

# Force Measurement Solutions



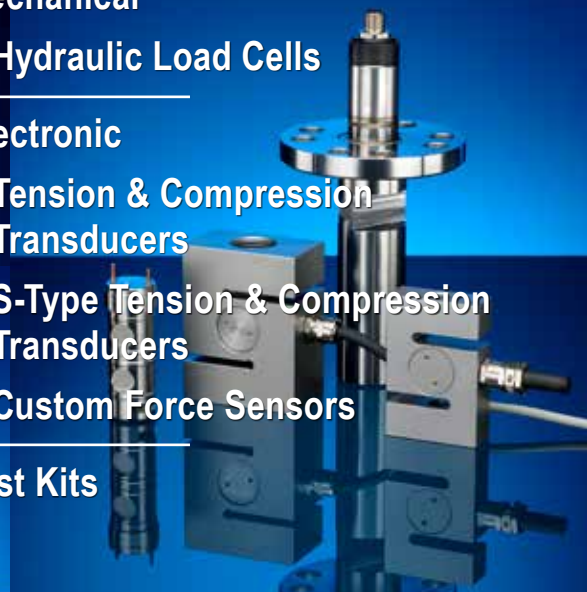
Mechanical  
Hydraulic Load Cells

Electronic  
Tension & Compression  
Transducers

S-Type Tension & Compression  
Transducers

Custom Force Sensors

Test Kits

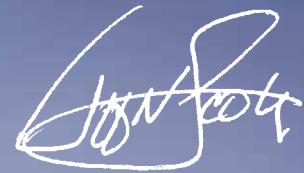


**A**t NOSHOK, we pride ourselves on being innovators in the industry by continually offering the latest technology and measurement solutions, and providing the best customer support in the marketplace.

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 50+ 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 9001:2015 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.

## T A B L E O F C O N T E N T S



### MECHANICAL FORCE MEASUREMENT

<b>6 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell:</b> 1000 SERIES .....	4-7
<b>20 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell:</b> 2000 SERIES .....	8-11
<b>80 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell:</b> 3000 SERIES .....	12-15
<b>10 cm<sup>2</sup>, 40 cm<sup>2</sup>, 100 cm<sup>2</sup>, 250 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell:</b> 4000 SERIES .....	16-19
<b>40 cm<sup>2</sup>, 60 cm<sup>2</sup>, 90 cm<sup>2</sup>, 160 cm<sup>2</sup>, 240 cm<sup>2</sup>, 410 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell:</b> 5000 SERIES .....	20-23

### ELECTRONIC FORCE MEASUREMENT

<b>Tension &amp; Compression Force Transducer:</b> 3540 SERIES .....	24-27
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### TEST KITS

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# 6 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell



## 1000 SERIES

- Compact flat body design for compression force measurement
- Ranges from 150 lb<sub>f</sub> to 7,000 lb<sub>f</sub>
- Accuracy levels range from ±0.25% full scale (BFSL) to ±1.6% 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

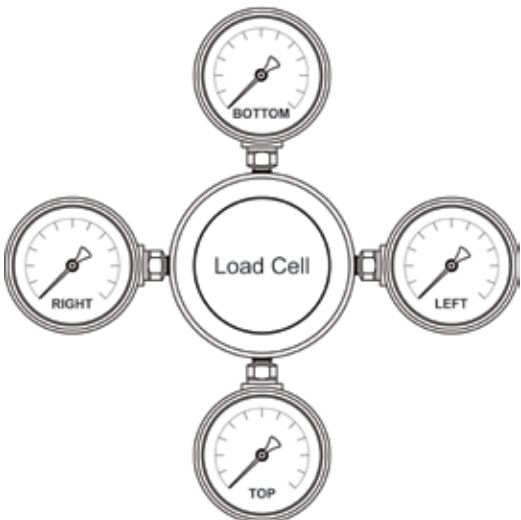
### APPLICATIONS

- 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

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

### Instrument Connection



For Load Cells using NOSHOK 300 Series Gauge:



**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

For Load Cells using NOSHOK 100, 200 & 615 Series Transducers/Transmitters:



**WARNING:** This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



ORDERING INFORMATION				
<b>LOAD CELLS</b>	<b>106P</b> ND 6 - Compression - plastic piston	<b>106S</b> ND 6 - Compression - Stainless Steel piston		
<b>MEASURING RANGES</b>	<b>150A</b> 150 lb <sub>f</sub>	<b>900A</b> 900 lb <sub>f</sub>	<b>4800A</b> 4,800 lb <sub>f</sub>	
	<b>400A</b> 400 lb <sub>f</sub>	<b>1400A</b> 1,400 lb <sub>f</sub>	<b>7000A</b> 7,000 lb <sub>f</sub>	
	<b>750A</b> 750 lb <sub>f</sub>	<b>2800A</b> 2,800 lb <sub>f</sub>		
	Other ranges available, please consult factory.			
<b>INSTRUMENTS</b>	<b>1</b> 25-300 Series gauge	<b>7</b> 200 Series transducer		
	<b>6</b> 100 Series transmitter	<b>8</b> 615 Series transducer		
<b>INSTRUMENT CONNECTIONS*</b>	<b>A</b> Bottom	<b>C</b> Right side	<b>E</b> None**	
	<b>B</b> Top	<b>D</b> Left side		
25-300 SERIES GAUGE OPTIONS	100 SERIES TRANSMITTER OPTIONS	200 SERIES TRANSDUCER OPTIONS	615 SERIES TRANSDUCER OPTIONS	
<b>0</b> No options	<b>Accuracy</b>	<b>Accuracy</b>	<b>Accuracy</b>	
<b>1</b> Dry gauge	<b>1</b> 0.50%	<b>1</b> 0.50%	<b>1</b> 0.25%	
<b>2</b> Maximum indicating pointer	<b>Output</b>	<b>Output</b>	<b>Output</b>	
<b>3</b> Set pointer	<b>1</b> 4 mA to 20 mA	<b>2</b> 0 Vdc to 5 Vdc	<b>1</b> 4 mA to 20 mA	
<b>4</b> Rubber case protector	<b>Electrical Connection</b>	<b>3</b> 1 Vdc to 5 Vdc	<b>2</b> 0 Vdc to 5 Vdc	
<b>5</b> Glass overlay		<b>5</b> 0 Vdc to 10 Vdc	<b>3</b> 1 Vdc to 5 Vdc	
<b>6</b> Safety glass overlay		<b>Electrical Connection</b>	<b>1</b> Option 7 with 36" cable	<b>5</b> 0 Vdc to 10 Vdc
			<b>3</b> 6-pin Bendix	<b>Electrical Connection</b>
	<b>6</b> 1/2" NPT conduit w/ 6" cable		<b>1</b> Option 8 with 36" cable	
	<b>7</b> Mini-Hirschmann		<b>3</b> 6-pin Bendix	
	<b>25</b> M12 x 1 (4-pin)	<b>6</b> 1/2" NPT conduit w/36" cable	<b>6</b> 1/2" NPT conduit w/ 36" cable	
		<b>7</b> Mini-Hirschmann	<b>8</b> Hirschmann	
		<b>25</b> M12 x 1 (4-pin)	<b>25</b> M12 x 1 (4-pin)	
<b>CONNECTING TYPES</b>	<b>1</b> 50 mm SS spacer	<b>3</b> Capillary w/ spiral protective sleeve		
	<b>2</b> 100 mm SS spacer			
<b>CAPILLARY LENGTH</b>	<b>##</b> Specify in feet (for options 3 and 4)			

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

\* Refer to Instrument Connection diagram on previous page.

\*\* Not required for transmitters, switches, or any instrument other than a dial indicating gauge.

**Note:** Separate multiple options with forward slash "/"

### EXAMPLE - With Pressure Gauge

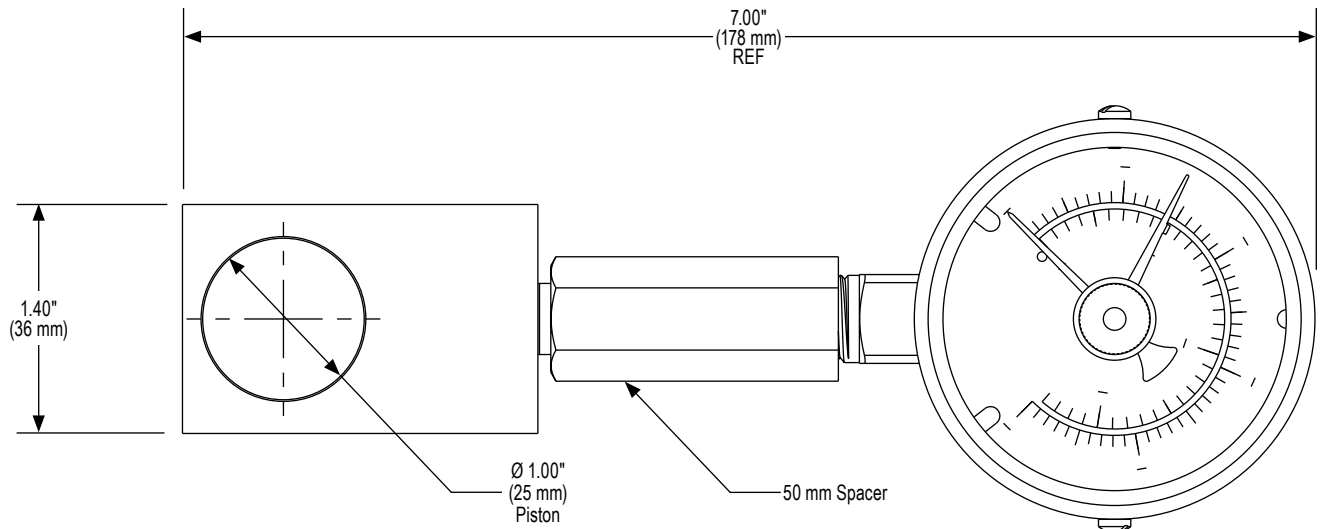
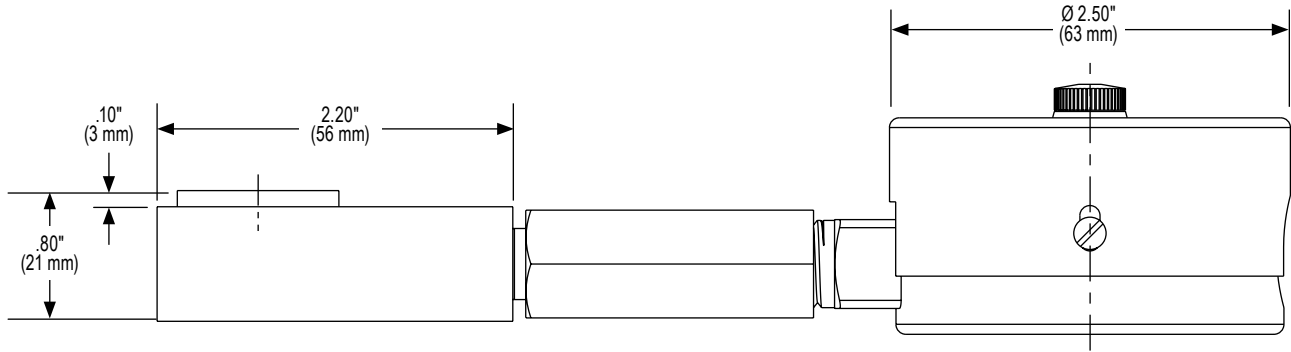
		<b>106S - 2800A - 1 - A - 1/3/4 - 1</b>
<b>Load cell</b> .....	1000 Series ND 6	
<b>Measuring range</b> .....	2,800 lb <sub>f</sub>	
<b>Instrument</b> .....	25-300 Series gauge	
<b>Instrument connection</b> .....	Bottom connection	
<b>Options</b> .....	Dry gauge, set pointer, RCP	
<b>Connecting type</b> .....	50 mm Stainless Steel spacer	

