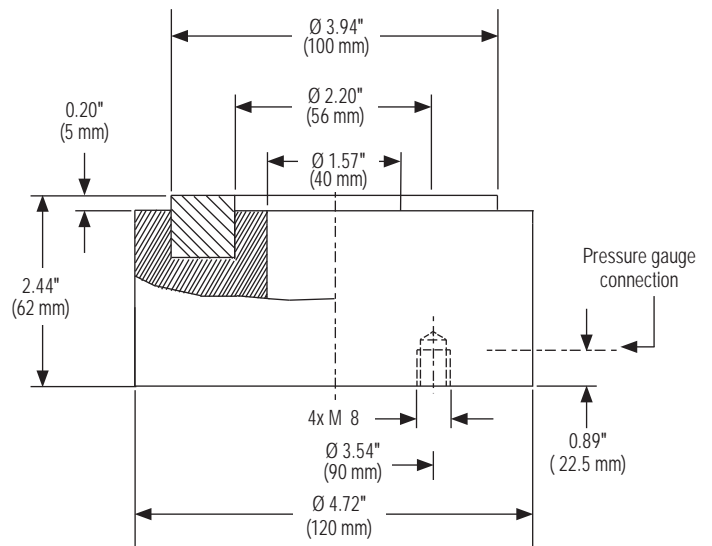
Load cell.....5000 Series ND 90
Measuring range.....70,000 lb_f
Instrument.....615 Series transducer
Instrument orientation.....Bottom connection
Options.....0.125% accuracy, 1 Vdc to 5 Vdc,
.....1/2" NPT conduit with 36" cable
Connecting type...Capillary w/spiral protective sleeve
Capillary length.....5'

Dimensions

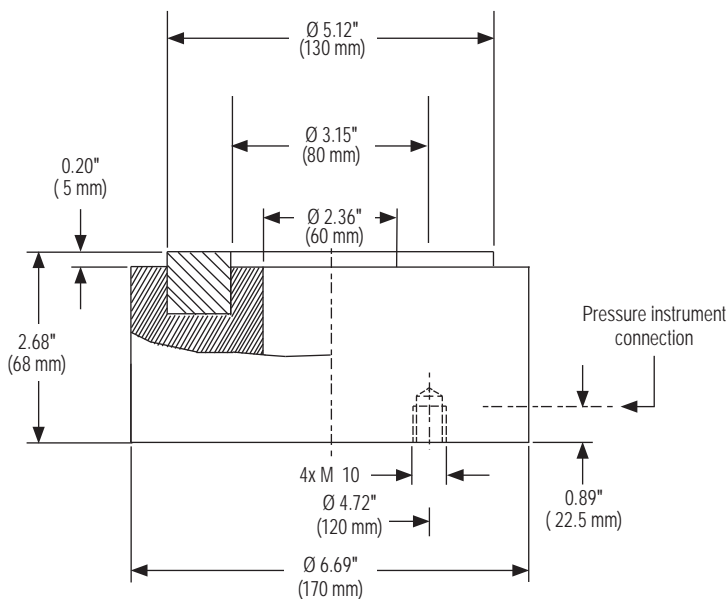
ND 40 Load Cell



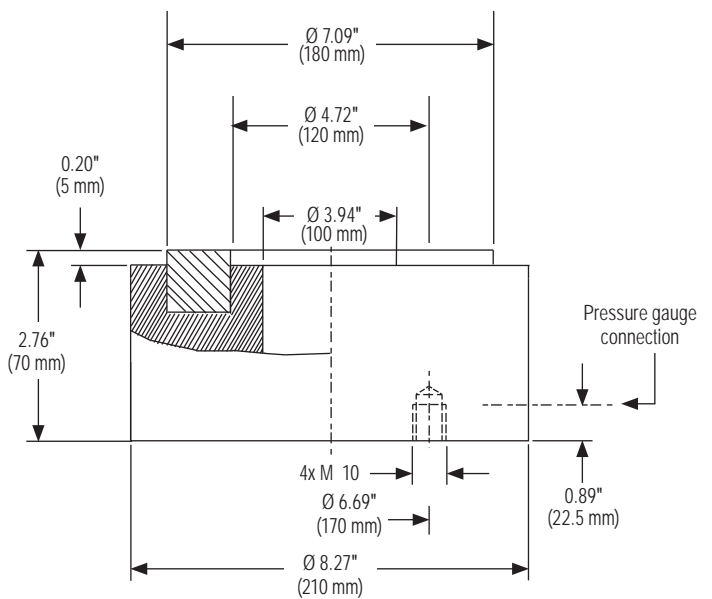
ND 60 Load Cell



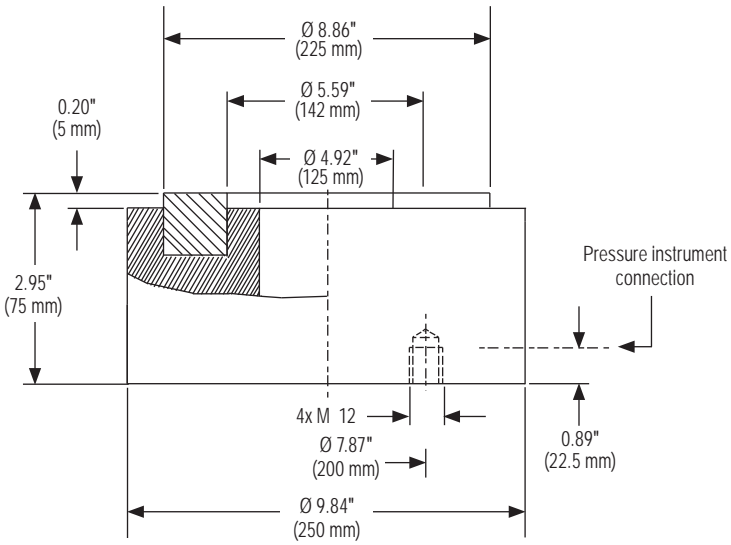
ND 90 Load Cell



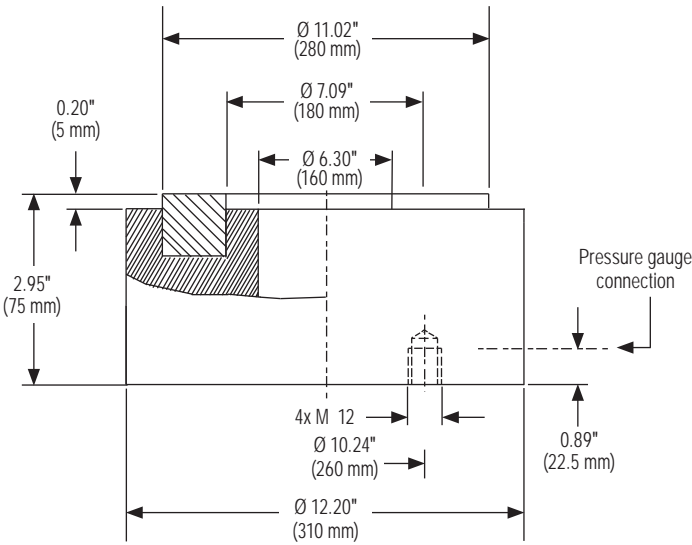
ND 160 Load Cell



ND 240 Load Cell



ND 410 Load Cell





5301/5308 SERIES

- Utilizes proven thin film sensor technology laser welded directly to the measuring instrument to provide accuracies up to $\pm 0.5\%$
- Minimizes the disadvantages seen in the bonded foil versions (temperature drifts and long term stability)
- Measuring ranges from 0 kN to 5 kN through 0 kN to 200 kN
- Available in a variety of sizes and shapes for direct replacement of existing bolts
- Various output signals are available to integrate with almost any electrical system

APPLICATIONS

- Shear force measurement
- Force measurement on roller bearings
- Industrial weighing
- Measurement of cable tension on hoists and overload protection on cranes

SPECIFICATIONS

Output signals	1-2 mV/V (4-wire), 4 mA to 20 mA (2-wire), 0 Vdc to 10 Vdc (3-wire), CANopen®, PROFIBUS®, others available on request
Measuring ranges	0 kN to 5 kN through 0 kN to 200 kN
Accuracy	$\pm 2.0\%$ full scale to $\pm 0.5\%$ full scale
Housing material	316 stainless steel
Environmental protection	NEMA 4X, IP67 per EN 60529/IEC 529
Operating temperature	-40 °F to 176 °F (-40 °C to 80 °C)
Electrical protection	Reverse polarity, overvoltage and short circuit protection
Nominal deflection	<0.002" (<0.05 mm)
Weight	5 kN: 0.51 lb (230 g) 10 kN: 0.66 lb (300 g) 20 kN: 0.95 lb (430 g) 30 kN: 1.39 lb (630 g) 50 kN: 2.09 lb (950 g)

CANopen® is a registered trademark of the CAN in Automation User's Group.
Profibus® is a registered trademark of Profibus International.

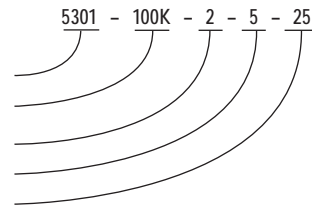
ORDERING INFORMATION					
SERIES	5301 Standard	5308 Custom			
MEASURING RANGES	5K 0 kN to 5 kN	20K 0 kN to 20 kN	50K 0 kN to 50 kN	200K 0 kN to 200 kN	
	10K 0 kN to 10 kN	30K 0 kN to 30 kN	100K 0 kN to 100 kN		
ACCURACIES	1 ±2.0% full scale	2 ±1.0% full scale	3 ±0.5% full scale*		
OUTPUT SIGNALS	1 4 mA to 20 mA	5 0 Vdc to 10 Vdc			
ELECTRICAL CONNECTION	25 M12 x 1 (4-pin)				

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* For 5308 only.

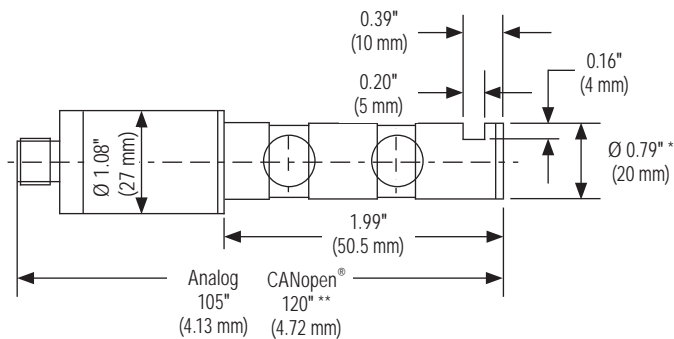
EXAMPLE

Series5301 Series
 Measuring range 0 kN to 100 kN
 Accuracy ±1.0% full scale
 Output signal 0 Vdc to 10 Vdc
 Electrical connection M12 x 1 (4-pin)

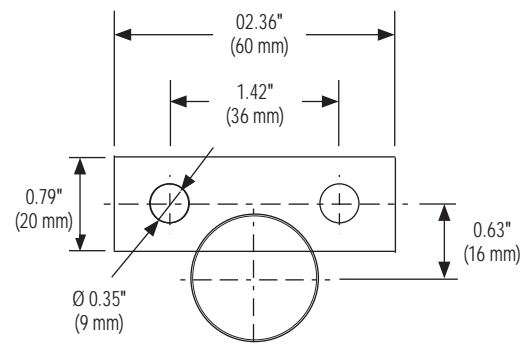


5301 Series

5301 Series - 5 kN



Axle bracket acc. to DIN 15 058
(to be ordered separately)

