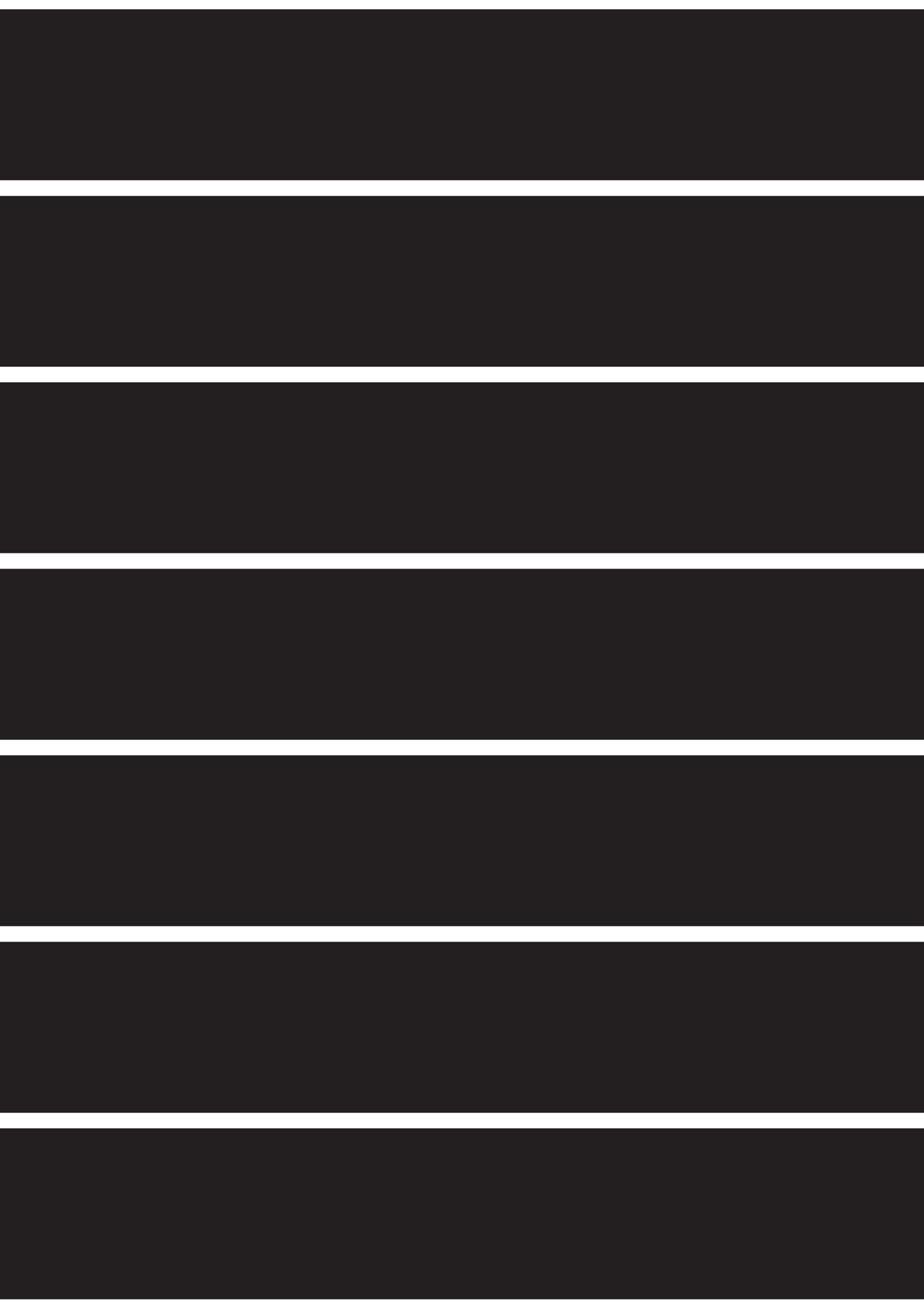


interface

ADVANCED FORCE MEASUREMENT



2015 CATALOG



LOAD CELLS

1

TORQUE TRANSDUCERS

91

INSTRUMENTS

177

MULTI-AXIS

199

OPTIONS & ACCESSORIES

223

CALIBRATION

233

APPENDIX

245

LOAD CELLS

LowProfile™

Column

Miniature

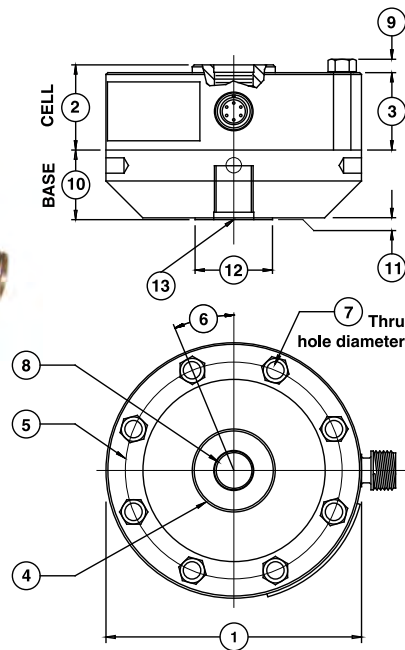
Specialty

interface

ADVANCED FORCE MEASUREMENT

Model 1000 Fatigue Rated Load Cell (US & Metric)

- Proprietary Interface temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to 0.03%
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Barometric compensation
- Shunt calibration
- Tension and compression



DIMENSIONS

| See Drawing | MODEL | | | | | |
|-------------|-------------------------------|--------------------------|---------------------------------|--------------------------|---------------------------------|--------------------------|
| | 1010 | | 1020 | | 1032 | |
| | US (lbf) | Metric (kN) | US (lbf) | Metric (kN) | US (lbf) | Metric (kN) |
| | 250, 500, 1K 2.5K, 5K | 1.25, 2.5, 5 12.5, 25 | 12.5, 25K | 50, 125 | 50K | 225 |
| | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.8 | 6.06 | 153.9 | 8.00 | 203.2 |
| (2) | 1.38 | 34.9 | 1.75 | 44.5 | 2.50 | 63.5 |
| (3) | 1.25 | 31.7 | 1.63 | 41.4 | 2.25 | 57.2 |
| (4) | 1.34 | 34.0 | 2.65 | 67.3 | 3.76 | 95.2 |
| (5) | 3.50 | 88.9 | 5.13 | 130.3 | 6.50 | 165.1 |
| (6) | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° |
| (7) | 0.28 | 7.10 | 0.41 | 10.4 | 0.53 | 13.5 |
| | 8 places | | 12 places | | 16 places | |
| (8) | 5/8-18 UNF-3B 1.12 in deep | M16x2-4H 28.4 mm deep | 1 1/4-12 UNF-3B 1.40 in deep | M33x2-4H 35.6 mm deep | 1 3/4-12 UNF-3B 2.15 in deep | M42x2-4H 54.6 mm deep |
| (9) | 0.20 | 5.10 | 0.30 | 7.60 | 0.40 | 10.2 |
| (10) | 1.13 | 28.6 | 1.75 | 44.5 | 2.00 | 50.8 |
| (11) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (12) | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 |
| (13) | 5/8-18 UNF-3B .87 in deep | M16x2-4H 22.1 mm deep | 1 1/4-12 UNF-3B 1.40 in deep | M33x2-4H 35.6 mm deep | 1 3/4-12 UNF-3B 1.75 in deep | M42x2-4H 44.5 mm deep |

SPECIFICATIONS

| PARAMETERS | MODEL | | | |
|---------------------------------|---------------|-------------|-------------|-------------|
| | 1010 | 1010 | 1020 | 1032 |
| | CAPACITY | | | |
| U.S. Models (lbf) | 250, 500, 1K | 2.5K, 5K | 12.5K, 25K | 50K |
| Metric Models (kN) | 1.25, 2.5, 5 | 12.5, 25 | 50, 125 | 225 |
| ACCURACY – (MAX ERROR) | | | | |
| Static Error Band-% FS | ±0.03 | ±0.04 | ±0.04 | ±0.05 |
| Nonlinearity-% FS | ±0.04 | ±0.04 | ±0.04 | ±0.05 |
| Hysteresis-% FS | ±0.03 | ±0.04 | ±0.05 | ±0.05 |
| Nonrepeatability-% RO | ±0.02 | ±0.02 | ±0.02 | ±0.02 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| TEMPERATURE | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | |
| Rated Output-mV/V (Nominal) | 1.0 | 2.0 | 2.0 | 2.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | |
| Safe Overload-% CAP | ±300 | ±300 | ±300 | ±300 |
| Deflection @ RO-inch | 0.0005 | 0.001 | 0.001 | 0.002 |
| Deflection @ RO-mm | 0.013 | 0.025 | 0.025 | 0.050 |
| Optional Base-P/N (Metric) | B101 (M) | B102 (M) | B103 (M) | B112 (M) |
| Natural Frequency-kHz | 5.0, 6.9, 9.8 | 6.6, 9.4 | 6.5, 7.0 | 5.8 |
| Weight-lb | 1.5 | 3.3 | 9.5 | 26 |
| Weight-kg | 0.7 | 1.5 | 4.3 | 12 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T & C | T & C | T & C | T & C |

OPTIONS

Base (Recommended)
 Integral 10 ft Cable
 Bayonet Connector
 Multiple Bridge
 Standardized Output
 Connector Protection
 Transducer Electronic Data Sheet (TEDS)

STANDARD CONFIGURATIONS

10 ft Integral Cable (10xxAJ-nn) <or>
 PC04E-10-6P Connector (10xxAF-nn)
 Installed Base (-B suffix)

ACCESSORIES

Mating Connector
 Instrumentation
 Loading Hardware



Shown with optional base.

Model 1000 Fatigue Rated High Capacity Load Cell (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to .06%
- Eccentric load compensated
- Low deflection
- .0008%/°F (.0015%/°C) temp. effect on output
- Barometric compensation
- Shunt calibration
- Tension and compression



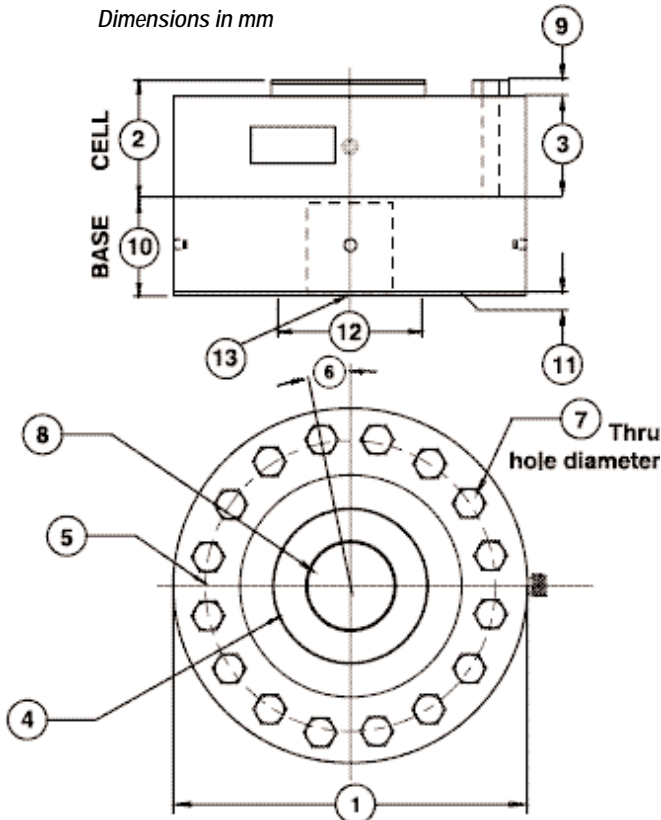
Shown with optional base

SPECIFICATIONS

| PARAMETERS | MODEL | | | | | |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1040 | 1044 | 1052 | 1060 | 1080 | 1090 |
| | CAPACITY | | | | | |
| U.S. Models (lbf) | 100K | 135K | 200K | 300K | 500K | 1000K |
| Metric Models (kN) | 450 | 600 | 900 | 1500 | 2250 | 4500 |
| ACCURACY – (MAX ERROR) | | | | | | |
| Static Error Band-% FS | ±0.06 | ±0.07 | ±0.09 | ±0.10 | ±0.15 | ±0.20 |
| Nonlinearity-% FS | ±0.06 | ±0.08 | ±0.09 | ±0.10 | ±0.15 | ±0.20 |
| Hysteresis-% FS | ±0.06 | ±0.08 | ±0.09 | ±0.10 | ±0.15 | ±0.20 |
| Nonrepeatability-% RO | ±0.02 | ±0.02 | ±0.02 | ±0.02 | ±0.02 | ±0.02 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.1 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.50 |
| TEMPERATURE | | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | | |
| Safe Overload-% CAP | ±300 | ±300 | ±300 | ±300 | ±300 | ±300 |
| Deflection @ RO-inch | 0.003 | 0.003 | 0.004 | 0.004 | 0.005 | 0.005 |
| Deflection @ RO-mm | 0.075 | 0.076 | 0.10 | 0.10 | 0.13 | 0.13 |
| Optional Base-P/N (Metric) | B105 (M) | B116 (M) | B121 (M) | B122 (M) | B123 (M) | B125 (M) |
| Natural Frequency-kHz | 4.9 | 5.0 | 5.5 | 5.5 | 5.5 | 5.5 |
| Weight-lb | 68 | 70 | 100 | 200 | 450 | 860 |
| Weight-kg | 30.9 | 31.8 | 45 | 90 | 205 | 390 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T & C | T & C | T & C | T & C | T & C | T & C |

DIMENSIONS

| See Drawing | MODEL | | | | | | | | | | | |
|-------------|----------------|----------------|----------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|
| | 1040 | | 1044 | | 1052 | | 1060 | | 1080 | | 1090 | |
| | CAPACITY | | | | | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 100K | 450 | 135K | 600 | 200K | 900 | 300K | 1500 | 500K | 2250 | 1000K | 4500 |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 11.0 | 279.0 | 11.0 | 279.0 | 12.0 | 304.8 | 15.5 | 393.7 | 20.50 | 520.7 | 26.00 | 660.4 |
| (2) | 3.50 | 88.9 | 4.00 | 101.6 | 4.50 | 114.3 | 5.50 | 139.7 | 6.25 | 158.8 | 7.75 | 196.9 |
| (3) | 3.00 | 76.2 | 3.25 | 82.6 | 4.25 | 108.0 | 5.00 | 127.0 | 6.00 | 152.4 | 7.50 | 190.5 |
| (4) | 4.81 | 122.2 | 4.81 | 122.2 | 5.68 | 144.3 | 7.73 | 196.3 | 10.55 | 267.9 | 13.79 | 350.3 |
| (5) | 9.00 | 228.6 | 8.75 | 222.2 | 9.88 | 250.8 | 12.68 | 322.1 | 16.5 | 419.1 | 20.50 | 520.7 |
| (6) | 11.25° | 11.25° | 11.25° | 11.25° | 9.00° | 9.00° | 7.50° | 7.50° | 6.43° | 6.43° | 5.63° | 5.63° |
| (7) | 0.65 | 16.5 | 0.79 | 20.1 | 0.79 | 21.0 | 0.94 | 23.9 | 1.06 | 27.0 | 1.31 | 33.3 |
| | 16 places | | 16 places | | 20 places | | 24 places | | 28 places | | 32 places | |
| (8) | 2 3/4-8 UNF-3B | M72 X 2-4H | 2 3/4-8 UNF-3B | M72 X 2-4H | 3 1/2-8 UN-3B | M90 X 3-4H | 4 1/4-8 UN-3B | M120 X 4-4H | 6.00-8 UN-3B | M150 X 4-4H | 8.00-8 UN-3B | M200 X 4-4H |
| | 3.25 in deep | 82.6 mm deep | 3.75 in deep | 96.3 mm deep | 3.75 in deep | 95.3 mm deep | 4.25 in deep | 108 mm deep | 5.63 in deep | 130 mm deep | 7.00 in deep | 178 mm deep |
| (9) | 0.50 | 12.7 | 0.50 | 12.7 | 0.59 | 15.0 | 0.69 | 17.5 | 1.00 | 25.4 | 1.25 | 31.3 |
| (10) | 3.00 | 76.2 | 4.00 | 101.6 | 4.50 | 114.3 | 5.00 | 127.0 | 7.00 | 177.8 | 9.00 | 228.6 |
| (11) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.10 | 2.5 |
| (12) | 4.50 | 114.3 | 4.50 | 114.3 | 6.00 | 152.4 | 7.75 | 196.9 | 10.55 | 267.9 | 14.00 | 355.6 |
| (13) | 2 3/4-8 UNF-3B | M72 X 2-4H | 2 3/4-8 UNF-3B | M72 X 2-4H | 3 1/2-8 UN-3B | M90 X 3-4H | 4 1/4-8 UN-3B | M120 X 4-4H | 6.00-8 UN-3B | M150 X 4-4H | 8.00-8 UN-3B | M200 X 4-4H |
| | 2.75 in deep | 69.8 mm deep | 3.75 in deep | 95.3 mm deep | 3.75 in deep | 95.3 mm deep | 4.25 in deep | 108 mm deep | 6.38 in deep | 162 mm deep | 7.25 in deep | 184 mm deep |



OPTIONS

- Base (Recommended)
- Integral 10 ft Cable
- Bayonet Connector
- Multiple Bridge
- Standardized Output
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

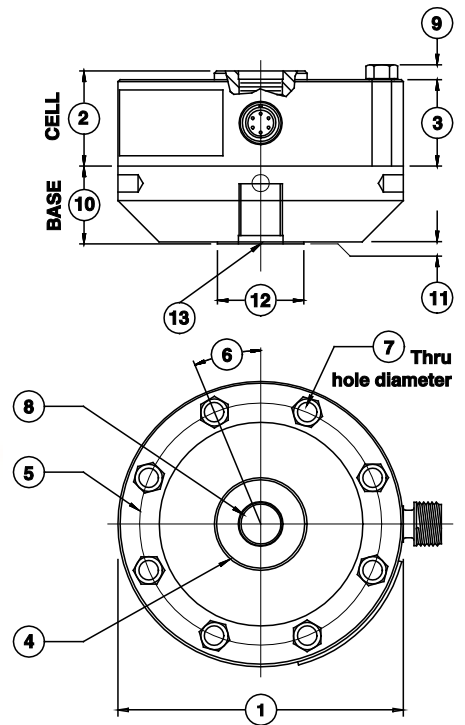
- Mating Connector
- Instrumentation
- Loading Hardware

STANDARD CONFIGURATIONS

- 10 ft Integral Cable (10xxAJ-nn)
- <or> PC04E-10-6P Standard Connector (10xxAF-nn)
- <or> PT02E-10-6P Bayonet Connector (10xxCDS-nn)
- Installed Base (-B suffix)

Model 1100 Ultra Precision Load Cell (US & Metric)

- Proprietary Interface temperature compensated strain gages
- Performance to 0.02%
- High output – to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- Barometric compensation
- Tension and compression



DIMENSIONS

| See Drawing | MODEL | | | | | | | |
|-------------|-----------------------------------|---------------------------|-----------------|--------------|-----------------|--------------|----------------|--------------|
| | 1110 | | 1120 | | 1132 | | 1140 | |
| | CAPACITY | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 300, 500, 1K 2K, 3K, 5K 10K | 1.5, 2.5, 5 10, 25, 50 | 25K, 50K | 100, 250 | 100K | 450 | 200K | 900 |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.8 | 6.06 | 153.9 | 8.00 | 203.2 | 11.00 | 279.0 |
| (2) | 1.38 | 34.9 | 1.75 | 44.5 | 2.50 | 63.5 | 3.50 | 88.9 |
| (3) | 1.25 | 31.7 | 1.63 | 41.4 | 2.25 | 57.2 | 3.00 | 76.2 |
| (4) | 1.34 | 34.0 | 2.65 | 67.3 | 3.76 | 95.2 | 4.81 | 122.2 |
| (5) | 3.50 | 88.9 | 5.13 | 130.3 | 6.50 | 165.1 | 9.00 | 228.6 |
| (6) | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° | 11.25° | 11.25° |
| (7) | 0.28 | 7.10 | 0.41 | 10.4 | 0.53 | 13.5 | 0.65 | 16.5 |
| (8) | 5/8-18 UNF-3B | M16x2-4H | 1 1/4-12 UNF-3B | M33x2-4H | 1 3/4-12 UNF-3B | M42x2-4H | 2 3/4-8 UNF-3B | M72x2-4H |
| | 1.12 in deep | 28.4 mm deep | 1.40 in deep | 35.6 mm deep | 2.15 in deep | 54.6 mm deep | 3.25 in deep | 82.6 mm deep |
| (9) | 0.20 | 5.10 | 0.30 | 7.60 | 0.40 | 10.2 | 0.50 | 12.7 |
| (10) | 1.13 | 28.6 | 1.75 | 44.5 | 2.00 | 50.8 | 3.00 | 76.2 |
| (11) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (12) | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 | 4.50 | 114.3 |
| (13) | 5/8-18 UNF-3B | M16x2-4H | 1 1/4-12 UNF-3B | M33x2-4H | 1 3/4-12 UNF-3B | M42x2-4H | 2 3/4-8 UNF-3B | M72x2-4H |
| | .87 in deep | 22.1 mm deep | 1.40 in deep | 35.6 mm deep | 1.75 in deep | 44.5 mm deep | 2.75 in deep | 69.8 mm deep |

SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|---------------------------------|---------------------------|-------------|-------------|-------------|-------------|
| | 1110 | 1110 | 1120 | 1132 | 1140 |
| | CAPACITY | | | | |
| U.S. Models (lbf) | 300, 500, 1K, 2K, 3K | 5K, 10K | 25K, 50K | 100K | 200K |
| Metric Models (kN) | 1.5, 2.5, 5, 10 | 25, 50 | 100, 250 | 450 | 900 |
| ACCURACY - (MAX ERROR) | | | | | |
| Static Error Band-% FS | ±0.02 | ±0.025 | ±0.035 | ±0.05 | ±0.06 |
| Nonlinearity-% FS | ±0.03 | ±0.035 | ±0.035 | ±0.05 | ±0.06 |
| Hysteresis-% FS | ±0.02 | ±0.035 | ±0.045 | ±0.05 | ±0.06 |
| Nonrepeatability-% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| TEMPERATURE | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F - MAX | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Zero-%RO/°C - MAX | ±0.0007 | ±0.0007 | ±0.0007 | ±0.0007 | ±0.0007 |
| Effect on Output-%RO/°F - MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%RO/°C - MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.004 | 0.004 | 0.006 | 0.012 |
| Deflection @ RO-mm | 0.05 | 0.10 | 0.10 | 0.15 | 0.20 |
| Base-P/N (Ref) (Metric) | B101 (m) | B102 (m) | B103 (m) | B112 (m) | B105 (m) |
| Natural Frequency-kHz | 2.7, 3.5, 4.9 7.0, 8.5 | 4.7, 6.6 | 4.6, 5.0 | 4.0 | 3.5 |
| Weight-lb | 3.3 | 7.3 | 21.5 | 52 | 146 |
| Weight-kg | 1.5 | 3.3 | 9.8 | 24 | 66 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T & C | T & C | T & C | T & C | T & C |

OPTIONS

Compression Overload Protection
 Integral 10 ft Cable
 Bayonet Connector
 Multiple Bridge
 Standardized Output
 Connector Protection
 Transducer Electronic Data Sheet (TEDS)

STANDARD CONFIGURATIONS

10 ft Integral Cable (11xxAJ-nn)
 <or> PC04E-10-6P Connector (11xxAF-nn)
 <or> PT02E-10-6P Bayonet Connector (11xxACK-nn)

ACCESSORIES

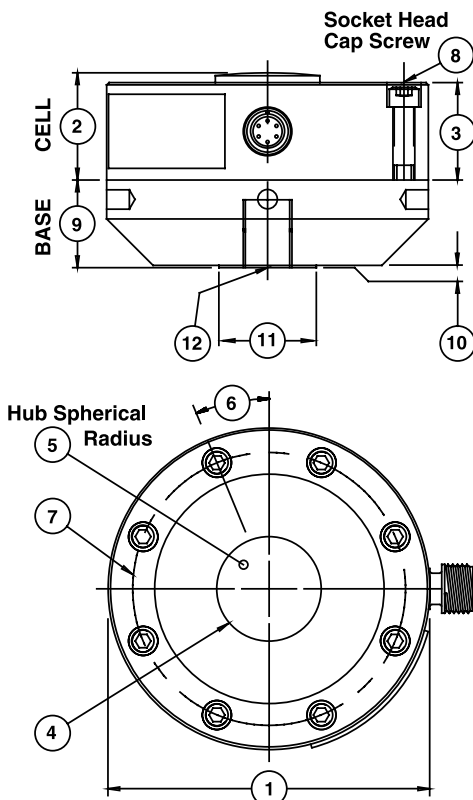
Mating Connector
 Instrumentation
 Loading Hardware



Model 1101 Ultra Precision Compression-Only Load Cell (U.S. & Metric)

Why the Interface model 1101 Ultra Precision Compression-Only Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Performance to .02%
- High output – to 4 mV/V
- Eccentric load compensated
- Low deflection
- .0008%/°F (.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- Barometric compensation



DIMENSIONS

| See Drawing | MODEL | | | |
|-------------|-----------------|---------------|-----------------|--------------|
| | 1111 | | 1121 | |
| | CAPACITY | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 1K, 2K, 5K, 10K | 5, 10, 25, 50 | 25K, 50K | 100, 250 |
| | inch | mm | inch | mm |
| ① | 4.13 | 104.8 | 6.06 | 153.9 |
| ② | 1.38 | 34.9 | 1.75 | 44.5 |
| ③ | 1.25 | 31.7 | 1.63 | 41.4 |
| ④ | 1.34 | 34.0 | 2.65 | 67.3 |
| ⑤ | 6.00 | 152.4 | 8.00 | 203.2 |
| ⑥ | 22.5° | 22.5° | 15.0° | 15.0° |
| ⑦ | 3.50 | 88.9 | 5.13 | 130.3 |
| ⑧ | 8 places | | 12 places | |
| ⑨ | 1.13 | 28.7 | 1.75 | 44.5 |
| ⑩ | 0.03 | 0.80 | 0.03 | 0.80 |
| ⑪ | 1.25 | 31.8 | 2.25 | 57.2 |
| ⑫ | 5/8-18 UNF-3B | M-16 X 2-4H | 1 1/4-12 UNF-3B | M33 X 2-4H |
| | .87 in deep | 22.1 mm deep | 1.40 in deep | 35.6 mm deep |

SPECIFICATIONS

| PARAMETERS | MODEL | | |
|---------------------------------|-------------|-------------|-------------|
| | 1111 | 1111 | 1121 |
| | CAPACITY | | |
| U.S. Models (lbf) | 1K, 2K | 5K, 10K | 25K, 50K |
| Metric Models (kN) | 5, 10 | 25, 50 | 100, 250 |
| ACCURACY – (MAX ERROR) | | | |
| Static Error Band-% FS | ±0.02 | ±0.03 | ±0.03 |
| Nonlinearity-% FS | ±0.03 | ±0.04 | ±0.04 |
| Hysteresis-% FS | ±0.02 | ±0.04 | ±0.04 |
| Nonrepeatability-% RO | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.1 | ±0.1 |
| TEMPERATURE | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Zero-%RO/°C – MAX | ±0.0007 | ±0.0007 | ±0.0007 |
| Effect on Output-%/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 4.0 | 4.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 |
| MECHANICAL | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.004 | 0.004 |
| Deflection @ RO-mm | 0.05 | 0.10 | 0.10 |
| Base Part Number (Ref) | B101 | B102 | B103 |
| Natural Frequency-kHz | 4.5, 6.4 | 4.3, 6.1 | 4.1, 4.6 |
| Weight-lb | 3.3 | 7.3 | 21.5 |
| Weight-kg | 1.5 | 3.3 | 9.8 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | Compression | Compression | Compression |

OPTIONS

Compression Overload Protection
 Integral 10 ft Cable
 Multiple Bridge
 Bayonet Connector
 Standardized Output
 Connector Protection
 Transducer Electronic Data Sheet (TEDS)

STANDARD CONFIGURATIONS

10 ft Integral Cable (11xxEX-nn)
 <or> PC04E-10-6P Connector (11xxHL-nn)
 <or> PTO2E-10-6P Bayonet Connector (11xxBAY-nn)

ACCESSORIES

Mating Connector
 Instrumentation
 Loading Hardware

Consult factory for more technical information

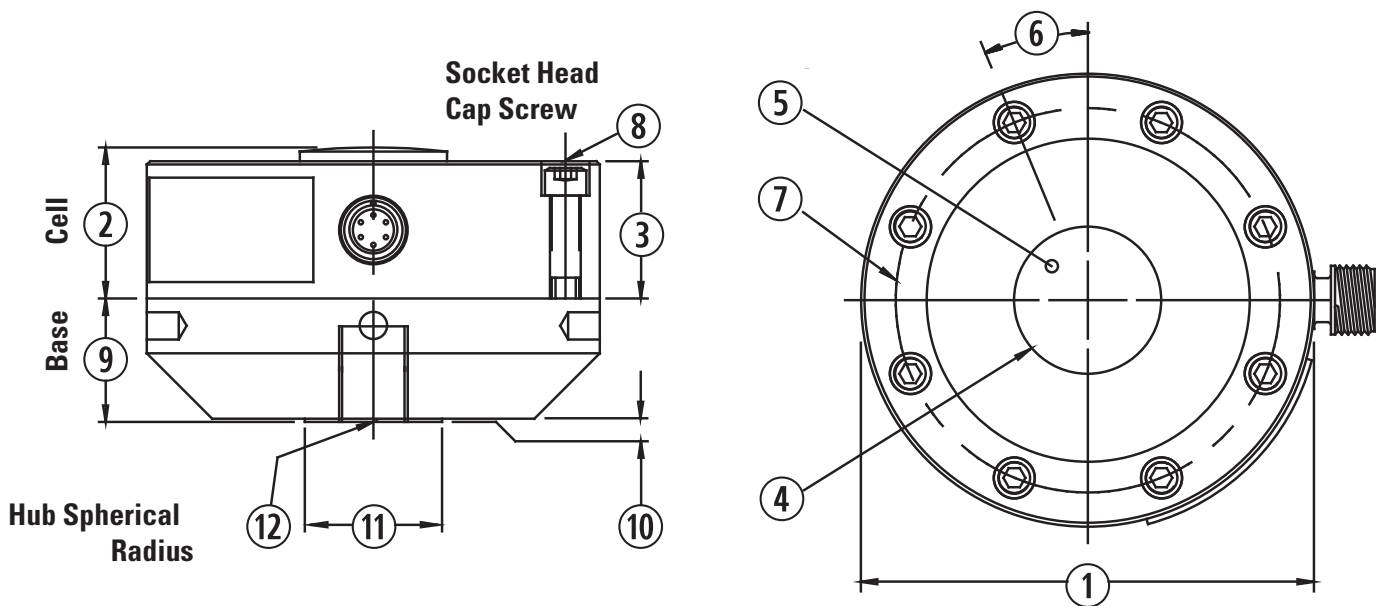


1220AF-25K

1200 Standard Precision LowProfile™ Load Cell (U.S. & Metric)

- Proprietary Interface Temperature Compensated Strain Gages
- Performance to .04%
- High Output – to 4 mV/V
- Eccentric Load Compensated
- .0008%/°F (.0015%/°C) Temp. Effect on Output
- Low Deflection
- Shunt Calibration
- Barometric Compensation
- Tension & Compression
- Compact Size

Dimensions



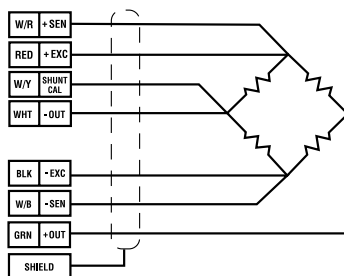
| Model | 1210 | | 1220 | | 1232 | |
|----------|----------------------------|-------------------------|------------------------------|------------------------|------------------------------|-------------------------|
| | US (Inch) | Metric (mm) | US (Inch) | Metric (mm) | US (Inch) | Metric (mm) |
| Capacity | 300, 500, 1K, 2K, 5K, 10K | 1.5, 2.5, 5, 10, 25, 50 | 25K, 50K | 100, 250 | 100K | 450 |
| 1 | 4.13 | 104.8 | 6.06 | 153.9 | 8.00 | 203.2 |
| 2 | 1.38 | 34.9 | 1.75 | 44.5 | 2.50 | 63.5 |
| 3 | 1.25 | 31.7 | 1.63 | 41.4 | 2.25 | 57.2 |
| 4 | 1.34 | 34.0 | 2.65 | 67.3 | 3.76 | 95.2 |
| 5 | 3.50 | 88.9 | 5.13 | 130.3 | 6.5 | 165.1 |
| 6 | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° |
| 7 | 0.28 | 7.10 | 0.41 | 10.4 | 0.53 | 13.5 |
| 8 | 8 places | | 12 places | | 16 places | |
| | 5/8-18 UNF-3B 1.12 deep | M16 x 2-4H 28.4 deep | 1 1/4-12 UNF-3B 1.40 deep | M33 X2-4H 35.6 deep | 1 3/4-12 UNF-3B 2.15 deep | M42 x 2-4H 54.6 deep |
| 9 | 0.20 | 5.10 | 0.30 | 7.60 | 0.40 | 10.2 |
| 10 | 1.13 | 28.6 | 1.75 | 44.5 | 2.00 | 50.8 |
| 11 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| 12 | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 |

Custom Sizes and Capacities Available.

Specifications

| Model | 1210 | 1210 | 1220 | 1232 |
|---------------------------------|-----------------------------|--------------------|----------------------|-----------------|
| Capacity | US (lbf) 300, 500, 1K, 2K | US (Lbf) 5K, 10K | US (Lbf) 25K, 50K | US (Lbf) 100K |
| | Metric (kN) 1.5, 2.5, 5, 10 | Metric (kN) 25, 50 | Metric (kN) 100, 250 | Metric (kN) 450 |
| Accuracy - (Max Error) | | | | |
| Static Error Band-% FS | ±0.04 | ±0.04 | ±0.04 | ±0.06 |
| Nonlinearity-% FS | ±0.04 | ±0.04 | ±0.04 | ±0.05 |
| Hysteresis-% FS | ±0.03 | ±0.04 | ±0.05 | ±0.06 |
| Nonrepeatability-% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity-%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Temperature | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect On Zero- % RO/°F -Max | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect On Zero- % RO/°F -Max | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output- %/°F -Max | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output- %/°F -Max | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Electrical | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 4.0 | 4.0 | 4.0 |
| Excitonal Voltage-VDC MAX | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ω (Nominal) | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 |
| Mechanical | | | | |
| Safe Overload-% of CAP | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.001 | 0.002 | 0.002 | 0.003 |
| Deflection @ RO-mm | 0.03 | 0.05 | 0.05 | 0.08 |
| Optional Base-P/N (Metric) | B101 (M) | B102 (M) | B103 (M) | B112 (M) |
| Natural Frequency-kHz | 3.9, 5.0, 6.9, 9.8 | 6.6, 9.4 | 6.5, 7.0 | 5.8 |
| Weight-lb | 1.5 | 3.3 | 9.5 | 26 |
| Weight-kg | 0.7 | 1.5 | 4.3 | 11.8 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T&C | T&C | T&C | T&C |

Wiring Diagram



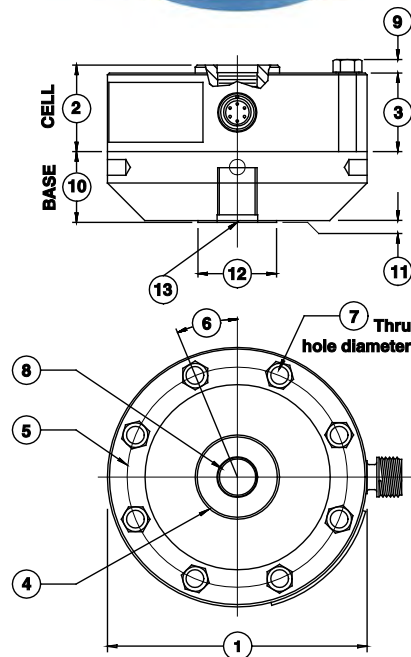
Ordering Information

12xx - xx - xx - xx

Base Option [-B]
Capacity Rating [300, 500, 1K, 2K, 5K, 10K, 25K, 50K, 100K]
Connector [A], [AF], [ACK]
Model [10, 20, 32]

1200 Standard Load Cell (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- Performance to .04%
- High output – to 4 mV/V
- Eccentric load compensated
- .0008%/°F (.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Tension and compression
- Compact size



DIMENSIONS

| See Drawing | MODEL | | | | | |
|-------------|----------------------------|-------------------------|-----------------|-------------|-----------------|-------------|
| | 1210 | | 1220 | | 1232 | |
| | CAPACITY | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 300, 500, 1K, 2K, 5K, 10K, | 1.5, 2.5, 5, 10, 25, 50 | 25K, 50K | 100, 250 | 100K | 450 |
| | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.8 | 6.06 | 153.9 | 8.00 | 203.2 |
| (2) | 1.38 | 34.9 | 1.75 | 44.5 | 2.50 | 63.5 |
| (3) | 1.25 | 31.7 | 1.63 | 41.4 | 2.25 | 57.2 |
| (4) | 1.34 | 34.0 | 2.65 | 67.3 | 3.76 | 95.2 |
| (5) | 3.50 | 88.9 | 5.13 | 130.3 | 6.50 | 165.1 |
| (6) | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° |
| (7) | 0.28 | 7.10 | 0.41 | 10.4 | 0.53 | 13.5 |
| | 8 places | | 12 places | | 16 places | |
| (8) | 5/8-18 UNF-3B | M16 x 2-4H | 1 1/4-12 UNF-3B | M33 x 2-4H | 1 3/4-12 UN-3B | M42 x 2-4H |
| | 1.12 deep | 28.4 deep | 1.40 deep | 35.6 deep | 2.15 deep | 54.6 deep |
| (9) | 0.20 | 5.10 | 0.30 | 7.60 | 0.40 | 10.2 |
| (10) | 1.13 | 28.6 | 1.75 | 44.5 | 2.00 | 50.8 |
| (11) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (12) | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 |
| (13) | 5/8-18 UNF-3B | M16 x 2-4H | 1 1/4-12 UNF-3B | M33 x 2-4H | 1 3/4-12 UNF-3B | M42 x 2-4H |
| | .87 deep | 22.1 deep | 1.40 deep | 35.6 deep | 1.75 deep | 44.5 deep |