### EXAMPLE - With Pressure Transducer

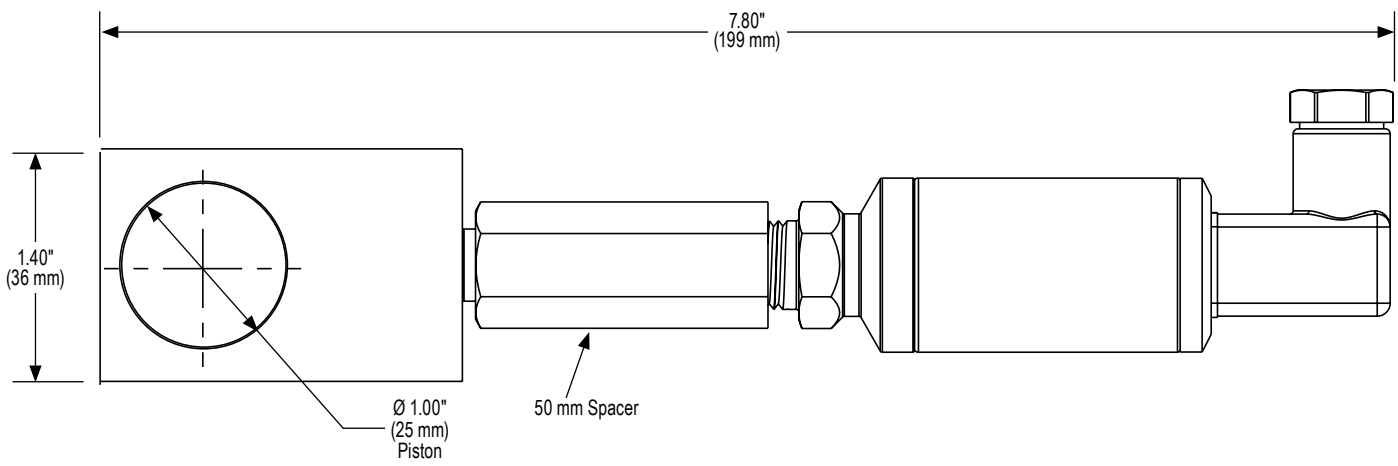
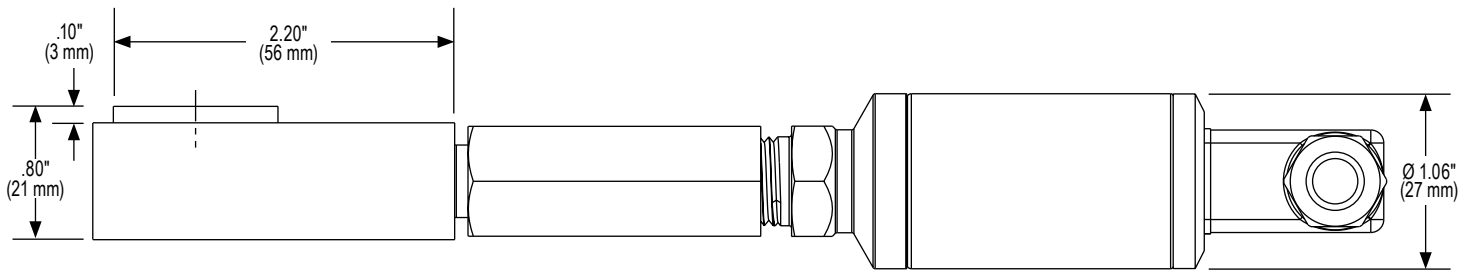
		<b>106S - 7000A - 8 - A - 1/2/25 - 3 - 5</b>
<b>Load cell</b> .....	1000 Series ND 6	
<b>Measuring range</b> .....	7,000 lb <sub>f</sub>	
<b>Instrument</b> .....	615 Series transducer	
<b>Instrument connection</b> .....	Bottom connection	
<b>Options</b> .....	0.25% accuracy, 0 Vdc to 5 Vdc, M12 x 1 (4-pin)	
<b>Connecting type</b> .....	Capillary w/ spiral protective sleeve	
<b>Capillary length</b> .....	5'	

# Dimensions

With 25-300 Series Pressure Gauge



### With 100/200 Series Transducer



# 20 cm<sup>2</sup> 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<sub>f</sub> to 22,000 lb<sub>f</sub>
- Accuracy levels range from  $\pm 0.25\%$  full scale (BFSL) to  $\pm 1.6\%$  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

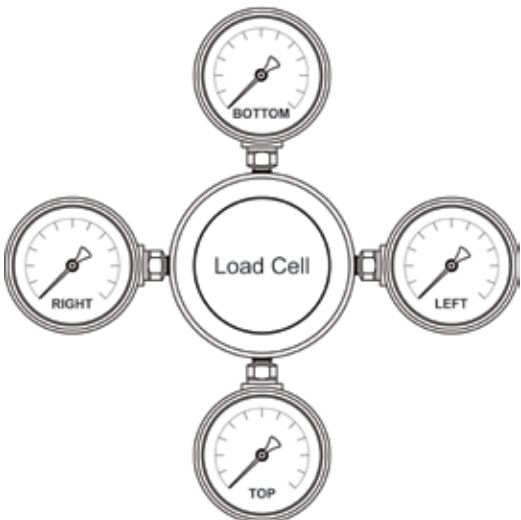
### APPLICATIONS

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

### SPECIFICATIONS

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

### Instrument Connection



For Load Cells using NOSHOK 300 Series Gauge:



**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

For Load Cells using NOSHOK 100, 200 & 615 Series Transducers/Transmitters:



**WARNING:** This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



ORDERING INFORMATION								
<b>LOAD CELLS</b>	2020 ND 20 - Compression - standard design			2120 ND 20 - Compression or tension - ring design				
<b>MEASURING RANGES</b>	90A	90 lb <sub>f</sub>	900A	900 lb <sub>f</sub>	2500A	2,500 lb <sub>f</sub>	9000A	9,000 lb <sub>f</sub>
	300A	300 lb <sub>f</sub>	1200A	1,200 lb <sub>f</sub>	3000A	3,000 lb <sub>f</sub>	15000A	15,000 lb <sub>f</sub>
	600A	600 lb <sub>f</sub>	1800A	1,800 lb <sub>f</sub>	4500A	4,500 lb <sub>f</sub>	22000A	22,000 lb <sub>f</sub> *
Other ranges available, please consult factory.								
<b>INSTRUMENTS</b>	1 25-300 Series gauge		6 100 Series transmitter		8 615 Series transducer			
	4 40-400 Series gauge		7 200 Series transducer					
<b>INSTRUMENT CONNECTIONS**</b>	A Bottom		C Right side		E None***			
	B Top		D Left side					
25-300 SERIES GAUGE OPTIONS	40-400 SERIES GAUGE OPTIONS	100 SERIES TRANSMITTER OPTIONS	200 SERIES TRANSDUCER OPTIONS	615 SERIES TRANSDUCER OPTIONS				
0 No options	0 No options	<b>Accuracy</b>	<b>Accuracy</b>	<b>Accuracy</b>				
1 Dry gauge	1 Glycerin filled	1 0.50%	1 0.50%	1 0.25%				
2 Max. indicating pointer	2 Max. indicating pointer	<b>Output</b>	<b>Output</b>	<b>Output</b>				
3 Set pointer	3 Set pointer	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	1 4 mA to 20 mA				
4 Rubber case protector	8 SS rear flange	<b>Electrical Connection</b>	3 1 Vdc to 5 Vdc	2 0 Vdc to 5 Vdc				
5 Glass overlay		1 Option 7 with 36" cable	5 0 Vdc to 10 Vdc	3 1 Vdc to 5 Vdc				
6 Safety glass overlay		3 6-pin Bendix	<b>Electrical Connection</b>	5 0 Vdc to 10 Vdc				
		6 1/2" NPT conduit w/ 36" cable	1 Option 7 with 36" cable	1 Option 8 with 36" cable				
		7 Mini-Hirschmann	3 6-pin Bendix	3 6-pin Bendix				
		25 M12 x 1 (4-pin)	6 1/2" NPT conduit w/ 36" cable	6 1/2" NPT conduit w/ 36" cable				
			7 Mini-Hirschmann	8 Hirschmann				
			25 M12 x 1 (4-pin)	25 M12 x 1 (4-pin)				
<b>CONNECTING TYPES</b>	0 Direct	2 100 mm SS spacer						
	1 50 mm SS spacer	3 Capillary w/ spiral protective sleeve						
<b>CAPILLARY LENGTH</b>	## Specify in feet (for options 3 and 4)							

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

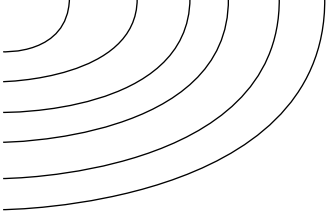
\* For 2120 only.  
 \*\* Refer to Instrument Connection diagram on previous page.  
 \*\*\* Not required for transmitters, switches, or any instrument other than a dial indicating gauge.