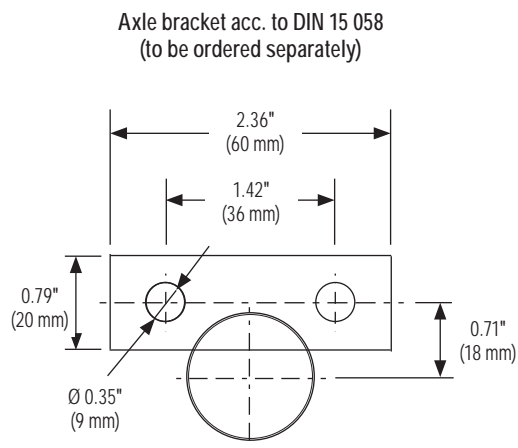
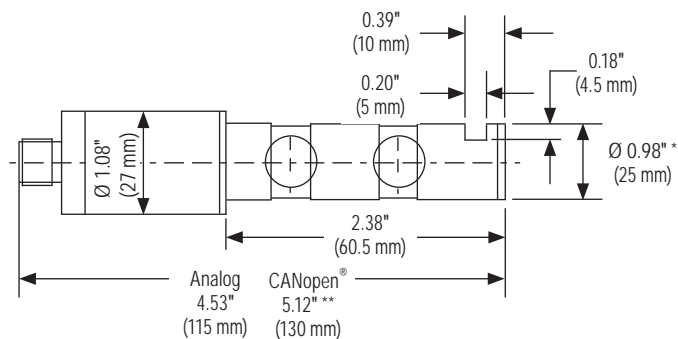


* Other load pin-Ø available

** Case diameter 1-37/64" (40 mm)

Dimensions

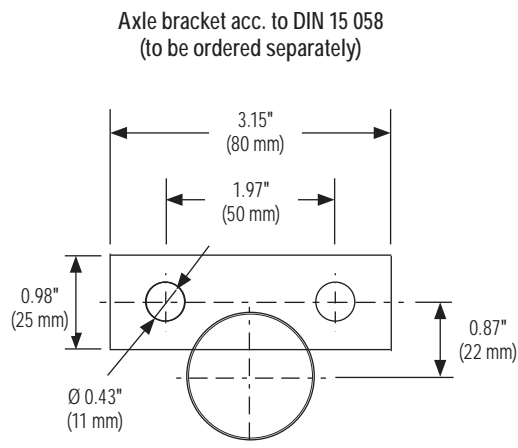
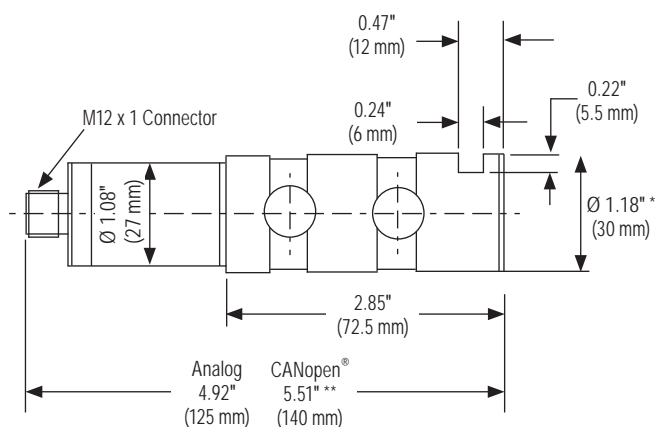
5301 Series - 10 kN



* Other load pin-Ø available

** Case diameter 1-37/64" (40 mm)

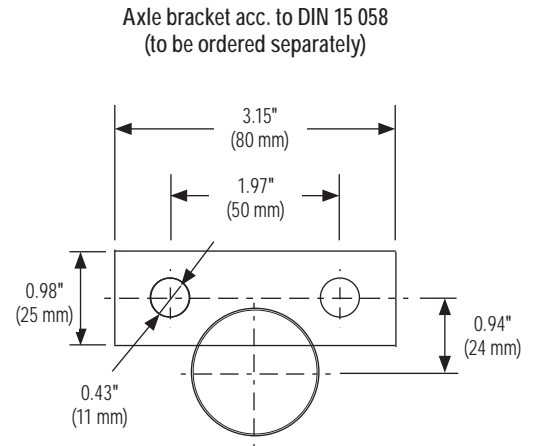
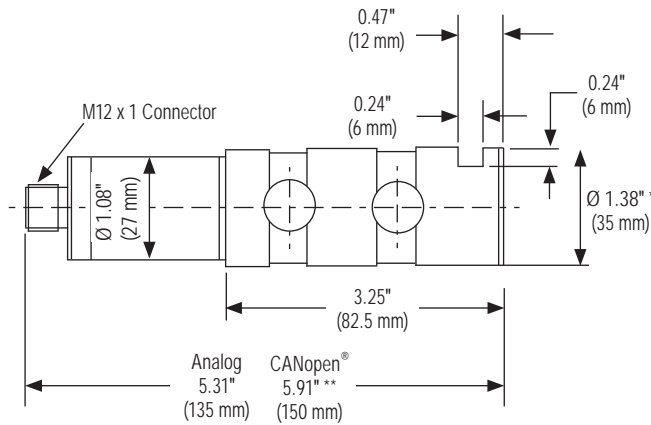
5308 Series - 20 kN



* Other load pin-Ø available

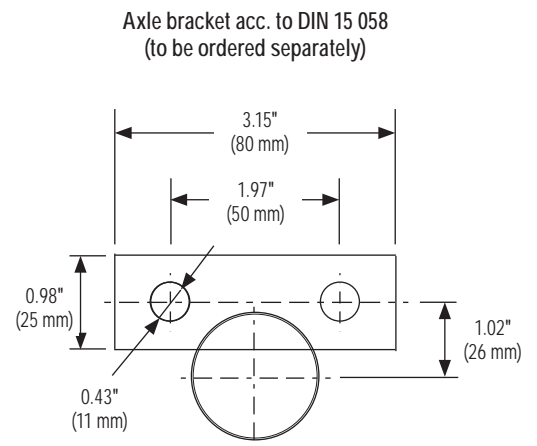
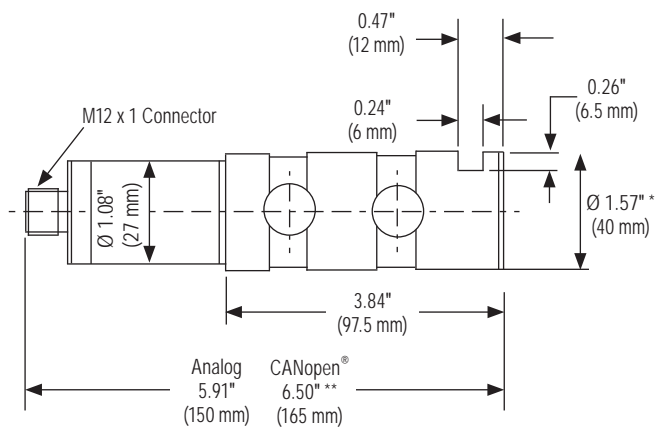
** Case diameter 1-37/64" (40 mm)

5308 Series - 30 kN



* Other load pin-Ø available
 ** Case diameter 1-37/64" (40 mm)

5308 Series - 50 kN



* Other load pin-Ø available
 ** Case diameter 1-37/64" (40 mm)

Tension & Compression Force Transducer



3540 SERIES

- Available in a variety of sizes and shapes to fit almost any application
- Measuring ranges from 0 kN to 1 kN through 0 kN to 500 kN
- Several outputs are available in both amplified and unamplified to interface with most electrical systems
- 316 stainless steel construction on many versions provides corrosion-resistance and durability - ideal for harsh environments
- Sputtered thin film sensor for maximum repeatability and stability

APPLICATIONS

- Cable or rod tension
- Weight measurement
- Overload protection
- Clamping force
- Fill level measurement

SPECIFICATIONS

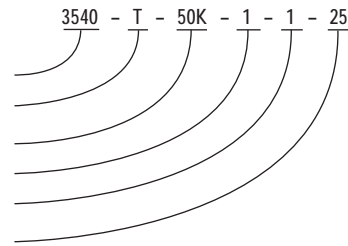
Series	3540								
Nominal load	kN	2	5	10	20	30	50	100	500
	lb _f	450	1124	2248	4496	6744	11240	22481	112404
Limit load	150% full scale								
Fracture load	>300% full scale								
Permissible oscillation	±80% full scale according to DIN 50100								
Output signal	4 mA to 20 mA, 2-wire or 3-wire; 0 Vdc to 10 Vdc, 3-wire								
Accuracy	<±0.2% F.S.								
Hysteresis	<±0.1% F.S.								
Stability	<±0.1% F.S. at F _{nom}								
Ambient temperature range	-4 °F to 176 °F (-20 °C to 80 °C)								
Storage temperature range	-4 °F to 212 °F (-20 °C to 100 °C)								
Temperature effect	-span	<±0.01% F _{nom} / °F							
	-zero	<±0.01% F _{nom} / °F							
Vibration effect	20 g, 100h, 50 Hz to 150 Hz according to IEC68-2-6-Fc								
Environmental protection	IP 67 according to EN 60 529 /IEC 529								
Electrical connection	M12 x 1 or cable								
Power supply	0 Vdc to 10 Vdc for 4 mA to 20 mA output 14 Vdc to 30 Vdc for 10 Vdc to 30 Vdc output								
Current consumption	4 mA to 20 mA, signal 0 to 10 Vdc, 8 mA								
Response time	<1 ms (within 10% to 90% F _{nom})								
Noise protection	CE compliant; RFI, EMI and ESD protected according to EN 61326								
Electrical protection	Short circuit, overvoltage and reverse polarity protection								
Material	17-4PH Stainless steel								

ORDERING INFORMATION								
SERIES	3540							
FORCE TYPES	T Tension		C Compression		TC Tension/compression			
MEASURING RANGES	1K	0 kN to 1 kN	10K	0 kN to 10 kN	50K	0 kN to 50 kN	300K	0 kN to 300 kN
	2K	0 kN to 2 kN	20K	0 kN to 20 kN	100K	0 kN to 100 kN	500K	0 kN to 500 kN
	5K	0 kN to 5 kN	30K	0 kN to 30 kN	200K	0 kN to 200 kN		
ACCURACY	1	±0.2% full scale						
OUTPUT SIGNALS	1	4 mA to 20 mA		5	0 Vdc to 10 Vdc			
ELECTRICAL CONNECTION	25	M12 x 1 (4-pin)						

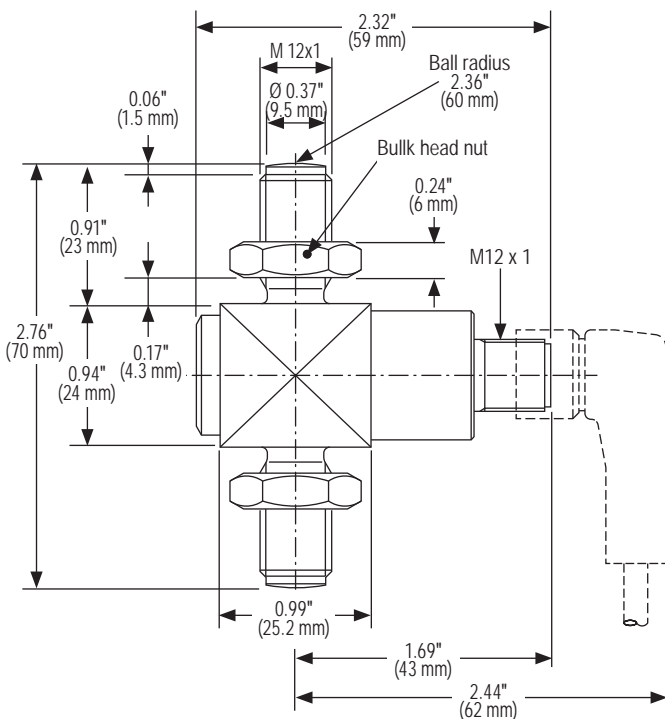
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