SPECIFICATIONS

| PARAMETERS | MODEL | | | |
|---------------------------------|--------------------|-------------|-------------|-------------|
| | 1210 | 1210 | 1220 | 1232 |
| | CAPACITY | | | |
| U.S. Models (lbf) | 300, 500, 1K, 2K | 5K, 10K | 25K, 50K | 100K |
| Metric Models (kN) | 1.5, 2.5, 5, 10 | 25, 50 | 100, 250 | 450 |
| ACCURACY – (MAX ERROR) | | | | |
| Static Error Band–% FS | ±0.04 | ±0.04 | ±0.04 | ±0.06 |
| Nonlinearity–% FS | ±0.04 | ±0.04 | ±0.04 | ±0.05 |
| Hysteresis–% FS | ±0.03 | ±0.04 | ±0.05 | ±0.06 |
| Nonrepeatability–% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min–% | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity–% | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity–%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| TEMPERATURE | | | | |
| Compensated Range–°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range–°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range–°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range–°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero–%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero–%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output–%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output–%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | |
| Rated Output–mV/V (Nominal) | 2.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage–VDC MAX | 20 | 20 | 20 | 20 |
| Bridge Resistance–Ohm (Nominal) | 350 | 350 | 350 | 350 |
| Zero Balance–% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance–Megohm | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | |
| Safe Overload–% CAP | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO–inch | 0.001 | 0.002 | 0.002 | 0.003 |
| Deflection @ RO–mm | 0.03 | 0.05 | 0.05 | 0.08 |
| Optional Base–P/N (Metric) | B101 (M) | B102 (M) | B103 (M) | B112 (M) |
| Natural Frequency–kHz | 3.9, 5.0, 6.9, 9.8 | 6.6, 9.4 | 6.5, 7.0 | 5.8 |
| Weight–lb | 1.5 | 3.3 | 9.5 | 26 |
| Weight–kg | 0.7 | 1.5 | 4.3 | 11.8 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T & C | T & C | T & C | T & C |

OPTIONS

- Base (recommended)
- Compression Overload Protection
- Integral 10 ft Cable
- Bayonet Connector
- Multiple Bridge
- Standardized Output
- Connector Protection
- Transducer Electronic Data Sheets (TEDS)

STANDARD CONFIGURATIONS

- 10 ft Integral Cable (12xxAJ-nn)
- <or> PC04E-10-6P Standard Connector (12xxAF-nn)
- <or> PC02E-10-6P Bayonet Connector (12xxACK-nn)
- Installed Base (-B suffix)

ACCESSORIES

- Mating Connector
- Instrumentation
- Loading Hardware



Shown with optional base

Model 1200 Standard High Capacity Load Cell (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- Performance to .07%
- High output – to 4 mV/V
- Eccentric load compensated
- .0008%/°F (.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Tension and compression
- Compact size



Shown with optional base

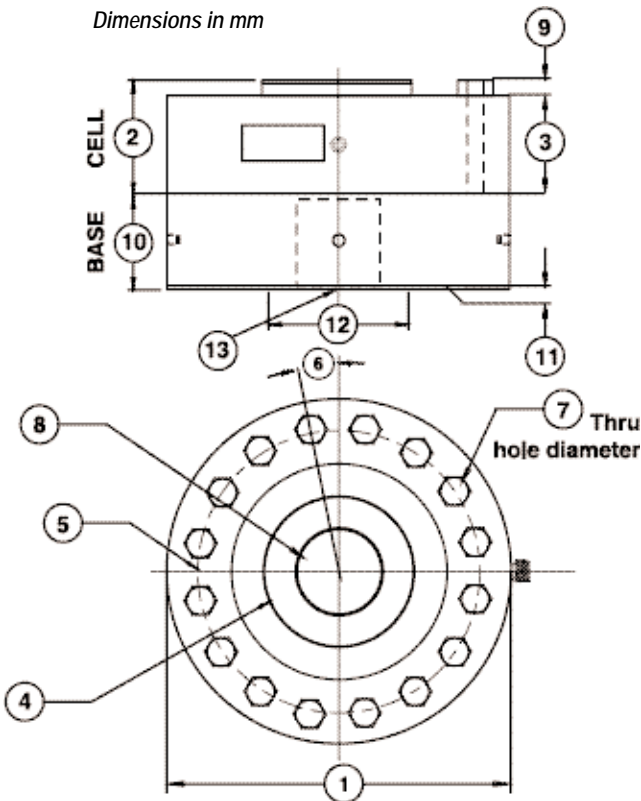
SPECIFICATIONS

| PARAMETERS | MODEL | | | | | |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1240 | 1244 | 1252 | 1260 | 1280 | 1290 |
| | CAPACITY | | | | | |
| U.S. Models (lbf) | 200K | 270K | 400K | 600K | 1000K | 2000K |
| Metric Models (kN) | 900 | 1200 | 1800 | 2700 | 4500 | 9000 |
| ACCURACY – (MAX ERROR) | | | | | | |
| Static Error Band-% FS | ±0.07 | ±0.07 | ±0.10 | ±0.12 | ±0.15 | ±0.20 |
| Nonlinearity-% FS | ±0.07 | ±0.08 | ±0.10 | ±0.12 | ±0.15 | ±0.20 |
| Hysteresis-% FS | ±0.07 | ±0.08 | ±0.10 | ±0.12 | ±0.15 | ±0.20 |
| Nonrepeatability-% RO | ±0.01 | ±0.02 | ±0.02 | ±0.02 | ±0.02 | ±0.02 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity-%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.50 |
| TEMPERATURE | | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | | | |
| Rated Output-mV/V (Nominal) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0** |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch w/Base | 0.012 | 0.006 | 0.007 | 0.008 | 0.008 | 0.010 |
| Deflection @ RO-mm w/Base | 0.30 | 0.15 | 0.18 | 0.2 | 0.2 | 0.25 |
| Optional Base-P/N (Metric) | B105 (M) | B116 (M) | B121 (M) | B122 (M) | B123 (M) | B125 (M) |
| Natural Frequency-kHz | 4.9 | 5.0 | 5.5 | 5.5 | 5.5 | 5.5 |
| Weight-lb | 68 | 70 | 100 | 200 | 450 | 860 |
| Weight-kg | 30.9 | 31.8 | 45 | 90 | 205 | 390 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | T & C | T & C | T & C | T & C | T & C | T & C |

**Calibrated to 1000K only

DIMENSIONS

| See Drawing | MODEL | | | | | | | | | | | |
|-------------|--------------------------------|----------------------------|--------------------------------|----------------------------|-------------------------------|-----------------------------|-------------------------------|----------------------------|------------------------------|-----------------------------|------------------------------|----------------------------|
| | 1240 | | 1244 | | 1252 | | 1260 | | 1280 | | 1290 | |
| | CAPACITY | | | | | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 200K | 900 | 270K | 1200 | 400K | 1800 | 600K | 2700 | 1000K | 4500 | 2000K | 9000 |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 11.0 | 279.0 | 11.0 | 279.0 | 12.0 | 304.8 | 15.5 | 393.7 | 20.50 | 520.7 | 26.00 | 660.4 |
| (2) | 3.50 | 88.9 | 4.00 | 101.6 | 4.50 | 114.3 | 5.50 | 139.7 | 6.25 | 158.8 | 7.75 | 196.9 |
| (3) | 3.00 | 76.2 | 3.25 | 82.6 | 4.25 | 108.0 | 5.00 | 127.0 | 6.00 | 152.4 | 7.50 | 190.5 |
| (4) | 4.81 | 122.2 | 4.81 | 122.2 | 6.18 | 156.8 | 7.73 | 196.3 | 10.55 | 267.9 | 13.79 | 350.3 |
| (5) | 9.00 | 228.6 | 8.75 | 222.2 | 9.88 | 250.8 | 12.68 | 322.1 | 16.5 | 419.1 | 20.50 | 520.7 |
| (6) | 11.25° | 11.25° | 11.25° | 11.25° | 9.00° | 9.00° | 7.50° | 7.50° | 6.43° | 6.43° | 5.63° | 5.63° |
| (7) | 0.65 | 16.5 | 0.79 | 20.1 | 0.79 | 21.0 | 0.94 | 23.9 | 1.06 | 27.0 | 1.31 | 33.3 |
| (8) | 16 places | | 16 places | | 20 places | | 24 places | | 28 places | | 32 places | |
| | 2 3/4-8 UN-3B 2.75 in deep | M72 X 2-4H 70 mm deep | 2 3/4-8 UN-3B 3.75 in deep | M72 X 2-4H 95.3 mm deep | 3 1/2-8 UN-3B 4.13 in deep | M90 X 3-4H 104.9 mm deep | 4 1/4-8 UN-3B 4.25 in deep | M120 X 4-4H 108 mm deep | 6.00-8 UN-3B 6.25 in deep | M150 X 4-4H 1.58 mm deep | 8.00-8 UN-3B 7.00 in deep | M200 X 4-4H 178 mm deep |
| (9) | 0.50 | 12.7 | 0.58 | 14.7 | 0.59 | 20.0 | 0.69 | 12.5 | 1.00 | 25.4 | 1.25 | 31.3 |
| (10) | 3.00 | 76.2 | 4.00 | 101.6 | 4.50 | 114.3 | 5.00 | 127.0 | 7.00 | 177.8 | 9.00 | 228.6 |
| (11) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.10 | 2.5 | 0.10 | 2.5 |
| (12) | 4.50 | 114.3 | 4.50 | 114.3 | 6.00 | 152.4 | 7.75 | 196.9 | 10.55 | 267.9 | 14.00 | 355.6 |
| (13) | 2 3/4-8 UNF-3B 2.75 in deep | M72 X 2-4H 69.8 mm deep | 2 3/4-8 UNF-3B 2.75 in deep | M72 X 2-4H 69.8 mm deep | 3 1/2-8 UN-3B 3.75 in deep | M90 X 3-4H 95.3 mm deep | 4 1/4-8 UN-3B 4.25 in deep | M120 X 4-4H 108 mm deep | 6.00-8 UN-3B 6.38 in deep | M150 X 4-4H 162 mm deep | 8.00-8 UN-3B 7.25 in deep | M200 X 4-4H 184 mm deep |



OPTIONS

- Base (Recommended)
- Integral 10 ft Cable
- Bayonet Connector
- Multiple Bridge
- Standardized Output
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Mating Connector
- Instrumentation
- Loading Hardware

STANDARD CONFIGURATIONS

- 10 ft Integral Cable (12xxAJ-nn)
- <or> PC04E-10-6P Standard Connector (12xxAF-nn)
- <or> PT02E-10-6P Bayonet Connector (12xxCDS-nn)
- Installed Base (-B suffix)

Model 1200 Flange Load Cell

- Standard flange design mounts directly to cylinders
- Tension and compression
- Fatigue rated
- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- Low deflection
- Alignment hole
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Barometric compensation
- IP 67



SPECIFICATIONS

| PARAMETERS | MODEL | | | | | | |
|---------------------------------|--------------|------------|------------|------------|------------|-----------------|------------|
| | 1228 | 1238 | 1248 | 1258 | 1268 | 1288 | 1298 |
| | CAPACITY | | | | | | |
| U.S. Models (lbf) | 30K | 55K | 110K | 220K | 330K | Consult Factory | |
| Metric Models (kN) | 50, 100, 140 | 250 | 500 | 1000 | 1500 | Consult Factory | |
| ACCURACY – (MAX ERROR) | | | | | | | |
| Static Error Band–% FS | ±0.05 | ±0.05 | ±0.06 | ±0.10 | ±0.12 | ±0.12 | ±0.15 |
| Nonlinearity–% FS | ±0.05 | ±0.05 | ±0.07 | ±0.10 | ±0.12 | ±0.12 | ±0.15 |
| Hysteresis–% FS | ±0.05 | ±0.05 | ±0.06 | ±0.10 | ±0.12 | ±0.12 | ±0.20 |
| Nonrepeatability–% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min–% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity–% | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity–%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.50 |
| Eccentric Load Sensitivity–%/mm | ±6.35 | ±6.35 | ±6.35 | ±6.35 | ±6.35 | ±6.35 | ±12.70 |
| TEMPERATURE | | | | | | | |
| Compensated Range–°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range–°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range–°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range–°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero–%/RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero–%/RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output–%/RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output–%/RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | | | | |
| Rated Output–mV/V (Nominal) | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Excitation Voltage–VDC MAX | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance–Ohm (Nominal) | 350 ±3.5 | 350 ±3.5 | 350 ±3.5 | 350 ±3.5 | 350 ±3.5 | 350 ±3.5 | 350 ±3.5 |
| Zero Balance–% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance–Megohm | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | | | |
| Safe Overload–300% CAP | ±150 | ±150 | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO–inch | 0.001 | 0.002 | 0.004 | 0.005 | 0.005 | Consult Factory | |
| Deflection @ RO–mm | 0.03 | 0.06 | 0.1 | 0.13 | 0.15 | Consult Factory | |
| Natural Frequency–kHz | 7 | 5.9 | 4.4 | 5 | 5.1 | 5.5 | 5.5 |
| Weight–lb | 9.5 | 26 | 71 | 100 | 204 | 450 | 860 |
| Weight–kg | 4.3 | 11.8 | 32.2 | 46.7 | 92.5 | 204 | 390 |
| Connector | PT02E-10-6P | | | | | | |
| Calibration | T & C | T & C | T & C | T & C | T & C | T & C | T & C |

DIMENSIONS

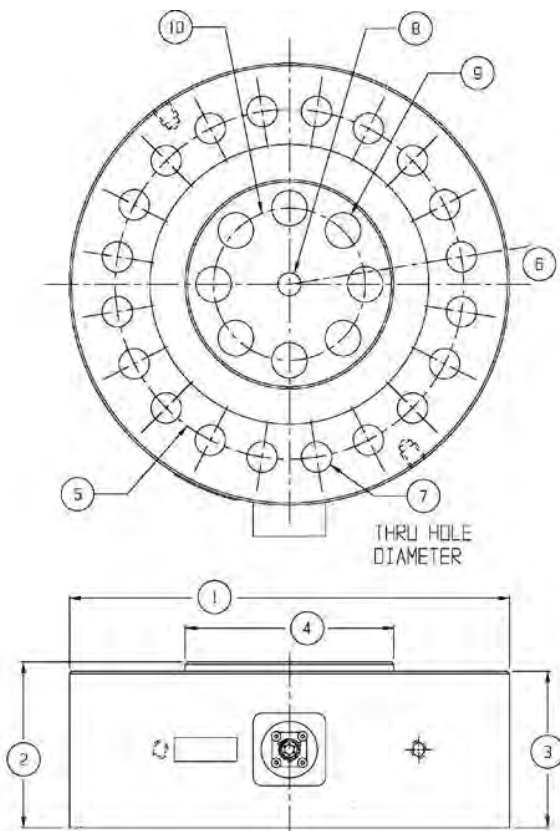
| See Drawing | MODEL | | | | | | | | | | | | | |
|-------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|-----------------|----------------|-----------------|----------------|
| | 1228 | | 1238 | | 1248 | | 1258 | | 1268 | | 1288 | | 1298 | |
| | CAPACITY | | | | | | | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 30K | 50, 100 140 | 55K | 250 | 110K | 500 | 220K | 1000 | 330K | 1500 | Consult Factory | | Consult Factory | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 6.06 | 153.9 | 8.00 | 203.2 | 11.00 | 279.4 | 12.00 | 304.8 | 15.50 | 393.7 | 20.50 | 510.7 | 26.00 | 660.4 |
| (2) | 1.75 | 44.5 | 2.5 | 63.5 | 3.50 | 88.9 | 4.5 | 114.3 | 5.50 | 139.7 | 6.25 | 158.8 | 7.75 | 190.5 |
| (3) | 1.63 | 41.4 | 2.25 | 57.2 | 3.00 | 76.2 | 4.25 | 108.0 | 5.00 | 127.0 | 6.00 | 152.4 | 7.50 | 190.5 |
| (4) | 2.65* | 67.3 | 3.76 | 95.5 | 4.81 | 122.2 | 5.68 | 144.3 | 7.75 | 196.9 | 10.55 | 267.9 | 13.79 | 350.3 |
| (5) | 5.13 | 130.3 | 6.50 | 165.1 | 9 | 228.8 | 9.50 | 241.3 | 12.68 | 322.1 | 16.50 | 419.10 | 20.50 | 520.70 |
| (6) | 15° | | 11.25° | | 11.25° | | 9.0° | | 7.5° | | 6.43° | | 5.63° | |
| (7) | 0.41 | 10.4 | 0.50 | 12.7 | 0.66 | 16.8 | 0.83 | 21.0 | 0.98 | 24.9 | 1.06 | 26.9 | 1.32 | 33.5 |
| | 12 places | | 16 places | | 16 places | | 20 places | | 24 places | | 28 places | | 32 places | |
| (8) | 0.316 | 8.03 | 0.631 | 16.02 | 0.631 | 16.02 | 0.631 | 16.02 | 0.788 | 20.02 | 1.00 | 25.4 | 1.25 | 31.8 |
| (9) | 0.41 | 10.4 | 0.65 | 16.5 | 0.65 | 16.5 | 0.97 | 24.6 | 0.97 | 24.6 | Consult Factory | | Consult Factory | |
| | 8 places | | 8 places | | 8 places | | 8 places | | 12 places | | | | | |
| (10) | 1.77 | 45.0 | 2.80 | 71.0 | 2.80 | 71.0 | 4.13 | 105.0 | 5.91 | 150.0 | Consult Factory | | Consult Factory | |

*2.41 (61.2) for 50kN

Dimensions are approximate.

Contact factory for current drawings.

For lower capacities; refer to the 1700 model.



Dimensions in mm

All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability and do not constitute any liability whatsoever.

OPTIONS

- Integral Cable
- PC04E-10-6P Connector
- Multiple Bridge
- Standardized Output
- Connector Protection
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

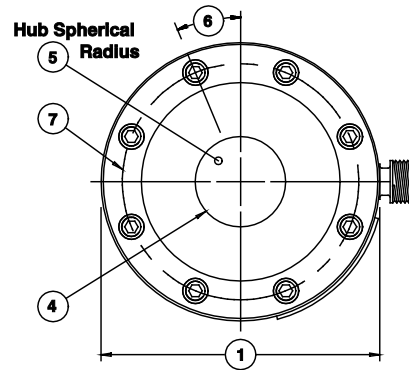
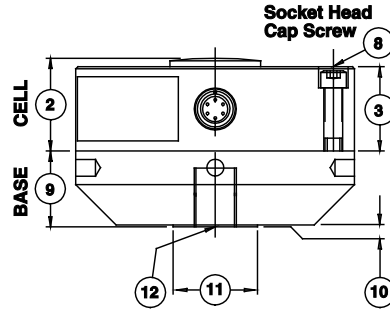
- Mating Connector
- Instrumentation

TECHNICAL ADVANTAGES

- Ease of installation
- Increased accuracy
- Ability to measure torsion with optional bridges
- Fatigue rated – Can survive 100 million fully reversed load cycles. Ideal for long term cycle testing when failure is unaffordable

1201 Standard Load Cell Compression-Only (U.S. & Metric)

- Performance to .03%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Compact size
- Counterbored mounting holes



DIMENSIONS

| See Drawing | MODEL | | | | | | | | | |
|-------------|------------------------------|----------------------------|-------------------------------|----------------------------|---------------------------------|----------------------------|--------------------------|----------------------------|----------------------------|----------------------------|
| | 1211 | | 1221 | | 1231 | | 1241 | | 1243 | |
| | CAPACITY | | | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 1K, 2K 5K, 10K | 5, 10 25, 50 | 25K, 50K | 125, 250 | 100K | 450 | 200K | 900 | 300K 400K | 1350 1800 |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.8 | 4.75 | 120.7 | 7.50 | 190.5 | 8.25 | 210 | 11.0 | 279.0 |
| (2) | 1.38 | 34.9 | 1.75 | 44.5 | 2.25 | 57.2 | 3.25 | 82.5 | 3.50 | 88.9 |
| (3) | 1.25 | 31.7 | 1.63 | 41.4 | 2.00 | 50.8 | 3.00 | 76.2 | 3.00 | 76.2 |
| (4) | 1.34 | 34.0 | 1.57 | 39.9 | 3.13 | 79.5 | 3.16 | 80.3 | 4.81 | 122.2 |
| (5) | 6.00 | 152.4 | 6.00 | 152.4 | 8.00 | 203.2 | 12.0 | 304.8 | 18.0 | 457 |
| (6) | 22.5° | 22.5° | 45.0° | 45.0° | 15.0° | 15.0° | 15.0° | 15.0° | 11.25° | 11.25° |
| (7) | 3.50 | 88.9 | 4.00 | 101.6 | 6.25 | 158.8 | 6.75 | 171.5 | 9.00 | 229 |
| (8) | 1/4-28x1 1/4 8 places | | 5/16-24x1 3/4 4 places | | 7/16-20x2 12 places | | 5/8-18x3 12 places | | 5/8-18x3.5 16 places | |
| (9) | 1.13 | 28.7 | 1.25 | 31.8 | 2.00 | 50.8 | 2.50 | 63.5 | 3.50 | 88.9 |
| (10) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (11) | 1.25 | 31.8 | 2.00 | 50.8 | 3.00 | 76.2 | 3.00 | 76.2 | 4.50 | 114 |
| (12) | 5/8-18 UNF-3B .87 deep | M16 x 2-4H 22.1 deep | 1/2-20 UNF-3B 0.88 deep | M16 x 2-6H 22.4 deep | 1 3/4-12 UNF-3B 1.75 deep | M27 x 2-6H 44.5 deep | 3/4-16 UNF-3B 1.50 | M27 x 2-6H 38.1 deep | 1 1/2-12 UNF-2B 2.00 | M42 x 2-6H 50.8 deep |

SPECIFICATIONS

| PARAMETERS | MODEL | | | | | |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1211 | 1211 | 1221 | 1231 | 1241 | 1243 |
| | CAPACITY | | | | | |
| U.S. Models (lbf) | 1K, 2K | 5K, 10K | 25K, 50K | 100K | 200K | 300K, 400K |
| Metric Models (kN) | 5, 10 | 25, 50 | 125, 250 | 450 | 900 | 1350, 1800 |
| ACCURACY – (MAX ERROR) | | | | | | |
| Static Error Band-% FS | ±0.03 | ±0.04 | ±0.04 | ±0.04 | ±0.05 | ±0.05 |
| Nonlinearity-% FS | ±0.03 | ±0.04 | ±0.05 | ±0.05 | ±0.05 | ±0.05 |
| Hysteresis-% FS | ±0.03 | ±0.04 | ±0.05 | ±0.05 | ±0.05 | ±0.05 |
| Nonrepeatability-% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, in 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity-%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| TEMPERATURE | | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | -55 to 90 | ±0.0008 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Zero-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%RO/°C – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| ELECTRICAL | | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0, 4.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.001 | 0.002 | 0.002 | 0.003 | 0.004 | 0.005 |
| Deflection @ RO-mm | 0.03 | 0.05 | 0.05 | 0.08 | 0.10 | 0.13 |
| Optional Base-P/N (Metric) | B101 | B102 | B106 | B104 | B108 | B124 |
| Natural Frequency-kHz | 6.4, 9.0 | 6.1, 8.6 | 8.2, 11.7 | 7.6 | 6.7 | 5.0 |
| Weight-lb | 1.5 | 3.3 | 6.8 | 13.5 | 40 | 74 |
| Weight-kg | 0.7 | 1.5 | 3.1 | 6 | 18 | 34 |
| Connector | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P | PC04E-10-6P |
| Calibration | Compression | Compression | Compression | Compression | Compression | Compression |

OPTIONS

Base (recommended)
 Compression Overload Protection
 Integral 10 ft Cable
 Bayonet Connector
 Multiple Bridge
 Standardized Output
 Connector Protection
 Transducer Electronic Data Sheets (TEDS)

STANDARD CONFIGURATIONS

10 ft Integral Cable (12xxEX-nn)
 <or> PC04E-10-6P Standard Connector (12xxHL-nn)
 <or> PC02E-10-6P Bayonet Connector (12xxBAY-nn)
 Installed Base (-B suffix)
 Counterbored Mounting Holes Except 1243

ACCESSORIES

Mating Connector
 Instrumentation
 Loading Hardware



Shown with optional base

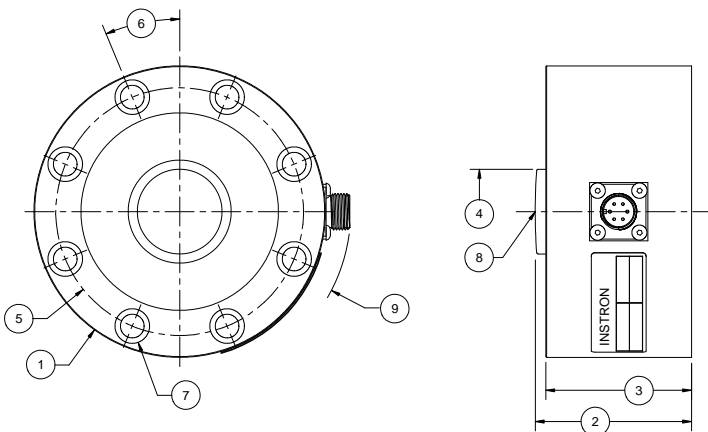


1331EEP-100K

1331 Compression-Only Load Cell (U.S. & Metric)

- High Output - 4mV/V
- Proprietary Interface Temperature Compensated Strain Gages
- Small Footprint
- Integral Load Button
- Eccentric Load Compensated
- .0008%/°F (.0015%/°C) Temperature Effect on Output
- Barometric Compensation

Dimensions

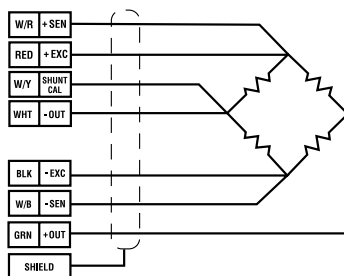


| Model | 1331 | |
|----------|---------------------------|---------------------------|
| Capacity | US (Inch) | Metric (mm) |
| | 100K lbf | 450 kN |
| 1 | Ø 5.00 | Ø 127.0 |
| 2 | 2.68 | 68.1 |
| 3 | 2.50 | 63.5 |
| 4 | Ø 1.45 | Ø 36.8 |
| 5 | Ø 4.250 | Ø 107.95 |
| 6 | Ø 0.41 thru Ø 0.59 0.40 | Ø 10.3 thru Ø 15.1 10.2 |
| 7 | SR 10.00 | SR 254.0 |
| 8 | Ø 3.39 | Ø 86.0 |
| | 1.12 deep | 28.4 deep |
| 9 | 0.02 | 0.4 |

Specifications

| Model | 1331 |
|-------------------------------|----------------------------------|
| Capacity | US (lbf) 100K Metric (kN) 450 |
| Accuracy - (Max Error) | |
| Static Error Band-% FS | ±0.07 |
| Nonlinearity-% FS | ±0.05 |
| Hysteresis-% FS | ±0.08 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |
| Temperature | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect On Zero- % RO/°F -Max | ±0.0008 |
| Effect On Zero- % RO/°C -Max | ±0.0015 |
| Effect on Output- %/°F -Max | ±0.0008 |
| Effect on Output- %/°C -Max | ±0.0015 |
| Electrical | |
| Rated Output-mV/V (Nominal) | 4.0 |
| Excititional Voltage-VDC MAX | 20 |
| Bridge Resistance-Ω (Nominal) | 350 |
| Zero Balance-% RO | ±1.0 |
| Insulation Resistance-Megohm | 5000 @ 50VDC |
| Mechanical | |
| Safe Overload-% of CAP | ±150 |
| Deflection @ RO-inch | 0.003 |
| Material | Steel |
| Seal | Environment |

Wiring Diagram



Ordering Information

1331 - xx - xx

Capacity Rating [100K]
Connector [A], [AF], [ACK]

Options

- Standard Output
- Special Connectors
- Connector Protection
- TEDS

Model 1500 Standard Low Capacity Load Cell (U.S. & Metric)

Why the Interface model 1500 Standard Low Capacity Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Performance to .05%
- Compact 2¾ in (70 mm) diameter
- Fatigue rated
- Eccentric load compensated
- .0008%/°F (.0015%/°C) temp. effect on output
- Shunt calibration
- Low deflection



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|---------------------------------|--------|
| Static Error Band–% FS | ±0.05 |
| Nonlinearity–% FS | ±0.05 |
| Hysteresis–% FS | ±0.05 |
| Nonrepeatability–% RO | ±0.02 |
| Creep, in 20 min–% | ±0.025 |
| Eccentric Load Sensitivity–%/in | ±0.25 |

TEMPERATURE

| | |
|------------------------------|------------|
| Compensated Range–°F | 15 to 115 |
| Compensated Range–°C | -10 to 45 |
| Operating Range–°F | -65 to 200 |
| Operating Range–°C | -55 to 90 |
| Effect on Output–%/°F – MAX | ±0.0008 |
| Effect on Output–%/°C – MAX | ±0.0015 |
| Effect on Zero–% RO/°F – MAX | ±0.0015 |
| Effect on Zero–% RO/°C – MAX | ±0.0027 |

ELECTRICAL

| | |
|---------------------------------|------|
| Rated Output–mV/V (Nominal) | 2.0 |
| Zero Balance–% RO | ±1.0 |
| Bridge Resistance–Ohm (Nominal) | 700 |
| Excitation Voltage – VDC – MAX | 20 |
| Insulation Resistance – Megohm | 5000 |

MECHANICAL

| | |
|----------------------|-----------------------|
| Calibration | Tension & Compression |
| Safe Overload–% CAP. | ±150 |
| Connector | PT02E-10-6P |
| Deflection @ RO–inch | 0.003 (0.08mm) |
| Natural Frequency | |

| | lbf | N | Hz |
|--|-----|------|------|
| | 25 | 125 | 2000 |
| | 50 | 250 | 2500 |
| | 100 | 500 | 4000 |
| | 200 | 1000 | 6000 |
| | 300 | 1500 | 7500 |

Weight1 lb (0.45 Kg)

OPTIONS

Dual Bridge
Standardized Output
Transducer Electronic Data Sheet (TEDS)

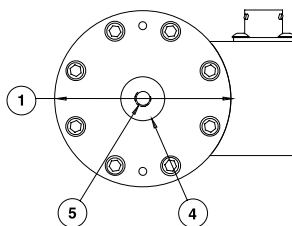
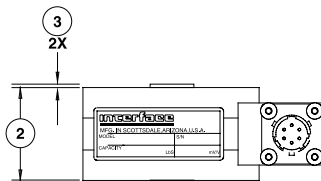
ACCESSORIES

Mating Cable
Instrumentation
Mounting Hardware

Consult factory for more technical information

STANDARD CONFIGURATIONS

Single Bridge (1500ASK-nn)
Dual Bridge (1500ASL-nn)

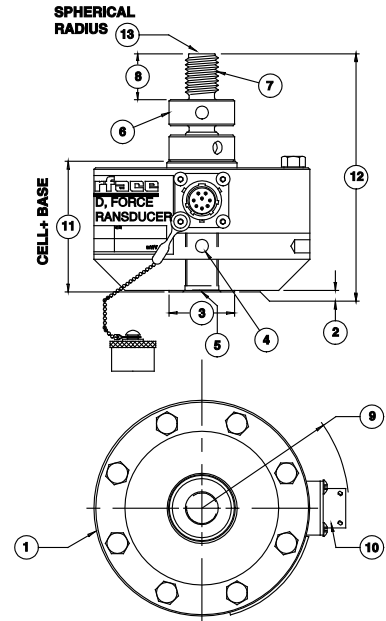


DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|----------------------------|---------------------------|
| | U.S. (lbf) | Metric (N) |
| | 25, 50, 100, 200, 300 | 125, 250, 500, 1000, 1500 |
| | inch | mm |
| ① | 2.75 | 69.8 |
| ② | 1.50 | 38.1 |
| ③ | 0.03 | 0.6 |
| ④ | 0.69 | 17.5 |
| ⑤ | 1/4-28 UNF 0.25 in deep | M6 X 1-6H 6.4 mm deep |

Model 1600 Gold Standard™ Calibration Load Cell

- Tension and compression in one unit
- .005% nonrepeatability
- .01% creep
- .0008%/°F temp. effect on output
- High output – to 4 mV/V
- Eccentric load compensated
- High precision base installed
- Factory installed calibration adapter
- 3 run NIST traceable ASTM E74 calibration
- 4% lower load limit per ASTM E74



DIMENSIONS

| See Drawing | MODEL | | | | | | | |
|-------------|----------------------------|-----------------------|------------------------------|-----------------------|-----------------------------|-----------------------|----------------------------|-----------------------|
| | 1610 | | 1620 | | 1632 | | 1640 | |
| | CAPACITY | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 500, 1K, 2K 5K, 10K | 2.2, 4.5, 9 22, 45 | 25K, 50K | 110, 225 | 100K | 450 | 200K | 900 |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.7 | 6.06 | 153.9 | 8.00 | 203.1 | 11.00 | 279.3 |
| (2) | 0.03 | 0.8 | 0.03 | 0.8 | 0.03 | 0.8 | 0.03 | 0.8 |
| (3) | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 | 4.50 | 114.3 |
| (4) | Φ 0.25 0.29 deep | Φ 6.4 7.4 deep | Φ 0.31 0.31 deep | Φ 7.9 7.9 deep | Φ 0.31 0.31 deep | Φ 7.9 7.9 deep | Φ 0.31 0.31 deep | Φ 7.9 7.9 deep |
| (5) | 5/8-18 UNF-3B 0.87 deep | M16x2-4H 22.1 deep | 1 1/4-12 UNF-3B 1.40 deep | M33x2-4H 35.6 deep | 1 3/4-12 UN-3B 1.75 deep | M42x2-4H 44.4 deep | 2 3/4-8 UN-3B 2.75 deep | M72x2-4H 69.8 deep |
| (6) | CA-101 | CA-201 | CA-102 | CA-202 | CA-103 | CA-203 | Integral | |
| (7) | 5/8-18 UNF-3A | M16x2-4g | 1 1/4-12 UNF-3A | M33x2-4g | 1 3/4-12 UN-3A | M42x2-4g | 2 3/4-8 UN-3A | M72x2-4h |
| (8) | 0.75 | 19.0 | 1.50 | 38.1 | 2.00 | 50.8 | 2.75 | 69.8 |
| (9) | 2.81 | 71.4 | 3.52 | 89.4 | 4.50 | 114.3 | 6.00 | 152.4 |
| (10) | PT02E-12-8P | | PT02E-12-8P | | PT02E-12-8P | | PT02E-12-8P | |
| (11) | 2.50 | 63.5 | 3.50 | 88.9 | 4.50 | 114.3 | 6.50 | 165.1 |
| (12) | 4.38 ±.12 | 111.3 ±3.1 | 6.50 ±.12 | 165.1 ±3.1 | 8.75 ±.12 | 222.2 ±3.1 | 10.5 ±.12 | 266.7 ±3.1 |
| (13) | 6.00 | 152.4 | 6.00 | 152.4 | 12.00 | 304.8 | 18.00 | 457.2 |

SPECIFICATIONS

| PARAMETERS | MODEL | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1610 | 1610 | 1610 | 1620 | 1632 | 1640 |
| | CAPACITY | | | | | |
| U.S. Models (lbf) | 500 | 1K, 2K | 5K, 10K | 25K, 50K | 100K, | 200K |
| Metric Models (kN) | 2.2 | 4.5, 9 | 22, 45 | 110, 225 | 450 | 900 |
| ACCURACY – (MAX ERROR) | | | | | | |
| Static Error Band-% FS | ±0.02 | ±0.02 | ±0.025 | ±0.025 | ±0.05 | ±0.05 |
| Nonlinearity-% FS | ±0.03 | ±0.03 | ±0.035 | ±0.035 | ±0.05 | ±0.05 |
| Hysteresis-% FS | ±0.02 | ±0.02 | ±0.035 | ±0.045 | ±0.05 | ±0.05 |
| Nonrepeatability-% RO | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 |
| Creep, in 20 min-% | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Lower Load Limit-% Cap. (ASTM E74 Class A) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| TEMPERATURE | | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 2.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.002 | 0.004 | 0.004 | 0.006 | 0.010 |
| Weight-lb | 3.8 | 3.8 | 8.0 | 23.5 | 58 | 171 |
| Connector | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P |
| Calibration | T & C | T & C | T & C | T & C | T & C | T & C |

OPTIONS

Compression Overload Protection
 Multiple Bridge - Add'l Bridges to Meet 1200 Series Specifications
 Standardized Output
 ASTM E74 Calibration
 Connector Protection
 Low Profile Options

STANDARD CONFIGURATIONS

PT02E-12-8 Connector (16xxAJH-nn)

ACCESSORIES

Precision mV/V Transfer Stand
 Instrument Cable Assemblies
 Signal Conditioning Boards
 Calibration Software

Model 1600 Gold Standard™ Calibration Compression-Only Load Cell

- .005% nonrepeatability
- .01% creep
- High output - to 4mV/V
- High precision base installed
- 3 run NIST traceable ASTM E74 calibration
- Eccentric load compensated
- .0008%/°F temp. effect on output
- 4% lower load limit

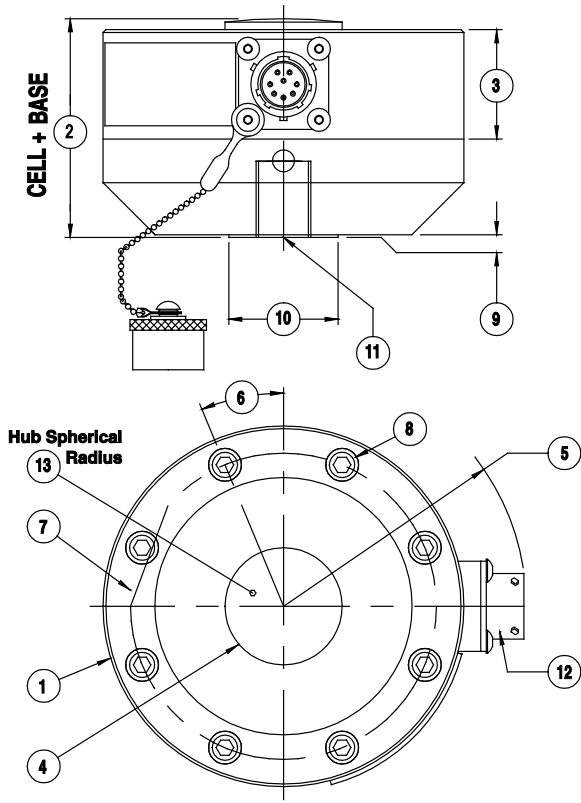


SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|--|-------------|-------------|-------------|-------------|-------------|
| | 1611 | 1611 | 1611 | 1621 | 1633 |
| | CAPACITY | | | | |
| U.S. Models (lbf) | 1K | 2K | 5K, 10K | 25K, 50K | 100K |
| Metric Models (kN) | 4.5 | 9 | 22, 45 | 110, 225 | 450 |
| ACCURACY – (MAX ERROR) | | | | | |
| Static Error Band-% FS | ±0.02 | ±0.02 | ±0.025 | ±0.03 | ±0.04 |
| Nonlinearity-% FS | ±0.03 | ±0.03 | ±0.04 | ±0.04 | ±0.04 |
| Hysteresis-% FS | ±0.02 | ±0.02 | ±0.04 | ±0.04 | ±0.05 |
| Nonrepeatability-% RO | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 |
| Creep, in 20 min-% | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Lower Load Limit - % Cap. (ASTM E74 Class A) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| TEMPERATURE | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Output-%/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 2.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.002 | 0.004 | 0.004 | 0.006 |
| Weight-lb | 3.3 | 3.3 | 7.5 | 21.5 | 52 |
| Connector | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P |
| Calibration | Compression | Compression | Compression | Compression | Compression |