**EXAMPLE - With Pressure Gauge**

**Note:** Separate multiple options with forward slash "/"

Load cell..... 2000 Series ND 20  
 Measuring range..... 1,200 lb<sub>f</sub>  
 Instrument..... 40-400 Series gauge  
 Instrument connection..... Top connection  
 Options..... Glycerin filled gauge, set pointer, SS rear flange  
 Connecting type..... Direct

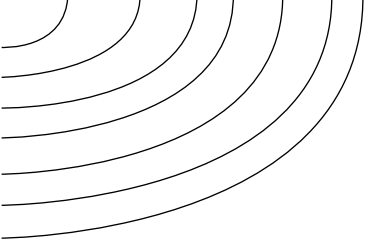
2020 - 1200A - 4 - B - 1/3/8 - 0



**EXAMPLE - With Pressure Transducer**

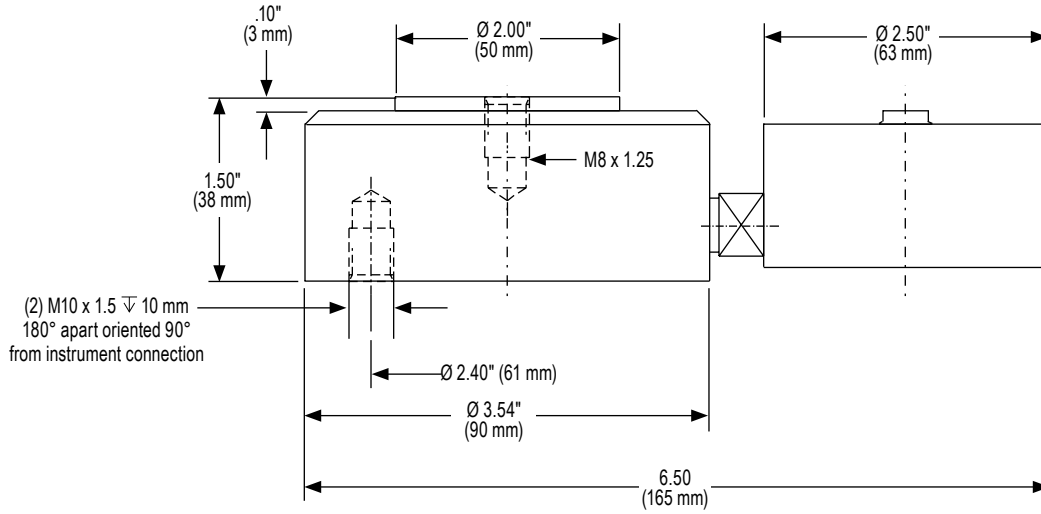
Load cell..... 2000 Series ND 20  
 Measuring range..... 15,000 lb<sub>f</sub>  
 Instrument..... 615 Series transducer  
 Instrument connection..... Bottom connection  
 Options..... 0.25% accuracy, 1 Vdc to 5 Vdc, 1/2" NPT w/36" cable  
 Connecting type..... Capillary w/spiral protective sleeve  
 Capillary length..... 5'

2120 - 15000A - 8 - A - 1/3/8 - 3 - 5

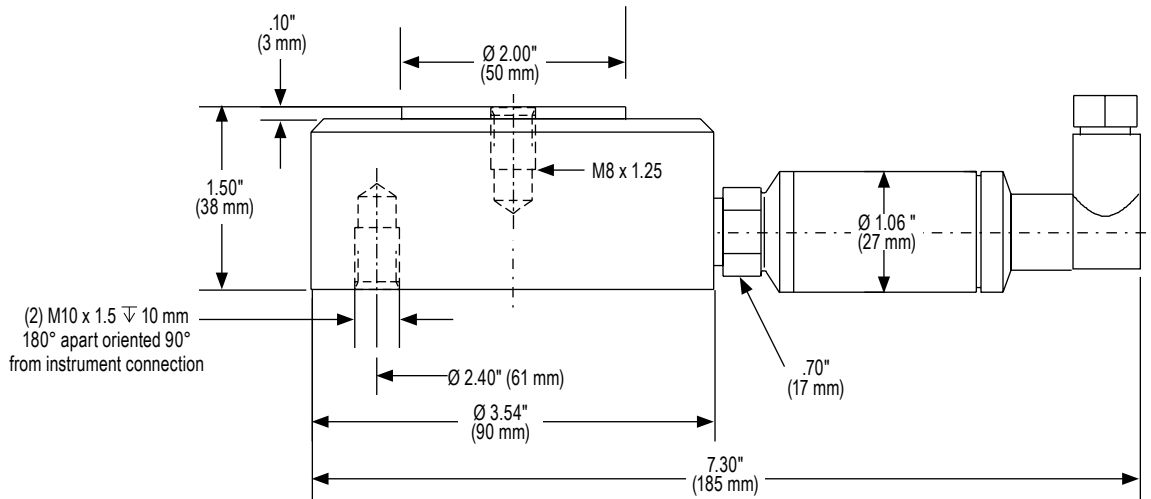


# Dimensions

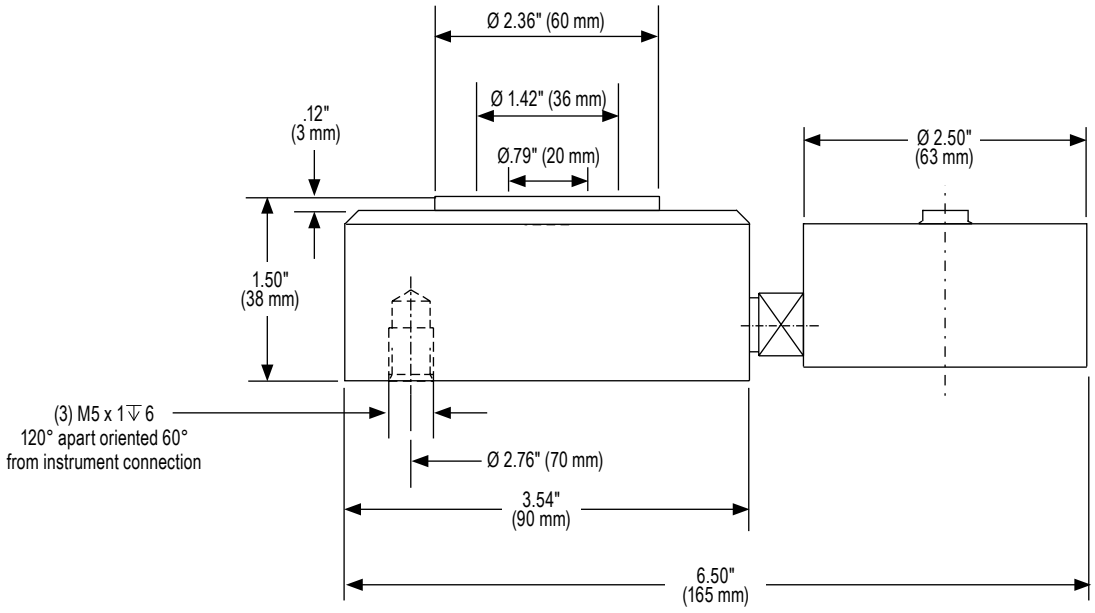
## With 25-300 Series Pressure Gauge



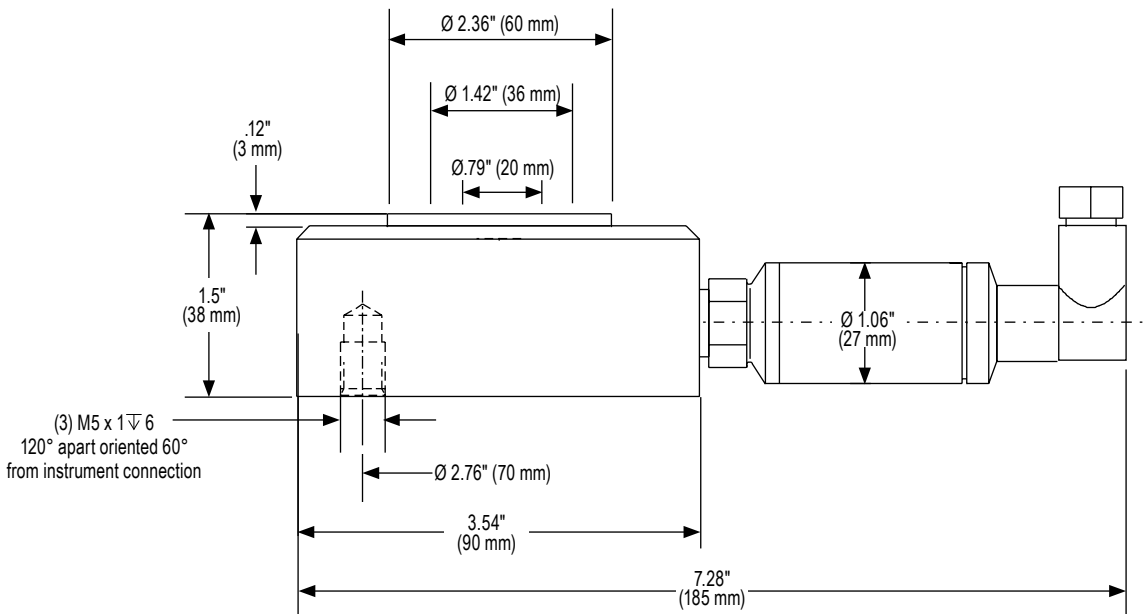
## With 100/200 Series Pressure Transducer



Ring Design With 25-300 Series Pressure Gauge



Ring Design With 100/200 Series Pressure Transducer



# 80 cm<sup>2</sup> Nominal Diameter Hydraulic Load Cell

## 3000 SERIES



### APPLICATIONS

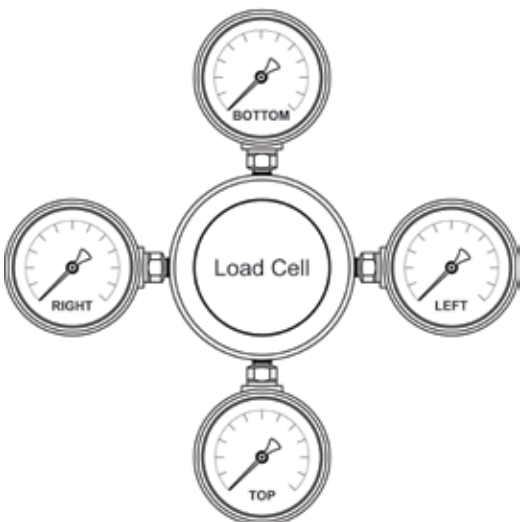
- Turning and drilling machines
- Extruders
- Measuring and test equipment
- Production lines
- Overload protection
- Vices
- Control systems and machine tools

- Designed for measuring axial loads and bearing forces
- Ranges from 360 lb<sub>f</sub> to 70,000 lb<sub>f</sub>
- 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  $\pm 0.25\%$  full scale (BFSL) to  $\pm 1.6\%$  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 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

### SPECIFICATIONS

Nominal diameter	ND 80
Load cell housing	Stainless Steel
Piston	80 cm <sup>2</sup> 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	Glycerin Others available upon request
Load cell fill	Glycerin and water
Operating temperature	-4 °F to 140 °F (-20 °C to 60 °C)
Ambient temperature	-4 °F to 140 °F (-20 °C to 60 °C)

### Instrument Connection



For Load Cells using NOSHOK 300 Series Gauge:



**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

For Load Cells using NOSHOK 100, 200 & 615 Series Transducers/Transmitters:



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ORDERING INFORMATION				
<b>LOAD CELL</b>	3080 ND 80 - Compression - standard design			
<b>MEASURING RANGES</b>	360A	360 lb <sub>f</sub>	2500A	2,500 lb <sub>f</sub>
	700A	700 lb <sub>f</sub>	3500A	3,500 lb <sub>f</sub>
	2000A	2,000 lb <sub>f</sub>	5000A	5,000 lb <sub>f</sub>
	6000A 6,000 lb <sub>f</sub> 18000A 18,000 lb <sub>f</sub> 9000A 9,000 lb <sub>f</sub> 36000A 36,000 lb <sub>f</sub> 10000A 10,000 lb <sub>f</sub> 70000A 70,000 lb <sub>f</sub>			
	Other ranges available, please consult factory.			
<b>INSTRUMENTS</b>	1 25-300 Series gauge	6 100 Series transmitter	8 615 Series transducer	
	4 40-400 Series gauge	7 200 Series transducer		
<b>INSTRUMENT CONNECTIONS*</b>	A Bottom	C Right side	E None**	
	B Top	D Left side		
25-300 SERIES GAUGE OPTIONS	40-400 SERIES GAUGE OPTIONS	100 SERIES TRANSMITTER OPTIONS	200 SERIES TRANSDUCER OPTIONS	615 SERIES TRANSDUCER OPTIONS
0 No options	0 No options	<b>Accuracy</b>	<b>Accuracy</b>	<b>Accuracy</b>
1 Dry gauge	1 Glycerin filled	1 0.50%	1 0.50%	1 0.25%
2 Max. indicating pointer	2 Max. indicating pointer	<b>Output</b>	<b>Output</b>	<b>Output</b>
3 Set pointer	3 Set pointer	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	1 4 mA to 20 mA
4 Rubber case protector	8 SS rear flange	<b>Electrical Connection</b>	3 1 Vdc to 5 Vdc	2 0 Vdc to 5 Vdc
5 Glass overlay		1 Option 7 with 36" cable	5 0 Vdc to 10 Vdc	3 1 Vdc to 5 Vdc
6 Safety glass overlay		3 6-pin Bendix	<b>Electrical Connection</b>	5 0 Vdc to 10 Vdc
		6 1/2" NPT conduit w/ 36" cable	1 Option 7 with 36" cable	<b>Electrical Connection</b>
		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)
<b>CONNECTING TYPES</b>	0 Direct	2 100 mm SS spacer		
	1 50 mm SS spacer	3 Capillary w/ spiral protective sleeve		
<b>CAPILLARY LENGTH</b>	# # Specify in feet (for options 3 and 4)			

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

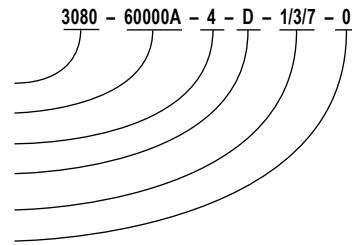
\* Refer to Instrument Connection diagram on previous page.

\*\* Not required for transmitters, switches, or any instrument other than a dial indicating gauge.

**Note:** Separate multiple options with forward slash "/"

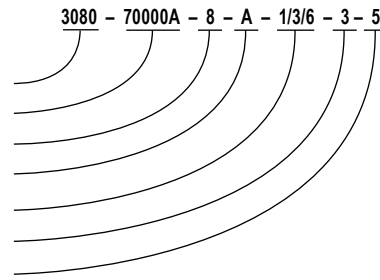
**EXAMPLE - With Pressure Gauge**

Load cell..... 3000 Series ND 80  
 Measuring range..... 60,000 lb<sub>f</sub>  
 Instrument..... 40-400 Series gauge  
 Instrument connection ..... Left side connection  
 Options ..... Glycerin filled gauge, set pointer, adjustable pointer  
 Connecting type ..... Direct



**EXAMPLE - With Pressure Transducer**

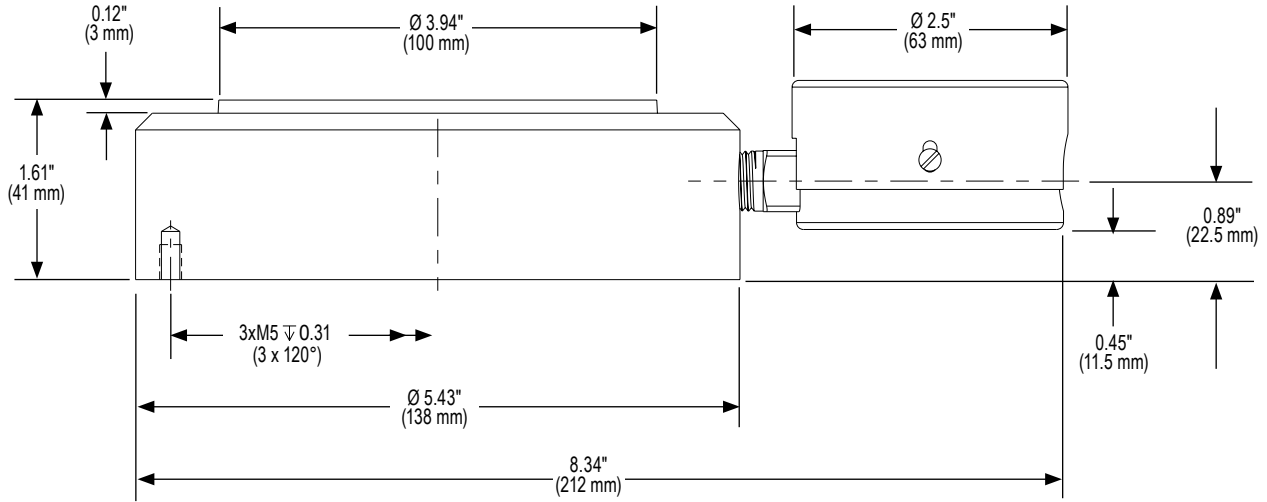
Load cell..... 3000 Series ND 80  
 Measuring range..... 70,000 lb<sub>f</sub>  
 Instrument..... 615 Series transducer  
 Instrument connection ..... Bottom connection  
 Options ..... 0.25% accuracy, 1 Vdc to 5 Vdc, 1/2" NPT w/36" cable  
 Connecting type ..... Capillary w/spiral protective sleeve  
 Capillary length ..... 5'



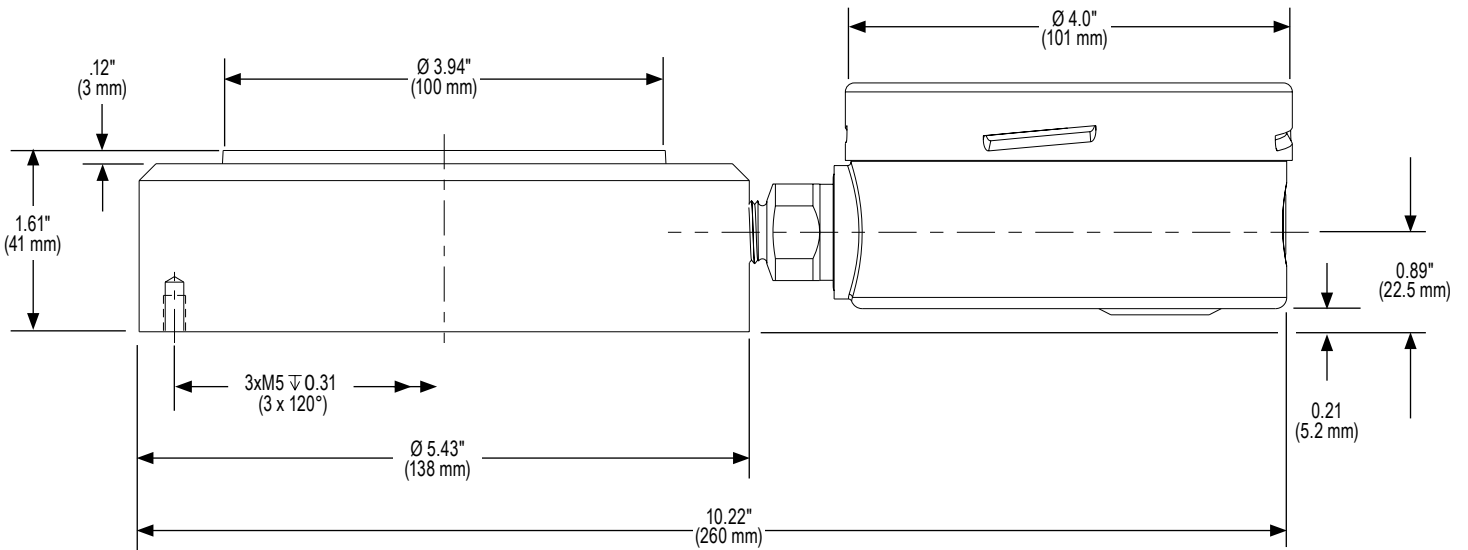


# Dimensions

**With 25-300 Series Pressure Gauge**



**With 40-901 Series Pressure Gauge**





# 40 cm<sup>2</sup> 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 900 lb<sub>f</sub> to 90,000 lb<sub>f</sub>
- Accuracy levels range from ±0.25% full scale (BFSL) to ±1.6% 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, 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

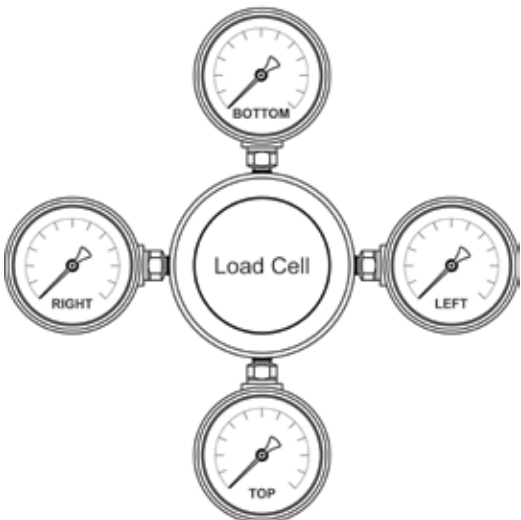
### APPLICATIONS

- 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

<b>Nominal diameter</b>	ND 40
<b>Load cell housing</b>	Galvanized and chrome-plated Steel
<b>Piston</b>	100 cm <sup>2</sup> high grade Stainless Steel
<b>Max piston stroke</b>	0.03" (0.8 mm)
<b>Connecting type</b>	Flexible tubing with 7 mm diameter spiral Steel jacket; Direct (Standard), 50 mm or 100 mm
<b>Standard capillary lengths:</b>	0.5, 1, 2 meters
<b>Gauge fill fluid</b>	Glycerin Others available upon request
<b>Load cell fill</b>	Glycerin and water
<b>Accessories</b>	Ball and socket Round form load plate
<b>Operating temperature</b>	-13 °F to 194 °F (-25 °C to 90 °C)
<b>Ambient temperature</b>	-13 °F to 194 °F (-25 °C to 90 °C)

### Instrument Connection



ORDERING INFORMATION				
<b>LOAD CELLS</b>	4040 ND 40 - Compression - standard design			
<b>MEASURING RANGES</b>	900A	900 lb <sub>f</sub>	6000A	6,000 lb <sub>f</sub>
	4500A	4,500 lb <sub>f</sub>	9000A	9,000 lb <sub>f</sub>
<b>INSTRUMENTS</b>	3	40-400 Series gauge	6	100 Series transmitter
	5	60-400 Series gauge	7	200 Series transducer
<b>INSTRUMENT CONNECTIONS*</b>	A	Bottom	C	Right side
	B	Top	D	Left side
			E None**	
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	<b>Accuracy</b>	<b>Accuracy</b>	<b>Accuracy</b>
1 Glycerin filled	1 Glycerin filled	1 0.50%	1 0.50%	1 0.50%
2 Max. indicating pointer	2 Max. indicating pointer	<b>Output</b>	<b>Output</b>	<b>Output</b>
3 Set pointer	3 Set pointer	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	1 4 mA to 20 mA
4 Rubber case protector	8 SS rear flange	<b>Electrical Connection</b>	3 1 Vdc to 5 Vdc	2 0 Vdc to 5 Vdc
6 Safety glass overlay		1 Option 7 with 36" cable	5 0 Vdc to 10 Vdc	3 1 Vdc to 5 Vdc
7 Adjustable pointer		3 6-pin Bendix	<b>Electrical Connection</b>	5 0 Vdc to 10 Vdc
8 SS rear flange		6 1/2" NPT conduit w/ 36" cable	1 Option 7 with 36" cable	<b>Electrical Connection</b>
		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)
<b>CONNECTING TYPES</b>	0 Direct	2 100 mm SS spacer		
	1 50 mm SS spacer	3 Capillary w/ spiral protective sleeve		
<b>CAPILLARY LENGTH</b>	# Specify in meters (for option 3)			

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

\* Refer to Instrument Connection diagram on previous page.