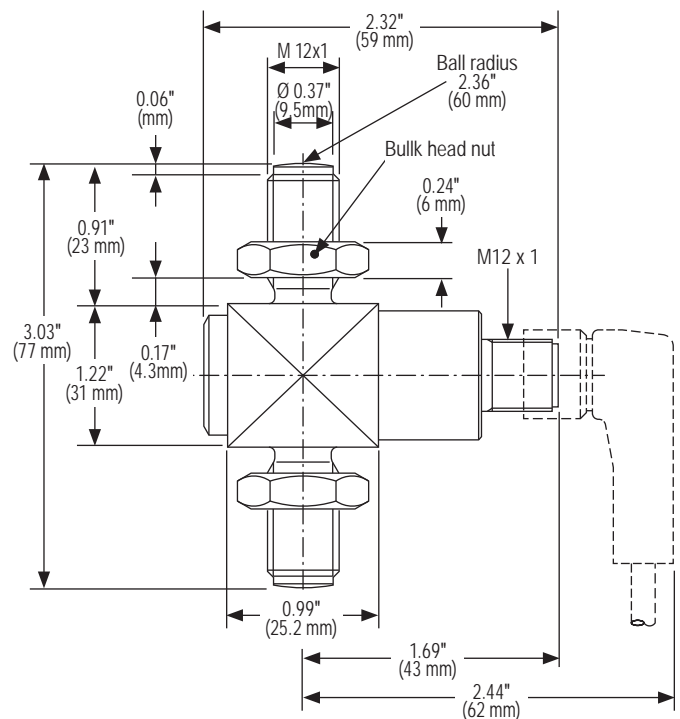
Series3540 Series
 Force type.....Tension
 Measuring range.....0 kN to 50 kN
 Accuracy.....±0.2% full scale
 Output signal.....4 mA to 20 mA
 Electrical connection.....M12 x 1 (4-pin)



1 kN to 5 kN

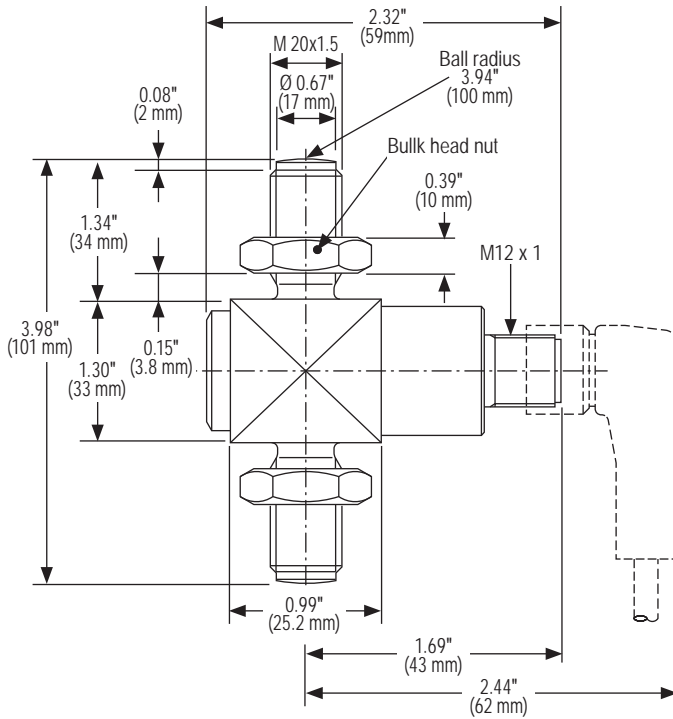


10 kN

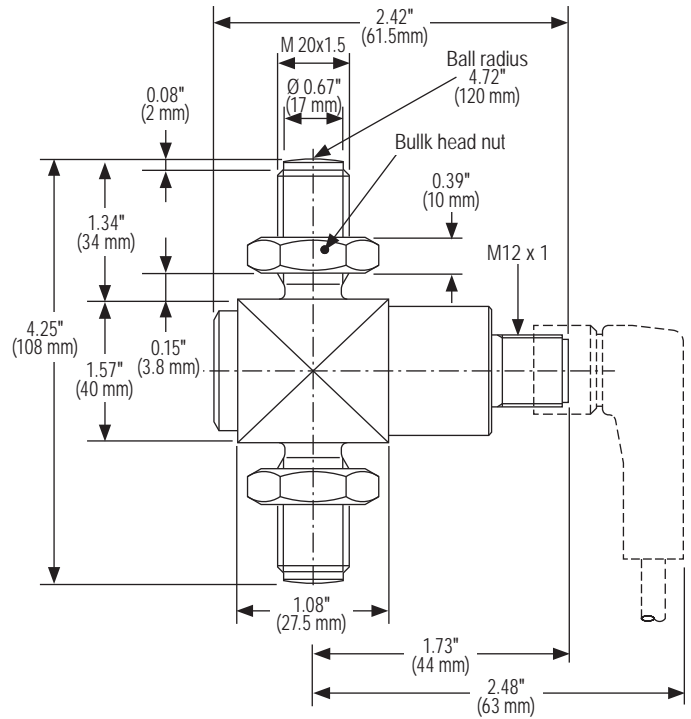


Dimensions

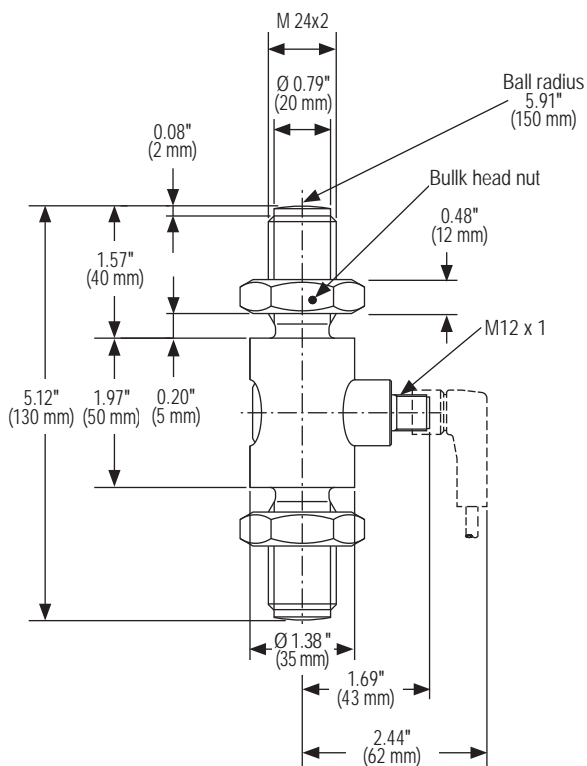
20 kN



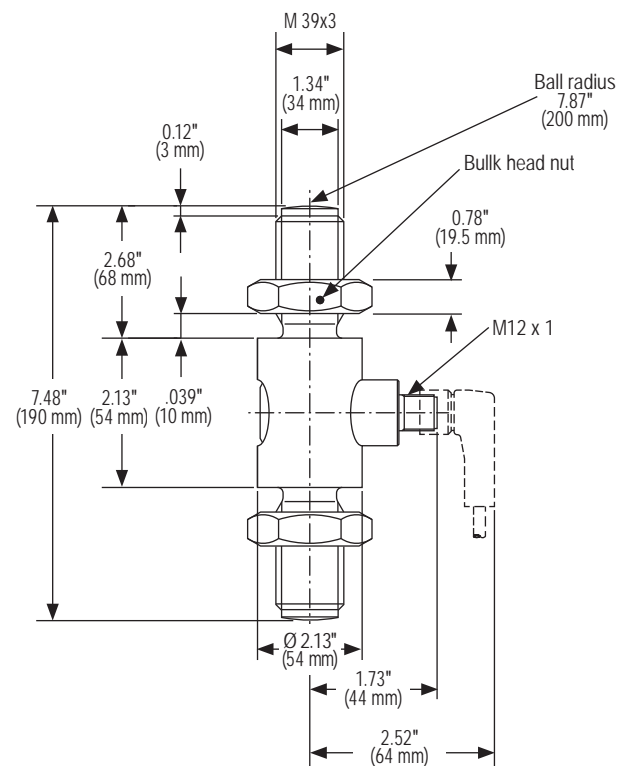
30 kN



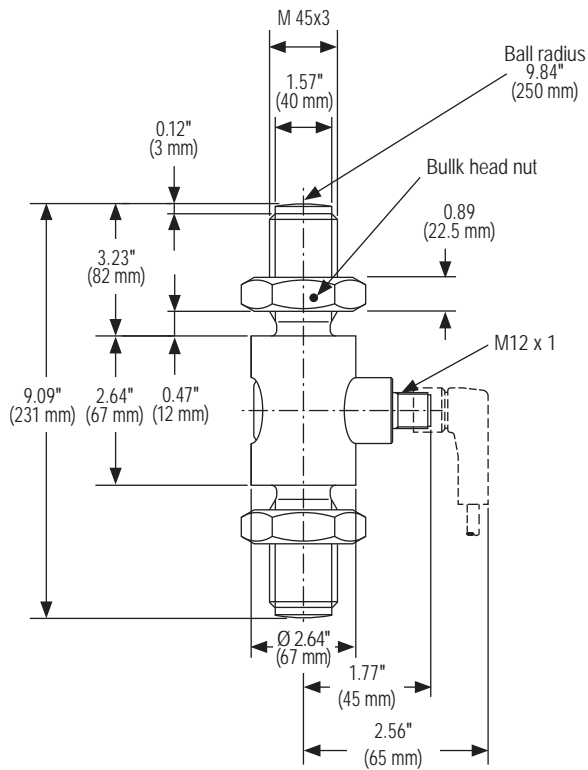
50 kN



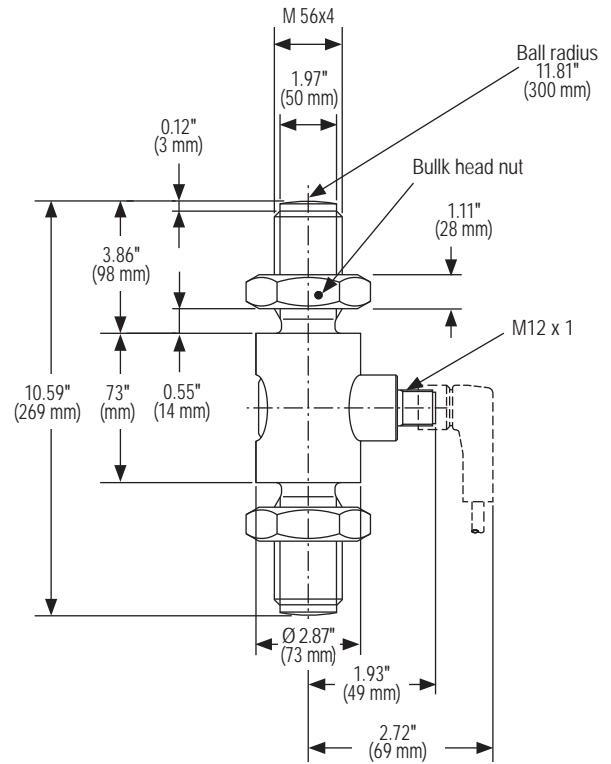
100 kN



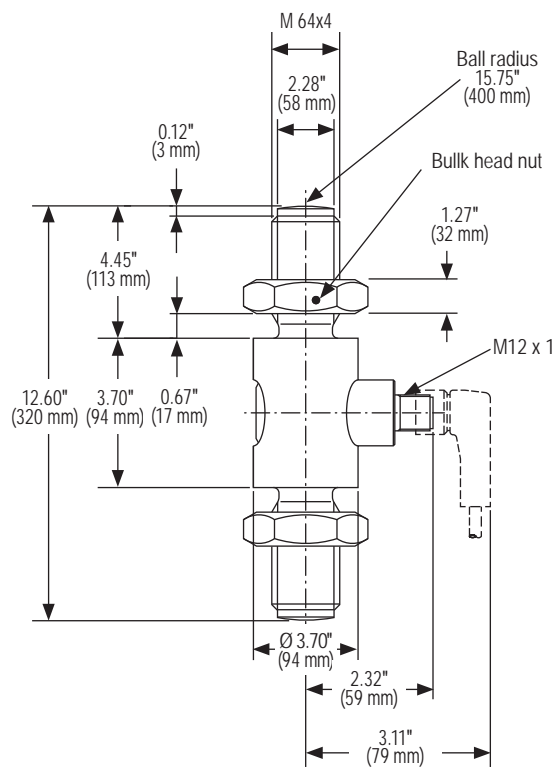
200 kN



300 kN



500 kN



S-Type Force Transducer

2351 SERIES



- Conventional design features internal threads which allow force to be easily introduced via suitable swivel heads
- Calibrations in the tension or compression direction only are available at no extra charge
- Features thin film sensors and an integrated amplifier
- High shock and vibration resistance
- Minimal temperature drift
- For dynamic or static requirements
- Overload protection is rated for 150% of the maximum nominal load
- Protection Class IP 65 or IP 67
- Accuracy up to 0.1% of full scale value