DIMENSIONS

| See Drawing | MODEL | | | | | |
|-------------|----------------------------|-----------------------|------------------------------|-----------------------|------------------------------|-----------------------|
| | 1611 | | 1621 | | 1633 | |
| | CAPACITY | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | inch | mm | inch | mm | inch | mm |
| (1) | 4.13 | 104.8 | 6.06 | 153.9 | 8.00 | 203.2 |
| (2) | 2.50 | 63.5 | 3.50 | 89.0 | 4.50 | 114.3 |
| (3) | 1.25 | 31.7 | 1.63 | 41.4 | 2.25 | 57.2 |
| (4) | 1.34 | 34.0 | 2.41 | 61.2 | 3.76 | 95.5 |
| (5) | 2.78 | 70.0 | 3.50 | 89.0 | 4.47 | 113.0 |
| (6) | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° |
| (7) | 3.50 | 88.9 | 5.13 | 130.3 | 6.50 | 165.1 |
| (8) | 8 SHCS | | 12 SHCS | | 16 SHCS | |
| (9) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (10) | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 |
| (11) | 5/8-18 UNF-3B 0.87 deep | M16x2-4H 22.1 deep | 1 1/4-12 UNF-3B 1.40 deep | M33x2-4H 35.6 deep | 1 3/4-12 UNF-3B 1.75 deep | M42x2-4H 44.5 deep |
| (12) | PT02E-12-8P | | PT02E-12-8P | | PT02E-12-8P | |
| (13) | 6.00 | 152.0 | 8.00 | 203.0 | 12.0 | 305.0 |



ACCESSORIES

- Precision mV/V Transfer Standard
- Instrument Cable Assemblies
- Signal Conditioning Boards
- Calibration Software

STANDARD CONFIGURATIONS

PT02E-12-8P Connector

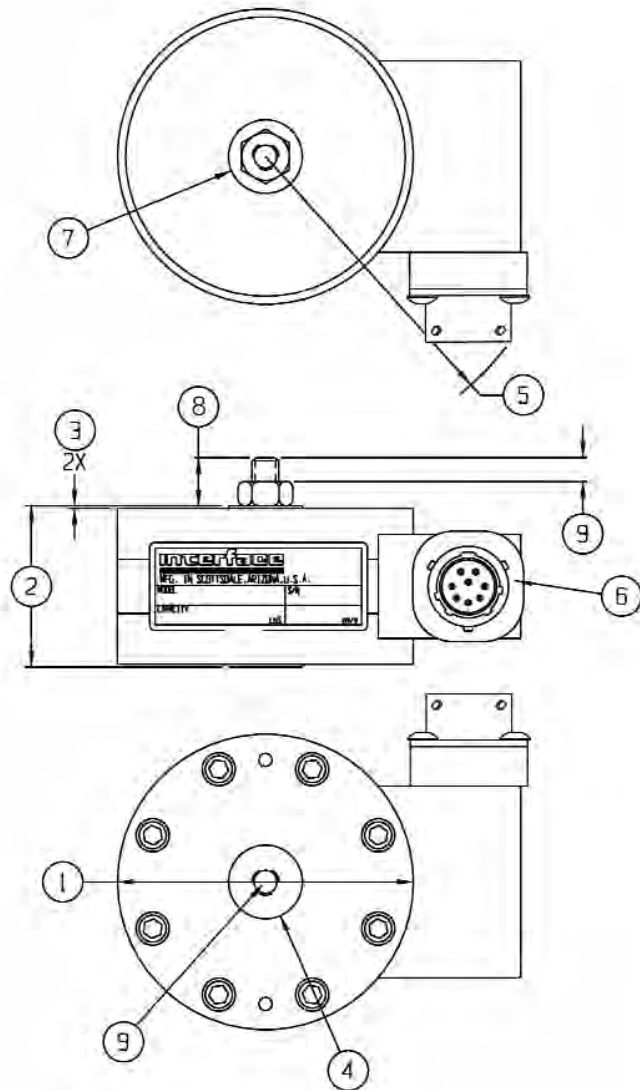
OPTIONS

- Compression Overload Protection
- Multiple Bridge
- Standardized Output
- Connector Protection
- Low Profile Options

Model 1606 Gold Standard™ Low Capacity Calibration Load Cell

Why the Interface model 1606 Gold Standard™ Low Capacity Calibration Load Cells are the best in class:

- Capacities from 50 lbf to 300 lbf (250N to 1,500N)
- Tension & compression in one unit
- 005% nonrepeatability
- .02% creep
- 3 run NIST traceable ASTM E74 calibration
- Factory installed calibration adapter
- Eccentric load compensated
- .0008%/°F temp. effect on output
- 4% lower load limit per ASTM E74
- Higher capacities available



DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|----------------------------|------------------------------|
| | U.S. (lbf) 50,100,200,300 | Metric (N) 250,500,1000,1500 |
| | inch | mm |
| ① | 2.75 | 69.8 |
| ② | 1.50 | 38.1 |
| ③ | 0.03 | 0.6 |
| ④ | 0.69 | 17.5 |
| ⑤ | 2.85 | 72.3 |
| ⑥ | PT02E-12-8P | PT02E-12-8P |
| ⑦ | 0.69 | 17.5 |
| ⑧ | 0.45 | 11.4 |
| ⑨ | 1/4-28 UNF 0.25 in deep | M6 X 1-6H 6.4 mm deep |

SPECIFICATIONS

| PARAMETERS | MODEL | |
|--|-------------|----------------------------------|
| | 1606 | 1606 |
| | CAPACITY | |
| U.S. Models (lbf) Metric Models (N) | 50 250 | 100, 200, 300 500, 1000, 1500 |
| ACCURACY – (MAX ERROR) | | |
| Static Error Band–% FS | ±0.03 | ±0.02 |
| Nonlinearity–% FS | ±0.04 | ±0.03 |
| Hysteresis–% FS | ±0.03 | ±0.02 |
| Nonrepeatability–% RO | ±0.005 | ±0.005 |
| Creep, 20 min–% | ±0.02 | ±0.02 |
| Side Load Sensitivity–% | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity–%/in | ±0.25 | ±0.25 |
| Lower Load Limit–% Cap. (ASTM E74 CLASS A) | 4.0 | 4.0 |
| TEMPERATURE | | |
| Compensated Range–°F | 15 to 115 | 15 to 115 |
| Compensated Range–°C | -10 to 45 | -10 to 45 |
| Operating Range–°F | -65 to 200 | -65 to 200 |
| Operating Range–°C | -55 to 90 | -55 to 90 |
| Effect on Zero–%RO/°F – MAX | ±0.0008 | ±0.0008 |
| Effect on Output–%/°F – MAX | ±0.0008 | ±0.0008 |
| ELECTRICAL | | |
| Rated Output–mV/V (Nominal) | 2.0 | 2.0 |
| Excitation Voltage–VDC – MAX | 20 | 20 |
| Bridge Resistance–Ohm (Nominal) | 700 | 700 |
| Zero Balance–% RO | ±1.0 | ±1.0 |
| Insulation Resistance–Megohm | 5000 | 5000 |
| MECHANICAL | | |
| Safe Overload–% CAP | ±150 | ±150 |
| Deflection @ RO–inch | 0.003 | 0.003 |
| Weight–lb | 1.0 | 1.0 |
| Connector | PT02E-12-8P | PT02E-12-8P |
| Calibration | T & C | T & C |

STANDARD CONFIGURATIONS

PT02E-12-8 Connector (16xxAJH-nn)

ACCESSORIES

Precision mV/V Transfer Standard
Instrument Cable Assemblies
Signal Conditioning Boards
Gold Standard Calibration System
Calibration Software

Consult factory for more technical information

Model 1700 Flange Load Cell

- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output



OPTIONS

Integral Cable
 Bayonet Connector
 Multiple Bridge
 Standardized Output
 Connector Protection
 Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

Instrumentation

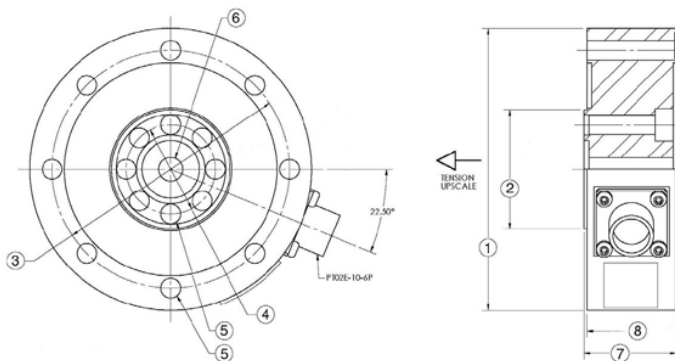
STANDARD CONFIGURATIONS

Integral Cable (12xxAJ-nn)
 PC04E-10-6P Standard Connector (12xxAF-nn)
 PT02E-10-6P Bayonet Connector (12xxACK-nn)

SPECIFICATIONS

| ACCURACY - (MAX ERROR) | |
|---------------------------------|------------|
| Nonlinearity-% FS | ±0.04 |
| Hysteresis-% FS | ±0.03 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Output-%/F°-MAX | ±0.0008 |
| Effect on Output-%/C°-MAX | ±0.0015 |
| Effect on Zero-% RO/F°-MAX | ±0.0008 |
| Effect on Zero-% RO/C°-MAX | ±0.0015 |
| ELECTRICAL | |
| Rated Output-mV/V (nominal) | 2.0 |
| Zero Balance-% RO | ±1.0 |
| Bridge Resistance-Ohm (nominal) | 350 ±3.5 |
| Excitation Voltage-VDC MAX | 20 |
| Insulation Resistance-Megohm | 5000 |
| MECHANICAL | |
| Calibration | T & C |
| Safe Overload-% CAP | ±150 |

DIMENSIONS



| See Drawing | MODEL | | | | | |
|-------------|--------------------------------|-------------|------------|-------------|------------|-------------|
| | 1710 | | 1720 | | 1730 | |
| | CAPACITY | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 220 | 1 | 2.2K | 10 | 11K | 50 |
| | 550 | 2.5 | 4.5K | 20 | 13.9K | 63 |
| | 1.1K | 5 | 5.5K | 25 | | |
| | 1.4K | 6.3 | | | | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 3.03 | 77.0 | 3.74 | 95.0 | 3.98 | 101.1 |
| (2) | 1.07 | 27.3 | 1.57 | 39.9 | 1.57 | 39.9 |
| (3) | 2.64 | 67.0 | 3.15 | 80.0 | 3.39 | 86.1 |
| (4) | 0.79 | 20.0 | 1.18 | 29.9 | 1.18 | 29.9 |
| (5) | 0.21 | 5.3 | 0.26 | 6.6 | 0.26 | 6.6 |
| | 6 places | | | 8 places | | |
| (6) | └─┬─┘ 0.50 x .08 M10x1 thru | | 0.315 | 7.9 | 0.315 | 7.9 |
| (7) | 1.14 | 29.0 | 1.22 | 31.0 | 1.22 | 31.0 |
| (8) | 0.08 | 2.0 | 0.04 | 1.0 | 0.04 | 1.0 |

Model 1800 Platinum Standard™ Calibration Load Cell

- Handcrafted excellence for the most demanding calibration requirements
- Tension and compression in one unit
- .005% nonrepeatability
- 2% lower load limit per ASTM E74
- High precision base installed
- ASTM E74 calibration standard
- Internal electronic ID
- Eccentric load compensated
- .0008%/°F temp. effect on output
- Connector protector standard

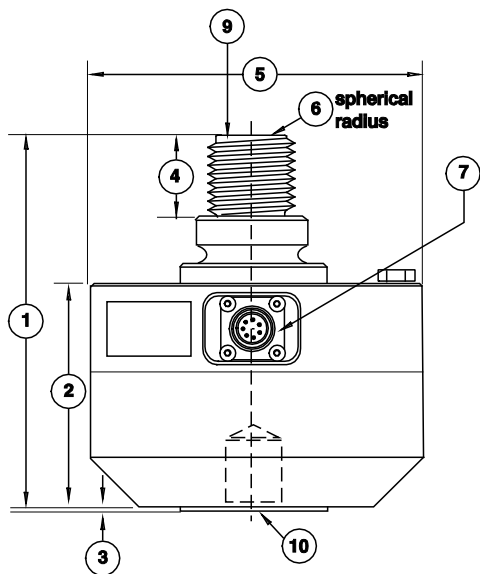
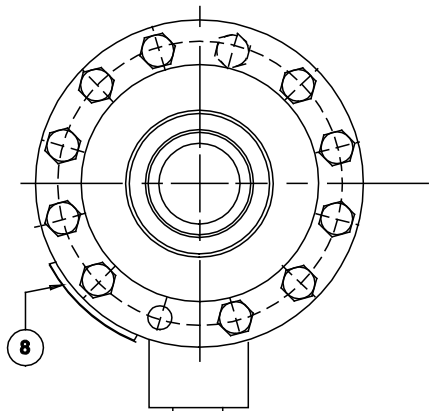


SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|--|-------------|-------------|-------------|-------------|-------------|
| | 1810 | 1810 | 1810 | 1820 | 1830 |
| | CAPACITY | | | | |
| U.S. Models (lbf) | 1.1K | 2.2K, 3.3K | 5.5K | 11K, 22K | 55K |
| Metric Models (kN) | 5 | 10, 15 | 25 | 50, 100 | 250 |
| ACCURACY - (MAX ERROR) | | | | | |
| Static Error Band-% FS | ±0.020 | ±0.020 | ±0.020 | ±0.020 | ±0.025 |
| Nonlinearity-% FS | ±0.020 | ±0.020 | ±0.020 | ±0.020 | ±0.020 |
| Hysteresis-% FS | ±0.020 | ±0.025 | ±0.025 | ±0.025 | ±0.030 |
| Nonrepeatability-% RO | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 |
| Creep, in 20 min-% | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Side Load Sensitivity-% | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity-%/in | ±0.05 | ±0.05 | ±0.05 | ±0.05 | ±0.05 |
| Lower Load Limit - % Cap. (ASTM E74 Class A) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| TEMPERATURE | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F - MAX | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Output-%RO/°F - MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 700 | 700 | 700 | 700 | 700 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | |
| Safe Overload-% CAP | ±150 | ±300 | ±300 | ±300 | ±300 |
| Deflection @ RO-inch | 0.002 | 0.002 | 0.002 | 0.002 | 0.004 |
| Weight-lb | 3.8 | 9 | 9 | 25 | 62 |
| Connector | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P | PT02E-12-8P |
| Calibration | T & C | T & C | T & C | T & C | T & C |

DIMENSIONS

| See Drawing | MODEL | | | | | |
|-------------|--------------------------------|---------------|----------------------------------|--------------|---------------------------------|--------------|
| | 1810 | | 1820 | | 1830 | |
| | CAPACITY | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 1.1K, 2.2K, 3.3K, 5.5K | 5, 10, 15, 25 | 11K, 22K | 50, 100 | 55K | 250 |
| | inch | mm | inch | mm | inch | mm |
| (1) | 4.65 | 118.1 | 6.85 | 174.0 | 8.26 | 209.7 |
| (2) | 3.28 | 83.3 | 4.13 | 104.9 | 5.00 | 127.0 |
| (3) | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| (4) | 0.75 | 19.1 | 1.50 | 38.1 | 1.88 | 47.8 |
| (5) | 4.13 | 104.9 | 6.06 | 154.0 | 8.00 | 203.2 |
| (6) | 6.00 | 152.4 | 6.00 | 152.4 | 8.00 | 203.2 |
| (7) | PT02E-12-8P | | | | | |
| (8) | Identification Label | | | | | |
| (9) | 5/8 - 18 UNF-3A | M16 x 2 - 4h | 1 1/4 - 12 UNF - 3A | M33 x 2 - 4h | 1 3/4 - 12 UNF - 3A | M42 x 2 - 4h |
| (10) | 5/8 - 18 UNF - 3B 0.75 deep | M16 x 2 - 4H | 1 1/4 - 12 UNF - 3B 1.25 deep | M33 x 2 - 4H | 1 3/4 - 12 UNF- 3B 2.00 deep | M42 x 2 - 4H |



ACCESSORIES

- Precision mV/V Transfer Standard
- Instrument Cable Assemblies
- Signal Conditioning Boards
- Calibration Software

STANDARD CONFIGURATIONS

PT02E-12-8P Connector



Model 2101 Dual Range Standard Load Cell Compression-Only (U.S. & Metric)

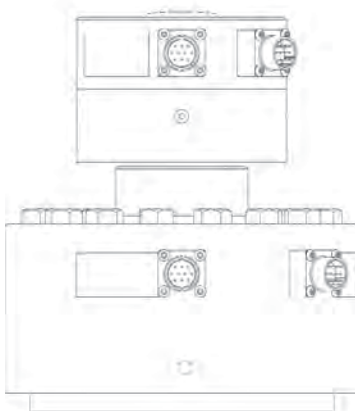
- Dual range allows for accurate measurements throughout test range
- 4X to 5X overload protection on lower capacity load cell
- Proprietary Interface temperature compensated gages
- High output for both ranges-to 4 mV/V
- Eccentric load compensated
- Shunt calibration
- Low deflection

Specifications

| Model | 2101 | |
|----------|---|-----------------------------------|
| Capacity | Lower | Higher |
| | Same as 1200 Compression-Only Series LowProfile | Same as 1200 Universal LowProfile |

Dimensions

| Model | 2101 | | 2121 | | 2131 | | 2141 | |
|--|---|-------------|------------|--------------|------------|---------------|-------------|----------------|
| Capacity | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) |
| | 1K / 5K | 5kN / 25kN | 5K / 25K | 25kN / 100kN | 25K/100K | 125kN / 450kN | 50K / 150K | 250kN / 900kN |
| | 2K / 10K | 10kN / 50kN | 10K / 50K | 50kN / 250kN | | | 100K / 270K | 450kN / 1200kN |
| Dimensions - Lower Capacity | Same as 1200 Compression-Only Series LowProfile | | | | | | | |
| Dimensions - Higher Capacity | Same as 1200 Universal LowProfile | | | | | | | |
| CONTACT FACTORY FOR FURTHER DETAILS | | | | | | | | |



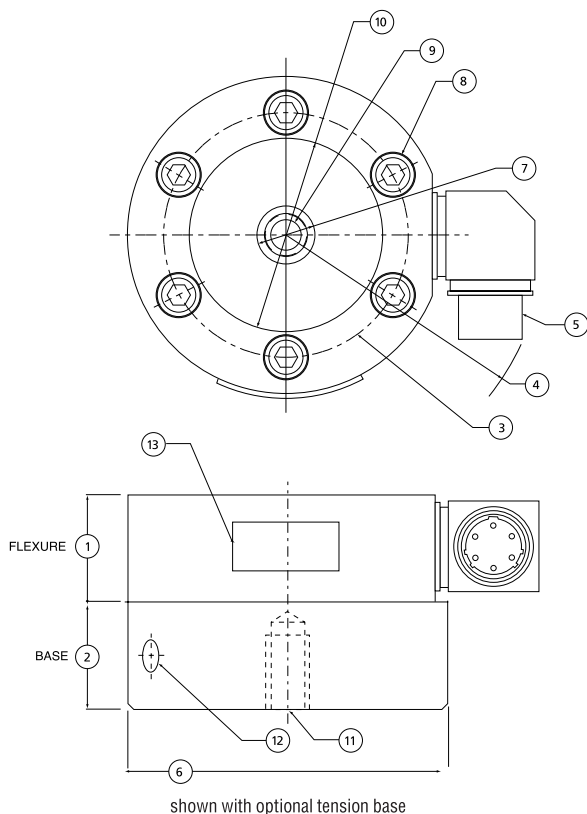
Specifications are subject to change without notice.

Model 2400 Standard Stainless Steel Load Cell

Capacities 100 lbf-5Klbf

Why the Interface model 2400 Standard Stainless Steel Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Compact size
- Counterbored mounting holes



DIMENSIONS

| See Drawing | MODEL | | | |
|-------------|----------------------------------|------|-----------------------------------|------|
| | 2420 | | 2430 | |
| | CAPACITY (lbf) | | | |
| | 100, 250, 500, 1000 | | 2K, 5K | |
| | inch | mm | inch | mm |
| ① | 1.00 | 25.4 | 1.00 | 25.4 |
| ② | 1.00 | 25.4 | 1.00 | 25.4 |
| ③ | 2.25 | 57.2 | 2.63 | 66.7 |
| ④ | 2.43 | 61.7 | 2.68 | 68.1 |
| ⑤ | PTWIH-10-6P | | | |
| ⑥ | 3.00 | 76.2 | 3.50 | 88.9 |
| ⑦ | 0.55 | 14.0 | 0.81 | 20.5 |
| ⑧ | Counterbored for 1/4-28 S.H.C.S. | | Counterbored for 5/16-24 S.H.C.S. | |
| ⑨ | 3/8-24 UNF-3B thru | | 1/2-20 UNF-3B thru | |
| ⑩ | 1.81 | 46.0 | 2.07 | 52.5 |
| ⑪ | 3/8-24 UNF 0.70 Deep | | 1/2-20 UNF 0.70 Deep | |
| ⑫ | Spanner holes 2 SPACED @ 180° | | | |
| ⑬ | Identification Label | | | |

SPECIFICATIONS

| PARAMETERS | MODEL | |
|---------------------------------|------------------------|------------|
| | 2420 | 2430 |
| | CAPACITY (lbf) | |
| | 100, 250, 500, 1000 | 2K, 5K |
| ACCURACY – (MAX ERROR) | | |
| Static Error Band-% FS | ±0.10 | ±0.10 |
| Nonlinearity-% FS | ±0.10 | ±0.10 |
| Hysteresis-% FS | ±0.08 | ±0.08 |
| Nonrepeatability-% RO | ±0.02 | ±0.02 |
| Creep, in 20 min-% | ±0.05 | ±0.05 |
| TEMPERATURE | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 121 | -55 to 121 |
| Effect on Zero-%RO/°F – MAX | ±0.002 | ±0.002 |
| Effect on Output-%RO/°F – MAX | ±0.002 | ±0.002 |
| ELECTRICAL | | |
| Rated Output-mV/V (Nominal) | 3.0 | 3.0 |
| Excitation Voltage-VDC – MAX | 15 | 15 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 |
| Zero Balance-% RO | ±2.0 | ±2.0 |
| Insulation Resistance-Megohm | 5000 | 5000 |
| MECHANICAL | | |
| Safe Overload-% CAP | ±150 | ±150 |
| Deflection @ RO-inch | .003, .002, .002, .002 | .002 |
| Optional Base-P/N | B318-2 | B319-2 |
| Natural Frequency-kHz | 2.2, 4.4, 6.0, 8.3 | 9.1, 11.7 |
| Weight-lb | 1.5 | 2.0 |
| Connector | PTWIH-10-6P | |
| Seal | Glass-metal hermetic | |
| Flexure Material | Stainless steel | |

OPTIONS

- Tension Base
- Submersible with Integral Cable
- Special Connectors
- Load Button
- 70-170°F Compensated Temperature Range
- Transducer Electronic Data Sheet (TEDS)

STANDARD CONFIGURATIONS

PTWIH-10-6P Connector (24xxBLX-nn)

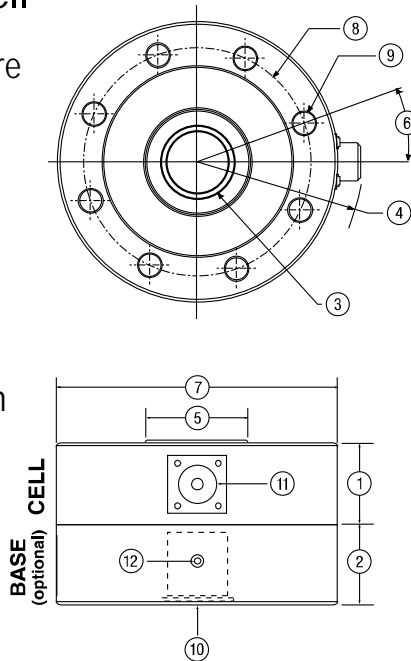
ACCESSORIES

- Mating Connector
- Instrumentation
- Loading Hardware

Consult factory for more technical information

Model 2400 Standard Stainless Steel Load Cell

- Proprietary Interface temperature compensated strain gages
- Stainless steel construction
- Welded diaphragm
- Tension & compression
- Compact size
- 7.5K lbf to 300K lbf capacity
- Counterbored mounting holes in 10K lbf model



DIMENSIONS

| See Drawing | MODEL | | | | | | | |
|--------------------|------------------------------|-------|-----------------|-------|------------|-------|-----------|-------|
| | 2440 | | 2450 | | 2470 | | 2480 | |
| | CAPACITY (lbf) | | | | | | | |
| U.S. Models (lbf) | 7.5K, 10K, 15K | | 20K, 50K | | 150K, 200K | | 300K | |
| Metric Models (kN) | 37.5, 50, 75 | | 100, 250 | | 750, 1000 | | 1350 | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 1.80 | 45.7 | 1.80 | 45.7 | 2.50 | 63.5 | 4.25 | 108.0 |
| (2) | 1.75 | 44.5 | 1.75 | 44.5 | 2.50 | 63.5 | 4.25 | 108.0 |
| (3) | 1-14 UNS-3B | | 1 1/2-12 UNF-3B | | 2.50-12 UN | | 3.50-8 UN | |
| (4) | 3.56 | 85.2 | 3.55 | 90.1 | 6.84 | 173.7 | 8.07 | 205.0 |
| (5) | 1.71 | 43.5 | 2.23 | 56.6 | 4.66 | 118.3 | 7.36 | 186.9 |
| (6) | 22.5° | | 20.0° | | 11.25° | | 15° | |
| (7) | 5.50 | 139.7 | 6.00 | 152.4 | 11.00 | 279.4 | 14.00 | 355.6 |
| (8) | 4.50 | 114.3 | 4.88 | 123.8 | 9.50 | 241.3 | 11.75 | 298.5 |
| (9) | 0.41 | 10.4 | 0.53 | 13.5 | 0.78 | 19.9 | 1.03 | 26.2 |
| | 8 places | | 8 places | | 8 places | | 8 places | |
| (10) | 1-14 UNS-3B | | 1 1/2-12 UNF-3B | | 2.50-12 UN | | 3.50-8 UN | |
| (11) | MS3102E-14S-6P | | | | | | | |
| (12) | Spanner holes 4 SPACED @ 90° | | | | | | | |

SPECIFICATIONS

| PARAMETERS | MODEL | | | |
|---------------------------------|-----------------|------------|------------|--------------|
| | 2440 | 2450 | 2470 | 2480 |
| | CAPACITY | | | |
| U.S. Models (lbf) | 7.5K, 10K, 15K | 20K, 50K | 150K, 200K | 300K |
| Metric Models (kN) | 37.5, 50, 75 | 100, 250 | 750, 1000 | 1350 |
| ACCURACY – (MAX ERROR) | | | | |
| Static Error Band-% FS | ±0.10 | ±0.10 | ±0.10 | ±0.10 |
| Nonlinearity-% FS | ±0.10 | ±0.10 | ±0.10 | ±0.10 |
| Hysteresis-% FS | ±0.08 | ±0.08 | ±0.08 | ±0.08 |
| Nonrepeatability-% RO | ±0.02 | ±0.02 | ±0.02 | ±0.02 |
| Creep, in 20 min-% | ±0.03 | ±0.05 | ±0.03 | ±0.03 |
| TEMPERATURE | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | |
| Rated Output-mV/V (Nominal) | 3.0 | 3.0 | 3.0 | 3.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±2.0 | ±2.0 | ±2.0 | ±2.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.002 | 0.010 | 0.010 |
| Optional Base-P/N | B323-2 | B320-1 | | |
| Natural Frequency-kHz | 9.4 | 8.0 | 4.5 | 4.1 |
| Weight-lb | 6 | 9 | 46 | 130 |
| Connector | MS3102E-14S-6P | | | |
| Seal | Environmental | | | |
| Flexure Material | Stainless Steel | | | Carbon Steel |

OPTIONS

Tension Base
 Submersible Cable
 Standardized Output
 Special Connectors
 Load Button
 Overload Protection
 Connector Protection
 Transducer Electronic Data Sheets (TEDS)

STANDARD CONFIGURATIONS

MS3102E-14S-6P Connector (24xxBXM-nn)
 Installed Base (-B suffix)

ACCESSORIES

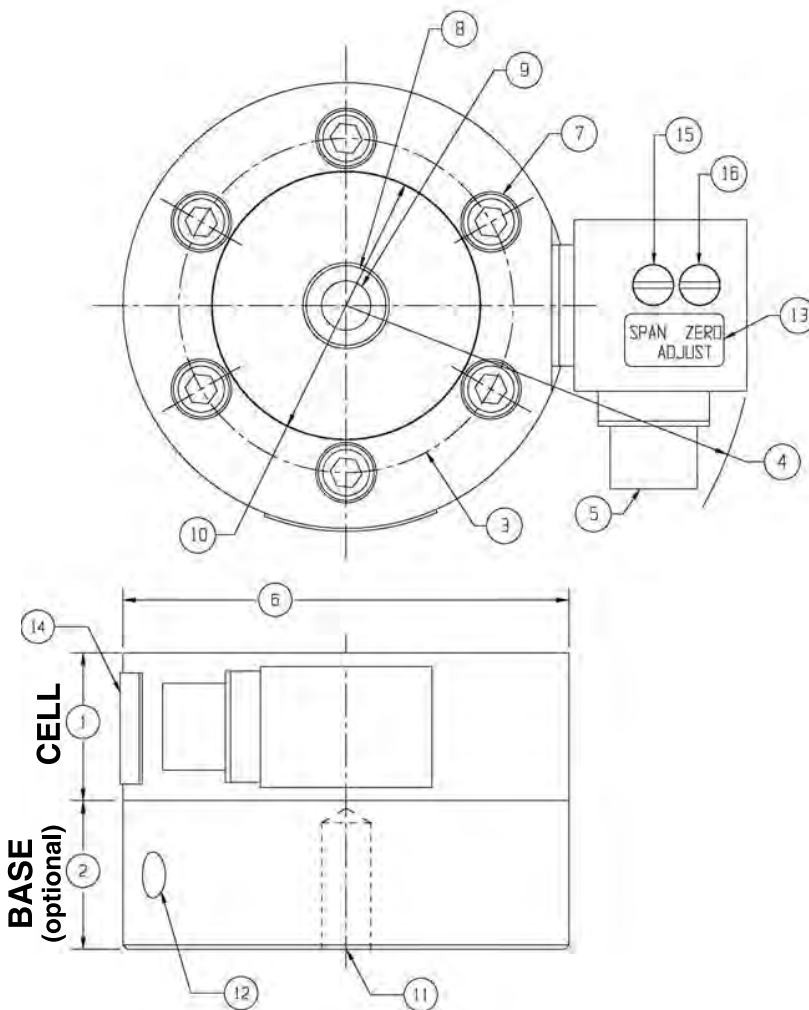
Mating Connector
 Instrumentation
 Loading Hardware

Model 2404 Standard Stainless Steel 2-Wire Amplified Load Cell

Capacities 100 lbf-5K lbf

Why the Interface model 2404 Standard Stainless Steel 2-Wire Amplified Load Cell is the best in class:

- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Counterbored mounting holes
- Internally amplified with 4-20 mA output
- Proprietary Interface temperature compensated strain gages



DIMENSIONS

| See Drawing | MODEL | | | |
|-------------|----------------------------------|------|-----------------------------------|-------|
| | 2424 | | 2434 | |
| | CAPACITY (lbf) | | | |
| | 100, 250, 500, 1000 | | 2K, 5K | |
| | inch | mm | inch | mm |
| ① | 1 | 25.4 | 1 | 25.4 |
| ② | 1 | 25.4 | 1 | 25.4 |
| ③ | 2.25 | 57.2 | 2.625 | 66.68 |
| ④ | 2.76 | 70.1 | 3.01 | 76.3 |
| ⑤ | PTWIH-10-6P | | | |
| ⑥ | 3 | 76.2 | 3.5 | 88.9 |
| ⑦ | Counterbored for 1/4-28 S.H.C.S. | | Counterbored for 5/16-24 S.H.C.S. | |
| ⑧ | 0.55 | 14 | 0.81 | 20.5 |
| ⑨ | 3/8-24 UNF-3B thru | | 1/2-20 UNF-3B thru | |
| ⑩ | 1.81 | 46 | 2.07 | 52.5 |
| ⑪ | 3/8-24 UNF 0.70 Deep | | 1/2-20 UNF 0.70 Deep | |
| ⑫ | (2) Spanner holes spaced at 180° | | | |
| ⑬ | Label | | | |
| ⑭ | Identification label | | | |
| ⑮ | Span Adjust | | | |
| ⑯ | Zero Adjust | | | |

SPECIFICATIONS

| PARAMETERS | MODEL | |
|------------------------------------|-------------------------------------|-------------------------|
| | 2424 | 2434 |
| | CAPACITY (lbf) | |
| | 100, 250, 500, 1000 | 2K, 5K |
| ACCURACY – (MAX ERROR) | | |
| Nonlinearity–% FS | ±0.10 | ±0.10 |
| Hysteresis–% FS | ±0.08 | ±0.08 |
| Nonrepeatability–% RO | ±0.03 | ±0.03 |
| Creep, in 20 min–% | ±0.05 | ±0.05 |
| TEMPERATURE | | |
| Compensated Range–°F | 15 to 115 | 15 to 115 |
| Compensated Range–°C | -10 to 45 | -10 to 45 |
| Operating Range–°F | -20 to 200 | -20 to 200 |
| Operating Range–°C | -30 to 93 | -30 to 93 |
| Effect on Zero–%RO/°F – MAX | ±0.005 | ±0.005 |
| Effect on Output–%RO/°F – MAX | ±0.009 | ±0.009 |
| ELECTRICAL *Rated Output mA | | |
| *Tension or Compression (unipolar) | +16.000 ±0.032 | |
| *Universal Tension (bipolar) | +8.000 ±0.016 | |
| *Universal Compression (bipolar) | -8.000 ±0.016 | |
| Zero Balance | 4.000 ±0.100 (unipolar) | 12.000 ±0.100 (bipolar) |
| Zero Adjustment | 1 mA range | |
| Span Adjustment | 5% range | |
| Supply Voltage range VDC | 9-28 | |
| Bandwidth Hz | 2000 | |
| MECHANICAL | | |
| Safe Overload–% CAP | ±150 | |
| Deflection @ RO–inch | 50 & 100: 0.003, 250 thru 5K: 0.002 | |
| Optional Base–P/N | B319-2 | |
| Natural Frequency–kHz | 1.3, 2.2, 4.4, 6.0, 8.3, 9.1, 11.7 | |
| Connector | PTWIH-10-6P | |

OPTIONS

Tension Base
 Submersible with Integral Cable
 Special Connectors
 Load Button
 70-170°F Compensated Temperature Range
 Other Capacities Available
 Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

Mating Connector
 Instrumentation
 Loading Hardware

Consult factory for more technical information

STANDARD CONFIGURATIONS

PTWIH-10-6P Connector (24xxBLX-nn)

| CONNECTOR PINOUTS | |
|-------------------|-----------------|
| PIN | FUNCTION |
| A | +SUPPLY |
| B | NO CONNECTION |
| C | NO CONNECTION |
| D | +OUTPUT(4-20mA) |
| E | CASE GROUND |
| F | NO CONNECTION |

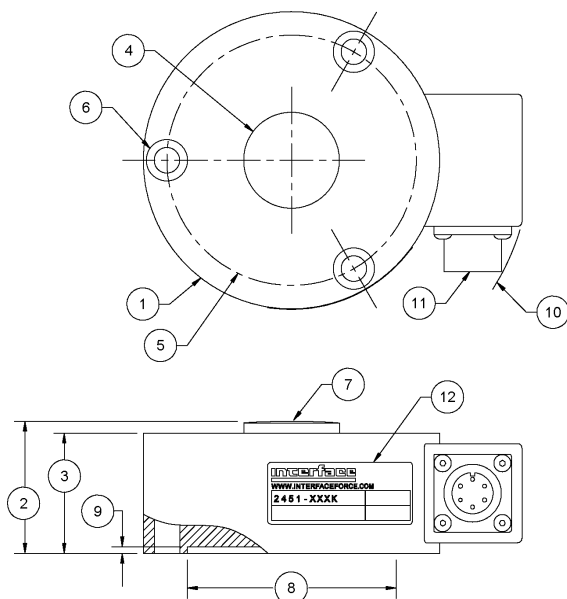
Model 2451/2461 Standard Stainless Steel Compression-Only Load Cell

- Proprietary Interface temperature compensated strain gages
- Stainless steel construction
- Small compact design
- Integral load button
- Welded diaphragm



DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | |
|-------------|------------------------|------------|------------|-------------|
| | 2451 | | 2461 | |
| | 50K, 75K, 100K | | 150K, 200K | |
| | inch | mm | inch | mm |
| (1) | 4.50 | 114.3 | 5.50 | 139.7 |
| (2) | 2.00 | 50.8 | 2.18 | 55.4 |
| (3) | 1.82 | 46.2 | 2.00 | 50.8 |
| (4) | 1.45 | 36.8 | 2.00 | 50.8 |
| (5) | 3.790 | 96.27 | 4.812 | 122.22 |
| (6) | Clearance for 3/8 SHCS | | | |
| (7) | 10.00 | 254.0 | 10.00 | 254.0 |
| (8) | 3.17 | 80.5 | 4.12 | 104.6 |
| (9) | 0.10 | 2.5 | .05 | 1.3 |
| (10) | R 3.75 MIN | R 95.2 MIN | R 4.20 MIN | R 106.7 MIN |
| (11) | MS3102E-14S-6P | | | |
| (12) | Identification Label | | | |



OPTIONS

- Submersible cable
- Standardized output
- Special connectors
- Hermetic seal

STANDARD CONFIGURATION

MS3102E-14S-6P Connector

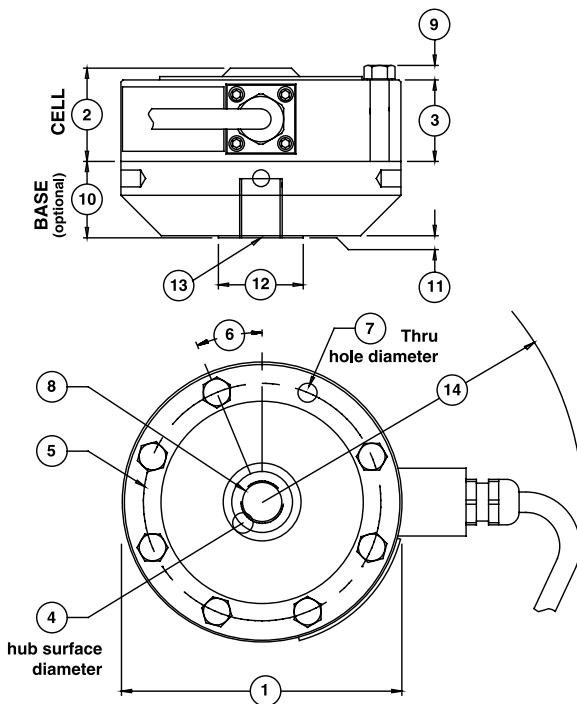
SPECIFICATIONS

| | |
|---------------------------------|-----------------|
| ACCURACY - (MAX ERROR) | |
| Static Error Band - %FS | ±0.1 |
| Nonlinearity - %FS | ±0.1 |
| Hysteresis - %FS | ±0.08 |
| Non-Repeatability - %FS | ±0.02 |
| Creep, in 20 min - % | ±0.03 |
| TEMPERATURE | |
| Compensated Range - °F | 15 to 115 |
| Operating Range - °F | -65 to 200 |
| Effect on Zero - % RO/°F - MAX | 0.002 |
| Effect on Output - %/°F - MAX | 0.002 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 3.0 |
| Excitation Voltage-VDC MAX | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Zero Balance - % RO | ±1.0 |
| Insulation Resistance-Megaohm | 5000 @ 50 VDC |
| MECHANICAL | |
| Safe Overload - % CAP | +150 |
| Deflection @ RO-inch | 0.004 |
| Material | Stainless Steel |
| Connector | MS3102E-14S-6P |
| Seal | Environmental |