\*\* Not required for transmitters, switches, or any instrument other than a dial indicating gauge.

Note: Separate multiple options with forward slash "/"

### EXAMPLE - With Pressure Gauge

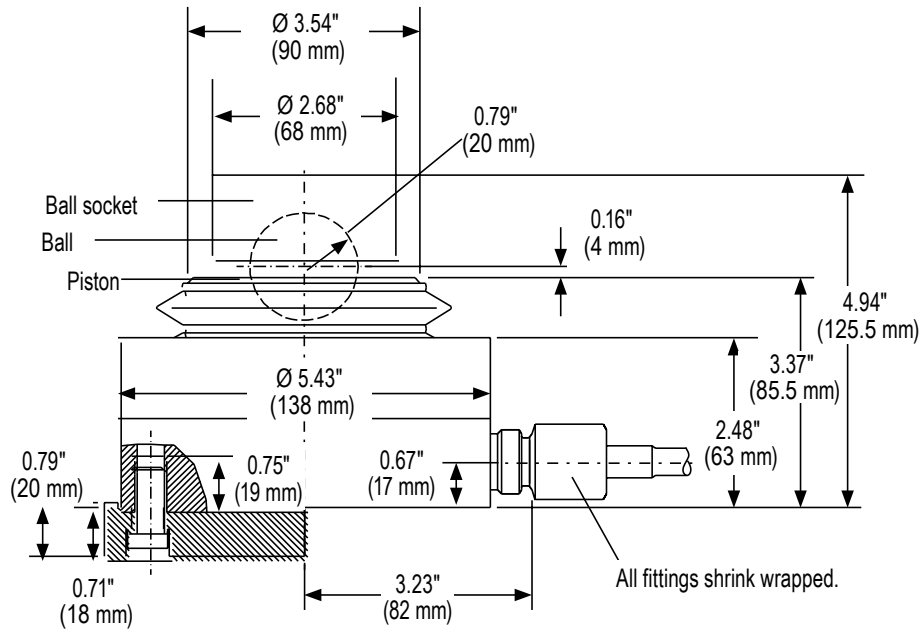
	4040 - 4500A - 5 - A - 3/8 - 3 - 10
Load cell.....	4000 Series ND 40
Measuring range.....	4,500 lb <sub>f</sub>
Instrument.....	60-400 Series gauge
Instrument connection.....	Bottom connection
Options.....	Set pointer, SS rear flange
Connecting type.....	Capillary w/spiral protective sleeve
Capillary length.....	10

### EXAMPLE - With Pressure Transducer

	4040 - 9000A - 8 - A - 1/3/6 - 3 - 5
Load cell.....	4000 Series ND 40
Measuring range.....	9,000 lb <sub>f</sub>
Instrument.....	615 Series transducer
Instrument connection.....	Bottom connection
Options.....	0.25% accuracy, 1 Vdc to 5 Vdc, 1/2" NPT conduit with 36" cable
Connecting type.....	Capillary w/spiral protective sleeve
Capillary length.....	5 meters

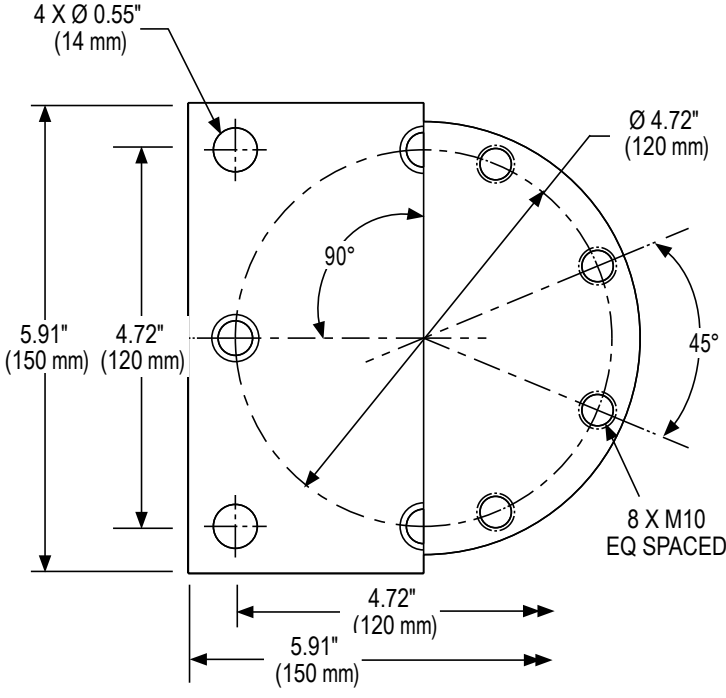
# Dimensions

## Side





Bottom



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

# 240 cm<sup>2</sup> 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 6,000 lb. to 28,000 lb
- Accuracy levels range from  $\pm 0.25\%$  full scale (BFSL) to  $\pm 1.6\%$  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, 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

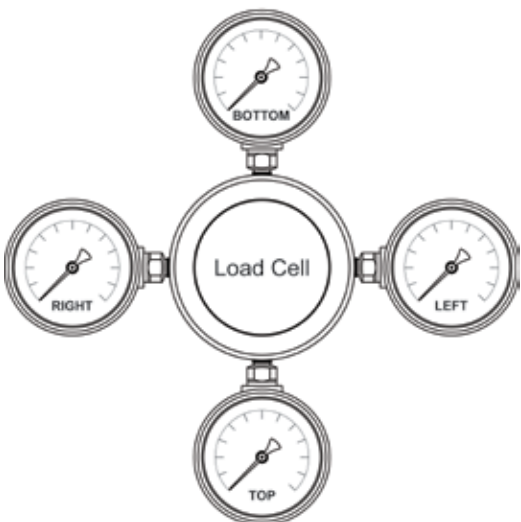
### APPLICATIONS

- 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

<b>Nominal diameter</b>	ND 240
<b>Load cell housing</b>	Stainless Steel
<b>Piston</b>	Stainless Steel
<b>Max piston stroke</b>	0.03" (0.8 mm)
<b>Connecting type</b>	Flexible tubing with 7 mm diameter spiral Steel jacket; Direct (Standard), 50 mm or 100 mm
<b>Standard capillary lengths</b>	0.5, 1, 2 meters
<b>Gauge fill fluid</b>	Glycerin Others available upon request
<b>Load cell fill</b>	Glycerin and water
<b>Accessories</b>	Ball and socket Round form load plate
<b>Operating temperature</b>	-13 °F to 194 °F (-25 °C to 90 °C)
<b>Ambient temperature</b>	-13 °F to 194 °F (-25 °C to 90 °C)

### Instrument Connection



ORDERING INFORMATION					
<b>LOAD CELLS</b> 5240 ND 240 - Compression or tension - ring type design					
6000A 6,000 lb <sub>f</sub>		9000A 9,000 lb <sub>f</sub>		60000A 60,000 lb <sub>f</sub> 160F 160 ton <sub>f</sub>	
8500A 8,500 lb <sub>f</sub>		28000A 28,000 lb <sub>f</sub>		90000A 90,000 lb <sub>f</sub>	
<b>INSTRUMENTS</b>		3 40-400 Series gauge		6 100 Series transmitter	
		5 60-400 Series gauge		7 200 Series transducer	
<b>INSTRUMENT CONNECTIONS*</b>		A Bottom		C Right side	
		B Top		D Left side	
				E None**	
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	<b>Accuracy</b>	<b>Accuracy</b>	<b>Accuracy</b>	
1 Glycerin filled	1 Glycerin filled	1 0.50%	1 0.50%	1 0.25%	
2 Max. indicating pointer	2 Max. indicating pointer	<b>Output</b>	<b>Output</b>	<b>Output</b>	
3 Set pointer	3 Set pointer	1 4 mA to 20 mA	2 0 Vdc to 5 Vdc	1 4 mA to 20 mA	
4 Rubber case protector	8 SS rear flange	<b>Electrical Connection</b>	3 1 Vdc to 5 Vdc	2 0 Vdc to 5 Vdc	
6 Safety glass overlay		1 Option 7 with 36" cable	5 0 Vdc to 10 Vdc	3 1 Vdc to 5 Vdc	
7 Adjustable pointer		3 6-pin Bendix	<b>Electrical Connection</b>	5 0 Vdc to 10 Vdc	
8 SS rear flange		6 1/2" NPT conduit w/ 36" cable	1 Option 7 with 36" cable	<b>Electrical Connection</b>	
		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)	
<b>CONNECTING TYPES</b>		0 Direct connection		2 100 mm SS spacer	
		1 50 mm SS spacer		3 Capillary w/ spiral protective sleeve	
<b>CAPILLARY LENGTH</b>		## Specify in meters (for option 3)			

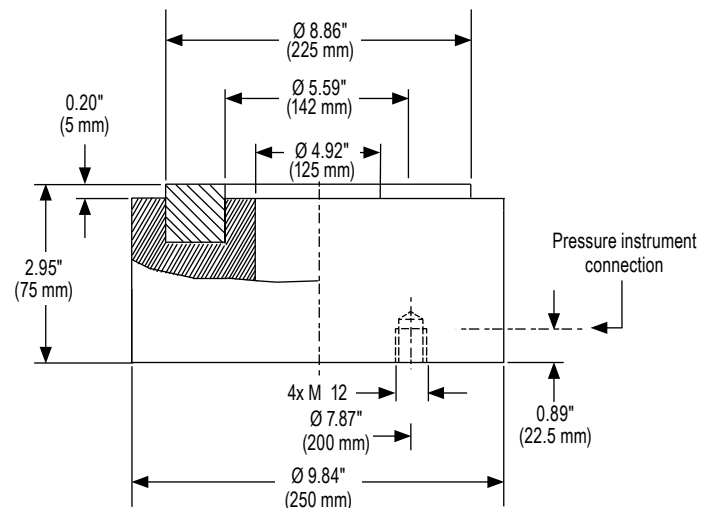
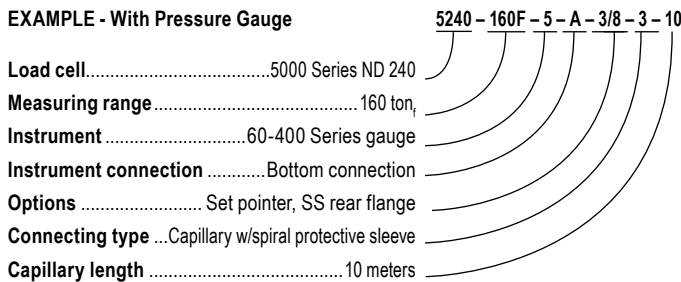
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

\* Refer to Instrument Connection diagram on previous page.