APPLICATIONS

- Plant engineering
- Production lines
- Measurement and monitoring facilities
- Special equipment and machinery construction
- Test benches and production lines

SPECIFICATIONS

Measuring ranges	0 to 20 N - 0 kN to 50 kN
Maximum dynamic load	$\pm 70\% F_{nom}$ according to DIN 50100
Nominal deflection	<0.15 mm
Accuracy	$\pm 0.2\%$ full scale ($\pm 0.1\%$ full scale optional)
Output signal	2 mV/V
Operating temperature	-30 °F to 85 °F (-34 °C to 29 °C)
Temperature effect -span	< $\pm 0.12\%$ of full scale/10K (< $\pm 0.08\%$ of full scale/10K optional)
-zero	< $\pm 0.04\%$ of full scale/10K (< $\pm 0.025\%$ of full scale/10K optional)
Electrical protection	Short circuit, overvoltage and reverse polarity protection

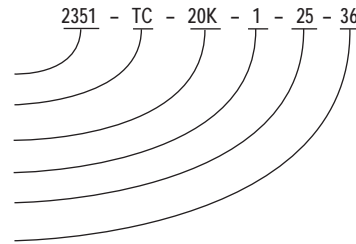
ORDERING INFORMATION			
SERIES	2351		
FORCE TYPES	T Tension	C Compression	TC Tension/Compression
MEASURING RANGES	20N 0 N to 20 N	200N 0 N to 200 N	10K 0 kN to 10 kN
	50N 0 N to 50 N	1000N 0 N to 1,000 N	20K 0 kN to 20 kN
	100N 0 N to 100 N	5K 0 kN to 5 kN	50K 0 kN to 50 kN
ACCURACIES	1 $\pm 0.2\%$ full scale	2 $\pm 0.1\%$ full scale	
OUTPUT SIGNAL	1 4 mA to 20 mA*	5 0 Vdc to 10 Vdc*	25 2 mV/V
ELECTRICAL CONNECTION	36 9' integral cable		

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Integrated cable amplifier

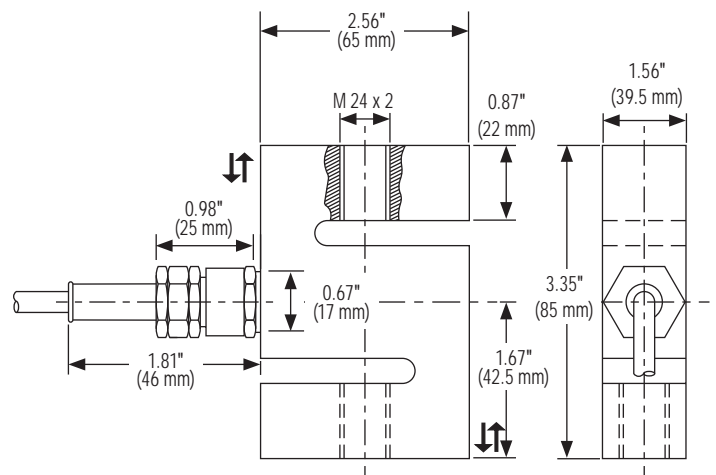
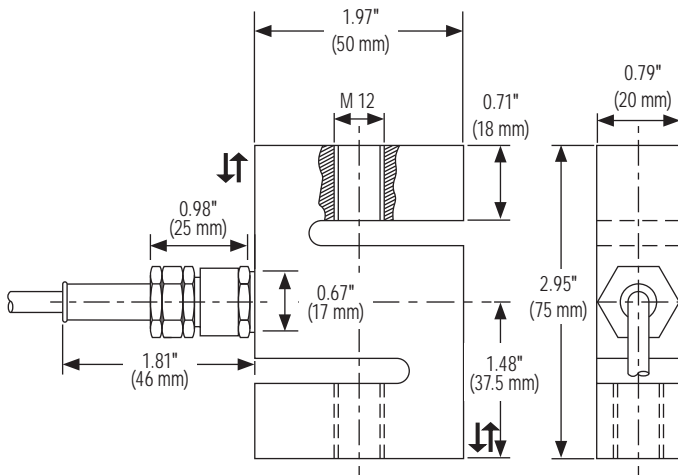
EXAMPLE

Series 2351 Series
 Force type Tension/compression
 Measuring range 0 kN to 20 kN
 Accuracy $\pm 0.2\%$ full scale
 Output signal 2 mV/V
 Electrical connection 9' integral cable



20 N to 10 kN

20 kN to 50 kN



Custom Force Sensors



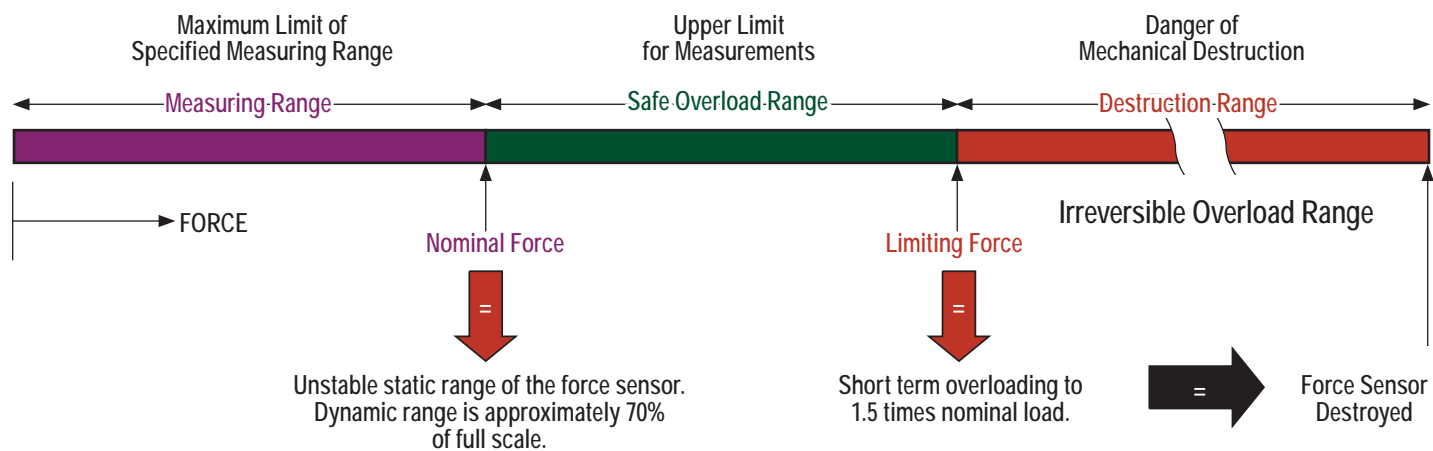
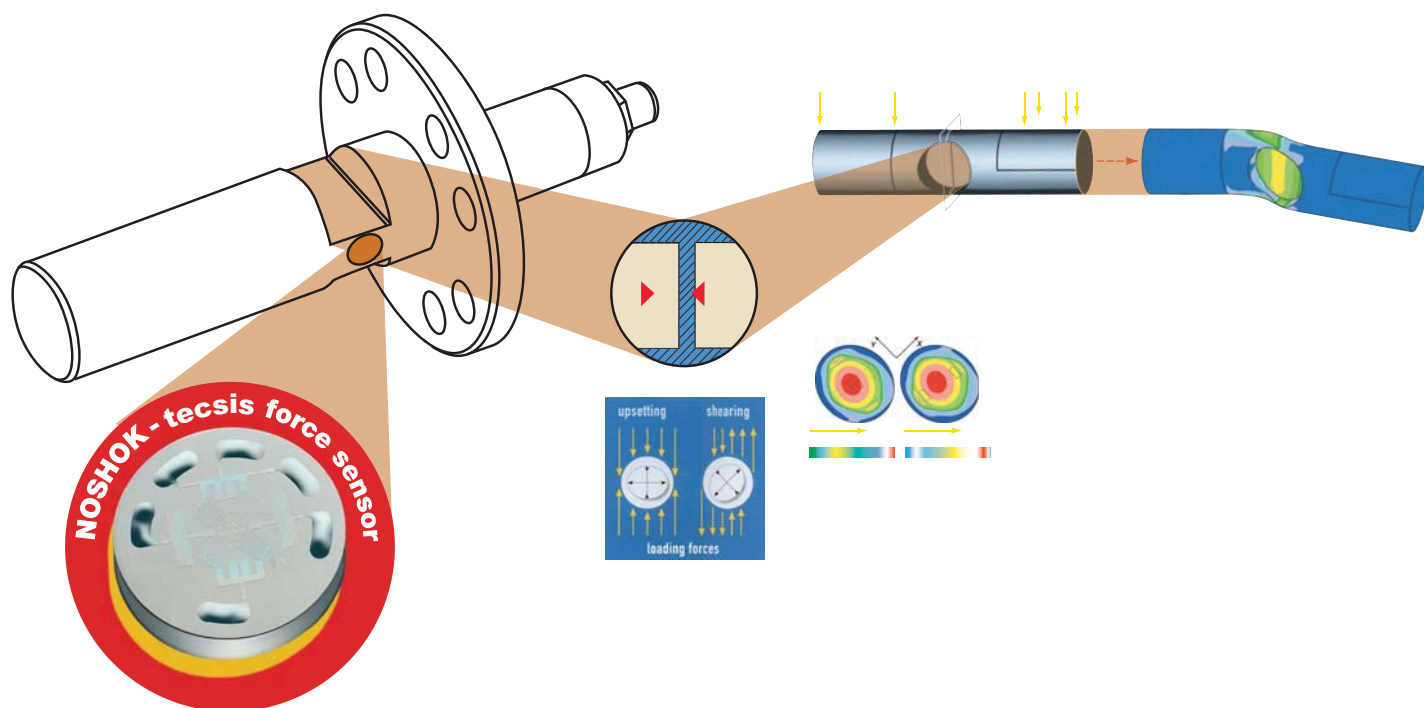
- Thin film sensor is laser welded to the deformation body for superior strength and performance
- Extremely accurate - with the help of Finite Element Method Analysis, this sensor is able to reach accuracies from 0.2% to 1% full scale
- Custom-designed to customer specifications and application needs, requiring less space for installation
- Provides OEMs and end-users unsurpassed flexibility and much higher accuracy than non-conforming standard designs
- Available in a variety of standard current and voltage output signals, with others available on request
- Deformation body is constructed from a high grade, high quality stainless steel that provides exceptional durability and extended service life
- Provides excellent performance and reliability while remaining cost effective

APPLICATIONS

- Jointing technology: pressing, punching, riveting
- Robot technology: contact forces, process forces, tong forces
- Platform technology: safety technology, lifting platforms, load status
- Cranes: overload protection, load measurement, cable tension measurement, slack rope recognition
- Farm vehicles and building machines: torque converter bearing, weight registration, tipping protection, support force
- Force measuring bearings: web tension, driving force
- Hoists and material handling: rough scales, cable tension
- Elevators: safety cutoff
- Testing facilities, machine & plant construction: locking force, torque monitoring, tightening force, anchor winches, traction and pressure forces, fill level measurement, tensioning forces, braking force, force on deflection rollers, cutting force, cable winches, conveyor belts

SPECIFICATIONS

Output signal	4 mA to 20 mA 2-wire, 0 Vdc to 5 Vdc 3-wire 0 Vdc to 10 Vdc 3-wire Others available - please consult factory
Nominal ranges	1,000 lb _f to 100,000 lb _f (5 kN to 500 kN), standard Others available - please consult factory
Limit force	150% F _{nom}
Fracture force	>300% full scale
Accuracy	<1% full scale
Hysteresis	<0.5% full scale
Power supply	10 Vdc to 30 Vdc for 4 mA to 20 mA output and 0 Vdc to 5 Vdc output 14 Vdc to 30 Vdc for 0 Vdc to 10 Vdc output
Housing material	316 stainless steel
Temperature ratings	Storage -4 °F to 176 °F (-20 °C to 80 °C) Ambient -40 °F to 212 °F (-40 °C to 100 °C)
Response time	≤1 ms (between 10% to 90% full scale)
Environmental rating	IP 67, NEMA 4X to NE 60529/IEC 529
Electrical protection	Reverse polarity, over-voltage and short circuit protection
Vibration	20 g's per IEC 68-2
Electrical connection	M12 X 1, 4-pin standard Others available - please consult factory