Model 3200 Standard Stainless Steel Load Cell

Why the Interface model 3200 Standard Stainless Steel Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Hermetically sealed cell
- Performance to .05%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- .0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation



DIMENSIONS

| See Drawing | 3210 | | MODEL 3220 | | 3232 | |
|-------------|----------------|-------|-----------------|-------|-----------------|--------|
| | CAPACITY (lbf) | | | | | |
| | 2.5K, 5K, 10K | | 25K, 50K | | 100K | |
| | inch | mm | inch | mm | inch | mm |
| ① | 4.13 | 104.9 | 6.06 | 153.9 | 8.00 | 203.2 |
| ② | 1.38 | 35.1 | 1.75 | 44.5 | 2.50 | 63.5 |
| ③ | 1.20 | 30.5 | 1.58 | 40.0 | 2.20 | 55.9 |
| ④ | 0.90 | 22.9 | 1.97 | 50.0 | 3.14 | 79.8 |
| ⑤ | 3.50 | 88.9 | 5.13 | 130.3 | 6.50 | 165.1 |
| ⑥ | 22.5° | 22.5° | 15.0° | 15.0° | 11.25° | 11.25° |
| ⑦ | 0.28 | 7.10 | 0.41 | 10.4 | 0.53 | 13.5 |
| ⑦ | 8 places | | 12 places | | 16 places | |
| ⑧ | 5/8-18 UNF-3B | | 1 1/4-12 UNF-3B | | 1 3/4-12 UNF-3B | |
| ⑧ | 1.12 in deep | | 1.40 in deep | | 2.15 in deep | |
| ⑨ | 0.20 | 5.10 | 0.30 | 7.60 | 0.31 | 7.90 |
| ⑩ | 1.13 | 28.6 | 1.75 | 44.5 | 2.00 | 50.8 |
| ⑪ | 0.03 | 0.80 | 0.03 | 0.80 | 0.03 | 0.80 |
| ⑫ | 1.25 | 31.8 | 2.25 | 57.2 | 3.00 | 76.2 |
| ⑬ | 5/8-18 UNF-3B | | 1 1/4-12 UNF-3B | | 1 3/4-12 UNF-3B | |
| ⑬ | 0.87 in deep | | 1.40 in deep | | 1.75 in deep | |
| ⑭ | 4.80 | 121.9 | 5.52 | 140.2 | 5.30 | 134.6 |

SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|---------------------------------|----------------|------------|----------------|------------|------------|
| | 3210 | 3210 | 3220 | 3220 | 3232 |
| | CAPACITY (lbf) | | CAPACITY (lbf) | | |
| | 2.5k, 5k | 10k | 25k | 50k | 100k |
| ACCURACY – (MAX ERROR) | | | | | |
| Static Error Band-% FS | ±0.05 | ±0.05 | ±0.05 | ±0.05 | ±0.06 |
| Nonlinearity-% FS | ±0.05 | ±0.05 | ±0.05 | ±0.05 | ±0.05 |
| Hysteresis-% FS | ±0.06 | ±0.06 | ±0.06 | ±0.06 | ±0.06 |
| Nonrepeatability-% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, 20 min-% | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity-% | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity-%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| TEMPERATURE | | | | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero-%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output-%/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | | |
| | (2.5K 2.0) | | | | |
| Rated Output-mV/V (Nominal) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage-VDC – MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 |
| Zero Balance-% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance-Megohm | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO-inch | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |
| Optional Base-P/N | B302 | B302 | B303 | B303 | B312 |
| Natural Frequency-kHz | 6.6 | 9.4 | 6.5 | 7.0 | 5.8 |
| Weight-lb | 3.3 | 3.3 | 9.5 | 9.5 | 26 |
| Calibration | T & C | T & C | T & C | T & C | T & C |

OPTIONS

Base (Recommended)
 Submersible Cable
 Compression Overload Protection
 Cable length (20 ft Standard)
 Multiple Bridge
 Standardized Output
 Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

Instrumentation
 Loading Hardware
 Load Button
 Top & Bottom Plates

Consult factory for more technical information

STANDARD CONFIGURATIONS

Integral 20 ft Cable (32xxBFG-nn)
 Installed Base (-B suffix)

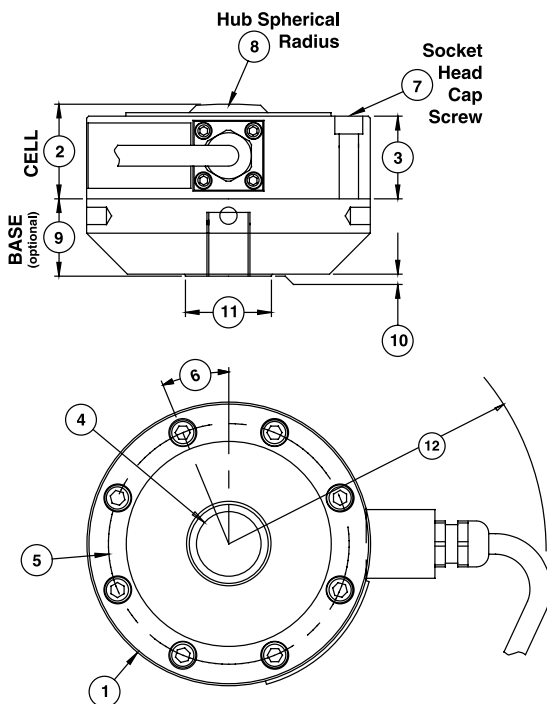


Optional base

Model 3200 Standard Stainless Steel Load Cell Compression-Only

Why the Interface model 3200 Standard Stainless Steel Load Cell Compression-Only is the best in class:

- Proprietary Interface temperature compensated strain gages
- Hermetically sealed cell
- Performance to .04%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- .0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation



DIMENSIONS

| See Drawing | 3211 | | MODEL 3221 | | 3231 | |
|-------------|----------------------------|--------|-----------------------------|--------|--------------------------|--------|
| | CAPACITY (lbf) | | | | | |
| | 2.5K, 5K, 10K | | 25K, 50K | | 100K | |
| | inch | mm | inch | mm | inch | mm |
| ① | 4.13 | 104.9 | 4.75 | 120.7 | 7.50 | 203.2 |
| ② | 1.38 | 35.1 | 1.75 | 44.4 | 2.25 | 57.2 |
| ③ | 1.20 | 30.5 | 1.58 | 40.1 | 1.95 | 49.5 |
| ④ | 0.90 | 22.9 | 1.19 | 30.2 | 2.67 | 67.8 |
| ⑤ | 3.50 | 88.9 | 4.00 | 101.6 | 6.25 | 158.8 |
| ⑥ | 22.5° | 22.5° | 45.00° | 45.0° | 15.0° | 15.0° |
| ⑦ | 1/4-28 x 1 1/4 8 places | | 5/16-24 x 1 1/2 4 places | | 7/16-20 x 2 12 places | |
| ⑧ | 6.00 | 152.40 | 6.00 | 152.40 | 8.00 | 203.20 |
| ⑨ | 1.13 | 28.70 | 1.25 | 31.80 | 2.00 | 50.80 |
| ⑩ | 0.03 | 00.80 | 0.03 | 00.80 | 0.03 | 00.80 |
| ⑪ | 1.25 | 31.80 | 2.00 | 50.80 | 3.00 | 76.20 |
| ⑫ | 4.80 | 121.90 | 5.61 | 142.50 | 5.30 | 134.60 |

SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|---------------------------------|-------------------|-------------|----------------|-------------|-------------|
| | 3211 | 3211 | 3221 | 3221 | 3231 |
| | CAPACITY (lbf) | | CAPACITY (lbf) | | |
| | 2.5K, 5K | 10K | 25K | 50K | 100K |
| ACCURACY – (MAX ERROR) | | | | | |
| Static Error Band–% FS | ±0.04 | ±0.04 | ±0.04 | ±0.04 | ±0.04 |
| Nonlinearity–% FS | ±0.05 | ±0.05 | ±0.05 | ±0.05 | ±0.05 |
| Hysteresis–% FS | ±0.06 | ±0.06 | ±0.06 | ±0.06 | ±0.06 |
| Nonrepeatability–% RO | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Creep, 20 min–%±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 | ±0.025 |
| Side Load Sensitivity–% | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| Eccentric Load Sensitivity–%/in | ±0.25 | ±0.25 | ±0.25 | ±0.25 | ±0.25 |
| TEMPERATURE | | | | | |
| Compensated Range–°F | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 | 15 to 115 |
| Compensated Range–°C | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 | -10 to 45 |
| Operating Range–°F | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 | -65 to 200 |
| Operating Range–°C | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 | -55 to 90 |
| Effect on Zero–%RO/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output–%/°F – MAX | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| ELECTRICAL | | | | | |
| Rated Output–mV/V (Nominal) | (2.5K 2.0) 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Excitation Voltage–VDC MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance–Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 |
| Zero Balance–% RO | ±1.0 | ±1.0 | ±1.0 | ±1.0 | ±1.0 |
| Insulation Resistance–Megohm | 5000 | 5000 | 5000 | 5000 | 5000 |
| MECHANICAL | | | | | |
| Safe Overload–% CAP | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection @ RO–inch | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |
| Optional Base–P/N | B302 | B302 | B306 | B306 | B304 |
| Natural Frequency–kHz | 6.1 | 8.6 | 8.2 | 11.7 | 7.6 |
| Weight–lb | 3.3 | 3.3 | 6.8 | 6.8 | 13.5 |
| Calibration | Compression | Compression | Compression | Compression | Compression |

OPTIONS

Base (Recommended)
Submersible Cable
Compression Overload Protection
Cable length (20 ft Standard)
Multiple Bridge
Standardized Output
Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

Instrumentation
Load Button
Top & Bottom Plates

Consult factory for more technical information

STANDARD CONFIGURATIONS

Integral 20 ft Cable and Counterbored
Mounting Holes (32xxBBE-nn)



Optional base

Model 2100 High Capacity Column Load Cell (U.S. & Metric)



Why the Interface model 2100 High Capacity Column Load Cell is the best in class:

- Capacities to 1000Klbf or 4450 kN
- Performance to $\pm 0.15\%$ FS
- Compact size
- Metric and English models

OPTIONS

Compression-Only available. Ask factory for specifications and dimensions.

Multiple Bridge
Standardized Output
ASTM E74 Calibration
Special Thread Size
Handles

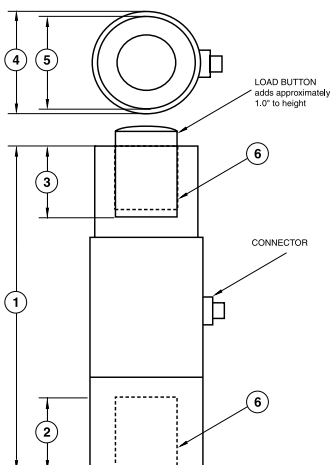
ACCESSORIES

Mating Connector
Cable Assembly

Consult factory for more technical information

SPECIFICATIONS

| PARAMETERS | Cal Grade |
|---------------------------------|----------------|
| ACCURACY | |
| Nonlinearity - %FS | ± 0.15 |
| Hysteresis - %FS | ± 0.05 |
| Nonrepeatability - %RO | ± 0.03 |
| Creep in 20 min - % | ± 0.05 |
| TEMPERATURE | |
| Compensated Range-°F | 32 to 132 |
| Operating Range-°F | -30 to 200 |
| Effect on Zero-%RO/°F | 0.003 |
| Effect on Output-%/°F | 0.003 |
| ELECTRICAL | |
| Rated Output - mV/V (Nominal) | 2.0 |
| Excitation - V AC/DC - Nominal | 10 |
| Excitation - V AC/DC - Maximum | 15 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Zero Balance - %RO | ± 1.0 |
| Insulation Resistance - Megohm | > 5000 |
| MECHANICAL | |
| Safe Overload-%CAP | 150 |
| Connector | MS3102A-14S-5P |



DIMENSIONS

| See Drawing | MODEL 2160 | | | | | | | | | | | |
|-------------|------------|---------|----------|---------|-------|---------|---------|---------|-------|---------|-------|---------|
| | CAPACITY | | | | | | | | | | | |
| | 300K | 1335 kN | 400K | 1780 kN | 500K | 2225 kN | 600K | 2670 kN | 700K | 3115 kN | 1000K | 4450 kN |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 16.50 | 419.1 | 19.00 | 482.6 | 21.26 | 540.0 | 23.25 | 590.6 | 25.50 | 647.7 | 27.80 | 706.1 |
| ② | 3.75 | 95.3 | 4.00 | 101.6 | 4.50 | 114.3 | 5.00 | 127.0 | 5.50 | 139.7 | 6.50 | 165.1 |
| ③ | 3.75 | 95.5 | 4.00 | 101.6 | 4.50 | 114.3 | 5.00 | 127.0 | 5.50 | 139.7 | 6.50 | 165.1 |
| ④ | 5.50 | 139.7 | 5.50 | 139.7 | 6.00 | 152.4 | 7.00 | 177.8 | 7.50 | 190.5 | 9.50 | 241.3 |
| ⑤ | 5.00 | 127.0 | 5.00 | 127.0 | 5.50 | 139.7 | 6.50 | 165.1 | 7.00 | 177.8 | 9.00 | 228.6 |
| ⑥ | 3 1/2-12 | M76x2 | 3 1/2-12 | M90x2 | 4-12 | M100x2 | 4 1/2-8 | M100x2 | 5-8 | M125x4 | 6-8 | M125x4 |

Model 2200 Calibration Column Load Cell (U.S. & Metric)

Why the Interface Model 2200 Calibration Column Load Cell is the best in class:

- Capacities from 100K – 200K lbf
(444.82 kN - 889.64 kN)
- Performance to <0.10%FS
- Quadruple the gages of standard column cell
- Lightweight
- Compact
- E74 calibration

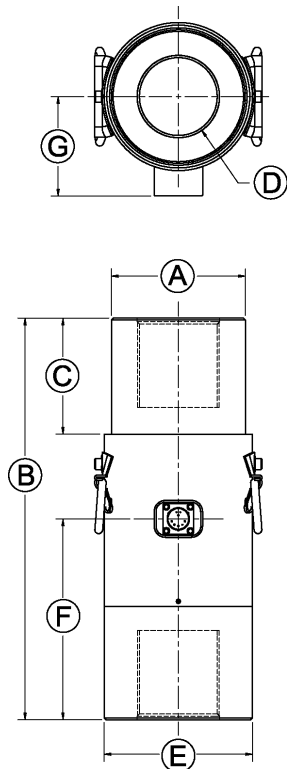
OPTIONS*

Compression-only available (Ask factory for specifications and dimensions)
Multiple bridge
Standardized output
ASTM E74 calibration
Special thread size

ACCESSORIES*

Mating connector
Cable assembly

*Please consult factory for additional information



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|---------------------------------|-------------|
| Nonlinearity-% FS | ±0.10 |
| Hysteresis-% FS | ±0.05 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.05 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Operating Range-°F | -30 to 175 |
| Effect on Zero- % RO/°F | 0.003 |
| Effect on Output- % /°F | 0.003 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.0 ± .20 |
| Excitation - V AC/DC - Nominal | 10 |
| Excitation - V AC/DC - Maximum | 15 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Zero Balance - %RO | ±1.0 |
| Insulation Resistance - Megohm | >5000 |
| MECHANICAL | |
| Safe Overload-% CAP | 150 |
| Connector | PTØ2E-12-8P |
| Weight | 35/45 lb |

DIMENSIONS

| See Drawing | MODEL | |
|-------------|-----------------|-----------------|
| | 2230 (100K lbf) | 2240 (200K lbf) |
| (A) | 3.0 | 4.5 |
| (B) | 10.1 | 13.5 |
| (C) | 2.75 | 3.9 |
| (D) | 1.75-12UN-3B | 2.75-8UN-3B |
| (E) | 3.5 | 4.98 |
| (F) | 5.05 | 6.75 |
| (G) | 2.59 | 3.34 |

Model 2300 High Capacity Load Cell

- Capacities 630, 1000, 1200, 2000 kN
- Accuracy class 0.05% FS
- Tension & compression
- Low profile, small mass
- Flange mounted
- Dual bridge available



OPTIONS

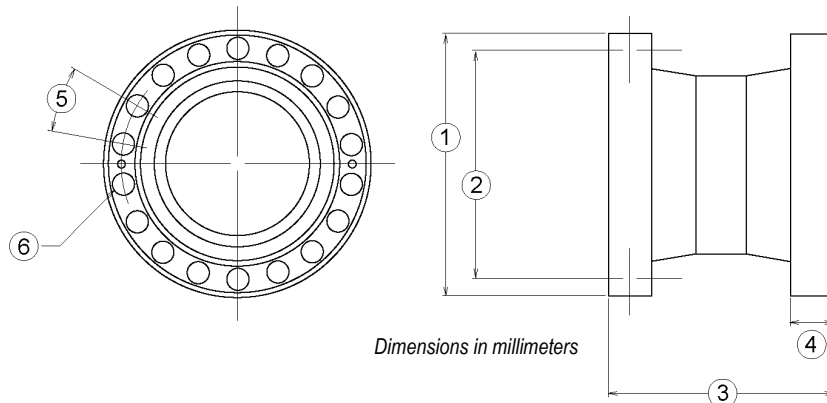
1. Fixed cable or plug connection
2. Redundancy: Dual bridge for axial force measurement
3. TEDS calibration IEEE 1451.4

DIMENSIONS

| Model | 2330 | 2340 | 2350 |
|---------------|--------------------------------------|------------|----------|
| Capacity (kN) | 630 | 1000, 1200 | 2000 |
| (1) | 197 | 240 | 305 |
| (2) | 160 | 200 | 250 |
| (3) | 160 | 230 | 326 |
| (4) | 25 | 40 | 57.5 |
| (5) | 30° | 30° | 30° |
| (6) | M20 x 12 | M24 x 12 | M30 x 12 |
| Weight-kg | 9 | 19 | 46 |
| | Recommended Mounting Plate Thickness | | |
| | 70 | 100 | 140 |

SPECIFICATIONS

| MODELS (kN) | 630, 1000, 2000 |
|---------------------------------|-----------------|
| ACCURACY – (MAX ERROR) | |
| Static Error Band-% FS | ±0.05 |
| Nonlinearity-% FS | ±0.05 |
| Hysteresis-% FS | ±0.1 |
| Nonrepeatability-% RO | ±0.02 |
| Creep, in 20 min-% | ±0.025 |
| Side Load Sensitivity-% | ±0.25 |
| Eccentric Load Sensitivity-%/mm | ±0.5 |
| TEMPERATURE | |
| Compensated Range-°C | 10 to 60 |
| Operating Range-°C | 10 to 60 |
| Effect on Zero-% RO/°C – MAX | 0.0025 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2 |
| Excitation Voltage-VDC MAX | 20 |
| MECHANICAL | |
| Fatigue Range-%CAP | ±80 |



Model MB Miniature Beam Load Cell

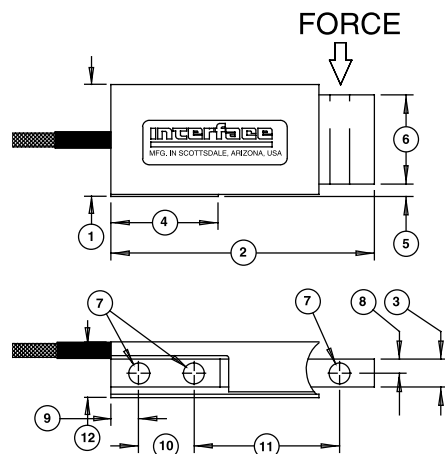
Why the Interface model MB Miniature Beam Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Performance to .03%
- Low height – 1 in
- .0008%/°F temp. effect on output
- Low cost



STANDARD CONFIGURATION

5 ft Integral Cable (MB-nn)



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|-----------------------|--------|
| Nonlinearity-% FS | ±0.03 |
| Hysteresis-% FS | ±0.02 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |

TEMPERATURE

| | |
|------------------------------|------------|
| Compensated Range-°F | 0 to 150 |
| Operating Range-°F | -65 to 200 |
| Effect on Output-%/°F – MAX | ±0.0008 |
| Effect on Zero-% RO/°F – MAX | ±0.0015 |

ELECTRICAL

| | |
|---------------------------------|--------|
| Rated Output-mV/V (Nominal) | 3.0 |
| Zero Balance-% RO | ±1.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage – MAX | 15 VDC |
| Insulation Resistance-Megohm | 5000 |

MECHANICAL

| | |
|-------------------------------|-------------|
| Calibration | Compression |
| Safe Overload-% CAP | ±150 |
| Cable length-ft | 5 |
| Natural Frequency/Deflection: | |

| lbf | Deflection (inches) | Nat. Freq. (hertz) |
|-----|---------------------|--------------------|
| 5 | .005 | 950 |
| 10 | .005 | 1300 |
| 25 | .005 | 2250 |
| 50 | .004 | 3300 |
| 75 | .004 | 3900 |
| 100 | .005 | 4000 |
| 150 | .005 | 4750 |
| 250 | .005 | 4400 |

DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | | | | | | | | | | | |
|-------------|----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 5, 10 | | 25 | | 50 | | 75 | | 100 | | 150 | | 250 | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.02 | 25.9 |
| ② | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 |
| ③ | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.5 | 12.8 |
| ④ | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 |
| ⑤ | 0.14 | 3.6 | 0.11 | 2.8 | 0.15 | 3.8 | 0.14 | 3.6 | 0.13 | 3.3 | 0.1 | 2.5 | 0.12 | 3 |
| ⑥ | 0.75 | 19.1 | 0.81 | 20.6 | 0.72 | 18.3 | 0.75 | 19.1 | 0.78 | 19.8 | 0.82 | 20.8 | 0.79 | 20.1 |
| ⑦ | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 |
| ⑧ | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.25 | 6.4 |
| ⑨ | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 |
| ⑩ | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| ⑪ | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 |
| ⑫ | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.75 | 19.1 |

Model MBI Fatigue Rated Mini Beam Overload Protected Load Cell

- Proprietary Interface temperature compensated strain gages
- Performance to .03%
- Low Height - 1 in.
- .0008%/°F temp. effect on output
- 10x overload protection

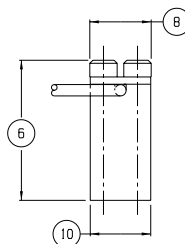
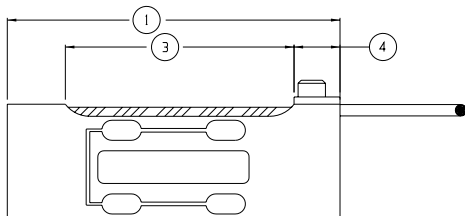
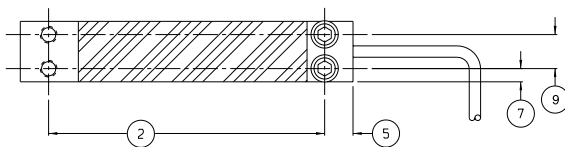


STANDARD CONFIGURATION

5 ft. integral cable (MBI-nn)

DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|-----------|------------|
| | U.S (lbf) | Metric (N) |
| (1) | 2, 5, 10 | 10, 20, 50 |
| (2) | 2.750 | 69.90 |
| (3) | 2.281 | 57.94 |
| (4) | 1.890 | 48.00 |
| (5) | 0.380 | 9.70 |
| (6) | 0.234 | 5.94 |
| (7) | 1.160 | 29.50 |
| (8) | 0.110 | 2.79 |
| (9) | 0.510 | 13.00 |
| (10) | 0.281 | 7.14 |
| | 0.500 | 12.70 |



SPECIFICATIONS

| | |
|----------------------------------|-------------|
| ACCURACY- (MAX ERROR) | |
| Nonlinearity-% FS | ±0.02 |
| Hysteresis-% FS | ±0.02 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |
| TEMPERATURE | |
| Compensated Range-°F | 70 to 170 |
| Operating Range-°F | -40 to 175 |
| Effect on Output- %/°F- MAX | ±0.0008 |
| Effect on Zero- % RO/°F- MAX | ±0.002 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2 |
| Zero Balance- % RO | ±1.0 |
| Bridge Resistance- Ohm (Nominal) | 350 |
| Excitation Voltage- MAX | 15 VDC |
| Insulation Resistance- Megohm | 5000 |
| MECHANICAL | |
| Calibration | Compression |
| Safe Overload - % CAP | 1000 |
| Cable Length - ft. | 5 |

Model MBP Miniature Beam Overload Protected Load Cell

Why the Interface model MBP Miniature Beam Overload Protected Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- 10X overload protection
- Low height – 1 in
- .0008%F temp. effect on output



STANDARD CONFIGURATION

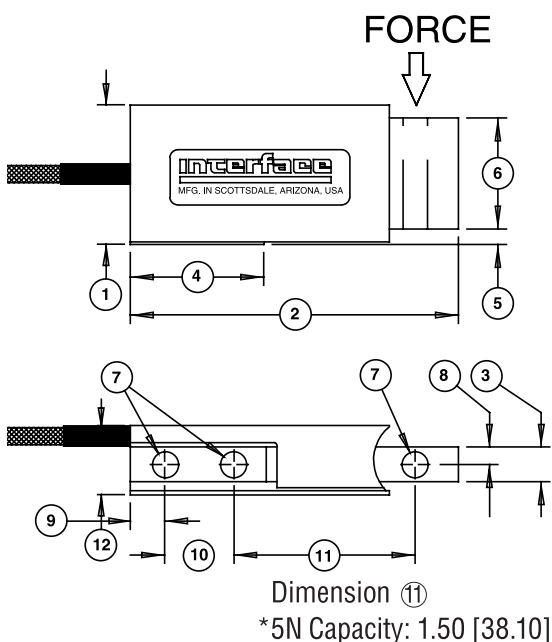
5 ft Integral Cable (MBP)

OPTIONS*

Cable Length
Standardized Output

ACCESSORIES*

Instrumentation



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|----------------------------|--------|
| Nonlinearity—% FS..... | ±0.03 |
| Hysteresis—% FS..... | ±0.02 |
| Nonrepeatability—% RO..... | ±0.01 |
| Creep, in 20 min—%..... | ±0.025 |

TEMPERATURE

| | |
|-----------------------------------|------------|
| Compensated Range—°F..... | 0 to 150 |
| Operating Range—°F..... | -65 to 200 |
| Effect on Output—%/°F – MAX..... | ±0.0008 |
| Effect on Zero—% RO/°F – MAX..... | ±0.0015 |

ELECTRICAL

| | |
|--------------------------------------|--------|
| Rated Output—mV/V (Nominal)..... | 3.0 |
| Zero Balance—% RO..... | ±1.0 |
| Bridge Resistance—Ohm (Nominal)..... | 350 |
| Excitation Voltage – MAX..... | 15 VDC |
| Insulation Resistance—Megohm..... | 5000 |

MECHANICAL

| | |
|---------------------------|----------------|
| Calibration..... | Compression |
| Safe Overload—% CAP: | |
| 2.5-10 lbf / 10-50 N..... | ±1000 |
| 100 N..... | ±500 |
| Cable length—ft..... | 5 |
| Deflection @RO—inch..... | 0.005 (0.13mm) |

*See appendix for more technical information

DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|------------|---------------------|
| | U.S. (lbf) | Metric (N) |
| | 2.5, 5, 10 | *5, 10, 20, 50, 100 |
| | inch | mm |
| ① | 1.01 | 25.7 |
| ② | 2.38 | 60.5 |
| ③ | 0.25 | 6.4 |
| ④ | 0.97 | 24.6 |
| ⑤ | 0.14 | 3.6 |
| ⑥ | 0.75 | 19.1 |
| ⑦ | 0.17 | 4.3 |
| ⑧ | 0.13 | 3.3 |
| ⑨ | 0.25 | 6.4 |
| ⑩ | 0.50 | 12.7 |
| ⑪ | 1.31 | *33.3 |
| ⑫ | 0.50 | 12.7 |

Model SSB Sealed Beam Load Cell

- Proprietary Interface temperature compensated strain gages
- 0.01% nonrepeatability
- Environmentally sealed
- 0.0008%/F° temperature effect on output
- Compact size



STANDARD CONFIGURATION

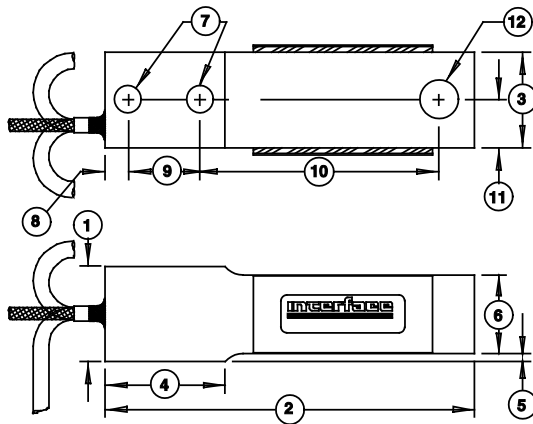
10 ft. Integral Cable (SSB-AJ-nn)
<or> 10 ft. Integral Cable & Standardized Output (SSB-AP-nn)

OPTIONS

Extra Cable Length
Standardized Output

ACCESSORIES

Instrumentation
Load Button



SPECIFICATIONS

| ACCURACY - (MAX ERROR) | | | | |
|---------------------------------|-------------|------------|----|---------------------------|
| Nonlinearity-% FS | ±0.03 | | | |
| Hysteresis-% FS | ±0.02 | | | |
| Nonrepeatability-% RO | ±0.01 | | | |
| Creep, in 20 min-% | ±0.025 | | | |
| TEMPERATURE | | | | |
| Compensated Range-°F | 0 to 150 | | | |
| Compensated Range-°C | -15 to 65 | | | |
| Operating Range-°F | -65 to 200 | | | |
| Operating Range-°C | -55 to 90 | | | |
| Effect on Output-%/°F | ±0.0008 | | | |
| Effect on Output-%/°C | ± | | | |
| Effect on Zero- % RO/°F | ±0.0015 | | | |
| Effect on Zero- % RO/°C | ± | | | |
| ELECTRICAL | | | | |
| Rated Output-mV/V (Nominal) | 3.0 | | | |
| Zero Balance-%RO | ±1.0 | | | |
| Bridge Resistance-Ohm (Nominal) | 350 | | | |
| Excitation Voltage-MAX | 15 VDC | | | |
| Insulation Resistance-Megohm | 5000 | | | |
| MECHANICAL | | | | |
| Calibration | Compression | | | |
| Safe Overload-% CAP | ±150 | | | |
| Cable length | 10 | | | |
| Natural Frequency/Deflection: | | | | |
| lbf | N | Deflection | | Natural Frequency (Hertz) |
| | | inches | mm | |
| 50 | | .004 | | 2130 |
| 100 | | .004 | | 2400 |
| 250 | | .005 | | 3000 |
| 500 | | .010 | | 2220 |
| 1000 | | .013 | | 1970 |

DIMENSIONS

| See Drawing | CAPACITY | | | | | | | | | | | | | | | |
|-------------|----------|------|-----------|------|-----------|------|-----------|------|----------|-------|------------|----|----------|----|-----------|----|
| | 50 (lbf) | | 100 (lbf) | | 250 (lbf) | | 500 (lbf) | | 1K (lbf) | | 2.5K (lbf) | | 5K (lbf) | | 10K (lbf) | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.98 | 24.9 | 0.98 | 24.9 | 0.98 | 24.9 | 1.00 | 25.4 | 1.50 | 38.1 | | | | | | |
| (2) | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 3.88 | 98.6 | 5.00 | 127.0 | | | | | | |
| (3) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.00 | 25.4 | | | | | | |
| (4) | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 1.25 | 31.8 | 1.75 | 44.5 | | | | | | |
| (5) | 0.11 | 2.80 | 0.11 | 2.80 | 0.11 | 2.80 | 0.09 | 2.30 | 0.10 | 2.50 | | | | | | |
| (6) | 0.82 | 20.8 | 0.82 | 20.8 | 0.82 | 20.8 | 0.82 | 20.8 | 1.36 | 34.5 | | | | | | |
| (7) | 0.17 | 4.30 | 0.17 | 4.30 | 0.17 | 4.30 | 0.28 | 7.10 | 0.41 | 10.3 | | | | | | |
| (8) | 0.25 | 6.40 | 0.25 | 6.40 | 0.25 | 6.40 | 0.25 | 6.40 | 0.38 | 9.70 | | | | | | |
| (9) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.75 | 19.1 | 1.00 | 25.4 | | | | | | |
| (10) | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 2.50 | 63.5 | 3.25 | 82.6 | | | | | | |
| (11) | 0.25 | 6.40 | 0.25 | 6.40 | 0.25 | 6.40 | 0.50 | 12.7 | 0.50 | 12.7 | | | | | | |
| (12) | 0.17 | 4.30 | 0.17 | 4.30 | 0.17 | 4.30 | 0.40 | 10.2 | 0.40 | 10.2 | | | | | | |

Model SM S-Type Load Cell (U.S. & Metric)



Why the Interface model SM S-Type Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- High performance
- .0008%/°F (.0015%/°C) temp. effect on output
- Lowest creep — 0.025%
- Tension and compression

STANDARD CONFIGURATION

5 ft Integral Cable (SM-nn)

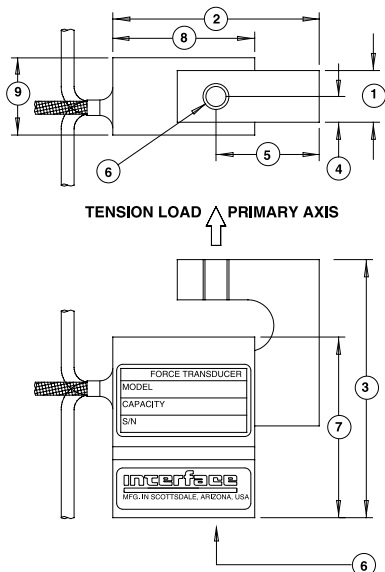
OPTIONS

Extra Cable Length
Standardized Output

ACCESSORIES

Load Button
Mounting Hardware
Instrumentation

Consult factory for more technical information



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|-----------------------|--------|
| Nonlinearity-% FS | ±0.03 |
| Hysteresis-% FS | ±0.02 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |

TEMPERATURE

| | |
|------------------------------|-----------|
| Compensated Range-°F | 0 to 150 |
| Compensated Range-°C | -15 to 65 |
| Operating Range-°F | -65 to 90 |
| Operating Range-°C | -55 to 90 |
| Effect on Output-%/°F – MAX | ±0.0008 |
| Effect on Output-%/°C – MAX | ±0.0015 |
| Effect on Zero-% RO/°F – MAX | ±0.0015 |
| Effect on Zero-% RO/°C – MAX | ±0.0027 |

ELECTRICAL

| | |
|---------------------------------|--------|
| Rated Output-mV/V (Nominal) | 3.0 |
| Zero Balance-% RO | ±1.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage – MAX | 15 VDC |
| Insulation Resistance-Megohm | > 5000 |

MECHANICAL

| | |
|-------------------------------|---------|
| Calibration | Tension |
| Safe Overload-% CAP | ±150 |
| Cable length-ft | 5 |
| Natural Frequency/Deflection: | |

| lbf | N | Deflection (inches) | Nat. Freq. (Hertz) |
|------|------|---------------------|--------------------|
| 10 | 50 | .003 | 600 |
| 25 | 100 | .003 | 1000 |
| 50 | 200 | .003 | 1550 |
| 100 | 500 | .004 | 1850 |
| 250 | 1000 | .006 | 2350 |
| 500 | 2000 | .006 | 2150 |
| 1000 | 5000 | .005 | 3350 |

DIMENSIONS

| See Drawing | CAPACITY | | | |
|-------------|--------------------------|------------------------|---------------|---------------|
| | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) |
| | 10,25,50, 100,150,250 | 50,100,200 500,1000 | 500 1000 | 2000 5000 |
| | inch | mm | inch | mm |
| ① | 0.50 | 12.7 | 1.00 | 25.4 |
| ② | 2.00 | 50.8 | 2.00 | 50.8 |
| ③ | 2.50 | 63.5 | 3.00 | 76.2 |
| ④ | 0.25 | 6.40 | 0.50 | 12.7 |
| ⑤ | 1.00 | 25.4 | 1.00 | 25.4 |
| ⑥ | 1/4-28 UNF-2B | M6 x 1-6H | 1/2-20 UNF-2B | M12 x 1.75-6H |
| ⑦ | 1.75 | 44.5 | 2.00 | 50.8 |
| ⑧ | 1.38 | 35.1 | 1.94 | 49.3 |
| ⑨ | 0.75 | 19.1 | 1.25 | 31.8 |

Model SMA Series Miniature S-Type Load Cell (U.S. & Metric)

Why the Interface model SMA Series Miniature S-Type Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Small compact design
- Tension & compression



STANDARD CONFIGURATION

5 ft. Integral Cable (SMA-nn)

OPTIONS

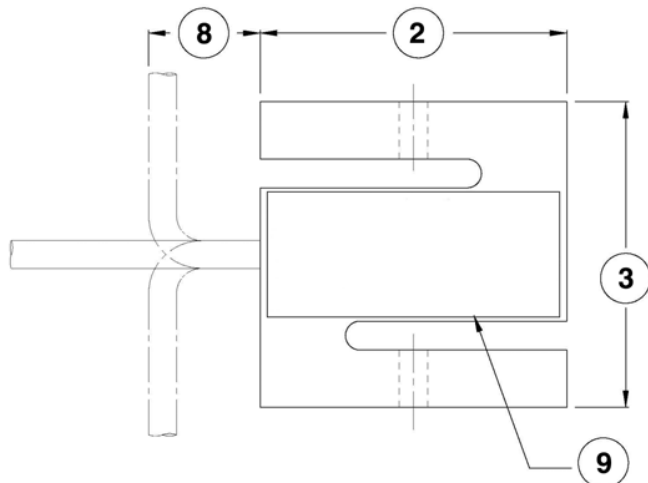
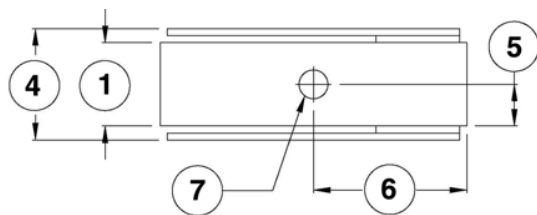
Extra Cable Length
Standardized Output

ACCESSORIES

Instrumentation

SPECIFICATIONS

| | |
|---------------------------------|-------------|
| ACCURACY – MAX | |
| Nonlinearity–% FS | ±0.05 |
| Hysteresis–% FS | ±0.05 |
| Nonrepeatability–% RO | ±0.02 |
| Creep, in 20 min–% | ±0.05 |
| TEMPERATURE | |
| Compensated Range–°F | 15 to 115 |
| Compensated Range–°C | –10 to 45 |
| Operating Range–°F | –65 to 200 |
| Operating Range–°C | –55 to 90 |
| Effect on Output–%/°F – MAX | ±0.0008 |
| Effect on Output–%/°C – MAX | ±0.0014 |
| Effect on Zero– % RO/°F – MAX | ±0.005 |
| Effect on Zero– % RO/°C – MAX | ±0.009 |
| ELECTRICAL | |
| Rated Output–mV/V (nominal) | 2.5 |
| Zero Balance–%RO | –0.6 to 0.0 |
| Bridge Resistance–Ohm (nominal) | 350 |
| Excitation Voltage–MAX | 15 VDC |
| Insulation Resistance–Megohm | >5000 |
| MECHANICAL | |
| Calibration | Tension |
| Safe Overload–% CAP | 150 |
| Cable Length–ft | 5 |



DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|----------------------|-------------------|
| | US (lbf) | Metric (N) |
| | 15, 100, 150, 200 | 60, 500, 600, 900 |
| | inch | mm |
| (1) | 0.38 | 9.53 |
| (2) | 1.38 | 35 |
| (3) | 1.38 | 35 |
| (4) | 0.56 | 14.2 |
| (5) | 0.19 | 4.8 |
| (6) | 0.69 | 17.5 |
| (7) | #10-32 UNF – 2B | M4 X .7 – 6 |
| (8) | 0.5 | 12.7 |
| (9) | Identification Label | |

Model SML Low Height Load Cell

- Proprietary Interface temperature compensated strain gages
- From 3/4" high (19mm)
- Performance to .05%
- Low extraneous load sensitivity
- Tension and compression
- .0008%/F° temperature effect on output
- Overload protection, SML-5 and SML-10 (SML-22N and SML-45N)



STANDARD CONFIGURATION

5 ft. (1.5m) Integral Cable (SML-nn)

OPTIONS

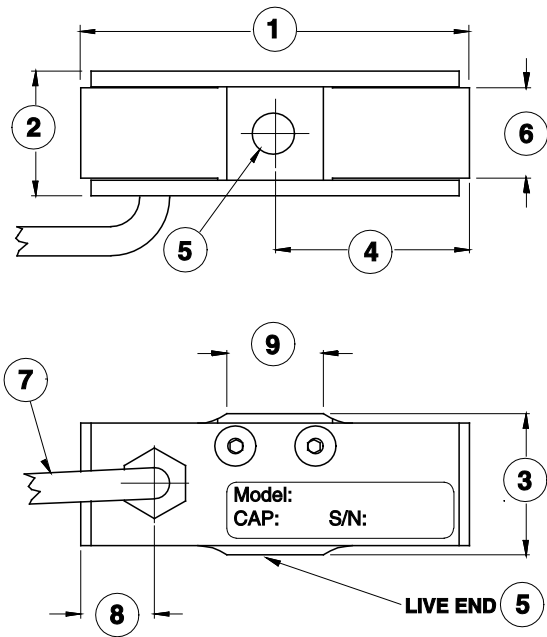
Extra Cable Length
Studs Instead of Threaded Holes

ACCESSORIES

Instrumentation

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | 5-300 lbf (22-1300N) | 500, 1000 lbf (2200, 4500N) | 2000 lbf (9000N) | |
|--------------------------------------|----------------------|-----------------------------|------------------|---------------------------|
| Nonlinearity-% FS | ±0.05 | ±0.10 | ±0.20 | |
| Hysteresis-% FS | ±0.05 | ±0.10 | ±0.10 | |
| Nonrepeatability-% RO | ±0.03 | | | |
| Creep, in 20 min-% | ±0.05 | | | |
| TEMPERATURE | | | | |
| Compensated Range-°F | 0 to 150 | | | |
| Compensated Range-°C | -15 to 65 | | | |
| Operating Range-°F | -65 to 200 | | | |
| Operating Range-°C | -55 to 90 | | | |
| Effect on Output-%/°F (%/°C) | ±0.0008 (±0.0015) | | | |
| Effect on Zero- % RO/°F (% RO/°C) | ±0.005 (±0.009) | | | |
| ELECTRICAL | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | | | |
| Zero Balance-%RO | ±1.0 | | | |
| Bridge Resistance-Ohm (Nominal) | 350 | | | |
| Excitation Voltage-MAX | 15 VDC | | | |
| Insulation Resistance-Megohm | > 5000 | | | |
| MECHANICAL | | | | |
| Calibration | Tension | | | |
| Safe Overload-% CAP | 800 | | | |
| 5, 10 lbf (22, 45N) | 150 | | | |
| 25-2000 lbf (110-9000N) | 150 | | | |
| Cable length | 5ft (1.5m) | | | |
| Natural Frequency/Deflection: | | | | |
| lbf | N | Deflection | | Natural Frequency (Hertz) |
| | | inches | mm | |
| 5,10 | 22, 45 | .005 | .13 | 3000 |
| 25 | 110 | .004 | .09 | 2500 |
| 50 | 220 | .003 | .08 | 3300 |
| 100 | 450 | .003 | .08 | 5000 |
| 200, 300 | 900, 1300 | .003 | .08 | 4500 |
| 500, 1000 | 2200, 4500 | .003 | .08 | 1800 |
| 2000 | 9000 | .004 | .09 | 1800 |



DIMENSIONS

| See Drawing | CAPACITY | | | | | | | |
|-------------|---|------|--|------|--|------|---|------|
| | 5, 10 (lbf) 22, 45 (N) | | 25, 50, 100 (lbf) 110, 220, 450 (N) | | 200, 300, 500, 1000 (lbf) 900, 1300, 2200, 4500 (N) | | 2000 (lbf) 9000 (N) | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 1.80 | 45.7 | 2.00 | 50.8 | 2.12 | 53.8 | 2.80 | 71.1 |
| (2) | 0.52 | 13.1 | 0.64 | 16.3 | 0.89 | 22.6 | 1.16 | 29.6 |
| (3) | 0.73 | 18.5 | 0.73 | 18.5 | 0.98 | 24.8 | 1.24 | 31.5 |
| (4) | 0.90 | 22.9 | 1.00 | 25.4 | 1.06 | 26.9 | 1.40 | 35.6 |
| (5) | 10-32 UNF-2B .20 deep M5x0.8-6H 5.0 deep | | 1/4-28 UNF-2B .25 deep M6x1-6H 6.0 deep | | 3/8-24 UNF-2B .38 deep M8x1.25-6H 8.0 deep | | 1/2-20 UNF-2B .49 deep M12x1.75-6H 12.0 deep | |
| (6) | 0.34 | 8.6 | 0.46 | 11.8 | 0.71 | 18.1 | 1.00 | 25.5 |
| (7) | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 |
| (8) | 0.29 | 7.4 | 0.38 | 9.7 | .46 | 11.7 | 0.75 | 19.0 |
| (9) | 0.50 | 12.7 | 0.50 | 12.7 | 0.57 | 14.5 | 0.77 | 19.6 |



Model SMS

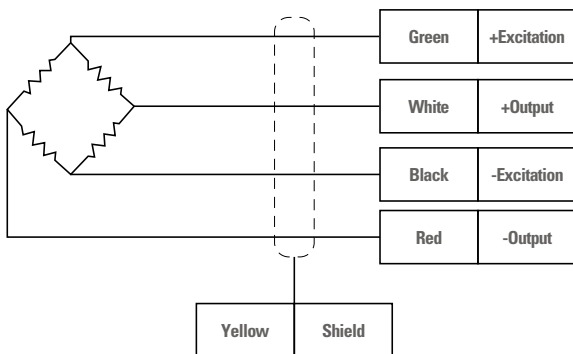
Model SMS S-Type Stainless Steel Load Cell

- Capacity 50 kg to 5K kg
- Stainless Steel Construction
- Environmental Protection IP67
- High Input Resistance: 1,100Ω
- High Accuracy
- Loading Hardware Available

Specifications

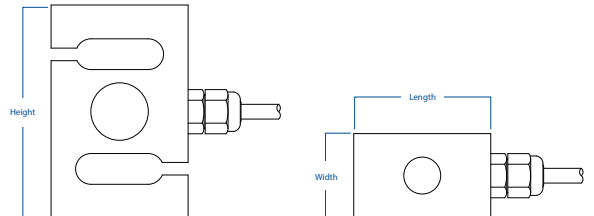
| Model | SMS | | |
|-------------------------------------|---|-----------|-------------------------------|
| Capacity (kg) | 100, 200, 500, 1000, 2000, 3000, & 5000 | 100 & 200 | 500, 1000, 2000, 3000, & 5000 |
| Accuracy - (MAX ERROR) | | | |
| Nonlinearity - %RO | ±0.04 | ±0.0166 | ±0.0166 |
| Hysteresis - %FS | ±0.04 | ±0.0166 | ±0.0166 |
| Creep, in 30 Min - %RO | ±0.06 | ±0.0166 | ±0.0166 |
| Temperature | | | |
| Compensated Temperature Range - °C | -10 – 40 | | |
| Operating Temperature Range - °C | -20 – 65 | | |
| Electrical | | | |
| Rated Output - mV/V (Nominal) | 2.00 ±0.1% | | |
| Zero Balance - % RO | ±5.0 | | |
| Input Resistance - Ω | 1,100 ±50 | | |
| Output Resistance - Ω | 1,100 ±2 | | |
| Insulation Resistance (100VDC) - MΩ | ≥5000 | | |
| Excitation - VDC (Nominal) | 5 – 15 | | |
| Mechanical | | | |
| Safe Load Limit - %*Emax | 200 | | |
| Ultimate Load - %*Emax | 300 | | |
| Cable Length - ft (m) | 19.7 ft (6m) | | |
| Sealing | Potted | | |
| Load Cell Material | Stainless Steel 17-4 PH (1.4548) | | |

Wiring Diagram

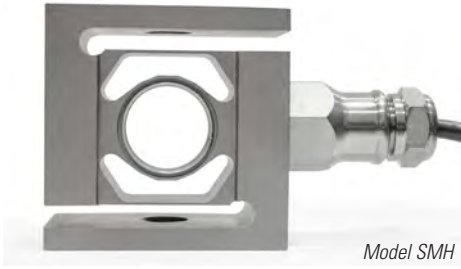


Specifications are subject to change without notice.

Dimensions



| Capacity | Height | Width | Length |
|--------------------|---------|---------|---------|
| 100, 200, & 500 kg | 76.2 mm | 30 mm | 49 mm |
| 1000 kg | 76.2 mm | 30 mm | 49 mm |
| 2000 kg | 86.1 mm | 30 mm | 76.2 mm |
| 3000 kg | 88.7 mm | 40 mm | 88.7 mm |
| 5000 kg | 146 mm | 56.4 mm | 91.2 mm |



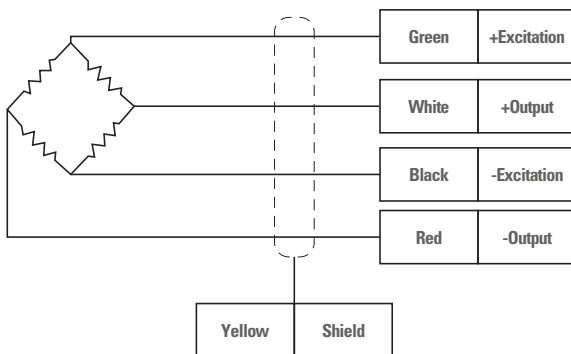
Model SMH S-Type Stainless Steel Load Cell

- Capacity 1 kN to 5 kN
- High Input Resistance
- Stainless Steel Construction
- Calibration in mV/V/Ω
- Environmental Protection IP68 with Complete Hermetic Sealing

Specifications

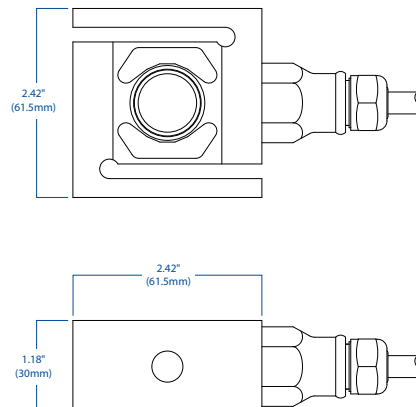
| Model | SMH | | |
|------------------------------------|----------------------------------|---------|---------|
| | Capacity | 1 kN | 2 kN |
| Accuracy - (MAX ERROR) | | | |
| Nonlinearity - %RO | ±0.04 | ±0.0275 | ±0.0166 |
| Hysteresis - %FS | ±0.04 | ±0.0275 | ±0.0166 |
| Creep, in 30 Min - %RO | ±0.06 | ±0.049 | ±0.0166 |
| Temperature | | | |
| Compensated Temperature Range - °C | -10 – 40 | | |
| Operating Temperature Range - °C | -40 – 80 | | |
| Electrical | | | |
| Rated Output - mV/V (Nominal) | 2.00 ±0.1% | | |
| Zero Balance - % RO | ±5.0 | | |
| Input Resistance - Ω | 1,100 ±50 | | |
| Output Resistance - Ω | 1,100 ±2 | | |
| Insulation Resistance - MΩ | ≥5000 | | |
| Excitation - VDC (Nominal) | 5...15 | | |
| Mechanical | | | |
| Safe Load Limit - %*Emax | 200 | | |
| Ultimate Load - %*Emax | 300 | | |
| Cable Length - ft (m) | 19.7 ft (6m) | | |
| Load Cell Material | Stainless Steel 17-4 PH (1.4548) | | |

Wiring Diagram



Specifications are subject to change without notice.

Dimensions



Custom Sizes and Capacities Available.

Model SSM / SSM2 Sealed S-Type Load Cell (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- 0.02% nonrepeatability
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- 0.025% creep
- Tension and compression



STANDARD CONFIGURATION

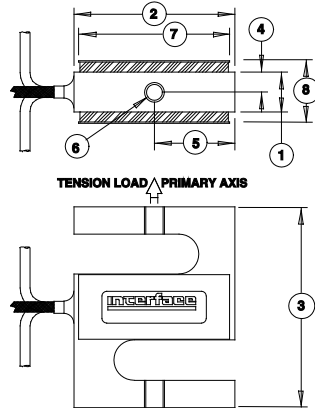
10 ft Integral Cable (SSM-AJ-nn) <or> PC04E-10-6P Standard Connector (SSM-AF-nn). Connector only available in 500-10K lbf or 2-50 kN capacities.

OPTIONS

PC04E-10-6P Connector (SSM-500 and above)
LEMO Connector
Standardized Output
High Temperature
Extra Cable Length

ACCESSORIES

Load Button
Instrumentation
Mounting Hardware



SPECIFICATIONS

| | | | |
|--------------------------------------|------------|-----------------|---------------------|
| ACCURACY – (MAX ERROR) | | | |
| Nonlinearity-% FS | ±0.05 | | |
| Hysteresis-% FS | ±0.03 | | |
| Nonrepeatability-% RO | ±0.02 | | |
| Creep in 20 min-% | ±0.025 | | |
| TEMPERATURE | | | |
| Compensated Range-°F | 0 to 150 | | |
| Compensated Range-°C | -15 to 65 | | |
| Operating Range-°F | -65 to 200 | | |
| Operating Range-°C | -55 to 90 | | |
| Effect on Output-%/°F – MAX | ±0.0008 | | |
| Effect on Output-%/°C – MAX | ±0.0015 | | |
| Effect on Zero- % RO/°F – MAX | ±0.0015 | | |
| Effect on Zero- % RO/°C – MAX | ±0.0027 | | |
| ELECTRICAL | | | |
| Rated Output-mV/V (Nominal) | 3 | | |
| Zero Balance-%RO | ±1 | | |
| Bridge Resistance-Ohm (Nominal) | 350 | | |
| Excitation Voltage-MAX | 15 VDC | | |
| Insulation Resistance-Megohm | >5000 | | |
| MECHANICAL | | | |
| Calibration | Tension | | |
| Safe Overload-% CAP | 150 | | |
| Cable Length-ft | 10 | | |
| Natural Frequency/Deflection: | | | |
| U.S. (lbf) | Metric (N) | Nat. Freq. (Hz) | Deflection (inches) |
| 50 | 200 | 1500 | 0.003 |
| 100 | 500 | 1850 | 0.004 |
| 150 | 500 | 1850 | 0.004 |
| 250 | 1000 | 2350 | 0.006 |
| 500 | 2kN | 2150 | 0.005 |
| 750 | N/A | 2350 | 0.005 |
| 1000 | 5kN | 3350 | 0.005 |
| 2000 | 10kN | 2400 | 0.005 |
| 3000 | N/A | 3000 | 0.005 |
| 5000 | 20kN | 2520 | 0.005 |

DIMENSIONS

| See Drawing | SSM | | | | | | | | SSM2 | |
|-------------|---------------|-----------|---------------|---------------|----------------------|----------------|---------------|------------|-----------------|--------------|
| | CAPACITY | | | | | | | | CAPACITY | |
| | U.S.(lbf) | Metric(N) | U.S. (lbf) | Metric(N) | U.S. (lbf) | Metric(kN) | U.S. (lbf) | Metric(kN) | U.S.(lbf) | Metric(kN) |
| | 50 | 200 | 100, 150, 250 | 500, 700,1000 | 500, 750, 1K, 2K, 3K | 2, 5, 10 | 5K | 20 | 5K, 10K | 25, 50 |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.50 | 38.1 | 1.48 | 37.6 |
| (2) | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 | 2.50 | 63.5 | 2.98 | 75.7 |
| (3) | 2.50 | 63.5 | 2.50 | 63.5 | 3.00 | 76.2 | 3.50 | 88.9 | 3.98 | 101.1 |
| (4) | 0.25 | 6.40 | 0.25 | 6.40 | 0.50 | 12.7 | 0.75 | 19.1 | 0.74 | 18.8 |
| (5) | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 | 1.49 | 37.8 |
| (6) | 1/4-28 UNF-2B | M6 X 1-6H | 1/4-28 UNF-2B | M6 X 1-6H | 1/2-20 UNF-2B | M-12 X 1.75-6H | 5/8-18 UNF-2B | M16 X 2-6H | 0.750-16 UNF-2B | M20 X 1.5-6H |
| (7) | 1.88 | 47.8 | 1.88 | 47.8 | 1.88 | 47.8 | 2.38 | 60.5 | 2.88 | 73.2 |
| (8) | 0.82 | 20.8 | 0.72 | 18.3 | 1.22 | 31.0 | 1.75 | 44.5 | 1.67 | 42.4 |

Model SSM-ARS High Temperature S-Type Load Cell

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- 0.02% nonrepeatability
- 0.0008%/°F temp. effect on output
- 0.03% creep
- Tension and compression



STANDARD CONFIGURATION

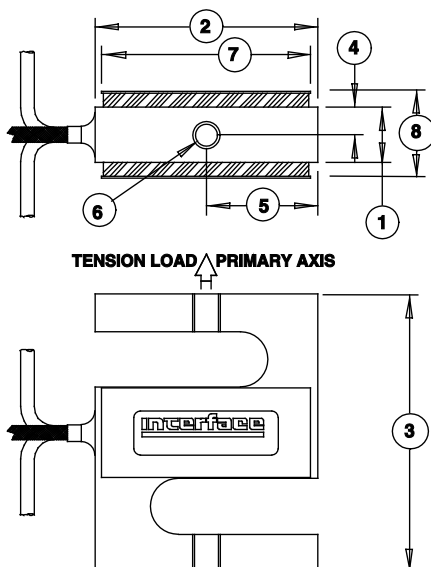
15 ft. Cable
High Temperature Operating Range -65 to 320°F

OPTIONS

LEMO Connector
Standardized Output
Extra Cable Length

ACCESSORIES

Instrumentation
Mounting Hardware



SPECIFICATIONS

| | | |
|---------------------------------|-----------------|--------------------|
| ACCURACY – (MAX ERROR) | | |
| Nonlinearity-% FS | ±0.05 | |
| Hysteresis-% FS | ±0.03 | |
| Nonrepeatability-% RO | ±0.02 | |
| Creep in 20 min-% | ±0.03 | |
| TEMPERATURE | | |
| Compensated Range-°F | 0 to 300 | |
| Compensated Range-°C | -20 to 150 | |
| Operating Range-°F | -65 to 320 | |
| Operating Range-°C | -50 to 160 | |
| Effect on Output-%/°F – MAX | ±0.0008 | |
| Effect on Output-%/°C – MAX | ±0.0015 | |
| Effect on Zero- % RO/°F – MAX | ±0.0008 | |
| Effect on Zero- % RO/°C – MAX | ±0.0015 | |
| ELECTRICAL | | |
| Rated Output-mV/V (Nominal) | 3 | |
| Zero Balance-%RO | ±1 | |
| Bridge Resistance-Ohm (Nominal) | 350 | |
| Excitation Voltage-MAX | 15 VDC | |
| Insulation Resistance-Megohm | >5000 | |
| MECHANICAL | | |
| Calibration | Tension | |
| Safe Overload-% CAP | 150 | |
| Cable Length-ft | 10 | |
| Natural Frequency/Deflection: | | |
| lbf | Deflection (in) | Nat. Freq. (Hertz) |
| 100 | .004 | 1850 |
| 150 | .004 | 1850 |
| 250 | .006 | 2350 |

DIMENSIONS

| | | |
|-------------|--------------------------|--|
| See Drawing | CAPACITY (lbf) | |
| | 100, 150, 250, 500, 1000 | |
| (1) | 0.50 | |
| (2) | 2.00 | |
| (3) | 2.50 | |
| (4) | 0.25 | |
| (5) | 1.00 | |
| (6) | 1/4-28 UNF-2B | |
| (7) | 1.88 | |
| (8) | 0.72 | |

SSMF Fatigue Rated S-Type Load Cell

- Fatigue-rated: 1×10^7 fully reversed cycles
- Proprietary Interface temperature compensated strain gages
- Capacities 25 to 2.5K lbf
- Environmentally sealed
- 0.02% nonrepeatability
- Near zero temp. effect on output – 0.0008%/°F (0.0015%/°C)
- Very low creep – 0.025%
- Tension and compression

STANDARD CONFIGURATION

10 ft. Integral cable or
PC04E-10-6P Connector (250 lbf & higher)

OPTIONS

Bayonet Connector (250 lbf & higher)
Standardized Output
Extra Cable Length

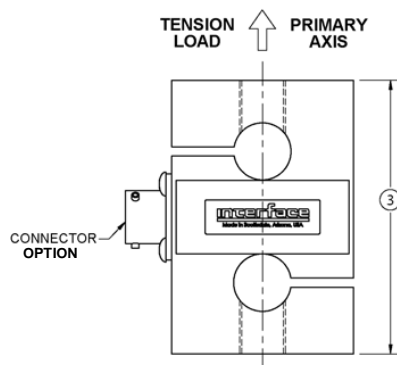
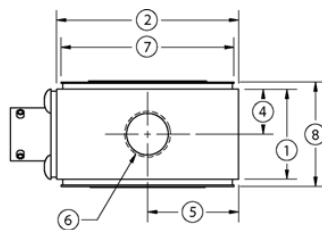
ACCESSORIES

Instrumentation
Mounting Hardware



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|---------------------------------|---|
| Nonlinearity–% FS | ±0.05 |
| Hysteresis–% FS | ±0.03 |
| Nonrepeatability–% RO | ±0.02 |
| Creep in 20 min–% | ±0.025 |
| TEMPERATURE | |
| Compensated Range–°F | 0 to 150 |
| Compensated Range–°C | -15 to 65 |
| Operating Range–°F | -65 to 200 |
| Operating Range–°C | -55 to 90 |
| Effect on Output–%/°F – MAX | ±0.0008 |
| Effect on Output–%/°C – MAX | ±0.0015 |
| Effect on Zero– % RO/°F – MAX | ±0.0015 |
| Effect on Zero– % RO/°C – MAX | ±0.0027 |
| ELECTRICAL | |
| Rated Output–mV/V (Nominal) | 1.5 |
| Zero Balance–%RO | ±1.0 |
| Bridge Resistance–Ohm (Nominal) | 350 |
| Excitation Voltage–MAX | 15 VDC |
| Insulation Resistance–Megohm | >5000 |
| MECHANICAL | |
| Calibration | T & C |
| Safe Overload–% CAP | 300 |
| Cable Length–ft | 10 |
| Deflection (inch) | .002 to .003 |
| Nat. Freq. (Hertz) | 1500 to 3300 |
| Fatigue-Rated | 1×10^7 Fully Reversed Loading Cycles |



DIMENSIONS

| See Drawing | CAPACITY | | | | | | | |
|-------------|----------------|------------|----------------|------------|----------------|---------------|----------------|-------------|
| | US (lbf) | Metric (N) | US (lbf) | Metric (N) | US (lbf) | Metric (kN) | US (lbf) | Metric (kN) |
| | 25 | 100 | 50 | 125 | 250 | 500 | 1K | 2.5K |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.50 | 38.1 |
| (2) | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 | 2.50 | 63.5 |
| (3) | 2.50 | 63.5 | 2.50 | 63.5 | 3.00 | 76.2 | 3.50 | 88.9 |
| (4) | 0.25 | 6.40 | 0.25 | 6.40 | 0.50 | 12.7 | 0.75 | 19.1 |
| (5) | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 |
| (6) | 1/4-28 UNF -2B | M6 x 1-6H | 1/4-28 UNF -2B | M6 x 1-6H | 1/2-20 UNF -2B | M12 x 1.75-6H | 5/8-18 UNF -2B | M16 x 2-6H |
| (7) | 1.88 | 47.8 | 1.88 | 47.8 | 1.88 | 47.8 | 2.38 | 60.5 |
| (8) | 0.82 | 20.8 | 0.72 | 18.3 | 1.22 | 31.0 | 1.75 | 44.5 |

Model SMT S-Type Overload Protected Load Cell (U.S. & Metric)

Why the Interface Model SMT S-Type Overload Protected Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Overload protected in both tension and compression
- Safe overload to 10X capacity
- Low creep
- 1 to 450 lbf
- High performance



STANDARD CONFIGURATION

5 ft Integral Cable

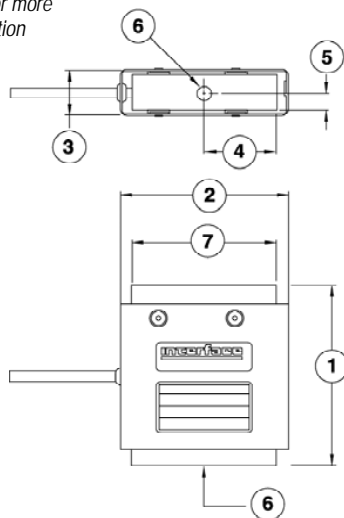
OPTIONS

Alternate Cable Length
Standardized Output

ACCESSORIES

Instrumentation
Mounting Hardware

Consult factory for more technical information

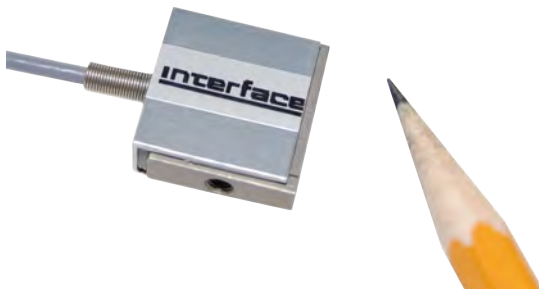


SPECIFICATIONS

| ACCURACY - (MAX ERROR) | | | |
|---|-------------|---------------------|--------------------|
| Nonlinearity-% FS | ±0.05 | | |
| Hysteresis-% FS | ±0.03 | | |
| Nonrepeatability-% RO | ±0.02 | | |
| Creep, in 20 min-% | ±0.025 | | |
| TEMPERATURE | | | |
| Compensated Range-°F | 0 to 125 | | |
| Compensated Range-°C | -15 to 50 | | |
| Operating Range-°F | -10 to 175 | | |
| Operating Range-°C | -25 to 80 | | |
| Effect on Output-%/°F - MAX | ±0.0010 | | |
| Effect on Output-%/°C - MAX | ±0.0018 | | |
| Effect on Zero- % RO/°F - MAX | ±0.0015 | | |
| Effect on Zero- % RO/°C - MAX | ±0.0027 | | |
| ELECTRICAL | | | |
| Rated Output-mV/V (nominal) | 2.0 | | |
| Zero Balance-%RO | ±3.0 | | |
| Bridge Resistance-Ohm (nominal) | 350 | | |
| Excitation Voltage-MAX | 15 VDC | | |
| Insulation Resistance-Megohm | >5000 | | |
| MECHANICAL | | | |
| Calibration | T & C | | |
| Safe Overload-% CAP (1.1, 2.2, 5.6, 11, 22, 56) (112, 225, 450) | 1000 500 | | |
| Cable Length-ft | 5 | | |
| Natural Frequency/Deflection: | | | |
| lbf | N | Deflection (inches) | Nat. Freq. (Hertz) |
| 1.1 | 5 | .014 | 100 |
| 2.2 | 10 | .012 | 160 |
| 5.6 | 25 | .011 | 260 |
| 11 | 50 | .009 | 380 |
| 22 | 100 | .007 | 600 |
| 56 | 250 | .006 | 900 |
| 112 | 500 | .007 | 600 |
| 225 | 1000 | .007 | 1200 |
| 450 | 2000 | .007 | 1500 |

DIMENSIONS

| See Drawing | CAPACITY | | | |
|-------------|-------------------------------|---------------------------|-------------------------------|-------------------------------|
| | SMT1 | | SMT2 | |
| | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) |
| | 1.1, 2.2, 5.6 11, 22, 56 | 5, 10, 25 50, 100, 250 | 112, 225 450 | 500, 1000 2000 |
| | inch | mm | inch | mm |
| (1) | 2.48 | 63.0 | 2.98 | 75.7 |
| (2) | 2.33 | 59.2 | 2.33 | 59.2 |
| (3) | 0.65 | 16.5 | 1.15 | 29.2 |
| (4) | 0.98 | 24.9 | 0.98 | 24.9 |
| (5) | 0.24 | 6.1 | 0.49 | 12.4 |
| (6) | 1/4-28 UNF-3B 0.31 deep | M6 x 1-6H 8.0 deep | 1/2-20 UNF-3B 0.57 deep | M12 x 1.75-6H 14.5 deep |
| (7) | 1.96 | 49.8 | 1.96 | 49.8 |



Model SMTM Micro S-Type Load Cell

- Capacities 5, 10, 25, & 50 lbf (20, 50, 100, & 200N)
- Calibrated for Tension & Compression
- Micro Sized 3/4" x 3/4" x 1/4" (19 x 19 x 7mm)
- Excellent Temperature Compensation (0.005% / °F Temp Effect on Output) (0.010% / °C Temp Effect on Output)
- Overload Protected Up to 8x Capacity

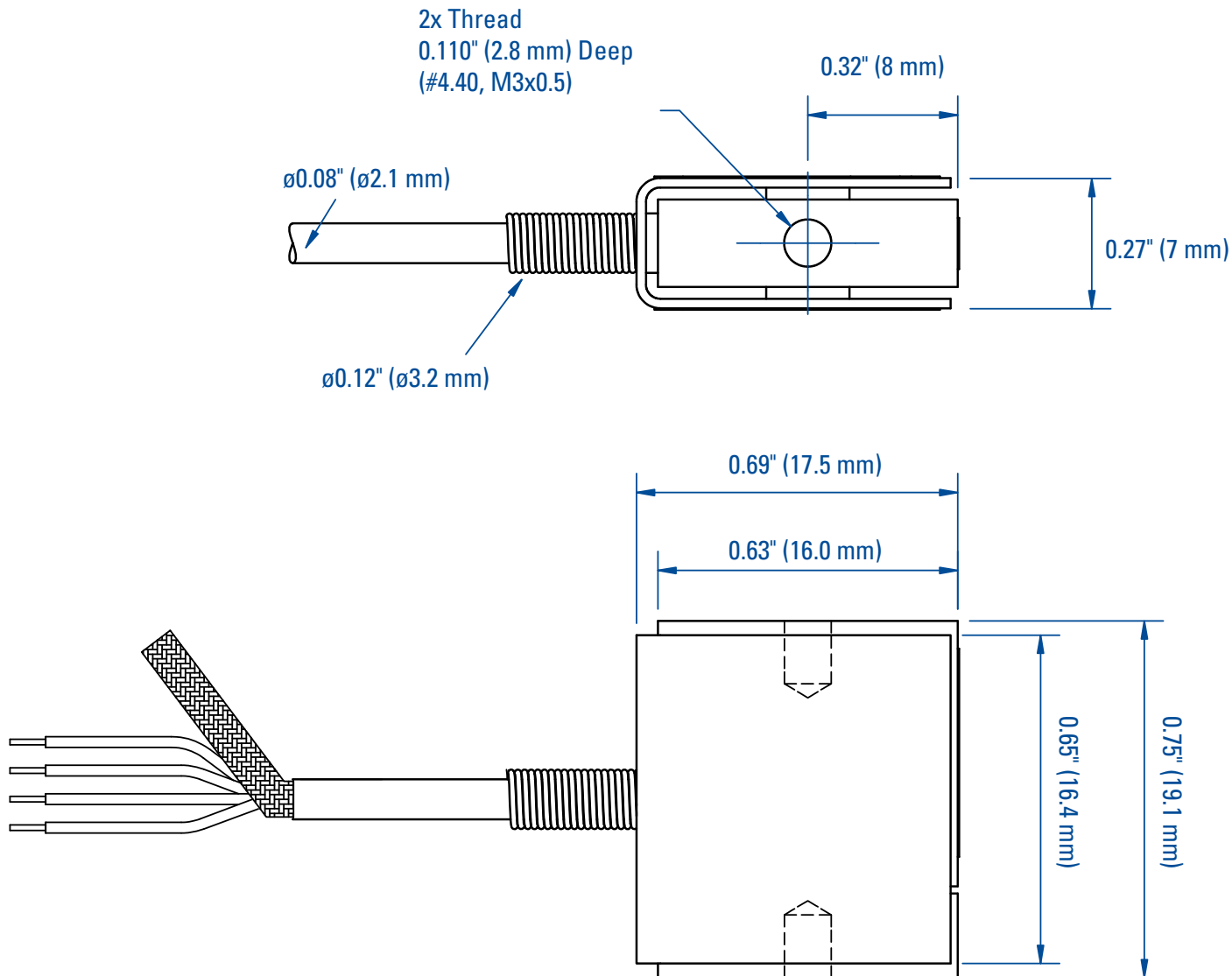
Specifications

| Model | SMTM | | | |
|--|------------------------|----------------|-----------------|-----------------|
| | 5 lbf 20 N | 10 lbf 50 N | 25 lbf 100 N | 50 lbf 200 N |
| Capacity | | | | |
| Accuracy -(Max Error) | | | | |
| Nonlinearity - %FS - Max | ±0.10 | | | |
| Hysteresis - %FS - Max | ±0.10 | | | |
| Nonrepeatability - %RO - Max | ±0.05 | | | |
| Creep, 20 Minutes - % - Max | ±0.10 | | | |
| Temperature | | | | |
| Compensated Range - °F (°C) | 0 to 150 (-15 to 65) | | | |
| Operating Range - °F (°C) | -29 to 200 (-34 to 90) | | | |
| Effect on Zero - %RO / 100°F - Max | ±0.5 | | | |
| Effect on Output - % / 100°F - Max | ±0.20 | | | |
| Electrical | | | | |
| Rated Output -mV/V (Nominal) | 2.00 ±0.20 | | | |
| Zero Balance - %RO - Max | ±2.0 | | | |
| Input Resistance -Ω | 350 +35 / -3.5 | | | |
| Output Resistance -Ω | 350 ±3.5 | | | |
| Excitation - VDC - Nominal | 5 | | | |
| Excitation - VDC or VAC - Max | 10 | | | |
| Insulation Resistance - MΩ - Min | 5K | | | |
| Mechanical | | | | |
| Symmetry Error - %RO - Max | ±0.2 | | | |
| Barometric Sensitivity | 0 | | | |
| Overload Ratings: | 8x | | | |
| Safe, Axial Load - % Capacity - Max ** | ±1000 | | | ±500 |
| Safe, Side Load - % Capacity - Max | 50, Any Direction | | | |
| Safe, Mounting Torque - in-lb - Max | 2 | 4 | 10 | 10 |
| Safe, Mounting Torque - Nm - Max | 0.23 | 0.45 | 1.13 | 1.13 |
| Deflection at Capacity - in - Nominal | 0.002 | | | 0.003 |
| Weight (With 5ft Cable) - lb | 0.04 | | 0.05 | |
| Flexure Material | Aluminum | | Stainless Steel | |

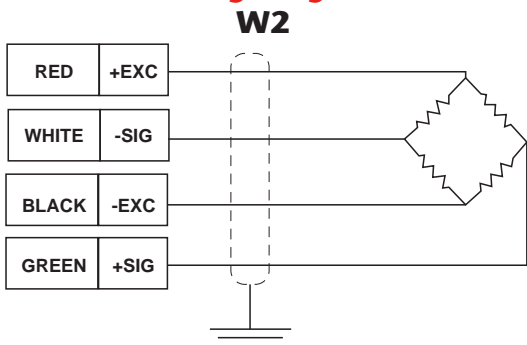
** FS. ≥ 3 at 50 lbf with min thread engagement = 8 turns

Specifications are subject to change without notice.