\*\* Not required for transmitters, switches, or any instrument other than a dial indicating gauge.

Note: Separate multiple options with forward slash "/"

**EXAMPLE - With Pressure Gauge**



# 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 <sub>f</sub>	450	1124	2248	4496	6744	11240	22481	112404
Limit load	150% full scale								
Fracture load	>300% full scale								
Permissible oscillation	±50% 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% $F_{nom} / ^\circ F$							
	-zero	<±0.01% $F_{nom} / ^\circ F$							
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	10 Vdc to 30 Vdc for 4 mA to 20 mA output								
	14 Vdc to 30 Vdc for 0 Vdc to 10 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								



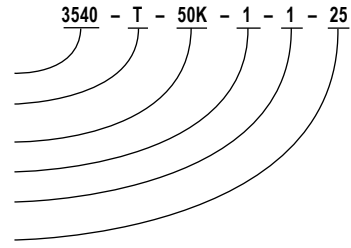
ORDERING INFORMATION				
<b>SERIES</b>	3540			
<b>FORCE TYPES</b>	<b>T</b> Tension	<b>C</b> Compression	<b>TC</b> Tension/compression*	
<b>MEASURING RANGES</b>	<b>1K</b> 0 kN to 1 kN	<b>10K</b> 0 kN to 10 kN	<b>50K</b> 0 kN to 50 kN	<b>300K</b> 0 kN to 300 kN
	<b>2K</b> 0 kN to 2 kN	<b>20K</b> 0 kN to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

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

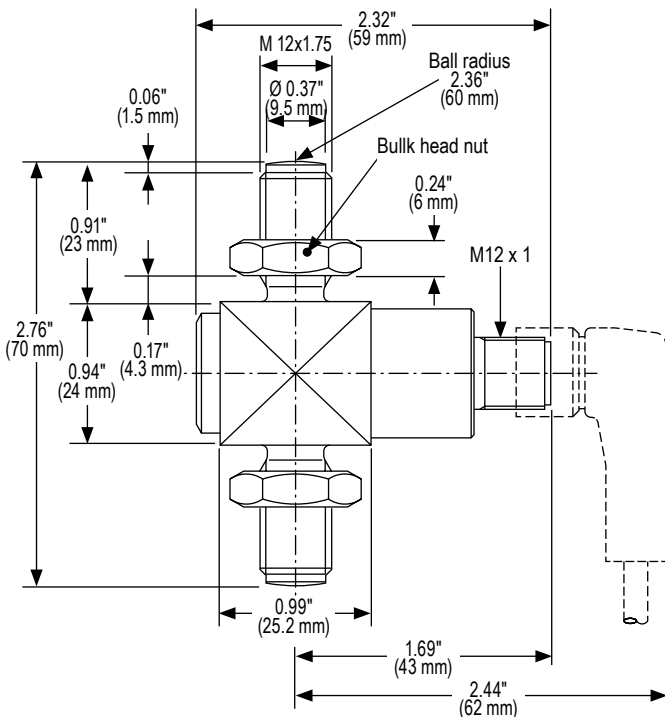
\* Please specify measuring range for both tension and compression.

### EXAMPLE

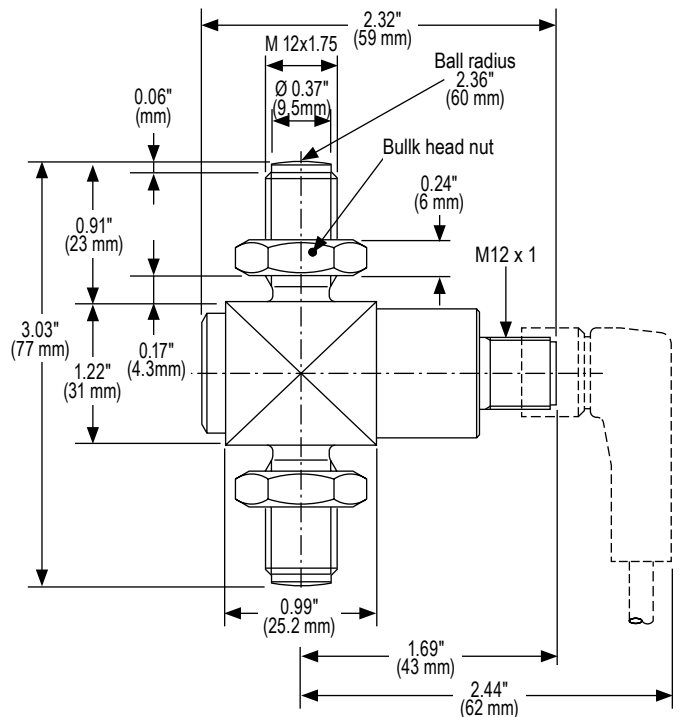
Series ..... 3540 Series  
 Force type ..... Tension  
 Measuring range ..... 0 kN to 50 kN  
 Accuracy ..... ±0.2% full scale  
 Output signal ..... 4 mA to 20 mA  
 Electrical connection ..... M12 x 1 (4-pin)



### 1 kN to 5 kN



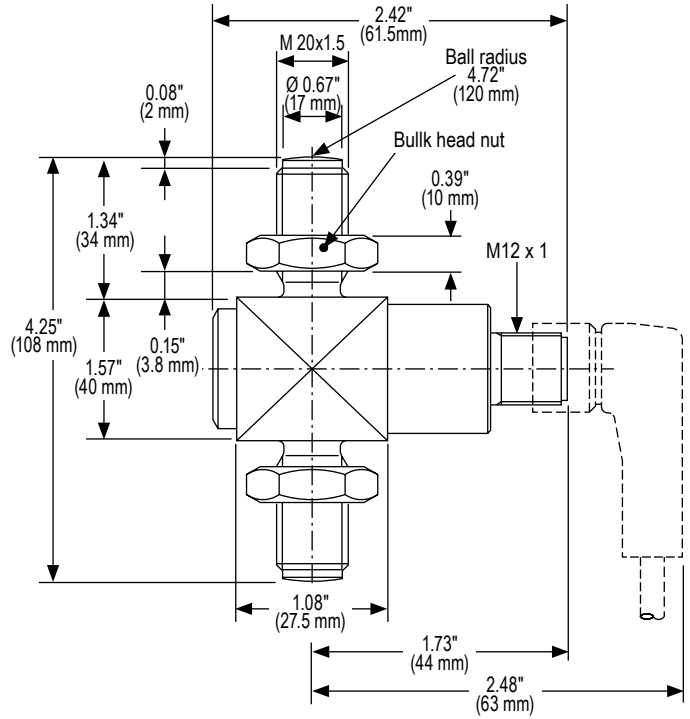
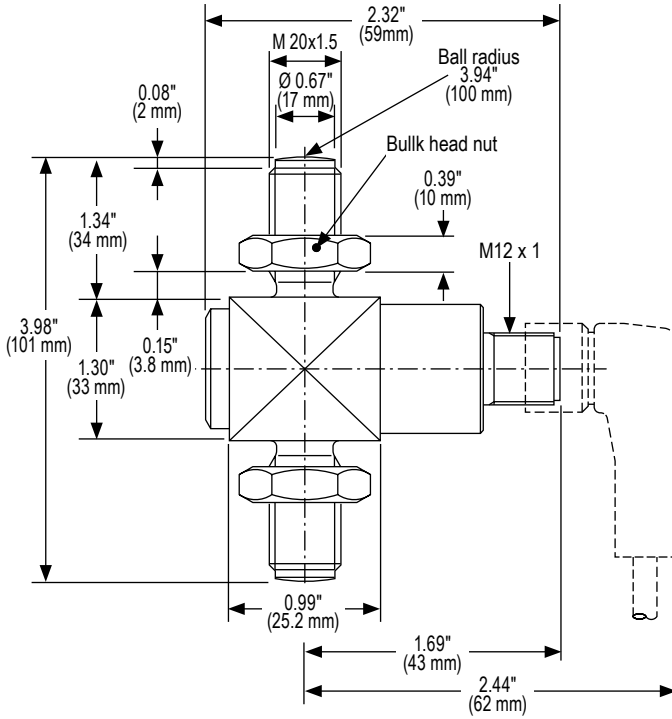
### 10 kN



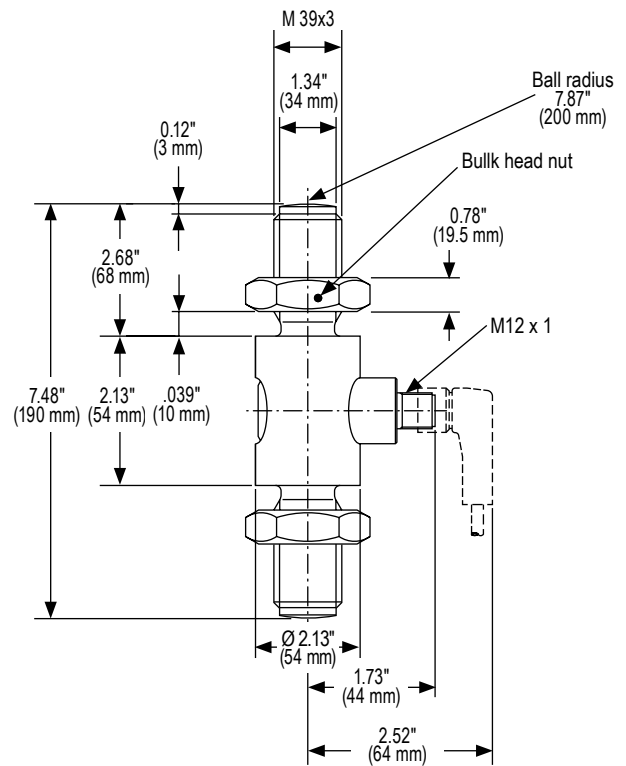
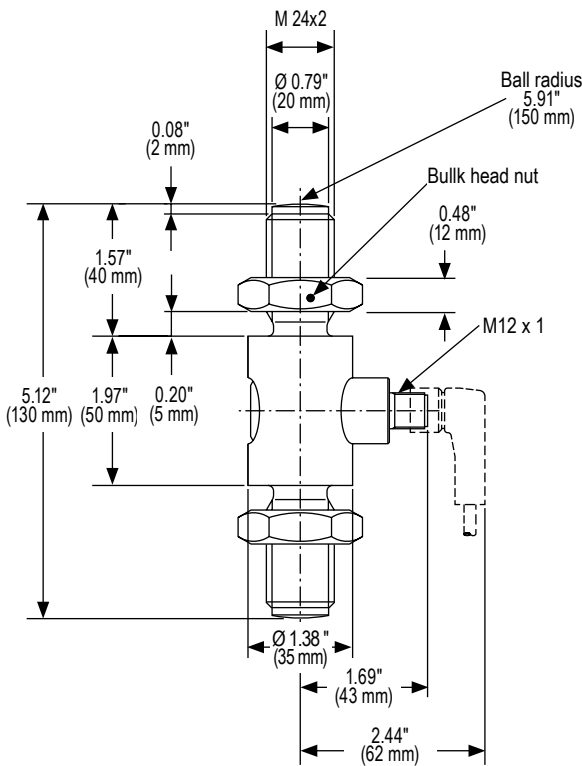