Chain Hoist

3010 SERIES



- For friction clutch testing on chain hoists
- Rugged design, light weight
- The force transducer is inserted into the chain, travels upwards with it against the base of the chain hoist and thereby blocks the chain
- An easy to use, precise, durable and dependable tester for slip couplings on chain hoists
- Wide range of measurement from 90 to 7,700 lb (other ranges available)
- High accuracy of < 2.2 lb
- Display unit allows you to read the load at which the friction clutch stalls
- Kit includes force transducer with integrated handle and a display unit
- Two chain adapters and three centering sleeves also included for use with most types of chain hoists in the specified load range
- Large, easy-to-read illuminated graphic display
- 99 different data sets can be optionally stored and transferred via an infrared interface to a PC
- Single sensor concept for the entire load range

APPLICATIONS

- Friction clutch testing on chain hoists
- Chain hoist users
- Service and maintenance

Chain Hoist Test Kit includes:

- ViSens display device
- Signal cable, 10 meter
- Charging device 110-240 V
- EU adapter
- Force transducer
- Chain centering shell 3 (4-5 mm)
- Chain centering shell 2 (6-7 mm)
- Chain centering shell 1 (8-11 mm)
- Chain adapter B (4-6 mm)
- Chain adapter A (7-22 mm)
- Aluminum carrying case

SPECIFICATIONS

Load range	90 to 7,700 lb (Additional measuring ranges available)
Accuracy	<2.2 lb
Hand-held indicator	LCD - display, 5-digit, illuminated Optional infrared interface for data evaluation via PC
Storage function (optional)	99 data sets (Serial number with 12 digits)
Additional display functions	MIN, MAX, HOLD, AVG, TARE, LGT
Battery life	8 hours (rechargeable battery)
Chain adapter	2 pieces, for chain size from 3 x 9 up to 11 x 31 mm (EN 818-2)
Chain center sleeve	3 pieces
Temperature application area	-4 °F to 140 °F
Environmental protection	Force transducer IP67, hand-held indicator IP40
Calibration	Force transducer and hand-held indicator are calibrated together as a measuring unit. A certified calibration is recommended every 12 months.
Case dimensions	17.5" x 6.5" x 13.8"
Weight	Approximately 15 lb.

ORDERING INFORMATION		
SERIES	3010	
OPTIONS	0 No options	1 Infrared interface

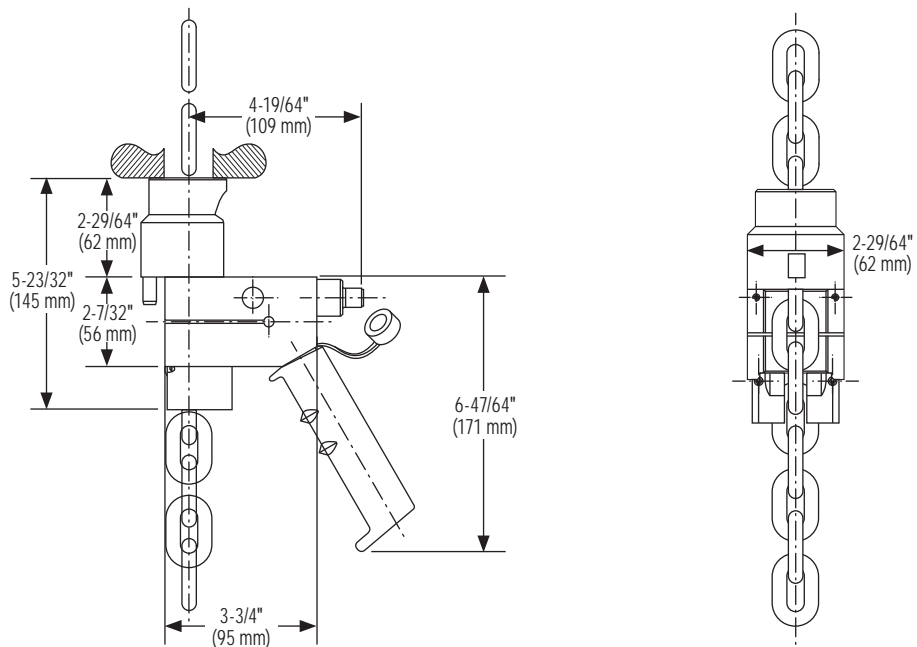
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

Series3010
Option.....Infrared interface

3010 - 1

Chain Hoist Test Kit





3020 SERIES

- For easy and accurate measurement of electrode force on spot welding equipment
- To check the force acting on the electrodes, the force transducer is held between the electrodes. The concave surfaces center the force transducer. When the welding electrodes come together, the magnitude of the applied force can be read on the display unit
- Kit includes force transducer, a hand-held display unit, plastic carrying case, charger, 2 meter signal cable and Manufacturer's Test Certificate
- Rugged, lightweight 13 lb. design
- Features a max/min value memory, a large illuminated display, and electrode diameters of 14-20 mm
- The force transducer's shear force construction makes it insensitive to transverse forces and torques
- Measuring range of 0 kN to 10 kN
- Output signal is connected to the hand-held display unit via a cable
- Display unit carries the voltage supply for the transducer; optionally the supply can be taken from a PLC
- Sensor is laser-welded, giving it all the advantages of the conventional bonded foil strain gauges, but without having their substantial disadvantages (temperature drifts due to the glue and creeping)

APPLICATIONS

- Measurement of spot welding electrode force

Weld Force Test Kit includes:

- Plastic carrying case
- Hand-held display unit
- Force transducer
- Charger
- 2 meter signal cable
- Manufacturer's Test Certificate

SPECIFICATIONS

Load range	Up to 10 kN (Additional measuring ranges available)
Accuracy	<0.5%
Display unit	LCD - display, 5-digit, illuminated
Additional display functions	MIN, MAX, HOLD, AVG, TARE, LGT
Battery life	8 hours (rechargeable battery)
Service temperature range	-4 °F to 140 °F
Environmental protection	Force transducer IP67, Display unit IP40
Case dimensions	17.5" x 6.5" x 13.8"
Weight	Approximately 13 lb.

ORDERING INFORMATION		
SERIES	3020	
OPTIONS	0 No options	1 Infrared interface

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

Series

Option.....

3020

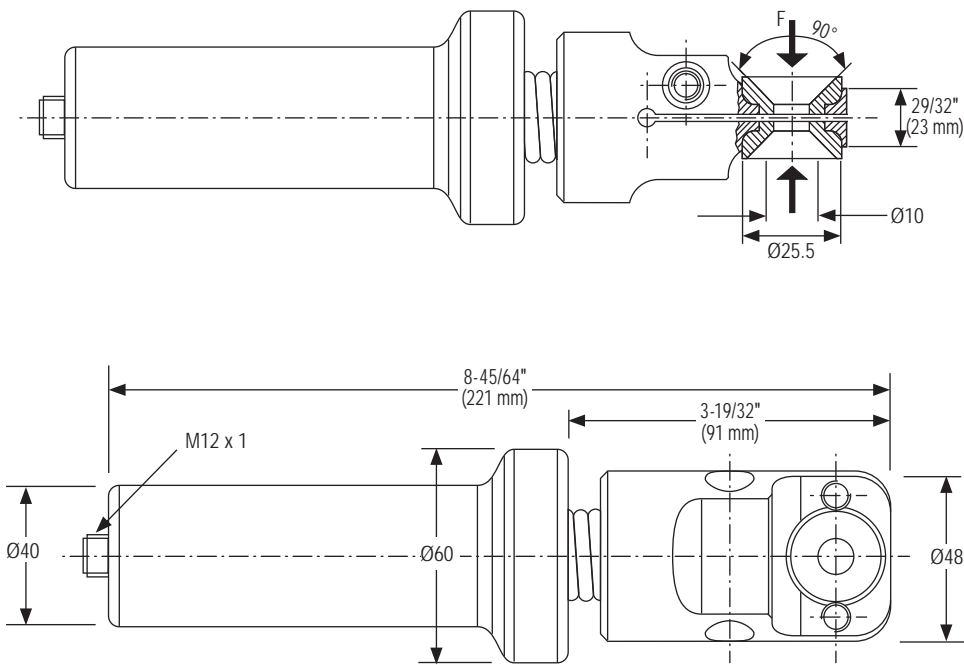
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3020

Infrared interface

Weld Force Test Kit



Attachable Loop-Powered Digital Indicators



Unit with relay option shown.

1800 SERIES

- High accuracy 4 mA to 20 mA loop-powered indicators for NOSHOK 300, 600, 615, 616 and 800 Series transmitters
- Can be fitted to NOSHOK pressure transmitters utilizing a 4 mA to 20 mA output signal and the Hirschmann (DIN 43650A) connector
- Easily inserted between the transmitter body and the connector
- Programmable to display a range of -1999 to 9999; may be tilted for better viewing
- User selectable digital filtering improves readability in rapidly varying pressure applications
- All parameters are stored in non-volatile memory so that reprogramming is not necessary in the event of a power failure

SPECIFICATIONS

Display	0.4" Liquid Crystal Display
Digits	4, from -1999 to 9999
Accuracy	±0.2% full scale, ±1 digit
Update rate	5 times/second
Filtering	Digital, field selectable .2, .5, 1 or 1.5 seconds, display only
Range	The 4 mA to 20 mA signal from the transmitter can be assigned any display value within the display range. Both scaling points are individually adjustable using the push buttons inside the case
Power supply	Loop-powered - no additional power supply required. Maximum current rating is 40 mA and voltage drop of 3 Vdc, unregulated
Temperature ranges	Ambient 32 °F to 122 °F (0 °C to 50 °C) Effect ±0.006% full scale/°F Storage -22 °F to 176 °F (-30 °C to 80 °C)
Electrical connection	Requires NOSHOK transmitter with 4 mA to 20 mA (2-wire) output and Hirschmann (DIN 43650A) connector
Environmental protection	IP65, NEMA 4X according to EN 60529/IEC 529
Electromagnetic rating	CE compliant to EMC norm EN 61326:1997/A1:1998 RFI, EMI and ESD protection
Case material	ABS plastic with polycarbonate window
Relay option	Type: n-switching
Weight	Approximately 3 oz.

APPLICATIONS

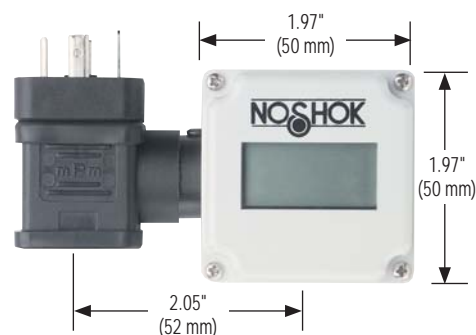
- Hydraulic and pneumatic systems
- Pumps and compressors
- Test equipment and systems
- Industrial machinery and machine tools
- HVAC systems
- Power generation
- Water and wastewater
- Stamping and forming presses

ORDERING INFORMATION

SERIES	1800
OPTIONS	0 No options 1 With relay

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

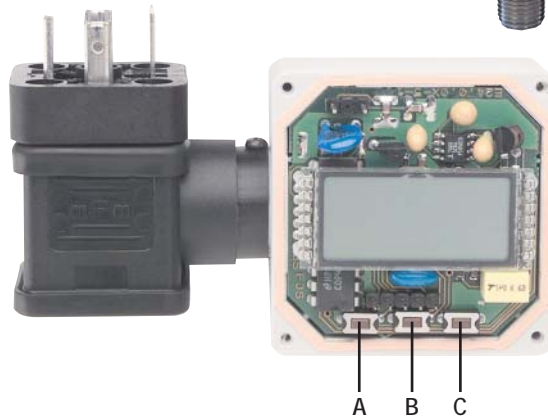
Note: Indicate display range on order eg. 0-1,000 for 4 mA to 20 mA





To install, remove the DIN 43650A plug and insert indicator on top of transducer and reinstall the plug. This indicator can be used with NOSHOK and some competitive transmitters with 2-wire 4 mA to 20 mA output, Hirschmann connector with the same pin configuration. (Pin 1 + supply, pin 2 + output)

To program, first remove the cover from the indicator housing and identify the buttons A, B, and C. These buttons are used to program the indicator to match the pressure range of the transmitter.