Dimensions

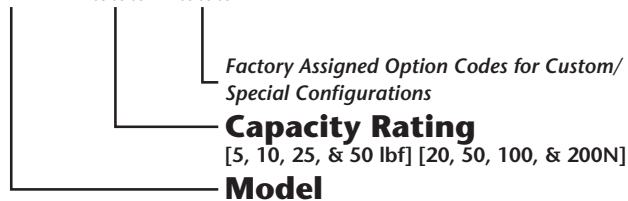


Wiring Diagram



Ordering Information

SMTM - xxx - xxx





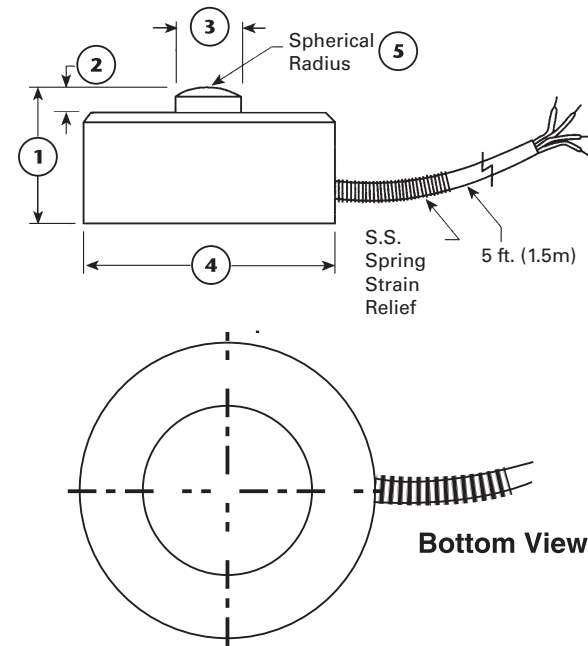
Model LBMU

Model LBMU High Accuracy Compression Load Button

- Capacities from 100 - 1K lbf
- Temperature Compensated
- Superior to Any Other Load Button
- Stainless Steel
- Enhanced Eccentric Load Rejection
- Low Power

Dimensions

Specifications



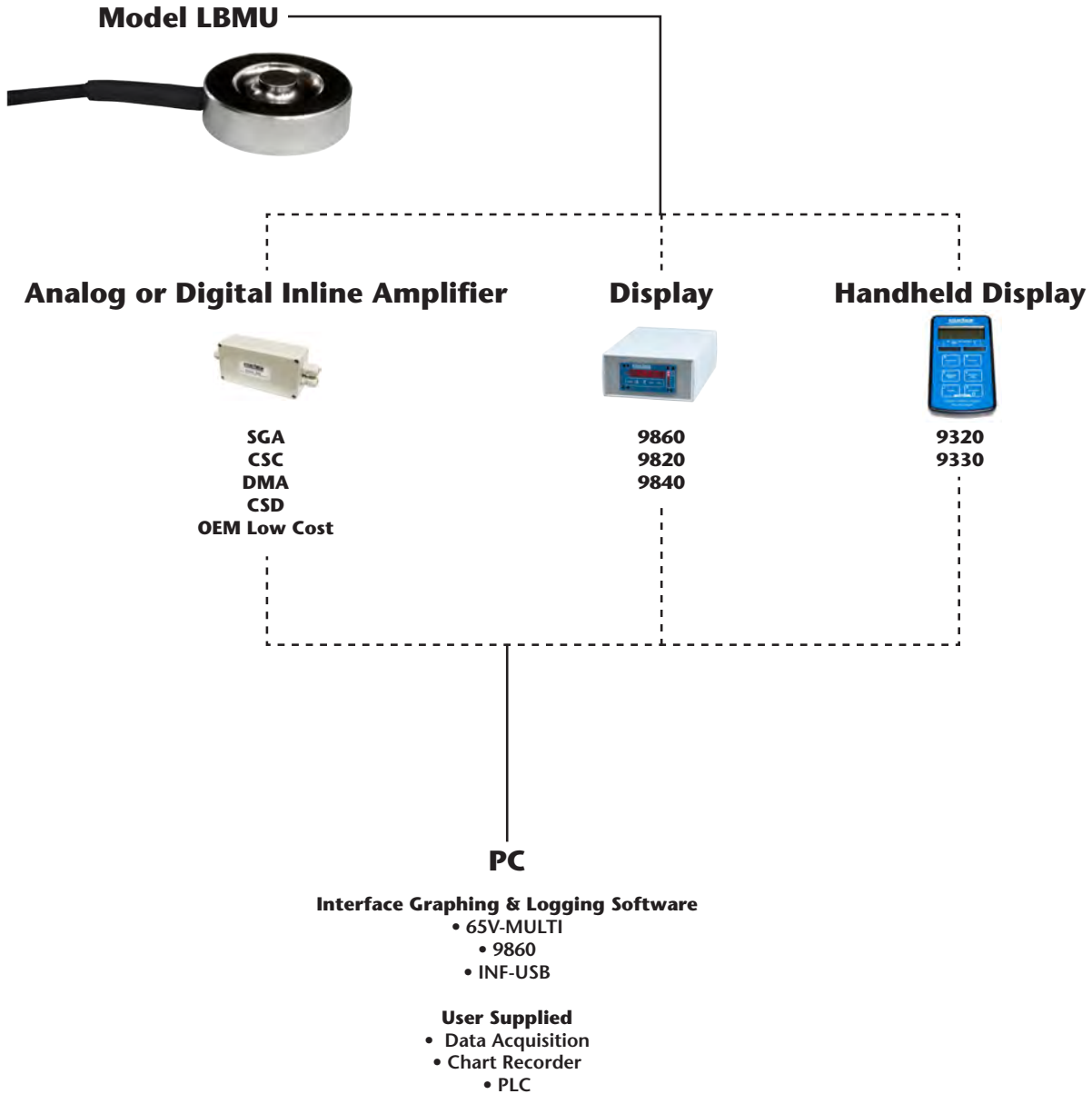
| Model | LBMU |
|--------------------------------|-----------------------------------|
| Capacity | US (lbf) 100, 250, 500, 1K |
| | Metric (kN) .45, 1.10, 2.20, 4.45 |
| Accuracy -(Max Error) | |
| Nonlinearity -%FS | ±0.15 |
| Hysteresis -%FS | ±0.15 |
| Nonrepeatability -%RO | ±0.05 |
| Temperature | |
| Compensated Range -°F | 70 to 170 |
| Compensated Range -°C | 20 to 75 |
| Operating Range -°F | -65 to 200 |
| Operating Range -°C | -55 to 90 |
| Effect On Zero -%RO/°F -Max | ±0.005 |
| Effect on Output -%/°F -Max | ±0.002 |
| Zero Balance -%FS | ±2 |
| Electrical | |
| Rated Output -mV/V (Nominal) | 2.0 |
| Bridge Resistance -Ω (Nominal) | 700 |
| Excitational Voltage | 5VDC |
| Mechanical | |
| Safe Overload -% CAP | 150 |
| Calibration | Compression |
| Ultimate Overload -% CAP | 300 |
| Deflection -in | 0.001 - 0.003 |
| Cable Length -ft | 5 |
| Cable Type | 4-Conductor |

| Model | LBMU | |
|----------|-------------------------|----------------------------|
| | US (Inch) | Metric (mm) |
| Capacity | 100, 250, 500, & 1K lbf | .45, 1.10, 2.20, & 4.45 kN |
| 1 | 0.39 | 9.91 |
| 2 | 0.07 | 1.78 |
| 3 | 0.32 | 8.13 |
| 4 | 1.25 | 31.75 |
| 5 | 1.50 | 38.10 |

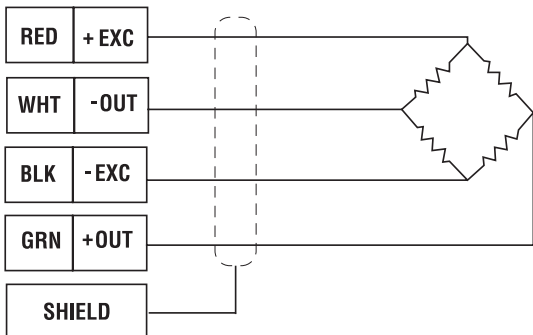
Specifications are subject to change without notice.

Custom Sizes and Capacities Available.

Sample System Overview



Wiring Diagram



Ordering Information

LBMU - xxx - xxx

Factory Assigned Option Codes for Custom/
Special Configurations

Capacity Rating (in lbf)
[100, 250, 500, 1K]

Model

Model LBM Compression Load Button

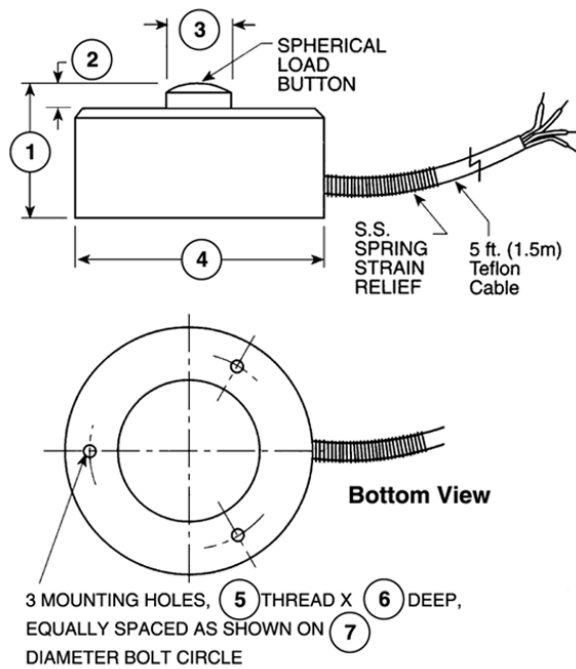
- Capacities from 25 to 50K lbf
- Temperature compensated
- Integral load button
- Small diameter
- Environmentally sealed
- Stainless steel



ACCESSORIES

Instrumentation

Consult factory for more technical information.



SPECIFICATIONS

| | |
|------------------------------------|-------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ±0.5 |
| Hysteresis-% FS | ±0.3 |
| Nonrepeatability-% RO | ±0.10 |
| TEMPERATURE | |
| Compensated Range-°F | 70 to 170 |
| Compensated Range-°C | 21 to 77 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -54 to 93 |
| Effect on Zero- % RO/°F – MAX | ±0.005 |
| Effect on Output-%/°F – MAX | ±0.005 |
| Zero Balance % FS | ±2 |
| ELECTRICAL | |
| Rated Output-mV/V (nominal) | 2.0 |
| Bridge Resistance-Ohm (nominal) | 350 |
| Excitation Voltage | 10 VDC |
| MECHANICAL | |
| Calibration | Comp. |
| Deflection | 0.001-0.003 |
| Safe Overload-% CAP | 150 |
| Ultimate Overload % of CAP | 300 |
| Cable Length-ft | 5 |
| 4-conductor Teflon insulated cable | |

DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | | | | | | | |
|-------------|----------------|-------|------------------|------|----------|------|----------|------|----------|------|
| | LBM Series | | | | | | | | | |
| | 25, 50, 100 | | 250, 500, 1K, 2K | | 5K, 10K | | 20K | | 50K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.62 | 15.7 | 0.39 | 9.90 | 0.63 | 16.0 | 1.0 | 25.4 | 1.50 | 38.1 |
| (2) | 0.05 | 1.30 | 0.07 | 1.80 | 0.08 | 2.00 | 0.12 | 3.00 | 0.18 | 4.60 |
| (3) | 0.21 | 5.30 | 0.32 | 8.10 | 0.43 | 10.9 | 0.60 | 15.0 | 0.78 | 19.8 |
| (4) | 1.00 | 25.4 | 1.25 | 31.8 | 1.50 | 38.1 | 2.00 | 50.8 | 3.00 | 76.2 |
| (5) | 4-40 UNC | | 6-32 UNC | | 6-32 UNC | | 6-32 UNC | | 6-32 UNC | |
| (6) | 0.19 | 4.83 | 0.25 | 6.35 | 0.25 | 6.35 | 0.25 | 6.35 | 0.25 | 6.35 |
| (7) | 0.75 | 19.00 | 1.00 | 25.4 | 1.25 | 31.8 | 1.63 | 41.3 | 2.38 | 60.3 |

Model LBS Miniature Compression Load Button

Why the Interface model LBS Miniature Compression Load Button is the best in class:

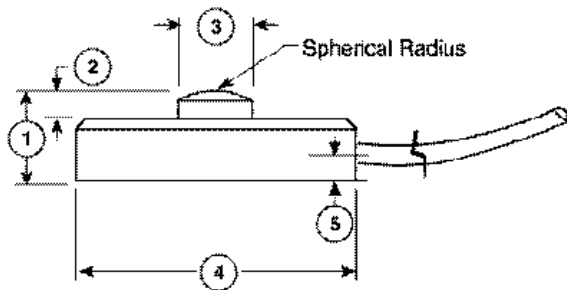
- Temperature compensated
- Integral load button
- Small diameter
- From .12" height



ACCESSORIES

Instrumentation

Consult factory for more technical information



SPECIFICATIONS

ACCURACY – (MAX ERROR)

Nonlinearity-% FS±0.50
Hysteresis-% FS±0.50
Nonrepeatability-% RO±0.10

TEMPERATURE

Compensated Range-°F60 to 160
Compensated Range-°C15 to 71
Operating Range-°F-65 to 225
Operating Range-°C-54 to 107
Effect on Zero-% RO/F – MAX±0.005
Zero Balance % FS±2

ELECTRICAL

Rated Output-mV/V (Nominal)2.0
Bridge Resistance-Ohm (Nominal)350
Excitation Voltage5 VDC
Excitation Voltage – MAX7 VDC

MECHANICAL

CalibrationCompression
Deflection0.001-0.003
Safe Overload-% CAP150
Ultimate Overload % of CAP300
Cable length-ft5
4-conductor Teflon insulated cable with temperature compensation board

DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | | | |
|-------------|----------------|------|----------|------|---------|------|
| | LBS Series | | | | | |
| | 5, 10, 25, 50 | | 100, 250 | | 500, 1K | |
| | inch | mm | inch | mm | inch | mm |
| ① | 0.12 | 3.00 | 0.15 | 3.80 | 0.25 | 6.4 |
| ② | 0.03 | 0.80 | 0.02 | 0.50 | 0.03 | 0.80 |
| ③ | 0.09 | 2.20 | 0.12 | 3.00 | 0.24 | 6.10 |
| ④ | 0.38 | 9.60 | 0.50 | 13.0 | 0.75 | 19.0 |
| ⑤ | 0.04 | 1.00 | 0.06 | 1.50 | 0.10 | 2.50 |

MSC Small Diameter High Capacity Load Button

- Proprietary Interface temperature compensated strain gages
- Small compact design
- Environmentally sealed
- Stainless steel construction
- Low deflection



STANDARD CONFIGURATION

5 ft. Integral Cable

OPTIONS

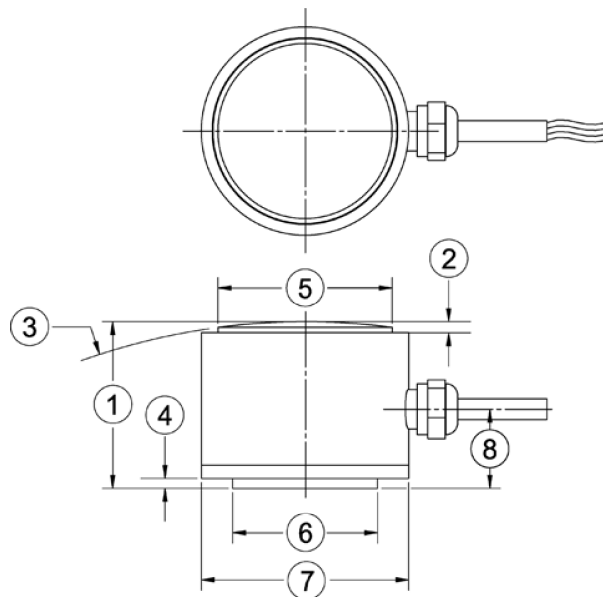
Extra Cable Length

ACCESSORIES

Instrumentation

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|---------------------------------|--------------|
| Nonlinearity–% FS | ±0.5 |
| Hysteresis–% FS | ±0.5 |
| Nonrepeatability–% RO | ±0.10 |
| Creep, in 20 min–% | ±0.15 |
| TEMPERATURE | |
| Compensated Range–°F | 40 to 140 |
| Compensated Range–°C | 5 to 60 |
| Operating Range–°F | -40 to 175 |
| Operating Range–°C | -40 to 80 |
| Effect on Output–%/°F–MAX | ±0.2 |
| Effect on Output–%/°C–MAX | ±0.005 |
| Effect on Zero–%/°F–MAX | ±0.5 |
| Effect on Zero–%/°C–MAX | ±0.002 |
| ELECTRICAL | |
| Rated Output–mV/V (Nominal) | 2 +40%/-20% |
| Zero Balance–% RO | ±2 |
| Bridge Resistance–Ohm (Nominal) | 350 +50/-3.5 |
| Excitation Voltage–MAX | 15 VDC |
| Insulation Resistance–Megohm | 5000 |
| MECHANICAL | |
| Calibration | Compression |
| Safe Overload - % CAP | 150 |
| Cable length–ft | 5 |



DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|---------------|----------------|
| | U.S. (lbf) | Metric (N) |
| | 15K, 20K, 30K | 65K, 90K, 130K |
| | inch | mm |
| (1) | 1.00 | 25.4 |
| (2) | 0.06 | 1.52 |
| (3) | R 4.0 ±.5 | 101.6 ±13 |
| (4) | 0.06 | 1.52 |
| (5) | 1.05 | 26.67 |
| (6) | 0.875 | 22.23 |
| (7) | 1.25 | 31.75 |
| (8) | .5 ±0.1 | 12.32 |

Model ULC Ultra Low Capacity Load Cell

Why the Interface model ULC Ultra Low Capacity Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Highest performance gram cell in the world
- Overload protected
- Safe side load overload to 5X capacity
- Low extraneous load sensitivity
- Low temperature effect on zero (0.002%/°F)
- Capacity down to 50 grams
- Tension and compression

STANDARD CONFIGURATION

5 ft Cable (ULC-nnN)

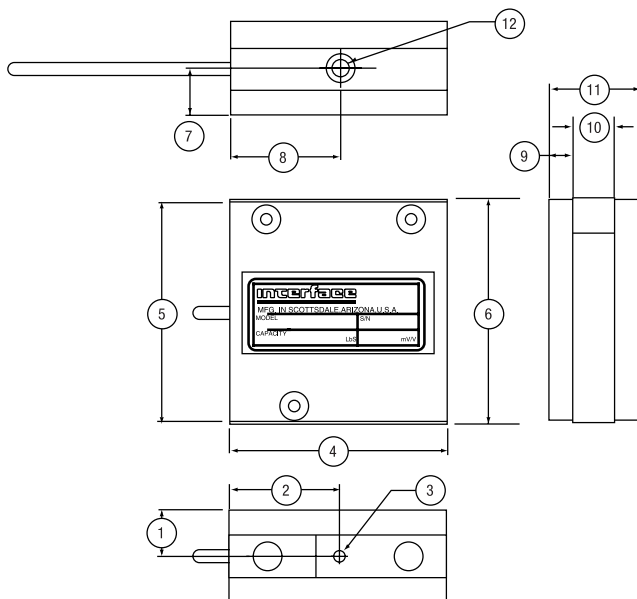
OPTIONS

Extra Cable Length

ACCESSORIES

Instrumentation

Consult factory for more technical information



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|---------------------------|------------|
| Nonlinearity-% FS |±0.05 |
| Hysteresis-% FS |±0.05 |
| Nonrepeatability-% RO |±0.05 |
| Creep, in 20 min-% (0.5N) |±0.1 |
| (All Others) |±0.05 |

TEMPERATURE

| | |
|------------------------------|-----------------|
| Compensated Range-°F |15 to 115 |
| Compensated Range-°C |-10 to 45 |
| Operating Range-°F |-65 to 200 |
| Operating Range-°C |-55 to 90 |
| Effect on Output-%/°F – MAX |±0.001 |
| Effect on Output-%/°C – MAX |±0.002 |
| Effect on Zero-% RO/°F – MAX |±0.002 |
| Effect on Zero-% RO/°C – MAX |±0.004 |

ELECTRICAL

| | |
|-----------------------------------|------------------|
| Rated Output-mV/V (Nominal)(0.5N) |±1.5 |
| (All Others) |±2.0 |
| Zero Balance-% RO (horiz.) |±2.0 |
| Input Resistance-Ohms |350+35/-3.5 |
| Output Resistance-Ohms |350±3.5 |
| Excitation Voltage – MAX |12 VDC |
| Insulation Resistance – Megohms |> 5000 |

MECHANICAL

| | |
|------------------------------------|--------------|
| Calibration |Tension |
| Safe Axial Overload-% CAP |±1000 |
| Safe Side Load Overload-% CAP |±500 |
| Safe Load Axis Moment-% CAP x 1 in |±500 |
| Cable length-ft |5 |

Natural Frequency/Deflection:

| N | Deflection (inches) | Nat. Freq. (Hertz) |
|-----|---------------------|--------------------|
| 0.5 | 0.011 | 120 |
| 1 | 0.011 | 125 |
| 2 | 0.008 | 200 |

DIMENSIONS

| See Drawing | CAPACITY (N)* | |
|-------------|------------------------------|------|
| | 0.5, 1, 2 | |
| | inch | mm |
| ① | 0.42 | 10.6 |
| ② | 0.99 | 25.1 |
| ③ | 4-40 UNC x 0.19 (4.8) Deep | |
| ④ | 1.98 | 50.3 |
| ⑤ | 1.96 | 49.8 |
| ⑥ | 2.00 | 50.8 |
| ⑦ | 0.42 | 10.6 |
| ⑧ | 0.99 | 25.1 |
| ⑨ | 0.23 | 5.8 |
| ⑩ | 0.38 | 9.5 |
| ⑪ | 0.84 | 21.2 |
| ⑫ | 1/4-28 UNF x 0.32 (8.1) Deep | |

*1 Newton = 102 gram force

Note: Other sizes are available – contact factory

Model LW Load Washer

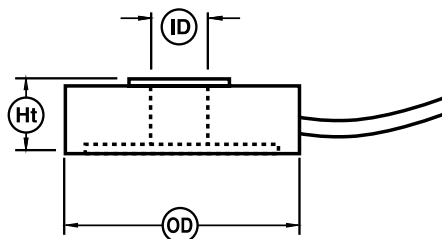
Why the Interface model LW Load Washer is the best in class:

- Capacities from 5 lbf to 100Klbf
- Wide selection of OD, ID, and height (as low as .25 in) combinations
- Stainless steel construction



SPECIFICATIONS

| PARAMETERS | MODEL | |
|--|------------------|--|
| | LW10xx LW12xx | LW15xx LW20xx LW25xx LW30xx LW31xx LW45xx |
| ACCURACY – (MAX ERROR) Combined Error-% FS | ±1.0 | ±0.5 |
| TEMPERATURE | | |
| Compensated Range-°F | 60 to 160 | |
| Compensated Range-°C | 16 to 71 | |
| Operating Range-°F | -65 to 250 | |
| Operating Range-°C | -54 to 121 | |
| Effect on Zero-%RO/°F – MAX | ±0.005 | |
| Effect on Zero-%RO/°C – MAX | ±0.009 | |
| ELECTRICAL | | |
| Rated Output-mV/V (Nominal) | 2.00 | |
| Bridge Resistance-Ohm (Nominal) | 350 | |
| Excitation Voltage – MAX | 15 VDC | |
| MECHANICAL | | |
| Safe Overload-% of RO | 150 | |
| Cable Length – ft | 5 | |
| Deflection @ R.O. – inch | .003 | |



(See dimensions on adjacent page)

OPTIONS

Special Cable Length

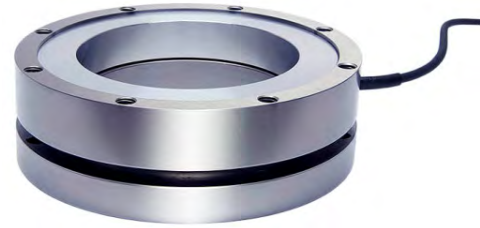
ACCESSORIES

Instrumentation

Consult factory for more technical information

Model LWPF1 Press Force Load Cell

- Capacities from 2 kN to 100 kN
- Short height
- Large thru-hole
- For press-force monitoring



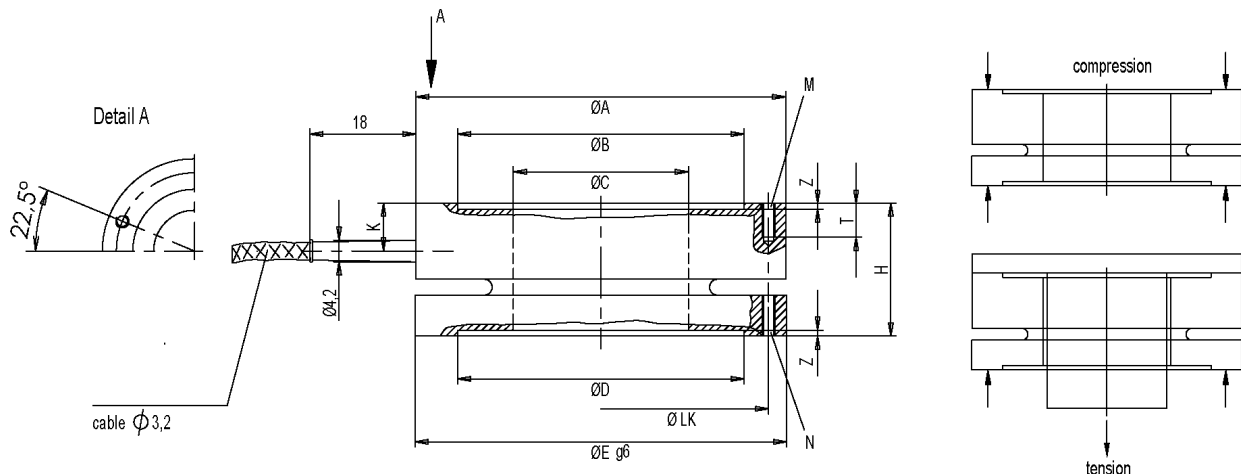
OPTIONS

Extended Temperature Range (-40°C to +150°C)
Internal Shunt Resistor – 100% output

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|-----------------------------------|---------------|
| Nonlinearity - %FS | +/-0.5 |
| Hysteresis - %FS | +/-0.5 |
| Nonrepeatability - % RO | +/-0.1 |
| Creep, in 30 min - % | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.02 |
| Compensated Range - °C | 0 to +60 |
| Operating Range - °C | -10 to +70 |
| ELECTRICAL | |
| Output – mV/V | 1 +/-20% |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 700 |
| Electrical Connection | 3-meter cable |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| Deflection at Rated Capacity - mm | <0.15 |
| Cyclic Load Rating - % RO | +/-70 Peak |
| IP Rating | 60 |

DIMENSIONS

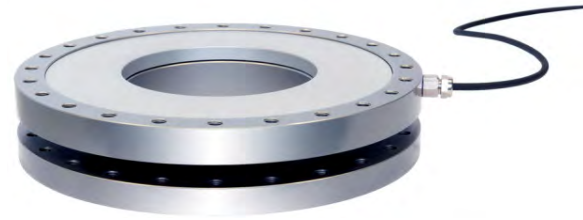


| Nominal Force [kN] | A | B | C | D | E | H | K | Z | M | T | LK | N |
|--------------------|-------|----|----|----|-----|----|----|-----|-------------|----|-----|-------------|
| 2 / 5 / 10 / 20 | 69.7 | 54 | 33 | 54 | 70 | 25 | 9 | 0.5 | M5, 8 x 45° | 6 | 62 | M5, 8 x 45° |
| 50 / 100 | 111.5 | 97 | 70 | 97 | 112 | 35 | 13 | 1.1 | M6, 8 x 45° | 10 | 104 | M6, 8 x 45° |

NOTE: Threaded mounting holes not intended for tension loading

Model LWPF2 Press Force Load Cell

- Capacities from 100 kN to 600 kN
- Short height
- Large thru-hole
- For press-force monitoring



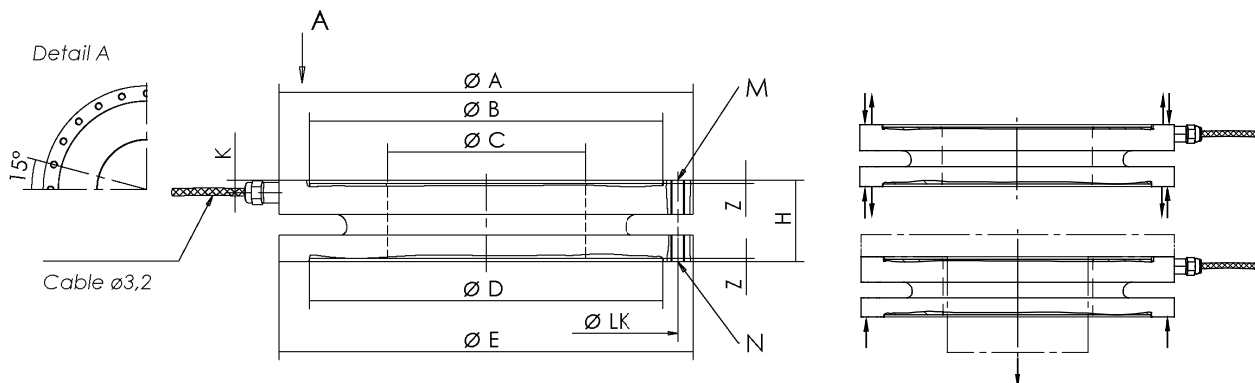
OPTIONS

Extended Temperature Range (-40°C to +150°C)
Internal Shunt Resistor – 100% output

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|-----------------------------------|---------------|
| Nonlinearity - %FS | +/-0.5 |
| Hysteresis - %FS | +/-0.5 |
| Nonrepeatability - % RO | +/-0.1 |
| Creep, in 30 min - % | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.02 |
| Compensated Range - °C | 0 to +60 |
| Operating Range - °C | -10 to +70 |
| ELECTRICAL | |
| Output – mV/V | 1 +/-20% |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 700 |
| Electrical Connection | 3-meter cable |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| Deflection at Rated Capacity - mm | <0.15 |
| Cyclic Load Rating - % RO | +/-70 Peak |
| IP Rating | 60 |

DIMENSIONS



| Nominal Force [kN] | A | B | C | D | E | H | K | Z | M | LK | N |
|--------------------|-----|-----|-----|-----|-----|----|------|---|----------|-----|----------|
| 100 | 178 | 152 | 85 | 152 | 178 | 35 | 5.4 | 1 | 24 x M6 | 165 | 24 x M6 |
| 200 | 196 | 170 | 120 | 170 | 196 | 35 | 7 | 1 | 24 x M8 | 182 | 24 x M8 |
| 300 | 258 | 226 | 180 | 226 | 258 | 35 | 8 | 1 | 24 x M10 | 242 | 24 x M10 |
| 400 | 258 | 226 | 170 | 226 | 258 | 45 | 8 | 1 | 24 x M12 | 242 | 24 x M12 |
| 600 | 320 | 266 | 205 | 266 | 320 | 60 | 12.5 | 1 | 24 x M16 | 290 | 24 x M16 |

Model WMC Miniature Sealed Stainless Steel Load Cell Capacities 5-500 lbf (22-2200N)

- Proprietary Interface temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed



STANDARD CONFIGURATION

5 ft. (1.5m) Integral Cable

OPTIONS

Extra Cable Length
Submersible

ACCESSORIES

Instrumentation

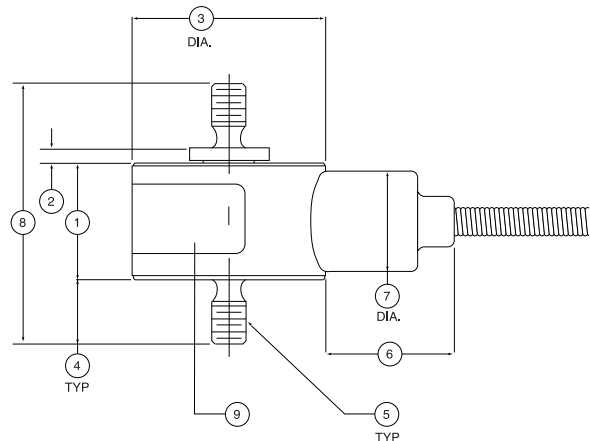
DIMENSIONS

| See Drawing | CAPACITY | | | | | |
|-------------|-----------------------|------|------------------------------------|------|------------------------------|------|
| | 5, 10 lbf 22, 45 N | | 25, 50, 100 lbf 110, 220, 450 N | | 250, 500 lbf 1100, 2200 N | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 0.45 | 11.4 | 0.52 | 13.2 | 0.53 | 13.4 |
| (2) | 0.06 | 1.5 | 0.03 | 0.8 | 0.03 | 0.8 |
| (3) | 0.75 | 19.1 | 1.00 | 25.4 | 1.00 | 25.4 |
| (4) | 0.25 | 6.4 | 0.25 | 6.4 | 0.38 | 9.7 |
| (5) | 6-32 UNC M4x0.7 | | 10-32 UNF M5x0.8 | | 1/4-28 UNF M6x1 | |
| (6) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| (7) | 0.39 | 9.9 | 0.39 | 9.9 | 0.39 | 9.9 |
| (8) | 1.01 | 25.7 | 1.05 | 26.7 | 1.32 | 33.5 |
| (9) | label | | label | | label | |

| Deflection @ RO - inch (mm) | | | | | | |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 5 | 10 | 25 | 50 | 100 | 250 | 500 |
| 0.0012 (0.030) | 0.0010 (0.025) | 0.0014 (0.036) | 0.0010 (0.025) | 0.0007 (0.018) | 0.0026 (0.066) | 0.0025 (0.064) |

SPECIFICATIONS

| | |
|---------------------------------|-------------------------------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ±0.15 |
| Hysteresis-% FS | ±0.15 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.05 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 250 |
| Operating Range-°C | -54 to 121 |
| Effect on Output-%/°F – MAX | ±0.002 |
| Effect on Zero- % RO/°F – MAX | ±0.005 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.0 |
| Zero Balance-%RO | ±2.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage-MAX | 12.0 VDC |
| Insulation Resistance-Megohm | > 5000 |
| MECHANICAL | |
| Calibration | T & C |
| Safe Overload-% CAP | |
| 5, 10 lbf (22, 45 N) | 150 |
| 25-500 lbf (110-2200 N) | 150 |
| Cable length | 5 ft. (1.5m) |
| Weight | 0.05 - 0.12 (lb) 22.7 - 54.4 (g) |



Model WMC Miniature Sealed Stainless Steel Load Cell Capacities 1K-10K lbf (4500-45000 N)

- Proprietary Interface temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed



STANDARD CONFIGURATION

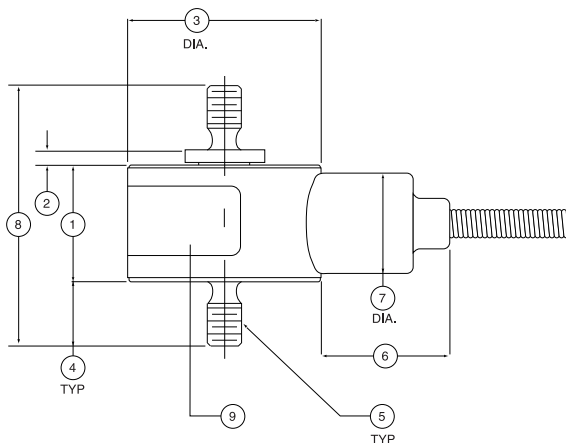
5 ft. (1.5m) Integral Cable

OPTIONS

Extra Cable Length

ACCESSORIES

Instrumentation



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|---------------------------------|----------------------------------|
| Nonlinearity-% FS | ±0.20 |
| Hysteresis-% FS | ±0.20 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.05 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 250 |
| Operating Range-°C | -54 to 121 |
| Effect on Output-%/°F – MAX | ±0.002 |
| Effect on Zero-% RO/°F – MAX | ±0.005 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.0 |
| Zero Balance-%RO | ±2.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage-MAX | 15.0 VDC |
| Insulation Resistance-Megohm | > 5000 |
| MECHANICAL | |
| Calibration | T & C |
| Safe Overload-% CAP | 150 |
| Cable length | 5 ft. (1.5m) |
| Weight | 0.13-0.50 (lb) 59.0-226.8 (g) |

DIMENSIONS

| See Drawing | CAPACITY | | | | | | | |
|-----------------|-----------------------|------|-------------------------|------|--------------------------|------|---|------|
| | 1K lbf (4.5 kN) | | 2K, 3K lbf (9, 13 kN) | | 5K lbf (22 kN) | | 7.5K, 10K lbf (33, 45 kN) | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.53 | 13.4 | 0.72 | 18.3 | 0.94 | 23.9 | 1.09 | 27.7 |
| (2) | 0.03 | 0.8 | 0.03 | 0.8 | 0.03 | 0.8 | 0.03 | 0.8 |
| (3) | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 | 1.38 | 34.9 |
| (4) | 0.38 | 9.7 | 0.50 | 12.7 | 0.63 | 16.0 | 0.88 | 22.4 |
| (5) | 0.250-28 UNF M6x1 | | 0.375-24 UNF M10x1.5 | | 0.500-20 UNF M12x1.75 | | 0.750-16 UNF M16x2 | |
| (6) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| (7) | 0.39 | 9.9 | 0.39 | 9.9 | 0.39 | 9.9 | 0.39 | 9.9 |
| (8) | 1.32 | 33.5 | 1.75 | 44.5 | 2.23 | 56.6 | 2.88 | 73.2 |
| (9) | label | | label | | label | | label | |
| Deflection @ RO | 0.0022 in 0.056 mm | | 0.0020 in 0.051 mm | | 0.0017 in 0.043 mm | | 0.0016 in (7.5K) 0.041 mm 0.0015 in (10K) 0.038 mm | |

Model WMCFP Miniature Sealed Stainless Steel Load Cell

Why the Interface model WMC Miniature Sealed Stainless Steel Load Cell is the best in class:

- Capacities from 500 to 1000g
- Proprietary Interface temperature compensated strain gages
- Tension and compression
- Environmentally sealed
- Overload protected to 8x capacity



STANDARD CONFIGURATION

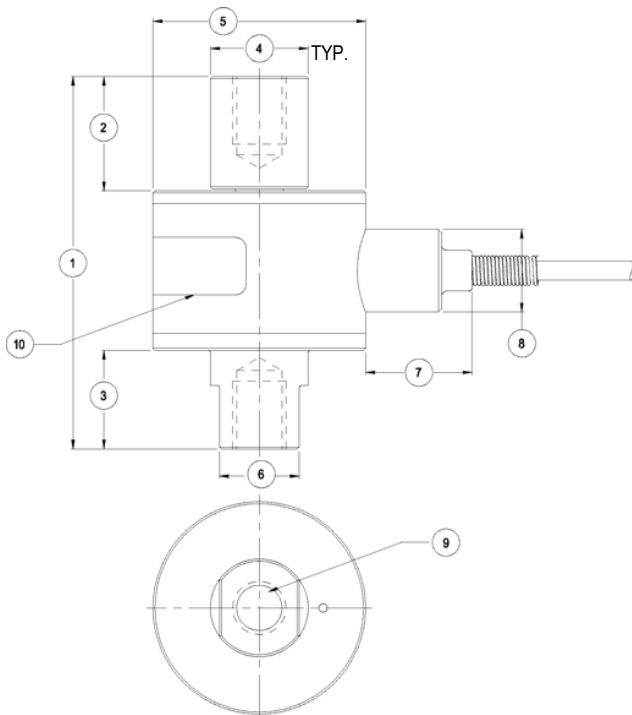
5 ft. Integral Cable

OPTIONS

Extra Cable Length

ACCESSORIES

Instrumentation



SPECIFICATIONS

| | |
|---------------------------------|---------------------------------|
| ACCURACY – MAX | |
| Nonlinearity-% FS | ±0.20 |
| Hysteresis-% FS | ±0.20 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.05 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 250 |
| Operating Range-°C | -54 to 121 |
| Effect on Output-%/°F – MAX | ±0.002 |
| Effect on Zero- % RO/°F – MAX | ±0.005 |
| ELECTRICAL | |
| Rated Output-mV/V (nominal) | 2.0 |
| Zero Balance-%RO | ±2.0 |
| Bridge Resistance-Ohm (nominal) | 350 |
| Excitation Voltage-MAX | 15 VDC |
| Insulation Resistance-Megohm | >5000 |
| MECHANICAL | |
| Calibration | Tension |
| Safe Overload-% CAP | 800 |
| Cable Length-ft | 5 |
| Deflection @ RO - inch | 0.0005 (500g) 0.0010 (1000g) |
| Weight-lb | 0.2 |

DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|--------------------------------|------|
| | 500g, 1000g | |
| | inch | mm |
| (1) | 1.75 | 44.5 |
| (2) | 0.52 | 13.2 |
| (3) | 0.52 | 13.2 |
| (4) | 0.46 | 11.7 |
| (5) | 1.00 | 25.4 |
| (6) | 0.38 | 9.5 |
| (7) | 0.50 | 12.7 |
| (8) | 0.39 | 9.9 |
| (9) | 0.250-28 UNF X 0.32 Deep | |
| (10) | Model, Capacity, Serial Number | |