# Dimensions

**20 kN** **30 kN**



**50 kN** **100 kN**





# 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

<b>Measuring ranges</b>	0 N to 500 N - 0 kN to 50 kN
<b>Maximum dynamic load</b>	$\pm 70\% F_{nom}$ according to DIN 50100
<b>Nominal deflection</b>	<0.15 mm
<b>Accuracy</b>	$\pm 0.2\%$ full scale
<b>Output signal</b>	2 mV/V
<b>Operating temperature</b>	-30 °F to 85 °F (-34 °C to 29 °C)
<b>Temperature effect -span</b>	$< \pm 0.12\%$ of full scale/10K ( $< \pm 0.08\%$ of full scale/10K optional)
<b>-zero</b>	$< \pm 0.04\%$ of full scale/10K ( $< \pm 0.025\%$ of full scale/10K optional)
<b>Electrical protection</b>	Short circuit, overvoltage and reverse polarity protection



ORDERING INFORMATION			
<b>SERIES</b>	2351		
<b>FORCE TYPES</b>	<b>T</b> Tension	<b>C</b> Compression	<b>TC</b> Tension/Compression**
<b>MEASURING RANGES</b>	<b>500N</b> 0 N to 500 N	<b>5K</b> 0 kN to 5 kN	<b>30K</b> 0 kN to 30 kN
	<b>1000N</b> 0 N to 1,000 N	<b>10K</b> 0 kN to 10 kN	<b>50K</b> 0 kN to 50 kN
	<b>2K</b> 0 kN to 2 kN	<b>20K</b> 0 kN to 20 kN	
<b>ACCURACIES</b>	1 ±0.2% full scale		
<b>OUTPUT SIGNAL</b>	1 4 mA to 20 mA*	5 0 Vdc to 10 Vdc*	25 2 mV/V
<b>ELECTRICAL CONNECTION</b>	36 9' integral cable		

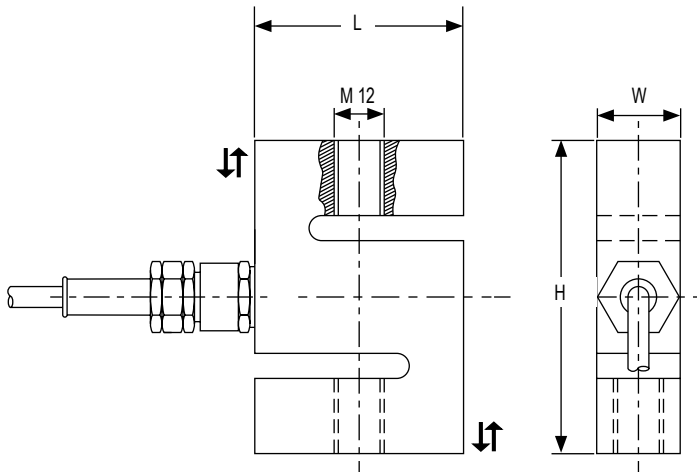
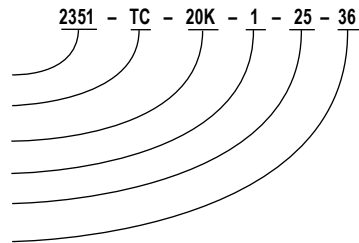
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

\* Integrated cable amplifier.

\*\* Please specify measuring range for both tension and compression.

### EXAMPLE

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



Rated Force in kN	Dimensions in mm		
	H	L	W
500N	63.5	50.8	25.4
100N, 2K	76.2	50.8	25.4
5K, 10K	87.3	57.2	31
20K, 30K	100	69.8	36.5
50K	114.3	76.2	36.5

# 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

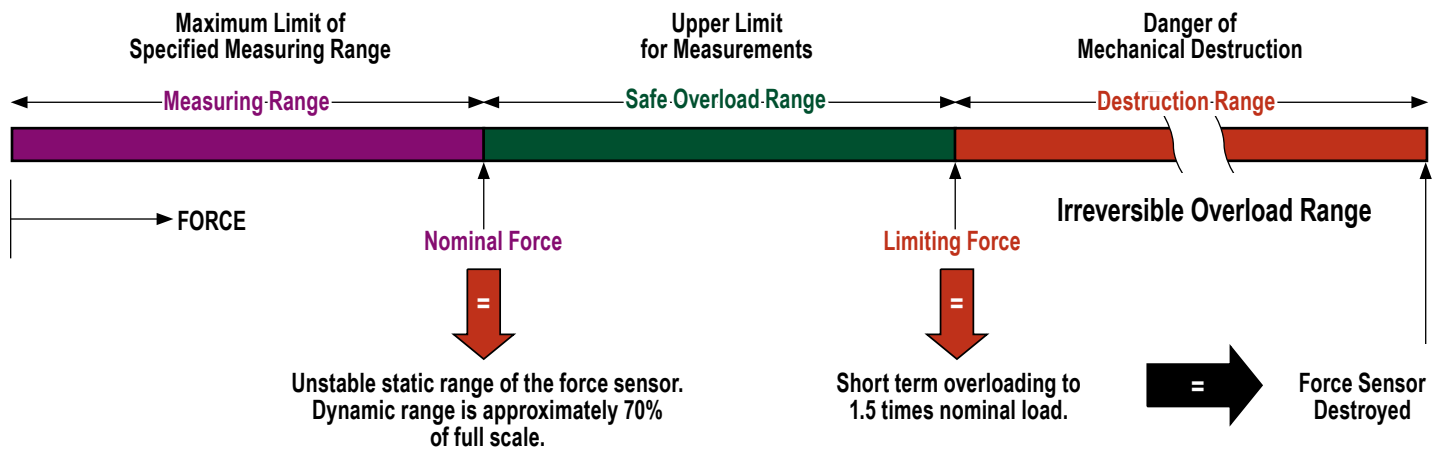
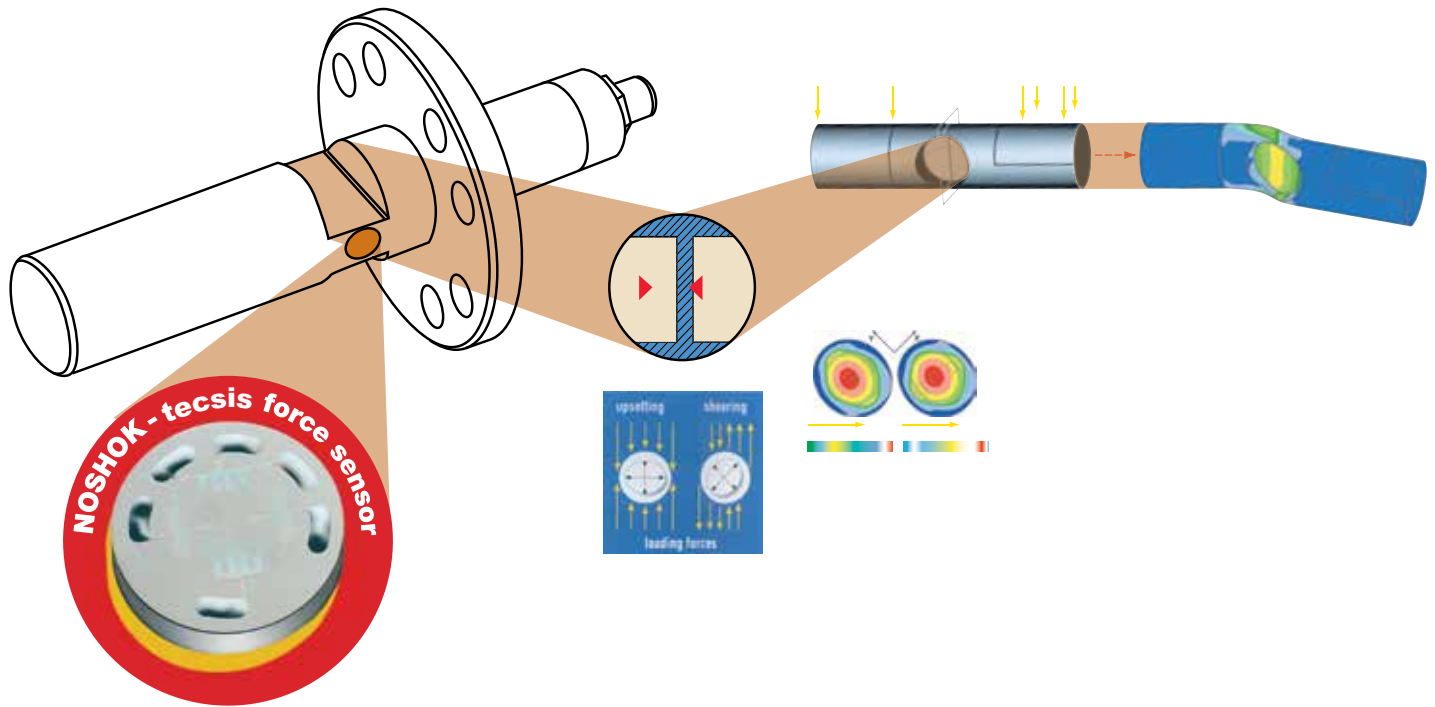
## APPLICATIONS

- 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

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

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

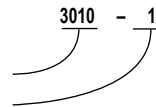


ORDERING INFORMATION	
SERIES	3010
OPTIONS	0 No options                      1 Infrared interface