A → down
B → program steps
C → up

1. → Set the decimal point
1 X B:

d	P		
---	---	--	--

→ C/A up or down
2. Set the lower end of the range
2 x B:

A	n		4
---	---	--	---

→ C/A up or down
3. Set the upper end of the range
3 x B:

A	n	2	0
---	---	---	---

C/A up or down

4. To enable error codes
3 X B:

L	1		
---	---	--	--

1 x C:

			1
--	--	--	---

 on
1 x A:

			0
--	--	--	---

 off
→ C/A up or down

Errors are shown as F1 for an underrange condition, and F2 for and overrange condition

5. Set digital filtering range
5 X B:

F	I	L	T
---	---	---	---

1 x C:

			0
--	--	--	---

 0.2 seconds
2 x C:

			1
--	--	--	---

 0.5 seconds
3 x C:

			2
--	--	--	---

 1.0 seconds
→ 4 x C:

			3
--	--	--	---

 1.5 seconds
C/A up or down

6. Return to measurement mode
2 x A

Compact Loop-Powered Digital Indicators



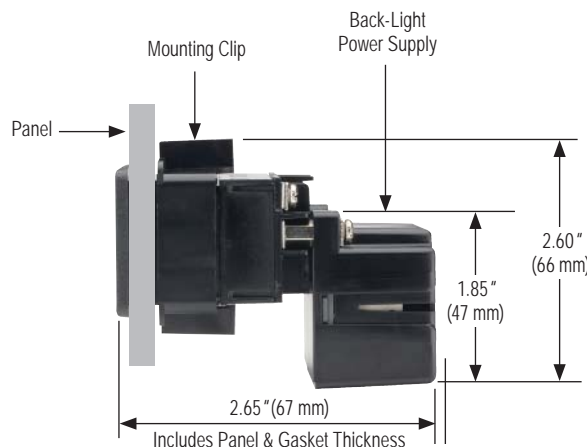
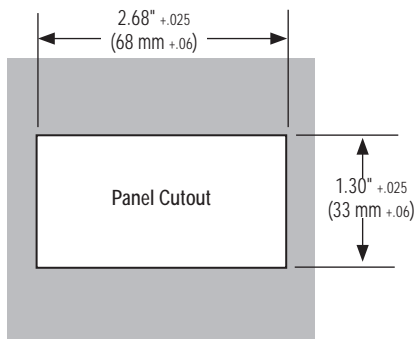
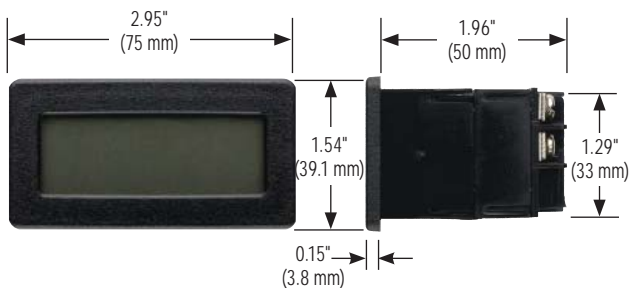
1900C SERIES

- Provides compact digital display of any desired unit of pressure, temperature, level, force, or flow measurement
- Dual range 4 mA to 20 mA or 10 mA to 50 mA
- 3-1/2 digit, 0.6" high display with a span range of 0 to 1999
- Positive image reflective LCD is standard; red or yellow/green back-lit versions optional
- Span and zero offset capabilities
- Negative pressure and overpressure indication
- Selectable decimal point position
- Compact, lightweight, impact-resistant NEMA 4X, IP65 housing with sealed front bezel
- Fits DIN standard cut-out 2.68" (68 mm) x 1.30" (33 mm)
- CE compliant to suppress RFI, EMI, and ESD

APPLICATIONS

Suitable for a wide variety of applications requiring pressure, flow, level, force and temperature measurement, including:

- Process indication
- On/off pump controls
- Compressor controls
- Safety or shutdown alarms



1900C-3/1900C-4: Loop Powered Display with backlight power supply

SPECIFICATIONS

Display	3-1/2" digital (-1999 to 1999), 0.6" tall LCD
Display type	Positive image reflective LCD standard; red or yellow/green backlight transfective LCD optional
Power supply	1900C-1/1900C-2: Loop Powered, 4 mA to 20 mA or 10 mA to 50 mA 1900C-3/1900C-4: Loop Powered Display w/backlight power supply 115/230 Vac, 50/60 Hz, 3VA required for backlight power supply, unregulated
Input signal	4 mA to 20 mA or 10 mA to 50 mA
Input impedance	160 Ω max @ 20 mA; 60 Ω max @ 50 mA
Maximum input current	100 mA
Span range	0 to 1999
Offset range	-1999 to 1999
Linearity	$\pm 0.1\%$ to 1 digit
Reading rate	2.5 readings per second, nominal
Response time	1.5 seconds to settle for a step change
Temperature ranges	Storage -40° to 175 °F (-40° to 80 °C) Operating 32° to 140 °F (0° to 60 °C)
Thermal effect (reference temperature 68 °F/20 °C)	Span: 100PPM/°C Offset: 0.2 digits/°C
Electromagnetic rating	Immunity per EN 50082-2, Emissions per EN 50081-1

ORDERING INFORMATION

SERIES	1900C	
INDICATIONS	1 Positive image reflective LCD	3 Yellow/green backlight transfective LCD with backlight power supply
	2 Positive image reflective LCD backlight	4 Red backlight transfective LCD with backlight power supply

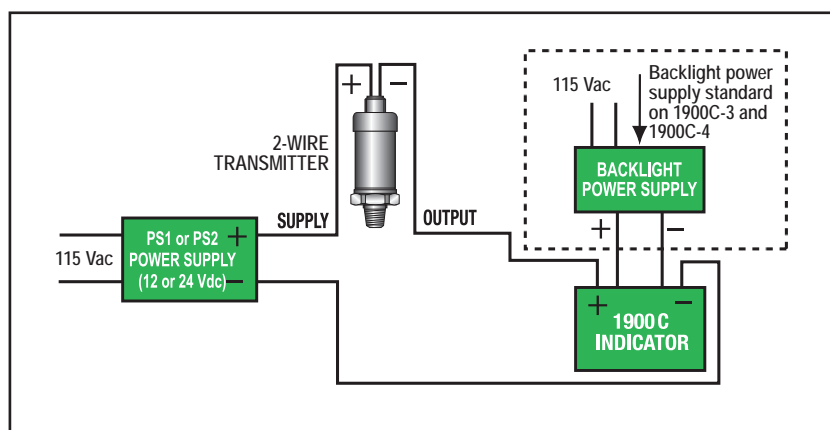
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

OPTIONAL POWER SUPPLIES		
MODEL	INPUT	OUTPUT
PS1	115 Vac	12 Vdc
PS2	115 Vac	24 Vdc

EXAMPLE

Series 100
Indication Red backlight LCD

1900C - 4



Typical wiring for the 1900C including the optional back light feature. See the photos below showing both the green and red color backlight versions.

Green backlight version
1900C-3



Available PS1 (12 Vdc) and PS2 (24 Vdc) power supply for powering a typical 2-wire loop or 3-wire configuration.

Red backlight version
1900C-4



1900C-3/1900C-4: Loop Powered Display
with backlight power supply



1900C-1/1900C-2: Loop Powered



1950 SERIES

- Offers all the features of a full size panel meter in a compact digital display for pressure, flow, level, force, and temperature measurement
- 5 digit, 0.48" LCD display with a span range of -9999 to 99999
- Reflective LCD display; or green backlighting optional
- Display is fully expandable to accommodate applications requiring relays, dual sinking outputs, and serial communications by RS232 or RS485
- Fully scalable & field upgradeable
- Simple programming through front panel
- Compact, lightweight, impact-resistant NEMA 4X, IP65 housing with sealed front bezel
- CE compliant to suppress RFI, EMI, and ESD

APPLICATIONS

Suitable for a wide variety of applications requiring pressure, flow, level, force and temperature measurement, including:

- Process indication
- On/off pump controls
- Compressor controls
- Safety or shutdown alarms

SPECIFICATIONS

Input signals	Current, voltage or resistance
Process display	5 digit, 0.48" high, (-9999 to 99999)
Power requirement	9 Vdc to 28 Vdc, unregulated (Optional power supply available for 85 Vac to 250 Vac excitation)
Connections	Terminal block in rear Recommended wire: 30-14 AWG copper
Memory	Nonvolatile E2PROM memory retains all programming parameters and max/min values when power is removed
Accuracy	0.1% of span
Response time	< 500 msec
Temperature ranges	Operating -35 °C to 75 °C Storage -35 °C to 85 °C
Operating and storage humidity	0 to 85% max. relative, non-condensing
Vibration	5 to 500 Hz, in X,Y,Z direction for 1.5 hours, 5 g's. According to IEC 68-2-6
Shock	Operational 30 g, 11 msec in 3 directions. According to IEC 68-2-27
Electromagnetic rating	Emissions and immunity to EN 61326
Environmental protection	NEMA 4X/IP65, sealed bezel only
Relay option card	Type: single FORM-C relay Isolation to sensor & user input commons: 1400 Vrms for 1 min. Working voltage: 150 Vrms Contact rating: 1 amp @ 30 Vdc resistive; 0.3 amp @ 125 Vac resistive Life expectancy: 100,000 minimum operations Response time: Turn on time: 4 msec max. Turn off time: 4 msec max.
Communications option card	RS485 multi-point balanced interface (non-isolated) Baud rate: 300 to 38.4k Data Format: 7/8 bits; odd, even, or no parity Bus address: 0 to 99; max 32 meters per line Transmit delay: Selectable RS232 half duplex (non-isolated) Baud rate: 300 to 38.4k Data format: 7/8 bits; odd, even, or no parity
Dual sinking output option card	Non-isolated switched DC, N channel open drain MOSFET Current rating: 100 mA max. VDS ON: 0.7 V @ 100 mA VDS MAX: 30 Vdc Offstate leakage current: 0.5 mA max.
Weight	3.2 oz (100 g)

1950 SERIES

ORDERING INFORMATION
WIRING DIAGRAMS
ELECTRICAL
CONNECTIONS
DIMENSIONS

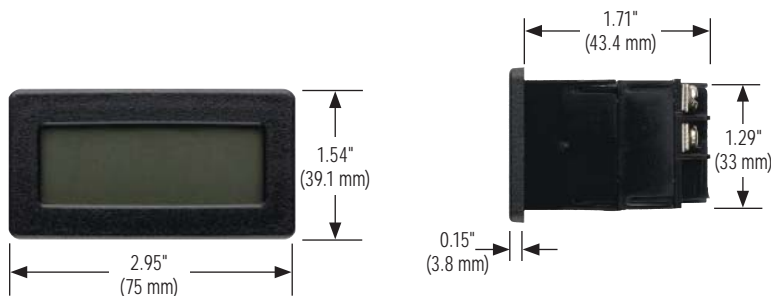
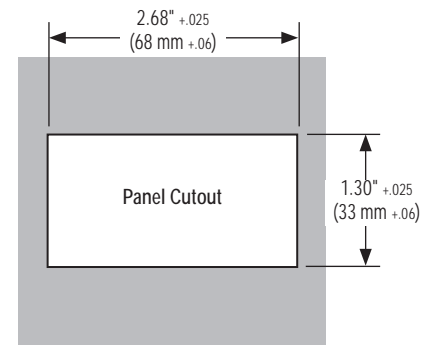
ORDERING INFORMATION					
SERIES	1950				
INPUT SIGNALS	C	Current	V	Voltage	R Resistance
DISPLAYS	1	Reflective	2	Backlight	
OPTION CARDS	0	None	2	Dual sinking open collector	7 RS485 comm
	1	Single relay	6	RS232 comm	
OPTIONAL POWER SUPPLIES	PS1	115 Vac to 12 Vdc (400 mA)	PS2	115 Vac to 24 Vdc (200 mA)	PS3 85 - 250 Vac to 12 Vdc (400 mA)
OPTIONAL ENCLOSURES	ENC1	Black painted steel	ENC2	Off-White fiberglass	