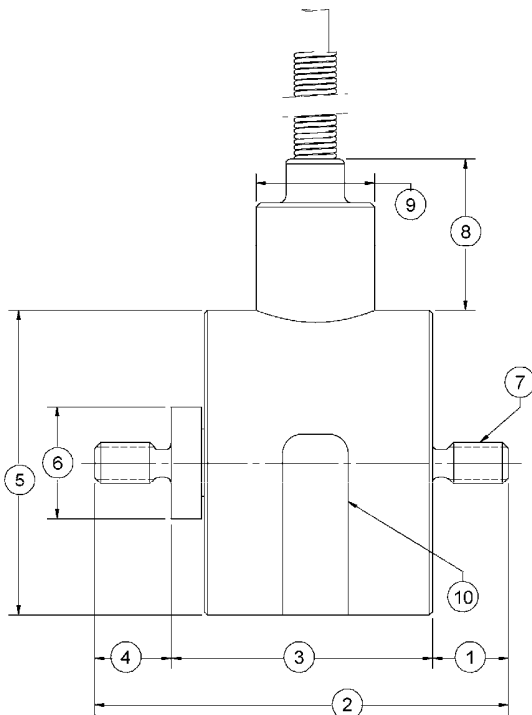
Model WMCP Stainless Steel Load Cell

- Capacities from 500 to 1000g
- Proprietary Interface temperature compensated in gages
- Tension and compression
- Small size
- Environmentally sealed
- Overload protected to 8x capacity



DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|--------------------------------|------|
| | 500g, 1000g | |
| | inch | mm |
| (1) | 0.25 | 6.4 |
| (2) | 1.36 | 34.5 |
| (3) | 0.86 | 21.9 |
| (4) | 0.25 | 6.4 |
| (5) | 1.00 | 25.4 |
| (6) | 0.37 | 9.4 |
| (7) | # 6 - 32 UNC-3A (Both Ends) | |
| (8) | 0.50 | 12.7 |
| (9) | 0.39 | 9.9 |
| (10) | Model, Capacity, Serial Number | |



SPECIFICATIONS

| CAPACITY | 500g | 1000g |
|---------------------------------|--------------|--------------|
| ACCURACY – MAX | | |
| Nonlinearity-% FS | ±0.15 | ±0.15 |
| Hysteresis-% FS | ±0.15 | ±0.15 |
| Nonrepeatability-% RO | ±0.15 | ±0.1 |
| Creep, in 20 min-% | ±0.1 | ±0.05 |
| TEMPERATURE | | |
| Compensated Range-°F | 50 to 150 | 50 to 150 |
| Compensated Range-°C | 10 to 66 | 10 to 66 |
| Operating Range-°F | -65 to 250 | -65 to 250 |
| Operating Range-°C | -54 to 121 | -54 to 121 |
| Effect on Output-%/°F – MAX | ±0.20 | ±0.20 |
| Effect on Zero-% RO/°F – MAX | ±2.00 | ±1.00 |
| ELECTRICAL | | |
| Rated Output-mV/V (nominal) | .75 ±0.15 | 1.50 ±0.30 |
| Zero Balance-%RO | ±2.0 | ±2.0 |
| Bridge Resistance-Ohm (nominal) | 350 ±3.5 | 350 ±3.5 |
| Excitation Voltage-MAX | 7 VDC or VAC | 7 VDC or VAC |
| Insulation Resistance-Megohm | 5000 | 5000 |
| MECHANICAL | | |
| Calibration | Tension | Tension |
| Safe Overload-% CAP | 1600 | 800 |
| Cable Length-ft | 5 | 5 |
| Deflection @ RO - inch | 0.005 | 0.010 |
| Weight-lb | 0.2 | 0.2 |

STANDARD CONFIGURATION

5 ft. Integral Cable

OPTIONS

Extra Cable Length

ACCESSORIES

Instrumentation

Model WMC Rod End Load Cell

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- Stainless steel construction
- Low deflection
- Tension & Compression



STANDARD CONFIGURATION

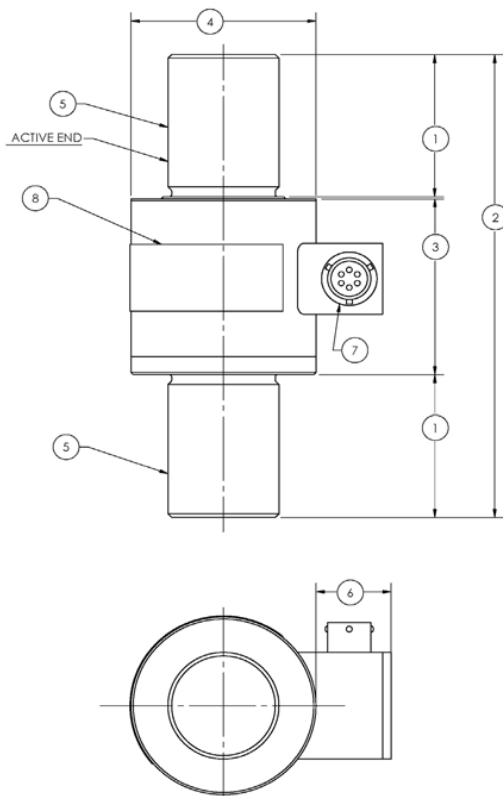
PTWIH-10-6P Connector

OPTIONS

Integral Cable
Standardized Output
Amplifier

ACCESSORIES

Instrumentation



SPECIFICATIONS

| Capacity | 15K, 20K, 30K, & 50K lbf 90, 130, & 220 kN | 100K lbf 450 kN | 200K lbf 900 kN |
|---------------------------------|---|--------------------|--------------------|
| Nonlinearity-% FS | ±0.10 | ±0.15 | ±0.20 |
| Hysteresis-% FS | ±0.10 | ±0.15 | ±0.20 |
| Nonrepeatability-% RO | ±0.05 | | |
| Creep, in 20 min-% | ±0.05 | | |
| TEMPERATURE | | | |
| Compensated Range-°F | 15 to 115 | | |
| Compensated Range-°C | -10 to 45 | | |
| Operating Range-°F | -65 to 250 | | |
| Operating Range-°C | -54 to 121 | | |
| Effect on Output-%/°F-MAX | ±0.004 | ±0.005 | ±0.005 |
| Effect on Output-%/°C-MAX | ±0.0072 | ±0.009 | ±0.009 |
| Effect on Zero-% RO/°F-MAX | ±0.0025 | ±0.005 | ±0.005 |
| Effect on Zero-% RO/°C-MAX | ±0.0045 | ±0.009 | ±0.009 |
| ELECTRICAL | | | |
| Rated Output-mV/V (nominal) | 2.0 | | |
| Zero Balance-%RO | ±1.0 | | |
| Bridge Resistance-Ohm (nominal) | 350 ±3.5 | | |
| Excitation Voltage-MAX | 15 VDC | | |
| Insulation Resistance-Megohm | >5000 | | |
| MECHANICAL | | | |
| Calibration | T & C | | |
| Safe Overload-% CAP | 150 | | |
| Deflection @ RO | 0.004(in) 0.10(mm) | 0.004 | 0.004 |
| Weight-lb | 4(lb) 1.8(kg) | 14 | 34.4 |

DIMENSIONS

| See Drawing | CAPACITY | | | | | |
|-------------|---|-------|--------------|--------|-------------|--------|
| | 15K, 20K, 30K, 50K lbf 90, 130, 220 (kN) | | 100K lbf | | 200K lbf | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 2.00 | 50.8 | 3.00 | 76.20 | 4.00 | 101.60 |
| (2) | 6.5 | 165.1 | 10.00 | 254.00 | 13.00 | 330.20 |
| (3) | 2.47 | 62.7 | 3.97 | 100.84 | 4.97 | 126.24 |
| (4) | 2.5 | 63.5 | 3.50 | 88.90 | 4.47 | 113.54 |
| (5) | 1.5 - 12 UNF M36 X 4 | | 2.50 - 12 UN | | 3.50 - 8 UN | |
| (6) | 1.01 | 25.7 | 1.28 | 32.51 | 1.36 | 34.54 |
| (7) | PTWIH-10-6P Connector | | | | | |
| (8) | label | | | | | |

Model REC Rod End Load Cell

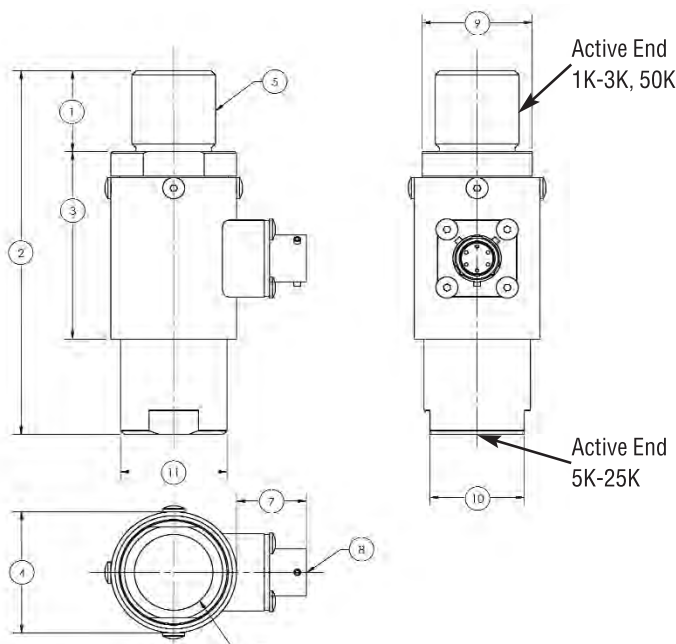
Why the Interface model REC Rod End Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- Stainless steel construction (1K, 5 kN aluminum)
- Low deflection



DIMENSIONS

| See Drawing | CAPACITY | | | | | | | |
|-------------|----------------------------|-------------|----------------------------|-------------|----------------------------|-------------|-----------------------------|-------------|
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 1K, 2K, 3K | 5, 10, 13 | 5K, 10K | 22, 45 | 15K 20K 25K | 67 90 110 | 50K | 220 |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 | 1.50 | 38.1 |
| ② | 4.25 | 108 | 4.50 | 114.3 | 4.50 | 114.3 | 7.00 | 177.8 |
| ③ | N/A | N/A | 2.32 | 58.9 | 2.32 | 58.9 | N/A | N/A |
| ④ | N/A | N/A | ∅ 1.50 | ∅ 38.1 | ∅ 1.73 | ∅ 43.9 | N/A | N/A |
| ⑤ | .750-16 UNF-3A | | 1.00-14 UNS-2A | | 1.00-14 UNS-2A | | 1.500-12 UNF-2A | |
| ⑥ | .750-16 UNF-2B X .88" deep | | 1.00-14 UNS-2B X 1.0" deep | | 1.00-14 UNS-2B X 1.0" deep | | 1.500-12 UNF-2B X 1.5" deep | |
| ⑦ | .83 | 21.1 | .83 | 21.1 | .85 | 21.6 | .71 | 18 |
| ⑧ | PT02E-10-6P Connector | | PT02E-10-6P Connector | | PT02E-10-6P Connector | | PT02E-10-6P Connector | |
| ⑨ | 1.13 | 28.7 | 1.31 | 33.3 | 1.50 | 38.1 | 1.75 | 44.5 |
| | Wrench Flats | | Wrench Flats | | Wrench Flats | | Wrench Flats | |
| ⑩ | 1.31 | 33.3 | 1.13 | 28.7 | 1.31 | 33.3 | 2.25 | 57.2 |
| | Wrench Flats | | Wrench Flats | | Wrench Flats | | Wrench Flats | |
| ⑪ | 1.50 | 38.1 | ∅ 1.27 | ∅ 32.3 | ∅ 1.50 | ∅ 38.1 | ∅ 2.50 | ∅ 63.5 |



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|-------------------------|-------|
| Nonlinearity - % FS | ±0.25 |
| Hysteresis - % FS | ±0.15 |
| Nonrepeatability - % FS | ±0.05 |

TEMPERATURE

| | |
|--------------------------|------------|
| Compensated Range - °F | 60 to 160 |
| Compensated Range - °C | 15 to 72 |
| Operating Range - °F | -60 to 200 |
| Operating Range - °C | -50 to 93 |
| Effect on Output - %/°F | ±0.005 |
| Effect on Output - %/°C | ±0.01 |
| Effect on Zero - % RO/°F | ±0.005 |
| Effect on Zero - % RO/°C | ±0.01 |

ELECTRICAL

| | |
|-----------------------------------|--------|
| Rated Output- mV/V (nominal) | 2 |
| Zero Balance - %RO | ±3 |
| Bridge Resistance – Ohm (nominal) | 350 |
| Excitation Voltage – MAX | 15 VDC |

MECHANICAL

| | |
|----------------------|-------------|
| Calibration | T & C |
| Safe Overload - % RO | 150 |
| Deflection | 0.001 inch |
| Connector | PT02E-10-6P |

STANDARD CONFIGURATION

PT02E-10-6P Connector
5K-50K: MS3102E-14-5P Connector optional

OPTIONS

Integral Cable
Standardized Output

ACCESSORIES

Instrumentation
Mating Connector PT06A-10-6S-SR

Consult factory for more technical information

Model 3400 Intrinsically Safe Load Cell

- Stainless steel construction
- Sealed connector
- IP68 environmental protection
- Internally amplified 4-20 mA output, loop-powered
- Unipolar (T or C) or bipolar (T and C)
- Zero and span adjustment access
- CE certified
- Explosion protection by Intrinsic Safety (approval pending) per ATEX designation: II 2 G Ex ib IIC T4



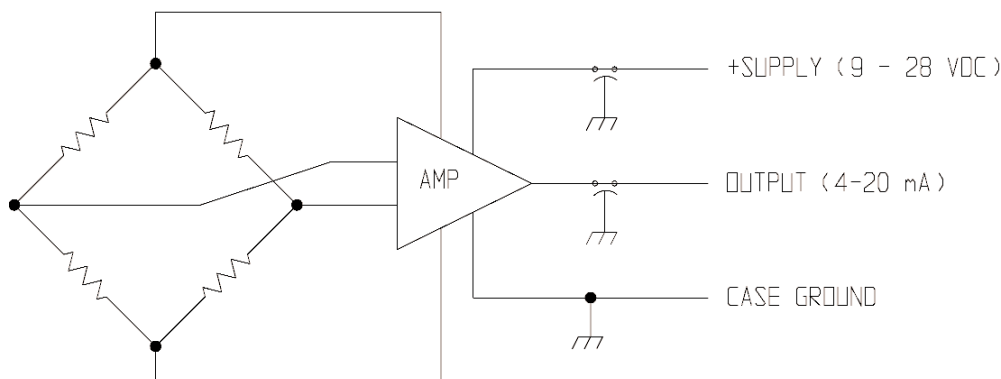
Specially designed load cells with loop-powered intrinsically safe amplified output for use in oil field and other hazardous locations. These load cells are derived from other proven Interface models by adding high resistance strain gages for low-current loop power and shielded internal amplifier for extra low emissions and minimal EMI susceptibility.

SPECIFICATIONS

| PARAMETERS | ALL MODELS |
|-------------------------------|---|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ±0.10* |
| Hysteresis-% FS | ±0.08* |
| TEMPERATURE | |
| Compensated Range-°F | 0 to 150 |
| Compensated Range-°C | -18 to 65 |
| Operating Range-°F | -40 to 200 |
| Operating Range-°C | -40 to 93 |
| Zero Balance | 4.00 ±0.10 mA Unipolar 12.00 ±0.10 mA Bipolar |
| Rated Output | 16.000 ±0.016 mA Unipolar ±8.000 ±0.008 mA Bipolar |
| ELECTRICAL | |
| Excitation Range | +9 to +28 VDC |
| Maximum Loop Resistance | 0 ohm @ 9VDC Excitation 950 ohm @ 28VDC Excitation |

*Some capacities of some models have higher performance specifications, contact factory for details.

Functional Diagram, Model 3400



Model 3400 Intrinsically Safe Load Cell

The Model 3400 is a family of load cells of various mechanical configurations, all with the same internal 4–20 mA loop-powered amplifier and 4000-5000 ohm strain gage bridge.

All load cells in the family are intrinsically safe when installed per the installation manual and are certified as such by the following Notified Body:

**Physikalisch-Technische Bundesanstalt
Braunschweig, Germany**

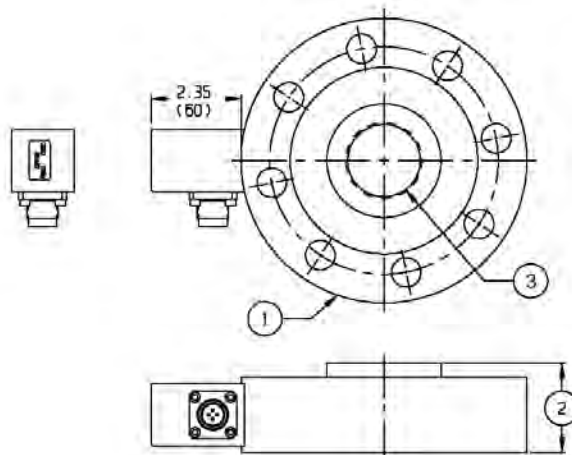
Intrinsic Safety is an explosion protection technique that ensures that a circuit operating in an explosive atmosphere cannot cause ignition. This is done by limiting the electrical and thermal energy in the load cell. The 3400 protection is for Zone 1 and the ATEX designation is:

II 2 G Ex ib IIC T4

Specific Models 3401 through 3499 are unique in being constructed in accordance with the certified circuit. Configurations for mechanical connections and force capacities are created to fit individual applications. The following are representative of specific models.

Tension - Compression Low Profile Type

| Dimensions See Drawing | MODEL | | | | | | | |
|------------------------------|-------------------|------|---------------|------|-------------|-------|-----------------|-------|
| | 3410 | | 3412 | | 3414 | | 3416 | |
| | CAPACITY (lbf) | | | | | | | |
| | 100, 250, 500, 1K | | 2K, 5K | | 10K | | 20K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 3.00 | 76.2 | 3.50 | 88.9 | 5.50 | 140.0 | 6.00 | 152.0 |
| (2) | 1.70 | 43.2 | 1.70 | 43.2 | 1.80 | 45.7 | 1.80 | 45.7 |
| (3) | 3/8-24 UNF-3B | | 1/2-20 UNF-3B | | 1-14 UNF-3B | | 1 1/2-12 UNF-3B | |



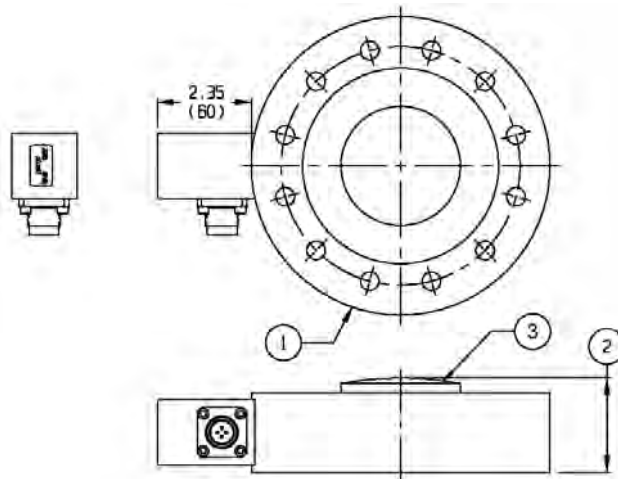
Tension - Compression Low Profile Type

| Dimensions See Drawing | MODEL | | | | | | | |
|------------------------------|----------------|-------|---------------|-------|-----------------|-------|-----------------|-------|
| | 3420 | | 3430 | | 3422 | | 3432 | |
| | CAPACITY (lbf) | | | | | | | |
| | 30K, 40K, 50K | | 25K, 50K, 60K | | 10K, 25K, 50K | | 100K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 7.5 | 190.5 | 8.00 | 203.2 | 6.06 | 153.9 | 8.00 | 203.2 |
| (2) | 2.00 | 50.8 | 2.50 | 63.5 | 1.75 | 44.4 | 2.50 | 63.5 |
| (3) | 2-12 UN-2B | | 2-12 UN-2B | | 1-1/4-12 UNF-3B | | 1 3/4-12 UNF-3B | |

Model 3400 Intrinsically Safe Load Cell

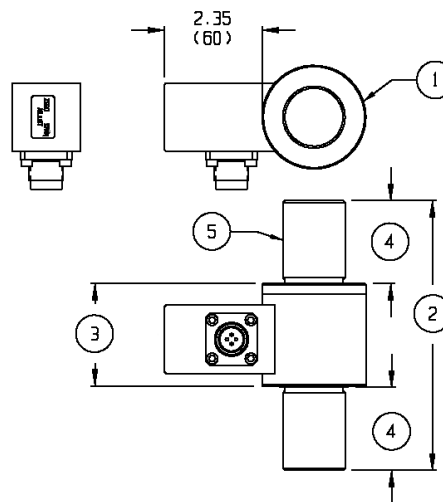
Compression Low Profile Type

| Dimensions See Drawing | MODEL (kN) | | | | | |
|------------------------------|-------------------------|-------|-------------------------|-------|--------------------------|-------|
| | 3421 | | 3431 | | 3441 | |
| | CAPACITY (lbf) | | | | | |
| | 10K, 25K, 50K | | 100K | | 200K | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 4.75 | 120.7 | 7.50 | 190.5 | 8.25 | 210.0 |
| (2) | 1.75 | 44.4 | 2.00 | 50.8 | 3.25 | 82.5 |
| (3) | 6.0 (152) sph radius | | 8.0 (203) sph radius | | 12.0 (305) sph radius | |

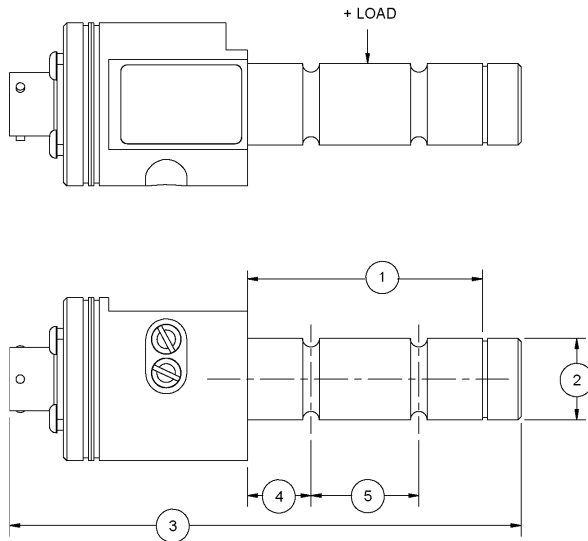


Tension-Compression Column Type

| Dimensions See Drawing | MODEL | |
|------------------------------|--------------------|------|
| | 3450 | |
| | 10K, 20K, 30K, 50K | |
| | inch | mm |
| (1) | 2.50 | 63.5 |
| (2) | 6.50 | 165 |
| (3) | 2.47 | 62.7 |
| (4) | 2.00 | 50.8 |
| (5) | 1 1/2-12 UNF-2A | |



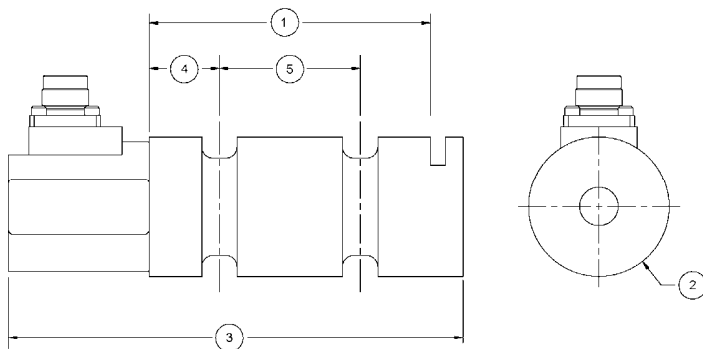
Load Pin Type – Model 3461



Dimensions

| See Drawing | CAPACITY (lbf) | | | | | | | | | |
|-------------|----------------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| | 2K | | 5K | | 10K | | 20K | | 30K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 1.75 | 44.5 | 2.18 | 55.4 | 2.26 | 57.4 | 3.00 | 76.2 | 3.51 | 89.2 |
| (2) | .500 | 12.70 | .750 | 19.05 | 1.000 | 25.40 | 1.250 | 31.75 | 1.500 | 38.10 |
| (3) | 4.5 | 114 | 5.0 | 127 | 5.5 | 140 | 6.0 | 152 | 6.5 | 165 |
| (4) | .50 | 12.7 | .59 | 15.0 | .63 | 16.0 | .81 | 20.6 | .94 | 23.9 |
| (5) | .75 | 19.1 | 1.00 | 25.4 | 1.00 | 25.4 | 1.38 | 35.1 | 1.63 | 41.4 |

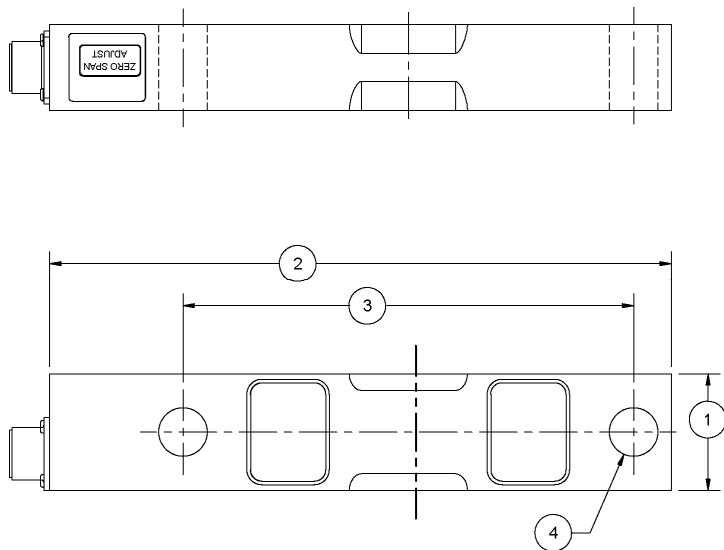
Load Pin Type – Model 3462



Dimensions

| See Drawing | CAPACITY (lbf) | | | | | | | |
|-------------|----------------|-------|-------|-------|-------|-------|-------|--------|
| | 50K | | 75K | | 100K | | 200K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 4.00 | 101.6 | 5.00 | 127.0 | 5.63 | 143.0 | 8.5 | 215.9 |
| (2) | 2.000 | 50.80 | 2.500 | 63.50 | 2.750 | 69.85 | 4.000 | 101.60 |
| (3) | 7.0 | 178 | 8.0 | 203 | 9.0 | 229 | 12.0 | 305 |
| (4) | 1.00 | 25.4 | 1.25 | 31.8 | 1.47 | 37.3 | 2.25 | 57.2 |
| (5) | 2.00 | 50.8 | 2.50 | 63.5 | 2.69 | 68.3 | 4.00 | 101.6 |

Compression Beam Type – Model 3401

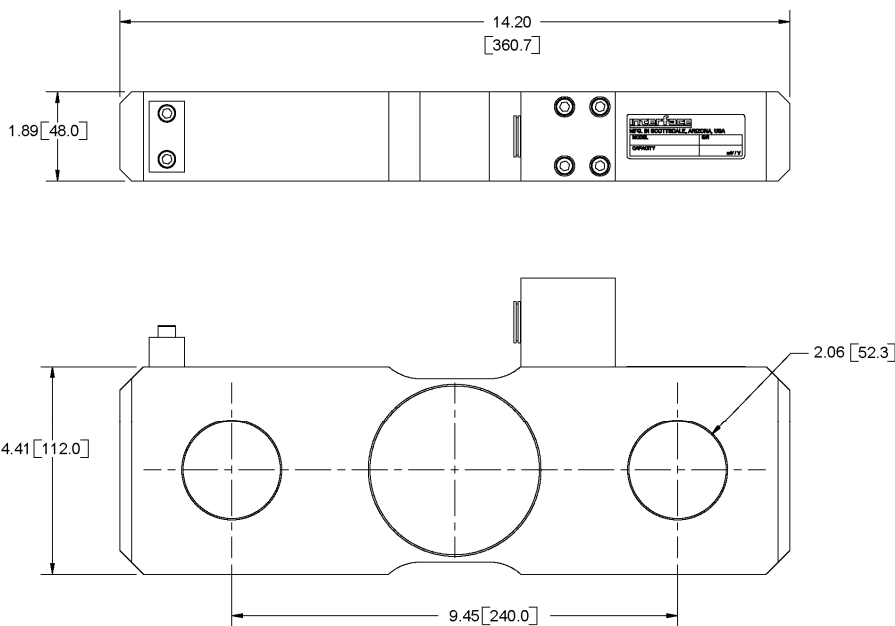


Dimensions

| See Drawing | CAPACITY (lbf) | | | |
|-------------|----------------|------|-------|------|
| | 10K | | 50K | |
| | inch | mm | inch | mm |
| (1) | 1.95 | 49.5 | 2.95 | 74.9 |
| (2) | 10.4 | 264 | 15.0 | 381 |
| (3) | 7.5 | 191 | 11.50 | 292 |
| (4) | 0.81 | 20.6 | 1.31 | 33.3 |

Tension Link Type – Model 3403

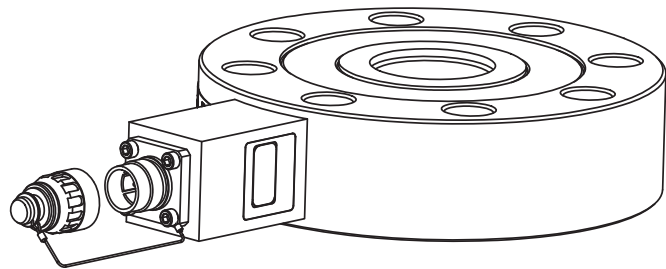
Capacity: 44 Klbf



Model 3420ESY-40K Coil Tubing Load Cell

Why the Interface model 3420DRS-40K Coil Tubing Load Cell is the best in class:

- Hermetically sealed cell
- Performance to .05%
- 4-20 m/A
- ATEX approved

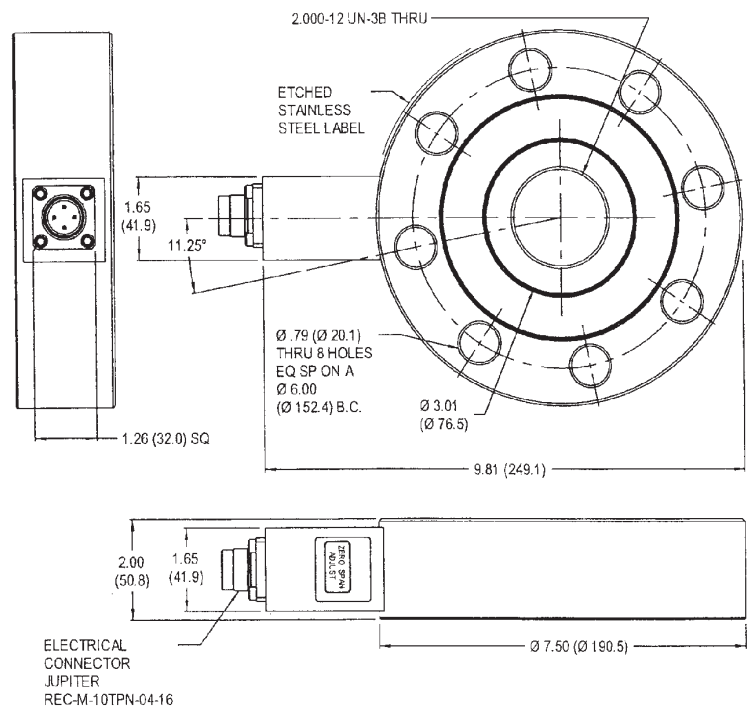


ISO View for reference only

SPECIFICATIONS

| | |
|---------------------------------|--|
| PARAMETERS | |
| US Models (lbf) | 40K |
| ACCURACY | |
| Nonlinearity | ±0.10 |
| Hysteresis | ±0.08 |
| Nonrepeatability | ±0.02 |
| Creep | ±0.03 |
| Side Load Sensitivity | ±0.25 |
| Eccentric Load Sensitivity..... | 1.0%/inch |
| TEMPERATURE | |
| Compensated Range °F..... | 0 to 150 |
| Compensated Range °C | -18 to 65 |
| Operating Range °F..... | -60 to 200 |
| Operating Range °C | -50 to 93 |
| Effect on Zero | ±0.002 |
| Effect on Output | ±0.002 |
| ELECTRICAL | |
| Rated Output | -40K (Nominally 4mA), +40K (Nominally 20mA) |
| Excitation Voltage | Excitation Range +9 to +28 VDC, 15 VDC Nominal |
| Bridge Resistance..... | 4000 ohms |
| Zero Balance..... | +8.570 ±0.100 |
| Insulation Resistance | 5000 |
| Loop Resistance..... | 0 @ Excitation = 9 VDC, 950 @ Excitation = 28 VDC |
| MECHANICAL | |
| Safe Overload | ±150 |
| Ultimate, Axial Load | ±300 |
| Safe Side Load | 50% Capacity |
| Safe Load Axis Moment | 50% Cap x 1 inch |
| Deflection | 0.002 |
| Weight-lb | 9.5 |
| Connector..... | Jupiter REC-M-10TPN-04-16 |
| Seal | Environmental |
| Flexure Material | Stainless Steel |
| Calibration | Tension & Compression |
| Natural Frequency | 7 kHz |

DIMENSIONS



Model BPL Pedal Load Cell

Capacities 50-500 lbf

Why the Interface model BPL Pedal Load Cell is the best in class:

- Lowest nonlinearity and hysteresis of any brake pedal load cell – < 0.05%
- Ultra low height
- Low sensitivity to off-center loads - <1.0%/in
- Mounts directly to pedal with included strap(s)
- Interchangeable mounting plates
- Storage case included
- For use with gas, brake or clutch pedal
- Storage case included



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|---------------------------------|-------|
| Static Error Band | ±0.05 |
| Nonlinearity-% FS | ±0.05 |
| Hysteresis-% FS | ±0.05 |
| Nonrepeatability-% RO | ±0.02 |
| Creep, in 20 min-% | ±0.05 |
| Eccentric Load Sensitivity-%/in | ±1 |

TEMPERATURE

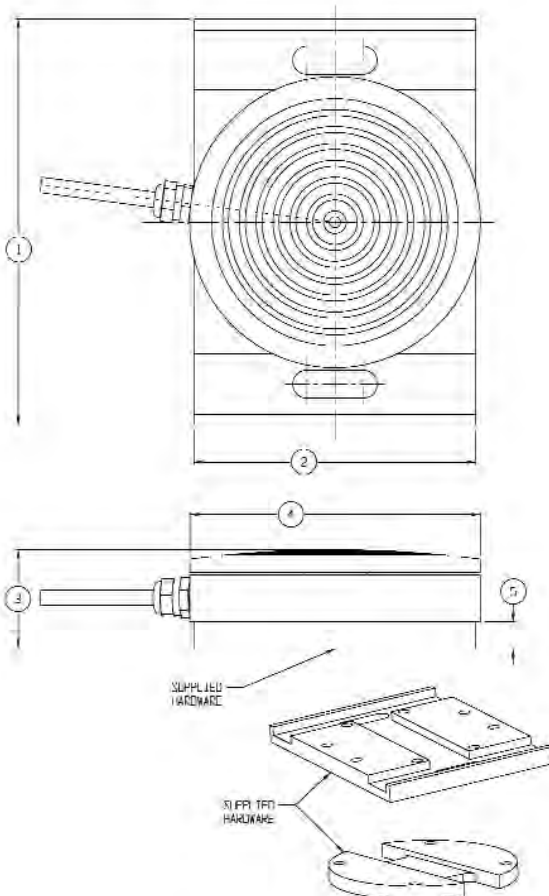
| | |
|----------------------------|------------|
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Output-%/°F-MAX | ±0.001 |
| Effect on Zero-% RO/°F-MAX | ±0.002 |

ELECTRICAL

| | |
|---------------------------------|--------|
| Rated Output-mV/V (Nominal) | 2.0 |
| Zero Balance-% RO | ±1.0 |
| Bridge Resistance-Ohm (Nominal) | 700 |
| Excitation Voltage-MAX | 15 VDC |
| Excitation Voltage-Nominal | 10 VDC |
| Insulation Resistance-Megohm | > 5000 |
| Deflection at Capacity (inch) | 0.002 |

MECHANICAL

| | |
|--------------------------|-------------------|
| Calibration | Compression |
| Safe Overload-% CAP | 150 |
| Safe Overload-Side-% CAP | 40, any direction |
| Cable | 10 ft |



DIMENSIONS

| See Drawing | CAPACITY (lbf) 50, 100, 200, 300, 500 | |
|-------------|--|------|
| | inch | mm |
| ① | 3.60 | 91.4 |
| ② | 2.50 | 63.5 |
| ③ | 0.88 | 22.3 |
| ④ | 2.58 | 65.5 |
| ⑤ | 0.24 | 6.1 |

Model A4200 & A4600 Weighcheck Load Cell

Why the Interface model A4200 and A4600 Weighcheck Load Cells are the best in class:

- Capacity ranges from 2.5K to 50K
- High output – 4 mV/V
- Self-centering in all directions
- High safe side load – to 400%
- Standardized output - $\pm 0.1\%$
- Zinc plated (A4200) or stainless steel (A4600)
- Factory assembled for easy field installation
- Static/dynamic/in-motion capabilities
- Low height—4.0" for 2.5K, 5K & 10K; 5.0" for 25K & 50K



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|------------------------|-------------|
| Static Error Band-% FS | ± 0.05 |
| Nonlinearity-% FS | ± 0.05 |
| Hysteresis-% FS | ± 0.03 |
| Nonrepeatability-% RO | ± 0.02 |
| Creep, in 20 min-% | ± 0.025 |

TEMPERATURE

| | |
|------------------------------|--------------|
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Output-%/°F – MAX | ± 0.0008 |
| Effect on Zero-% RO/°F – MAX | ± 0.0008 |

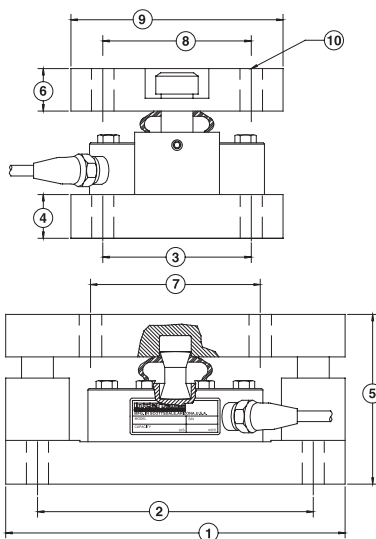
ELECTRICAL

| | |
|--------------------------------|------------------------|
| Rated Output-mV/V | 4.000 $\pm 0.1\%$ |
| (2.5K) | 2.000 mV/V $\pm 0.1\%$ |
| Zero Balance-% RO | ± 1.0 |
| Bridge Resistance-Ohms | 350 |
| Excitation Voltage – MAX | 20 VDC |
| Insulation Resistance – Megohm | 5000 |

MECHANICAL

| | |
|---------------------|-------------|
| Calibration | Compression |
| Safe Overload-% CAP | 150 |
| Cable length-ft | 30 |

| Mount Model | Material | Range | Safe Side Load (lb) | (% Range) |
|-------------|-----------|-------|---------------------|-----------|
| M4200-1 | Alloy | 5K | 20K | 400 |
| M4200-1 | Alloy | 10K | 20K | 200 |
| M4200-2 | Alloy | 25K | 50K | 200 |
| M4200-2 | Alloy | 50K | 50K | 100 |
| M4600-1 | Stainless | 5K | 10K | 200 |
| M4600-1 | Stainless | 10K | 10K | 100 |
| M4600-2 | Stainless | 25K | 25K | 100 |
| M4600-2 | Stainless | 50K | 25K | 50 |



OPTIONS*

Zinc Plated (A4200)
Stainless Steel (A4600)
Special Cable Length

*See appendix for more technical info.