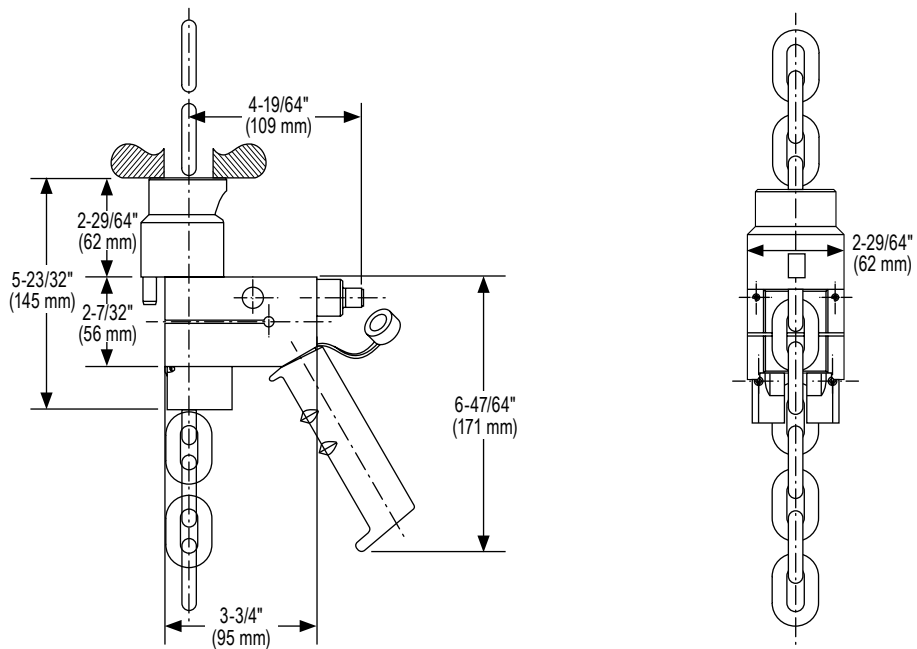
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

**EXAMPLE**

Series .....3010  
Option.....Infrared interface



## Chain Hoist Test Kit





# Weld Force

## 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

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

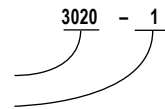


ORDERING INFORMATION	
SERIES	3020
OPTIONS	0 No options                      1 Infrared interface

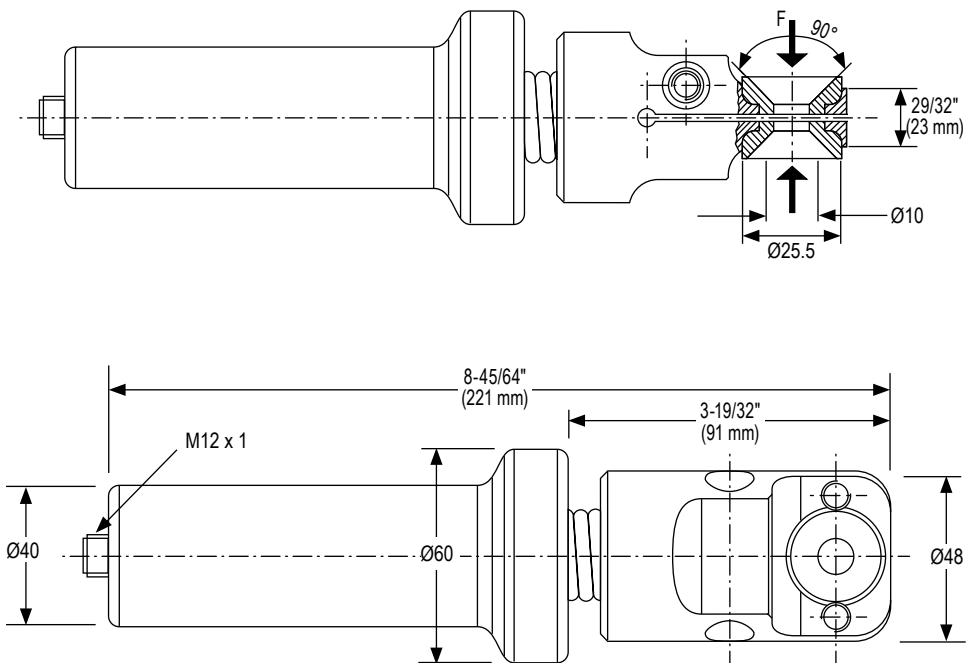
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

Series ..... 3020  
Option.....Infrared interface



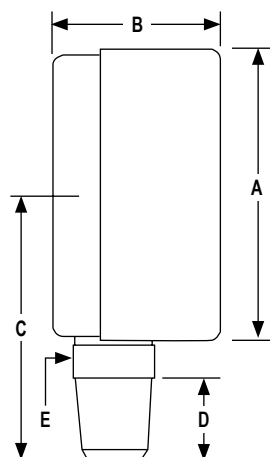
## Weld Force Test Kit



## Pressure Measuring Instrument Specifications

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

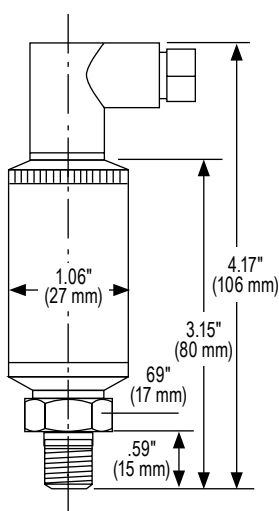
	60-400 SERIES All SS Pressure Gauge	60-500 SERIES All SS Pressure Gauge
<b>Gauge housing</b>	6" 304SS housing	6" 304SS housing
<b>Bayonet ring</b>	Polished Stainless Steel	Polished Stainless Steel
<b>Lens</b>	Laminated safety glass	Laminated safety glass
<b>Accuracy</b>	±1% full scale, ANSI Grade 1A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

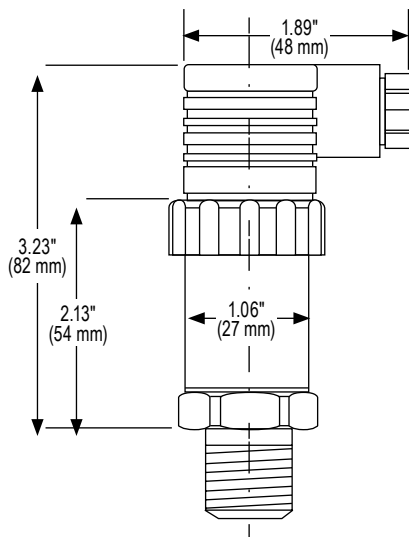
100 and 200 SERIES TRANSDUCERS		
<b>Output Signals</b>	<b>100 Series</b> <b>200 Series</b>	4 mA to 20 mA, 2-wire 0 Vdc to 5 Vdc, 0 Vdc to 10 Vdc, 1 Vdc to 5 Vdc, 1 Vdc to 6 Vdc, 1 Vdc to 11 Vdc, 3-wire
<b>Accuracies</b>		±0.5% full scale (BFSL) - standard Includes the combined effects of linearity, hysteresis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



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

## Pressure Measuring Instrument Specifications

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

### Voltage, 3-Wire Wiring Diagram

	Hirschmann	Cable	M12	Bendix 6-pin
<b>+ Supply</b>	1	Red	1	A
<b>+ Output</b>	3	White	4	C
<b>Common</b>	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

• 3 point seating, shape of container; symmetric

• 4 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 force measuring units**

Values are measured under each container foot

**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

• 4 point seating, shape of container; symmetric

**1 force measuring unit, 2 fixed bearing**

1/2 is measured

The load is distributed 50/50

**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

• 4 point seating

**Container with 3 force measuring units**

Values are measured under each container foot

**Container with 4 force measuring units**

Values are measured under each container foot

Weight of Container: \_\_\_\_\_

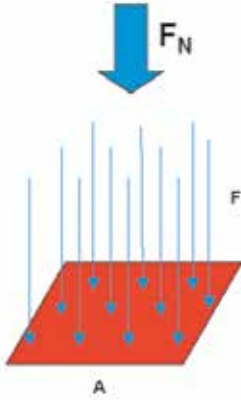
Nominal capacity, nominal load: \_\_\_\_\_

Filling material: \_\_\_\_\_

Weight density: \_\_\_\_\_

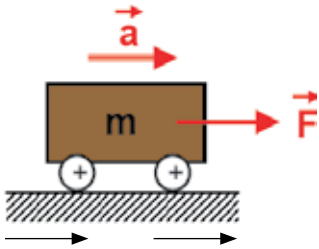
Additional features required: \_\_\_\_\_

## Reference Information



$$P = F_N / A$$

Pressure = force/area



$$F = m * a$$

Force = mass \* acceleration

### Definitions

<b>Pressure</b>	The force acting on a surface divided by the area over which it acts. <b>Symbol p</b>
<b>Force</b>	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. <b>Symbol F; Defined <math>F = m \cdot a</math></b>
<b>Area</b>	The extent of a planar region or of the surface of a solid measured in square units.
<b>Gravity</b>	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.
<b>Newton</b>	An SI unit of force equivalent to the force that produces an acceleration of one meter per second on a mass of one kilogram. <b>Symbol N</b>
<b>Ton</b>	An imperial unit of weight, equal to (2,000 lb) in the United States (a.k.a. short ton).
<b>Metric ton</b>	A unit of weight equal to 1,000 kg.
<b>Long ton</b>	An imperial unit of weight, equal to 1,016 kg (2,240 lb) in the United Kingdom.
<b>Nominal load</b>	The load/force for which the load cell is constructed.
<b>Nominal temperature range</b>	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	<b>1</b>	4.448221615	0.45359237	0.004448222	16	0.0005	0.000446429	0.000453592
N	0.224808943	<b>1</b>	0.101971621	0.001	3.59694309	0.000112404	0.000100361	0.000101972
kg	2.204622622	9.80665	<b>1</b>	0.00980665	35.27396195	0.001102311	0.000984207	0.001
kN	224.8089431	1000	101.9716213	<b>1</b>	3596.94309	0.112404472	0.100361135	0.101971621
oz	0.0625	0.278013851	0.028349523	0.000278014	<b>1</b>	0.00003125	2.79018E-05	2.83495E-05
ton (short)	2000	8896.443231	907.18474	8.896443231	32000	<b>1</b>	0.892857143	0.90718474
ton (long)	2240	9964.016418	1016.046909	9.964016418	35840	1.12	<b>1</b>	1.016046909
ton (metric)	2204.622622	9806.65	1000	9.80665	35273.96195	1.102311311	0.984206528	<b>1</b>







# NOTES

A series of horizontal lines for writing notes, overlaid with a large, faint, stylized graphic of the letters 'NO'.

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# Quality Policy

NOSHOK is committed to providing a high degree of value and continually improving processes to enhance customer satisfaction by focusing on customer requirements for the design, manufacture and distribution of pressure, level, temperature, and force measurement instrumentation, needle, manifold valves, custom manifold systems for industrial applications and compressed air filters.

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 50+ 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](mailto:noshok@noshok.com)  
Web: [www.noshok.com](http://www.noshok.com)