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

Series 1950
Input signal Current
Display Reflective
Option cards Single relay
Options Enclosure black painted steel

1950 - C - 1 - 1 - ENC1



2000/2100 SERIES



- Accepts a variety of standard process signals and precisely scales them into any desired unit of measurement
- Single input or dual input
- Employs advanced technology for stable, drift-free readout
- Field upgradeable with plug-in option cards; including 4 set point alarms, analog output and serial communication
- 24 Vdc transmitter power supply
- 16 point scaling for non-linear processes
- Max. and min. value display
- Easy menu-driven programming
- NEMA 4X/IP65 sealed front bezel
- Optional PC software available for configuration
- AC or DC input power
- Signal totalizer for batch weighing or other timed input processes
- Programmable signal response time
- Standard DIN panel cutout
- CE compliant to suppress RFI, EMI, and ESD

APPLICATIONS

- Process indication
- On/off pump controls
- Compressor controls
- Safety or shutdown alarms
- Local indication with signal
- Retransmission to computer control system

SPECIFICATIONS

Input signals	Current, voltage or resistance
Process display	5 digit, 0.56 "red LED, (-19999 to 99999)
Keypad	3 programmable function keys, 5 keys total
Power requirement	115/230 Vac or 11 Vdc to 36 Vdc (18 Vdc to 36 Vdc for 2100 Series)
Internal power supply	24 Vdc (18 Vdc for 2100 Series), unregulated
Electrical connection	Terminal blocks in rear
Memory	Non-volatile Eprom, will hold set up data for 10 years without power
Accuracy	±0.03% of reading +3 μ A for 4 mA to 20 mA input; ±0.03% of reading +3 mV for 0 Vdc to 5 Vdc and 0 Vdc to 10 Vdc inputs over the range of 18°C to 28°C
Update rate	Up to 20 times per second, adjustable (Up to 105 time per second, adjustable for 2100 Series)
Temperature ranges	Operating 32 °F to 122 °F (0 °C to 50 °C) Storage -40 °F to 140 °F (-40 °C to 60 °C)
Electromagnetic rating	CE compliant to EMC norm EN 61326:1997/A1:1998 RFI, EMI and ESD protection
Environmental protection	NEMA 4X/IP65 sealed bezel only
Linearization	6 point scaling of non linear input
Dual relay option card	Two FORM-C relays. Rating: One relay energized; 5 amps @ 120/240 Vac/115/230 Vac or 28 Vdc (resistive load), 1/8 HP @ 120 Vac, inductive load. Total current not to exceed 5 amps with both relays energized
Quad relay option card	Four FORM-A relays. Rating: One relay energized; 3 amps @ 240 Vac or 30 Vdc (resistive load), 1/10 HP @ 120 Vac, inductive load. Total current not to exceed 4 amps with all four relays energized
Analog output option card	0 mA to 20 mA, 4 mA to 20 mA or 0 Vdc to 10 Vdc retransmitted signal
Quad NPN-OC option card	4 isolated open collector sinking transistors, 100 mA at maximum 30 Vdc
Quad PNP-OC option card	4 isolated open collector sourcing transistors, 24 Vdc with 30 mA total maximum
Communication option cards	RS232C or RS485

2000/2100 SERIES

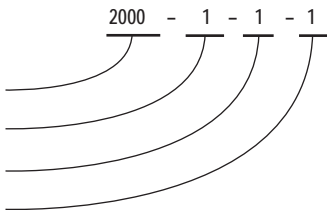
ORDERING INFORMATION
WIRING DIAGRAMS
ELECTRICAL
CONNECTIONS
DIMENSIONS

ORDERING INFORMATION					
SERIES	2000 (Single input)		2100 (Dual input)		
INPUT SIGNALS	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	4 1 Vdc to 6 Vdc	5 0 Vdc to 10 Vdc	6 1 Vdc to 11 Vdc
POWER REQUIREMENTS	1 115/230 Vac	3 11 Vdc to 36 Vdc			
OPTION CARDS	0 No option card	3 Quad NPN-OC option card		6 RS 232-C Serial communications option card	
	1 Dual relay option card	4 Quad PNP-OC option card		7 RS 485 Serial communications option card	
	2 Quad relay option card	5 Analog output option card			

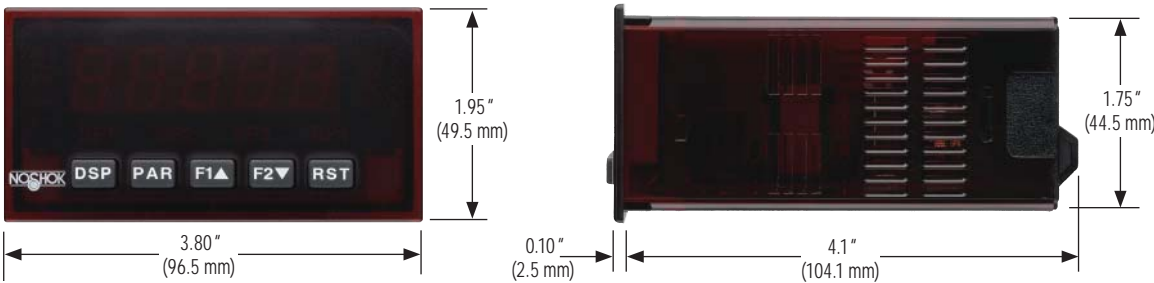
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

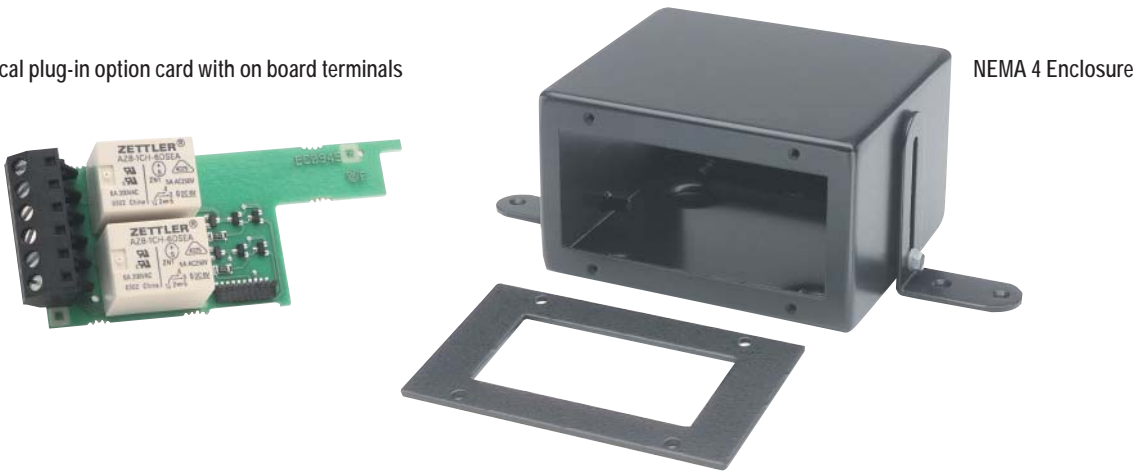
Series2000
Input signal 4 mA to 20 mA
Option cards 115/230 Vac
OptionsDual relay option card



OPTIONAL ACCESSORIES
RS232C Mating connector
RS485 Mating connector
2000-50000 NEMA 4 enclosure



Typical plug-in option card with on board terminals

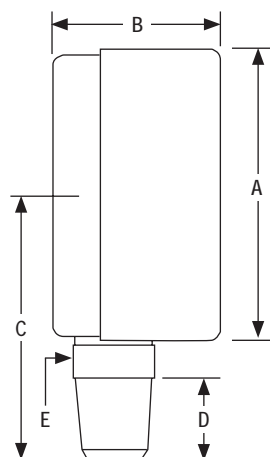


Available options are plug-in cards that provide alarm and setpoint relay outputs, analog and digital outputs, including RS 232-C and RS 485 functions.

Pressure Measuring Instrument Specifications

	25-300 SERIES	40-901 SERIES
Gauge housing	2-1/2" one-piece, die cast brass	4" SS housing, dry or liquid filled
Cover ring or bayonet ring	Brass cover ring - standard Panel mount options available for remote installation	Stainless steel bayonet ring - standard Panel mount options available for remote installation
Lens	Acrylic	Instrument glass
Accuracy	±1.5% full scale, ASME Grade A	±1% full scale, ASME Grade 1A
Safety relief	Safety relief disc on top of case	Safety relief disc on top of case
Pointer	Balanced aluminum, black finish	Balanced aluminum, black finish
Dial	Aluminum, white finish with black markings	Aluminum, white finish with black graduations
Fill fluid	Glycerine Others available upon request	Glycerine Others available upon request
Operating temperature	14 °F to 122 °F (-10 °C to 50 °C)	14 °F to 122 °F (-10 °C to 50 °C)
Ambient temperature	-4 °F to 140 °F (-20 °C to 60 °C)	-4 °F to 140 °F (-20 °C to 60 °C)

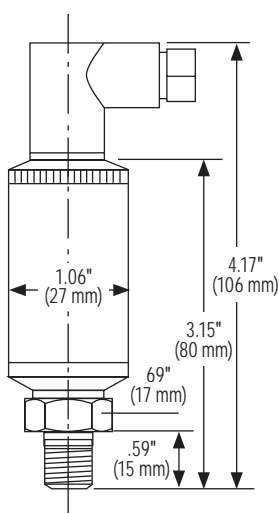
	60-400 SERIES All SS Pressure Gauge	60-500 SERIES All SS Pressure Gauge
Gauge housing	6" 304SS housing	6" 304SS housing
Bayonet ring	Polished stainless steel	Polished stainless steel
Lens	Laminated safety glass	Laminated safety glass
Accuracy	±1% full scale, ANSI Grade 1A	±1% full scale, ASME Grade 1A
Safety relief	Safety relief disc on top of case	Safety relief disc on top of case
Pointer	Balanced aluminum, black finish	Balanced aluminum, black finish
Dial	Aluminum, white finish with black markings	Aluminum, white finish with black graduations
Fill fluid	None - dry case gauge	Glycerine Others available upon request
Operating temperature	14 °F to 122 °F (-10 °C to 50 °C)	14 °F to 122 °F (-10 °C to 50 °C)
Ambient temperature	-40 °F to 260°F (-40°C to 127°C)	-40 °F to 260°F (-40°C to 127°C)



Series		A	B	C	D	E
25-300	in	2.48	1.34	2.13	0.55	0.55
	mm	63.0	34.0	54.0	14.0	14.0
40-901	in	3.98	2.01	3.43	0.55	0.87
	mm	101.0	51.0	87.0	14.0	22.0
60-400 / 60-500	in	6.30	2.36	4.65	0.79	0.87
	mm	160.0	60.0	118.0	20.0	22.0

Pressure Measuring Instrument Specifications

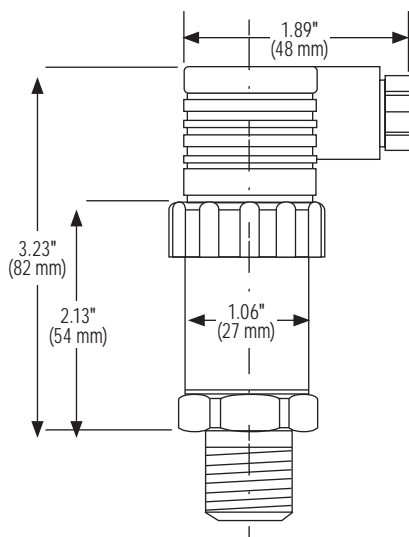
100 and 200 SERIES TRANSDUCERS		
Output Signals	100 Series 200 Series	4 mA to 20 mA, 2-wire 0 Vdc to 5 Vdc, 0 Vdc to 10 Vdc, 1 Vdc to 5 Vdc, 1 Vdc to 6 Vdc, 1 Vdc to 11 Vdc, 3-wire
Accuracies		±0.5% full scale (BFSL) - standard Includes the combined effects of linearity, hysteresis and repeatability ±0.25% full scale – optional
Repeatability		±0.05% full scale
Hysteresis		≤±0.1% full scale
Stability		≤±0.2% full scale for 1 year, non-accumulating
Power supplies		10 Vdc to 30 Vdc for 4 mA to 20 mA, 0 Vdc to 5 Vdc, 1 Vdc to 5 Vdc and 1 Vdc to 6 Vdc 14 Vdc to 30 Vdc for 1 Vdc to 11 Vdc, and 0 Vdc to 10 Vdc
Load limitations	100 Series 200 Series	≤(Vpower supply – 10)/0.020 Amp for 100 Series ≥ 10,000 Ω for 0 Vdc to 10 Vdc, 3-wire and 1 Vdc to 11 Vdc outputs ≥ 5,000 Ω for 0 Vdc to 5 Vdc, 3-wire, 1 Vdc to 5 Vdc and 1 Vdc to 6 Vdc outputs. Current consumption 8 mA
Housing material		316 Stainless steel
Temperature ranges		Compensated 32 °F to 176 °F/0 °C to 80 °C Effect ±0.017% full scale/°F for zero and span Storage -40 °F to 212 °F/-40 °C to 100 °C Medium -22 °F to 212 °F/-30 °C to 100 °C Ambient -40 °F to 185 °F/-10 °C to 85 °C
Adjustment		±10% full scale for zero and span
Environmental rating		NEMA 4X, IP65 (IEC 529)
Electromagnetic rating		CE compliant to EMC norm EN61326: 1997/A1: 1998 RFI,EMI,ESD protection
Electrical protection		Reverse polarity, over-voltage and short circuit protection
Shock		1000 g's per IEC 770
Vibration		30 g's per IEC 770



100 Series Wiring Diagram				
	Mini Hirschmann	Cable	M12	Bendix 6-pin
+ Supply	1	Red	1	A
+ Output	2	Black	3	B
200 Series Wiring Diagram				
	Mini Hirschmann	Cable	M12	Bendix 6-pin
+ Supply	1	Red	1	A
+ Output	3	White	4	C
Common	2	Black	3	B

Pressure Measuring Instrument Specifications

615 SERIES TRANSDUCERS	
Output Signal	4 mA to 20 mA, 2-wire 0 Vdc to 5 Vdc, 0 Vdc to 10 Vdc, 1 Vdc to 5 Vdc, 1 Vdc to 6 Vdc, 1 Vdc to 11 Vdc, 3-wire
Accuracy	±0.25% full scale (BFSL) – standard Includes the combined effects of linearity, hysteresis and repeatability ±0.125% full scale – optional
Repeatability	≤±0.05% full scale
Hysteresis	≤±0.1% full scale
Stability	≤±0.2% full scale for 1 year, non-accumulating
Power supply	10 Vdc to 30 Vdc for 4 mA to 20 mA, 0 Vdc to 5 Vdc, 1 Vdc to 5 Vdc and 1 Vdc to 6 Vdc 14 Vdc to 30 Vdc for 1 Vdc to 11 Vdc and 0 Vdc to 10 Vdc
Load limitations	≤ (Vpower supply – 10)/0.020 Amp for 100 Series ≥ 10,000 Ω for 0 Vdc to 10 Vdc, 3-wire and 1 Vdc to 11 Vdc outputs ≥ 5,000 Ω for 0 Vdc to 5 Vdc, 3-wire, 1 Vdc to 5 Vdc and 1 Vdc to 6 Vdc outputs Current consumption 8 mA
Housing material	316 Stainless steel
Temperature ranges	Compensated 32 °F to 175 °F/0 °C to 80 °C Effect ±0.01%/°F for zero and span Storage -40 °F to 212 °F/-40 °C to 100 °C Medium -20 °F to 212 °F/-30 °C to 100 °C Ambient -15 °F to 175 °F/-10 °C to 80 °C
Adjustment	±10% full scale for zero and span
Environmental rating	NEMA 4X, IP65 (IEC 529)
Electromagnetic rating	CE compliant to EMC norm EN61326: 1997/A1: 1998 RFI, EMI, ESD protection
Electrical protection	Reverse polarity, over-voltage and short circuit protection
Shock	Less than ±0.05% full scale effect or 1,000 g's @ 20 ms on any axis
Vibration	Less than ±0.01% full scale effect or 15 g's @ 0 Hz to 2,000 Hz on any axis



Current, 2-Wire Wiring Diagram

	Hirschmann	Cable	M12	Bendix 6-pin
+ Supply	1	Red	1	A
+ Output	2	Black	3	B

Voltage, 3-Wire Wiring Diagram

	Hirschmann	Cable	M12	Bendix 6-pin
+ Supply	1	Red	1	A
+ Output	3	White	4	C
Common	2	Black	3	B

Hydraulic Load Cell Overview

NOSHOK hydraulic load cells measure force in a direct, simple and cost-effective manner without the need for an external power source. The load cells are available in a variety of shapes and sizes with measuring ranges suited for most force applications.

Regardless of the external dimensions of the unit, NOSHOK hydraulic load cells operate under the hydraulic principle. The load, when applied to the surface area of the piston, causes a pressure increase in the hydraulic fluid and from there is transferred to the attached high-quality NOSHOK pressure gauge or transducer for measurement indication. They are designed for static and quasi static loads (i.e. the rise time of the force should not exceed one second, since faster changes in force could damage the attached gauge). Capillary restrictors are available to dampen pressure spikes generated by loading and unloading the load cell. NOSHOK load cells can be used for weight measurement of force measurement.

Mounting conditions of the load cell does influence the accuracy of the entire unit as well as the service life and reliability. The mounting should always ensure an axial and central introduction of the force to be measured for the highest degree of accuracy. Side forces, bending or torque should be avoided through proper installation to prevent false indications and maintain load cell service life.

NOSHOK hydraulic load cells are manufactured to the highest quality standards utilizing proven technologies that require little or no maintenance while providing excellent value. In addition to the outstanding features in the basic design, NOSHOK offers options such as maximum indicating pointers to measure maximum pressure/force loads in the system, attachable loop-powered indicators for local indication, custom dials and scales, custom connections (including direct connection), flexible and rigid tubing, various fill fluids and more to help provide a complete and suitable package for all of your force measurement needs.

Final calibration tests are performed on all hydraulic load cells, ensure 100% "out of the box" reliability.

Applications for the NOSHOK Hydraulic Load Cell

■ Material handling and lifting gear

- Bearing and support forces on lifting tools

■ Agricultural and construction equipment

- On carriers and presses
- Torque measurement through lifting gears
- Excavators in brown coal mining equipment

■ Testing and control equipment

- Clamping force measurement on vices
- Tailstock spindles
- Brake test beds

■ Machine construction and operation

- Injection molding machine screws
- Rope and belt tension measurements, as well as torque measurements
- Jug and special machine construction

■ Weight measurement and level measurement in bunkers, silos and tanks

■ Welding and printing machines

- Measuring the force between tongs on spot welding machines
- Control forces between rollers on printing equipment
- Control of pressure stamp

Information Required for Level Measurement

Level Measurement:

Standing/hanging container: (hanging container up to 60 ton total weight).

The measuring unit is applicable for evenly distributed amounts (liquids).

The dimensions in the distance have to be equal to each other and equal to the center.

• 3 point seating, shape of container; symmetric

1 force measuring unit, 2 fixed bearings

1/3 is measured

The indicated value is 3 times the measured value

• 3 point seating, shape of container; symmetric

3 force measuring units

Values are measured under each container foot

• 4 point seating, shape of container; symmetric

4 measuring units

Values are measured under each container foot

Weight of Container: _____

Nominal capacity, nominal load: _____

Filling material: _____

Weight density: _____

Lying containers:

The measuring unit is applicable for evenly distributed amounts (liquids)

Important: the containers must have a symmetric shape

• 3 point seating, shape of container; symmetric

1 force measuring unit, 2 fixed bearing

1/2 is measured

The load is distributed 50/50

• 4 point seating, shape of container; symmetric

4 force measuring units

Values are measured under each container foot

Weight of Container: _____

Nominal capacity, nominal load: _____

Filling material: _____

Weight density: _____

Standing/lying containers for bulk material:

The value indicated is calculated using 3 or 4 measuring values without a fixed bearing. The measuring values are transferred to a processing unit with tara/zero suppression. All load cells are linked to an indicator with the output corresponding to the sum of all measuring values and being displayed.

• 3 point seating

Container with 3 force measuring units

Values are measured under each container foot

• 4 point seating

Container with 4 force measuring units

Values are measured under each container foot

Weight of Container: _____

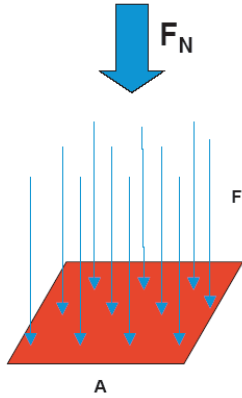
Nominal capacity, nominal load: _____

Filling material: _____

Weight density: _____

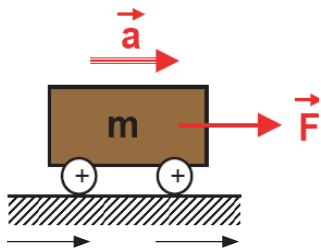
Additional features required: _____

Reference Information



$$P = F_N / A$$

Pressure = force/area



$$F = m \cdot a$$

Force = mass * acceleration

Definitions

Pressure	The force acting on a surface divided by the area over which it acts. Symbol p
Force	A physical influence that tends to change the position of an object with mass, equal to the rate of change in momentum of the object. Symbol F; Defined $F = m \cdot a$
Area	The extent of a planar region or of the surface of a solid measured in square units.
Gravity	A force attracting massive bodies towards each other that is proportional to the product of their masses and inversely proportional to the square of their separation.
Newton	An SI unit of force equivalent to the force that produces an acceleration of one meter per second on a mass of one kilogram. Symbol N
Ton	An imperial unit of weight, equal to (2,000 lb) in the United States (a.k.a. short ton).
Metric ton	A unit of weight equal to 1,000 kg.
Long ton	An imperial unit of weight, equal to 1,016 kg (2,240 lb) in the United Kingdom.
Nominal load	The load/force for which the load cell is constructed.
Nominal temperature range	The temperature range where the measuring instrument complies with its specifications.

Force Units Cross Reference Chart

units	lbf	N	kg	kN	oz	ton (short)	ton (long)	ton (metric)
lbf	1	4.448221615	0.45359237	0.004448222	16	0.0005	0.000446429	0.000453592
N	0.224808943	1	0.101971621	0.001	3.59694309	0.000112404	0.000100361	0.000101972
kg	2.204622622	9.80665	1	0.00980665	35.27396195	0.001102311	0.000984207	0.001
kN	224.8089431	1000	101.9716213	1	3596.94309	0.112404472	0.100361135	0.101971621
oz	0.0625	0.278013851	0.028349523	0.000278014	1	0.00003125	2.79018E-05	2.83495E-05
ton (short)	2000	8896.443231	907.18474	8.896443231	32000	1	0.892857143	0.90718474
ton (long)	2240	9964.016418	1016.046909	9.964016418	35840	1.12	1	1.016046909
ton (metric)	2204.622622	9806.65	1000	9.80665	35273.96195	1.102311311	0.984206528	1

[illegible]

[illegible]

NOTES



A series of horizontal lines for writing notes, overlaid on a decorative background featuring a large, faint, stylized 'V' and a circle.

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Quality Policy

NOSHOK is
committed to providing
a high degree of value and continually
improving processes to improve customer
satisfaction by focusing on customer
requirements for the design, manufacture
and distribution of pressure, temperature,
and force measurement instruments
along with needle and
manifold valves.

All from world class technology.

Combined with real-world stamina.

The highest value with the industry's best warranty.

And all from a company with a 45+ year record of customer satisfaction.

All from your Single Source Instrumentation Company.



Corporate Headquarters

1010 West Bagley Road
Berea, Ohio 44017
Ph: 440.243.0888
Fax: 440.243.3472
E-mail: noshok@noshok.com
Web: www.noshok.com