ACCESSORIES

| | |
|--------|--------------|
| 9300 | SGA |
| 9390 | Junction Box |
| UMC600 | |

DIMENSIONS

| See Drawing | MODEL | | | |
|-------------|----------------|-------|--------------|-------|
| | A4211 or A4611 | | A4221, A4621 | |
| | CAPACITY (lbf) | | | |
| | 2.5K, 5K, 10K | | 25K, 50K | |
| | inch | mm | inch | mm |
| ① | 8.00 | 203.2 | 10.00 | 254.0 |
| ② | 6.50 | 165.1 | 7.75 | 196.9 |
| ③ | 3.50 | 88.9 | 4.50 | 114.3 |
| ④ | 1.00 | 25.4 | 1.25 | 31.8 |
| ⑤ | 4.00 | 101.6 | 5.00 | 127.0 |
| ⑥ | 1.00 | 25.4 | 1.25 | 31.8 |
| ⑦ | 4.00 | 101.6 | 5.00 | 127.0 |
| ⑧ | 3.50 | 88.9 | 4.50 | 114.3 |
| ⑨ | 5.00 | 127.0 | 6.00 | 152.4 |
| ⑩ | 0.52 | 13.2 | 0.78 | 19.8 |

Model SPI Platform Scale Load Cell

Capacities 3-15 lbf

Why the Interface model SPI Platform Scale Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- .01% nonrepeatability
- 400% compression overload protection
- .0008%/°F temp. effect on output
- Eccentric load compensated

STANDARD CONFIGURATION

5 ft Integral Cable (SPI-nn)

OPTIONS

- Tension & Compression
- Overload Protection
- Extra Cable Length
- Standardized Output

ACCESSORIES

Instrumentation

Consult factory for more technical information



SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|---------------------------------|-------------|
| Nonlinearity-% FS |±0.02 |
| Hysteresis-% FS |±0.02 |
| Nonrepeatability-% RO |±0.01 |
| Creep, in 20 min-% |±0.025 |
| Eccentric load sensitivity-%/in |0.012 |

TEMPERATURE

| | |
|------------------------------|-----------------|
| Compensated Range-°F |15 to 115 |
| Compensated Range-°C |-10 to 45 |
| Operating Range-°F |-65 to 200 |
| Operating Range-°C |-55 to 90 |
| Effect on Output-%/°F – MAX |±0.0008 |
| Effect on Zero-% RO/°F – MAX |±0.0015 |

ELECTRICAL

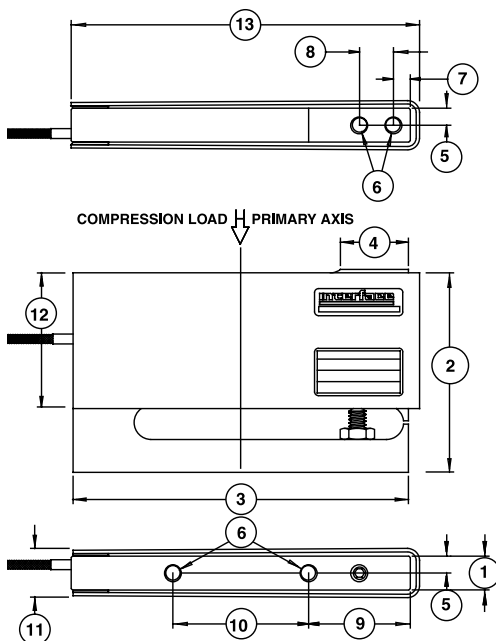
| | |
|---------------------------------|-------------|
| Rated Output-mV/V (Nominal) |3.0 |
| Zero Balance-% RO |±5.0 |
| Bridge Resistance-Ohm (Nominal) |350 |
| Excitation Voltage – MAX |15 VDC |
| Insulation Resistance-Megohm |5000 |

MECHANICAL

| | |
|----------------------|--------------|
| Calibration |Comp. |
| Safe Overload-% CAP |400 |
| Cable length-ft |5 |
| Deflection @ RO-inch |to .015 |

| | lbf | Deflection (inches) | Nat. Freq. (hertz) |
|--|-----|---------------------|--------------------|
| | 3 | .015 | 130 |
| | 7.5 | .009 | 220 |
| | 15 | .009 | 220 |

DIMENSIONS



| See Drawing | CAPACITY (lbf) | | | | | |
|-------------|----------------|-------|---------------|-------|---------------|-------|
| | 3 | | 7.5 | | 15 | |
| | inch | mm | inch | mm | inch | mm |
| ① | 0.38 | 9.60 | 0.50 | 12.7 | 1.00 | 25.4 |
| ② | 2.99 | 75.9 | 2.99 | 75.9 | 2.99 | 75.9 |
| ③ | 5.00 | 127 | 5.00 | 127 | 5.00 | 127 |
| ④ | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 |
| ⑤ | 0.19 | 4.80 | 0.25 | 6.40 | 0.5 | 12.7 |
| ⑥ | 10-32 UNF-2B | | 1/4-28 UNF-2B | | 1/4-28 UNF-2B | |
| ⑥ | 0.50 in deep | | 0.56 in deep | | 0.56 in deep | |
| ⑦ | 0.25 | 6.40 | 0.25 | 6.40 | 0.25 | 6.40 |
| ⑧ | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| ⑨ | 1.50 | 38.1 | 1.50 | 38.1 | 1.50 | 38.1 |
| ⑩ | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 |
| ⑪ | 0.62 | 15.7 | 0.75 | 19.0 | 1.25 | 31.8 |
| ⑫ | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 |
| ⑬ | 5.13 | 130.3 | 5.13 | 130.3 | 5.13 | 130.3 |

Model SPI Platform Scale Load Cell

Capacities 25-150 lbf



Why the Interface model SPI Platform Scale Load Cell is the best in class:

- Proprietary Interface temperature compensated strain gages
- .01% nonrepeatability
- Safe overload to 200%
- .0008%/°F temp. effect on output
- Eccentric load compensated

STANDARD CONFIGURATION

5 ft Integral Cable (SPI-nn)

OPTIONS

Extra Cable Length
Standardized Output

ACCESSORIES

Instrumentation

Consult factory for more technical information

SPECIFICATIONS

ACCURACY – (MAX ERROR)

| | |
|-----------------------------------|--------|
| Nonlinearity-% FS | ±0.02 |
| Hysteresis-% FS | ±0.02 |
| Nonrepeatability-% RO | ±0.01 |
| Creep, in 20 min-% | ±0.025 |
| Eccentric load sensitivity-%/inch | 0.002 |

TEMPERATURE

| | |
|------------------------------|------------|
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Output-%/°F – MAX | ±0.0008 |
| Effect on Zero-% RO/°F – MAX | ±0.0015 |

ELECTRICAL

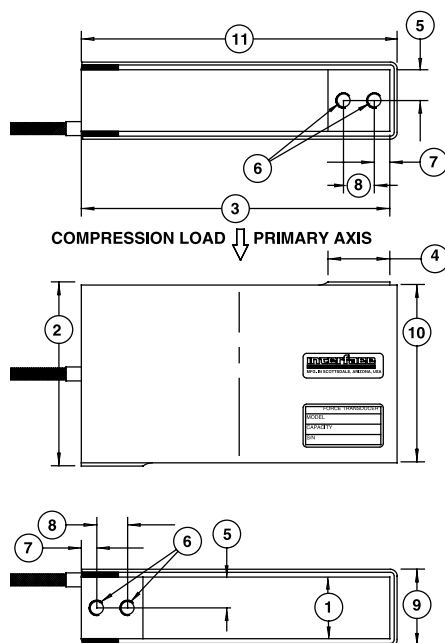
| | |
|---------------------------------|--------|
| Rated Output-mV/V (Nominal) | 3.0 |
| Zero Balance-% RO | ±5.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage – MAX | 15 VDC |
| Insulation Resistance-Megohm | 5000 |

MECHANICAL

| | |
|----------------------|-------------|
| Calibration | Compression |
| Safe Overload-% CAP | 200 |
| Cable length-ft | 5 |
| Deflection @ RO-inch | to .008 |

Natural Frequency/Deflection:

| lbf | Deflection (inches) | Nat. Freq. (hertz) |
|-----|---------------------|--------------------|
| 25 | .008 | 240 |
| 50 | .008 | 310 |
| 100 | .007 | 470 |
| 150 | .005 | 580 |



DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | |
|-------------|----------------|------|---------------|-------|
| | 25, 50 | | 100, 150 | |
| | inch | mm | inch | mm |
| ① | 1.00 | 25.4 | 1.00 | 25.4 |
| ② | 3.00 | 76.2 | 3.00 | 76.2 |
| ③ | 5.00 | 127 | 6.00 | 152.4 |
| ④ | 1.00 | 25.4 | 1.50 | 38.1 |
| ⑤ | 0.50 | 12.7 | 0.50 | 12.7 |
| ⑥ | 1/4-28 UNF-2B | | 1/4-28 UNF-2B | |
| ⑥ | 0.56 in deep | | 0.56 in deep | |
| ⑦ | 0.25 | 6.40 | 0.25 | 6.40 |
| ⑧ | 0.50 | 12.7 | 1.00 | 25.4 |
| ⑨ | 1.25 | 31.8 | 1.25 | 31.8 |
| ⑩ | 2.88 | 73.0 | 2.88 | 73.0 |
| ⑪ | 5.12 | 130 | 6.12 | 155.4 |

Model SSM-Sealed S-Type Inherently Safe* Load Cell (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- 0.02% nonrepeatability
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- 0.025% creep
- Tension and compression



STANDARD CONFIGURATION

10 ft (3 m) Integral Cable

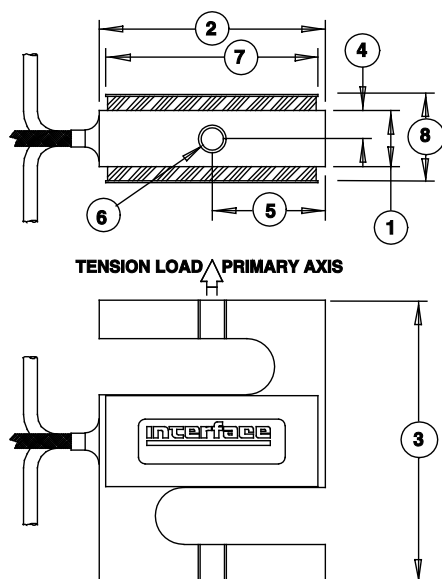
OPTIONS

Standardized Output
Special Cable Length - up to 200 ft (60 m)

ACCESSORIES

Load Button
Instrumentation
Mounting Hardware

Consult factory for more technical information



*When installed in appropriate I.S. Circuit with safety barrier.

SPECIFICATIONS

| | | | |
|-----------------------------------|------------------------|-----------------|--------------------|
| ACCURACY - (MAX ERROR) | | | |
| Nonlinearity-% FS | ±0.05 | | |
| Hysteresis-% FS | ±0.03 | | |
| Nonrepeatability-% RO | ±0.02 | | |
| Creep in 20 min-% | ±0.025 | | |
| TEMPERATURE | | | |
| Compensated Range-°F (°C) | 0 to 150 (-15 to 65) | | |
| Operating Range-°F (°C) | -65 to 200 (-55 to 90) | | |
| Effect on Output-%/°F - MAX (°C) | ±0.0008 (±0.0015) | | |
| Effect on Zero-% RO/°F - MAX (°C) | ±0.0015 (±0.0027) | | |
| ELECTRICAL | | | |
| Rated Output-mV/V (Nominal) | 3 | | |
| Zero Balance-%RO | ±1 | | |
| Bridge Resistance-Ohm (Nominal) | 350 | | |
| Excitation Voltage-MAX | 15 VDC | | |
| Insulation Resistance-Megohm | >5000 | | |
| MECHANICAL | | | |
| Calibration | Tension | | |
| Safe Overload-% CAP | 150 | | |
| Cable Length-ft (m) | 10 (3) | | |
| Natural Frequency/Deflection: | | | |
| lbf | N | Deflection (in) | Nat. Freq. (Hertz) |
| 50 | 200 | .003 | 1500 |
| 100 | 500 | .004 | 1850 |
| 150 | 500 | .004 | 1850 |
| 250 | 1000 | .006 | 2350 |
| 500 | 2kN | .005 | 2150 |
| 750 | | .005 | 2350 |
| 1000 | 5kN | .005 | 3350 |
| 2000 | 10kN | .005 | 2400 |
| 3000 | | .005 | 3000 |
| 5000 | 20kN | .005 | 2520 |

DIMENSIONS

| | | | | | | | | |
|-------------|----------------|-----------|----------------|-----------|----------------|---------------|----------------|------------|
| See Drawing | CAPACITY (lbf) | | | | | | | |
| | lbf | N | lbf | N | lbf | kN | lbf | kN |
| | 50 | 200 | 100 | 500 | 500 | 2, 5 | 5K | 20 |
| | | | 150 | 700 | 750 | 10 | | |
| | | | 250 | 1000 | 1K | | | |
| | | | | | 2K | | | |
| | | | | | 3K | | | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.50 | 38.1 |
| (2) | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 | 2.50 | 63.5 |
| (3) | 2.50 | 63.5 | 2.50 | 63.5 | 3.00 | 76.2 | 3.50 | 88.9 |
| (4) | 0.25 | 6.40 | 0.25 | 6.40 | 0.50 | 12.7 | 0.75 | 19.1 |
| (5) | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 |
| (6) | 1/4-28 UNF -2B | M6 x 1-6H | 1/4-28 UNF -2B | M6 x 1-6H | 1/2-20 UNF -2B | M12 x 1.75-6H | 5/8-18 UNF -2B | M16 x 2-6H |
| (7) | 1.88 | 47.8 | 1.88 | 47.8 | 1.88 | 47.8 | 2.38 | 60.5 |
| (8) | 0.82 | 20.8 | 0.72 | 18.3 | 1.22 | 31.0 | 1.75 | 44.5 |

Model SSMH Sealed S-Type Load Cell for Hazardous Environments (U.S. & Metric)

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed IP65
- High temperature rated 290°F (143°C)
- Tension or compression
- Certified for explosion protection by intrinsic safety for dust and gas per ATEX designations

- II 2 D Ex ib IIIC T160°C (-40 < Ta < 143°C)
- II 2 G Ex ib IIC T4 (-40 < Ta < 112°C)



| Intrinsic Safety Entity Parameters | |
|------------------------------------|--------|
| Ui | 20 V |
| Ii | 460 mA |
| Pi | 1.3 W |
| Ci | 15 nF |
| Li | 51 µH |

STANDARD CONFIGURATION

10 ft (3 m) Integral Cable

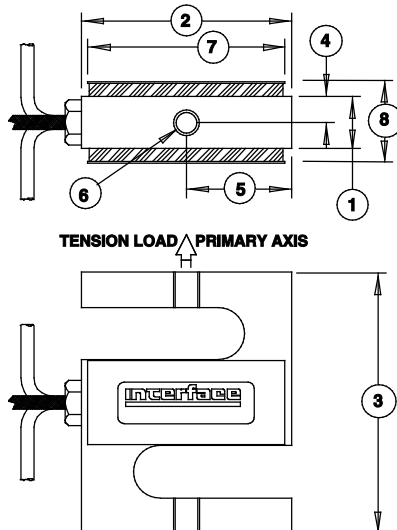
OPTIONS

Standardized Output
Special Cable Length - up to 300 ft (100 m)

ACCESSORIES

Load Button
Instrumentation
Mounting Hardware

Consult factory for more technical information



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | | |
|------------------------------------|-------------------------|-----------------|--------------------|
| Nonlinearity-% FS | ±0.05 | | |
| Hysteresis-% FS | ±0.03 | | |
| Nonrepeatability-% RO | ±0.02 | | |
| Creep in 20 min-% | ±0.025 | | |
| TEMPERATURE | | | |
| Compensated Range-°F (°C) | 0 to 150 (-15 to 65) | | |
| Operating Range-°F (°C) | -40 to 290 (-40 to 143) | | |
| Effect on Output-%/°F – MAX (°C) | ±0.0008 (±0.0015) | | |
| Effect on Zero- % RO/°F – MAX (°C) | ±0.0015 (±0.0027) | | |
| ELECTRICAL | | | |
| Rated Output-mV/V (Nominal) | 3 | | |
| Zero Balance-%RO | ±1 | | |
| Bridge Resistance-Ohm (Nominal) | 350 | | |
| Excitation Voltage-MAX | 15 VDC | | |
| Insulation Resistance-Megohm | >5000 | | |
| MECHANICAL | | | |
| Calibration | Tension | | |
| Safe Overload-% CAP | 150 | | |
| Cable Length-ft (m) | 10 (3) | | |
| Natural Frequency/Deflection: | | | |
| lbf | N | Deflection (in) | Nat. Freq. (Hertz) |
| 50 | 200 | .003 | 1500 |
| 100 | 500 | .004 | 1850 |
| 150 | 700 | .004 | 2000 |
| 250 | 1000 | .006 | 2350 |
| 500 | 2000N | .005 | 2150 |
| 750 | 3000N | .005 | 2350 |
| 1000 | 5000N | .005 | 3350 |
| 2000 | 10kN | .005 | 2400 |
| 3000 | 15kN | .005 | 3000 |
| 5000 | 20kN | .005 | 2520 |

DIMENSIONS

| See Drawing | CAPACITY (lbf) | | | | | | | |
|-------------|----------------|-----------|----------------|-----------|----------------|---------------|----------------|------------|
| | lbf | N | lbf | N | lbf | kN | lbf | kN |
| | 50 | 200 | 100 | 500 | 500 | 2, 3 | 5K | 20 |
| | | | 150 | 700 | 750 | 5 | | |
| | | | 250 | 1000 | 1K | 10 | | |
| | | | | | 2K | 15 | | |
| | | | | | 3K | | | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.50 | 38.1 |
| (2) | 2.00 | 50.8 | 2.00 | 50.8 | 2.00 | 50.8 | 2.50 | 63.5 |
| (3) | 2.50 | 63.5 | 2.50 | 63.5 | 3.00 | 76.2 | 3.50 | 88.9 |
| (4) | 0.25 | 6.40 | 0.25 | 6.40 | 0.50 | 12.7 | 0.75 | 19.1 |
| (5) | 1.00 | 25.4 | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 |
| (6) | 1/4-28 UNF -2B | M6 x 1-6H | 1/4-28 UNF -2B | M6 x 1-6H | 1/2-20 UNF -2B | M12 x 1.75-6H | 5/8-18 UNF -2B | M16 x 2-6H |
| (7) | 1.88 | 47.8 | 1.88 | 47.8 | 1.88 | 47.8 | 2.38 | 60.5 |
| (8) | 0.82 | 20.8 | 0.72 | 18.3 | 1.22 | 31.0 | 1.75 | 44.5 |

TORQUE TRANSDUCERS

Rotary / Dynamic
Reaction / Static
Specialty

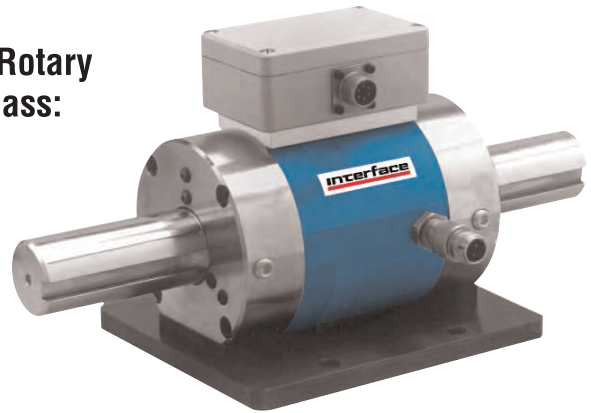
interface

ADVANCED FORCE MEASUREMENT

Model RT10E High Capacity Rotary Transformer Torque Transducer

Why the Interface model RT10E High Capacity Rotary Transformer Torque Transducer is the best in class:

- 4X overload rating
- Infinite fatigue life
- Hardened to EMI from adjustable speed drives
- Performance to 0.07%
- Bidirectional operation including stall
- Ferrite-free rotary transformer coupling
- Calibration & balance free of cable effects
- Unexcelled immunity to machinery magnetic fields
- 15-5 PH stainless shaft, splash proof & corrosion resistant
- mV/V output compatible with carrier amplifiers



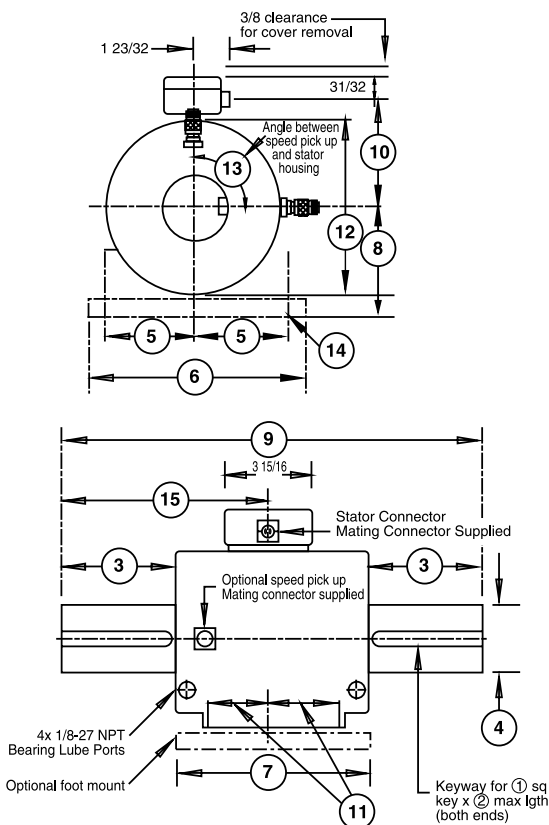
OPTIONS*

- On-board Signal Conditioning**
- Digital Output-RS232**
- Enhanced Performance
- Foot Mount (shown in photo)
- Standard & Zero Velocity Speed Pickups
- Flange Style Mount

ACCESSORIES*

- Interconnect Cables
- Digital Readout (9850)

*Please call for additional information
**Please consult factory for specifications



DIMENSIONS (inch)

| See Drawing | CAPACITY (lb-in) | | | | | | | | |
|-------------|------------------|------------|-----------|----------|------------|------------|--------------|------------|------------|
| | 25 to 100 | 250 to 500 | 500 to 1K | 2K to 5K | 10K to 20K | 25K to 50K | 100K to 250K | 500K to 1M | 1.5M to 2M |
| ① | 0.187 | 0.187 | 0.250 | 0.375 | 0.625 | 0.750 | 1.000 | Note 3 | Note 4 |
| ② | 1.125 | 1.625 | 1.750 | 2.750 | 3.500 | 4.500 | 6.500 | 8.000 | 12 |
| ③ | 1.50 | 2.00 | 2.00 | 3.38 | 4.13 | 5.13 | 7.56 | 9.00 | 13.50 |
| ④ | 0.625 | 0.750 | 1.000 | 1.500 | 2.500 | 3.000 | 4.500 | 7.750 | 9.375 |
| ⑤ | 2.25 | 2.25 | 2.625 | 2.625 | 4.25 | 4.25 | 4.25 | 7.00 | 8.50 |
| ⑥ | 5.50 | 5.50 | 6.25 | 6.25 | 10.00 | 10.00 | 10.00 | 15.50 | 18.50 |
| ⑦ | 5.50 | 5.50 | 7.00 | 7.00 | 8.75 | 8.75 | 7.75 | 18.00 | 20.00 |
| ⑧ | 2.250 | 2.250 | 2.500 | 2.500 | 5.000 | 5.000 | 5.000 | 8.000 | 9.750 |
| ⑨ | 8.50 | 9.50 | 10.00 | 12.75 | 17.00 | 19.00 | 23.00 | 36.00 | 47.00 |
| ⑩ | 4.219 | 4.219 | 2.969 | 2.969 | 4.875 | 4.875 | 5.125 | 7.875 | 9.500 |
| ⑪ | 1.500 | 1.500 | 1.500 | 1.500 | 2.813 | 2.813 | 2.813 | 7.875 | 8.875 |
| ⑫ | 3.469 | 3.469 | 2.563 | 2.563 | 7.938 | 7.938 | 8.500 | 13.875 | 17 |
| ⑬ | 90° | 90° | 90° | 90° | 0° | 0° | 0° | 0° | 0° |
| ⑭ | .254 | .304 | .406 | .609 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| ⑮ | 4.250 | 4.750 | 5 | 6.375 | 9.500 | 9.500 | 12.844 | 18 | 23.500 |

1. Tolerance on ④ diameter is +0.0000/-0.0005 for diameters ≤ 2.500 inch and +0.000/-0.001 for diameter ≥ 2.500 inch.
2. Slotted 0.531 inch wide by 1.125 inch long.
3. Dual rectangular keyways at each end are 2.000 inch wide by 1.500 inch high.
4. Dual rectangular keyways at each end are 2.500 inch wide by 1.750 inch high.

SPECIFICATIONS

| PARAMETERS | MODEL | |
|---|----------|--------------------------------------|
| | STANDARD | ENHANCED |
| ACCURACY – (MAX ERROR) | | |
| Combined Error–%FS | ±0.1 | ±0.07 |
| Nonlinearity–%FS | ±0.1 | ±0.05 |
| Hysteresis–%FS | ±0.1 | ±0.05 |
| Nonrepeatability–%FS | ±0.05 | ±0.02 |
| Stability, 6 Months–%FS | ±0.15 | ±0.10 |
| Rotational Effect on Zero–%FS | ±0.05 | ±0.02 |
| TEMPERATURE | | |
| Effect on Zero–%FS/°F | ±0.002 | ±0.001 |
| Span–%/°F | ±0.002 | ±0.001 |
| Compensated Range–°F | | +75 to +175 |
| Usable Range–°F | | -25 to +185 |
| Storage Range–°F | | -65 to +225 |
| ELECTRICAL | | |
| Fully bi-directional, dual output with common characteristics, as follows | | |
| Clockwise (CW) Torque | | +1.5 mV/V |
| Counterclockwise (CCW) Torque | | -1.5 mV/V |
| Zero Balance | | ±1% of FS, nominal |
| Excitation (MAX) | | 3-6 V rms, 3 khz ±10% sine wave only |
| Readout | | Strain gage carrier amplifier |

*Specifications apply to mV/V models only. When selecting the **ON-BOARD SIGNAL CONDITIONING** or **DIGITAL OUTPUT** options please contact factory for specification details.

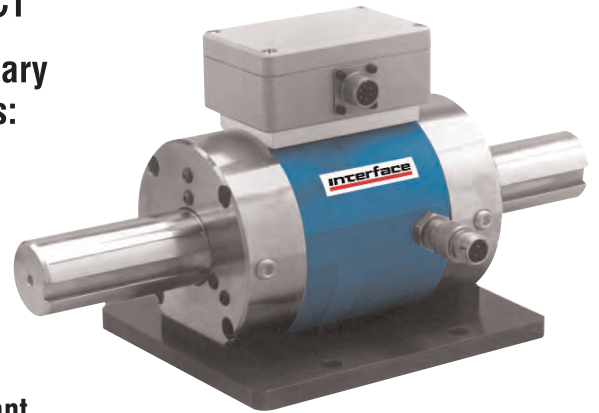
| TORQUE RANGE | | SPEED RATING | SHAFT* STIFFNESS | ROTATING INERTIA | MAX. WT. |
|--------------|---------|--------------|------------------|---------------------------|----------|
| [lb-in] | [Nm] | [rpm] | [lb-in/radian] | [oz-in sec ²] | [lbs] |
| 25 | 2.82 | 0 to ±15,000 | 5,590 | 0.035 | 11 |
| 50 | 5.65 | 0 to ±15,000 | 11,700 | 0.035 | 11 |
| 100 | 11.3 | 0 to ±15,000 | 21,400 | 0.035 | 11 |
| 250 | 28.2 | 0 to ±15,000 | 50,200 | 0.036 | 12 |
| 500 | 56.5 | 0 to ±15,000 | 56,000 | 0.036 | 12 |
| 500 | 56.5 | 0 to ±10,000 | 154,000 | 0.11 | 23 |
| 1K | 113 | 0 to ±10,000 | 214,000 | 0.11 | 23 |
| 2K | 226 | 0 to ±10,000 | 421,000 | 0.16 | 26 |
| 5K | 565 | 0 to ±10,000 | 593,000 | 0.16 | 26 |
| 10K | 1,130 | 0 to ±8,000 | 1,800,000 | 2.3 | 105 |
| 20K | 2,260 | 0 to ±8,000 | 2,700,000 | 2.4 | 105 |
| 25K | 2,820 | 0 to ±6,000 | 5,700,000 | 2.8 | 115 |
| 50K | 5,650 | 0 to ±6,000 | 7,100,000 | 3.0 | 115 |
| 100K | 11,300 | 0 to ±3,600 | 29,000,000 | 11.0 | 150 |
| 250K | 28,200 | 0 to ±3,600 | 36,000,000 | 11.7 | 150 |
| 500K | 56,500 | 0 to ±1,800 | 125,000,000 | 207 | 780 |
| 1M | 113,000 | 0 to ±1,800 | 142,000,000 | 218 | 800 |
| 1.5M | 170,000 | 0 to ±1,200 | 221,000,000 | 567 | 1455 |
| 2M | 226,000 | 0 to ±1,200 | 227,000,000 | 582 | 1475 |

*Stiffness is conservatively rated and includes both the torsion section and shaft ends.

Model RT12E High Capacity Rotary Transformer Torque Transducer

Why the Interface model RT12E High Capacity Rotary Transformer Torque Transducer is the best in class:

- 2X overload rating
- Performance to 0.07%
- Bidirectional operation including stall
- Ferrite-free rotary transformer coupling
- Calibration & balance free of cable effects
- Unexcelled immunity to machinery magnetic fields
- 15-5 PH stainless shaft, splashproof & corrosion resistant
- mV/V output compatible with carrier amplifiers
- Noise hardening



OPTIONS*

- On-board Signal Conditioning**
- Digital Output-RS232**
- Enhanced Performance
- Foot Mount (shown in photo)
- Standard & Zero Velocity Speed Pickups
- Flange Style Mount

ACCESSORIES*

- Interconnect Cables
- Digital Readout (9850)

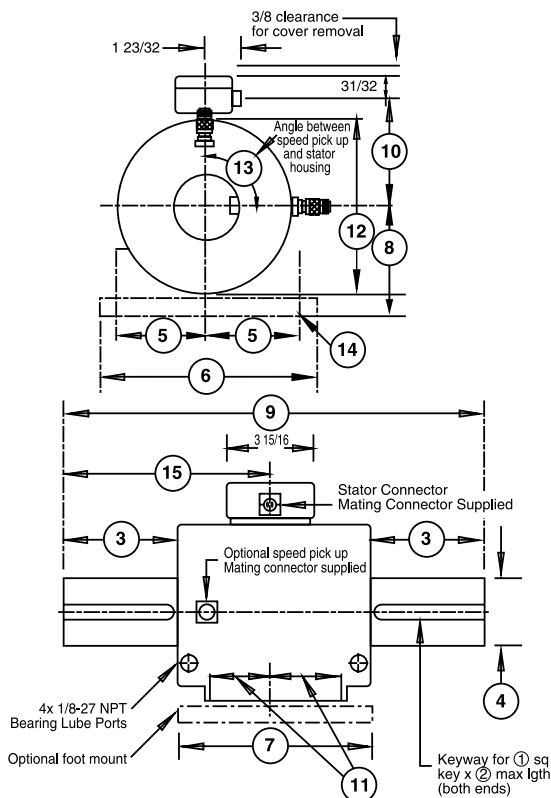
*Please call for additional information

**Please consult factory for specifications

DIMENSIONS (inch)

| See Drawing | CAPACITY (lb-in) | | | | | | | | |
|-------------|------------------|-----------|----------|-----------|------------|-------------|--------------|--------------|----------|
| | 25 to 100 | 500 to 1K | 1K to 2K | 5K to 10K | 20K to 40K | 50K to 100K | 200K to 375K | 750K to 1.5M | 3M to 4M |
| ① | 0.187 | 0.187 | 0.250 | 0.375 | 0.625 | 0.750 | 1.000 | Note 3 | Note 4 |
| ② | 1.125 | 1.625 | 1.750 | 2.750 | 3.500 | 4.500 | 6.500 | 8.000 | 12 |
| ③ | 1.50 | 2.00 | 2.31 | 3.69 | 4.13 | 5.13 | 7.56 | 9.00 | 13.50 |
| ④ | 0.625 | 0.750 | 1.000 | 1.500 | 2.500 | 3.000 | 4.500 | 7.750 | 9.375 |
| ⑤ | 2.25 | 2.25 | 2.625 | 2.625 | 4.25 | 4.25 | 4.25 | 7.00 | 8.50 |
| ⑥ | 5.50 | 5.50 | 6.25 | 6.25 | 10.00 | 10.00 | 10.00 | 15.50 | 18.50 |
| ⑦ | 5.50 | 5.50 | 5.50 | 5.50 | 8.75 | 8.75 | 7.75 | 18.00 | 20.00 |
| ⑧ | 2.250 | 2.250 | 2.500 | 2.500 | 5.000 | 5.000 | 5.000 | 8.000 | 9.750 |
| ⑨ | 8.50 | 9.50 | 10.00 | 12.75 | 17.00 | 19.00 | 23.00 | 36.00 | 47.00 |
| ⑩ | 2.688 | 2.688 | 2.969 | 2.969 | 4.875 | 4.875 | 5.125 | 7.875 | 9.500 |
| ⑪ | 1.500 | 1.500 | 1.500 | 1.500 | 2.813 | 2.813 | 2.813 | 7.875 | 8.875 |
| ⑫ | 3.469 | 3.469 | 3.969 | 3.969 | 7.938 | 7.938 | 8.500 | 13.875 | 17 |
| ⑬ | 90° | 90° | 90° | 90° | 0° | 0° | 0° | 0° | 0° |
| ⑭ | .254 | .304 | .406 | .609 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| ⑮ | 4.250 | 4.750 | 5 | 6.375 | 8.500 | 9.500 | 12.844 | 18 | 23.500 |

1. Tolerance on ④ diameter is +0.0000/-0.0005 for diameters ≤ 2.500 inch and +0.000/-0.001 for diameter ≥ 2.500 inch.
2. Slotted 0.531 inch wide by 1.125 inch long.
3. Dual rectangular keyways at each end are 2.000 inch wide by 1.500 inch high.
4. Dual rectangular keyways at each end are 2.500 inch wide by 1.750 inch high.



SPECIFICATIONS

| PARAMETERS | MODEL | |
|---|----------|--------------------------------------|
| | STANDARD | ENHANCED |
| ACCURACY – (MAX ERROR) | | |
| Combined Error–%FS | ±0.1 | ±0.07 |
| Nonlinearity–%FS | ±0.1 | ≤±0.05 |
| Hysteresis–%FS | ±0.1 | ±0.05 |
| Nonrepeatability–%FS | ±0.05 | ±0.02 |
| Stability, 6 Months–%FS | ±0.15 | ±0.10 |
| Rotational Effect on Zero–%FS | ±0.05 | ±0.02 |
| TEMPERATURE | | |
| Effect on Zero–%FS/°F | ±0.002 | 0.001 |
| Span–%/°F | ±0.002 | ±0.001 |
| Compensated Range–°F | | +75 to +175 |
| Minimum Usable Range–°F | | -25 to +185 |
| Storage Range–°F | | -65 to +225 |
| ELECTRICAL | | |
| Fully bi-directional, dual output with common characteristics, as follows | | |
| Clockwise (CW) Torque | | +1.5 mV/V |
| Counterclockwise (CCW) Torque | | -1.5 mV/V |
| Zero Balance | | ±1% of FS, nominal |
| Excitation (MAX) | | 3-6 V rms, 3 kHz ±10% sine wave only |
| Readout | | Strain gage carrier amplifier |

*Specifications apply to mV/V models only. When selecting the **ON-BOARD SIGNAL CONDITIONING** or **DIGITAL OUTPUT** options please contact factory for specification details.

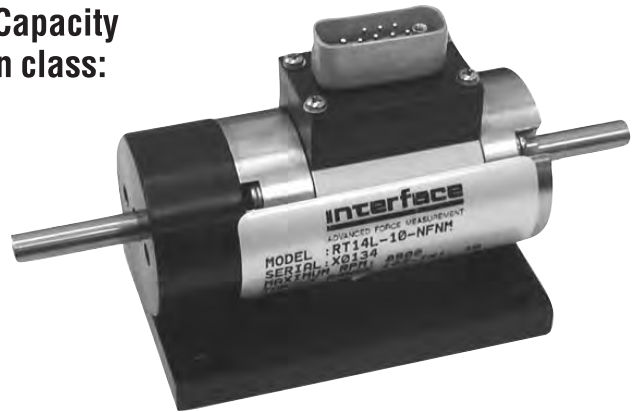
| TORQUE RANGE | | SPEED RATING | SHAFT* STIFFNESS | ROTATING INERTIA | MAX. WT. |
|--------------|---------|--------------|------------------|----------------------------|----------|
| [lb-in] | [Nm] | [rpm] | [lb-in/radian] | [oz.-in sec ²] | [lbs] |
| 25 | 2.82 | 0 to ±15,000 | 2,150 | 0.034 | 6 |
| 50 | 5.65 | 0 to ±15,000 | 6,030 | 0.034 | 6 |
| 100 | 11.3 | 0 to ±15,000 | 14,700 | 0.034 | 6 |
| 200 | 22.6 | 0 to ±15,000 | 18,900 | 0.034 | 6 |
| 500 | 56.5 | 0 to ±15,000 | 57,900 | 0.035 | 7 |
| 1K | 113 | 0 to ±15,000 | 70,100 | 0.035 | 7 |
| 1K | 113 | 0 to ±8,500 | 197,100 | 0.15 | 11 |
| 2K | 226 | 0 to ±8,500 | 260,000 | 0.15 | 11 |
| 5K | 565 | 0 to ±8,500 | 580,000 | 0.19 | 14 |
| 10K | 1,130 | 0 to ±8,500 | 605,000 | 0.19 | 14 |
| 20K | 2,260 | 0 to ±8,000 | 1,800,000 | 2.3 | 105 |
| 40K | 4,520 | 0 to ±8,000 | 2,700,000 | 2.4 | 105 |
| 50K | 5,650 | 0 to ±6,000 | 5,700,000 | 2.8 | 115 |
| 100K | 11,300 | 0 to ±6,000 | 7,100,000 | 3 | 115 |
| 200K | 22,600 | 0 to ±3,600 | 29,000,000 | 11 | 150 |
| 375K | 42,400 | 0 to ±3,600 | 38,000,000 | 11.7 | 150 |
| 750K | 84,700 | 0 to ±1,800 | 115,000,000 | 205 | 775 |
| 1.5M | 169,000 | 0 to ±1,800 | 136,000,000 | 212 | 790 |
| 3M | 339,000 | 0 to ±1,200 | 221,000,000 | 567 | 1455 |
| 4M | 452,000 | 0 to ±1,200 | 227,000,000 | 582 | 1475 |

*Stiffness is conservatively rated and includes both the torsion section and shaft ends.

Model RT13L & RT14L Low Capacity Rotary Transformer Torque Cell

Why the Interface model RT13L & RT14L Low Capacity Rotary Transformer Torque Cells are the best in class:

- 2X overload rating RT14L
- 4X overload rating RT13L
- Performance to 0.1%
- NIST Traceable dead weight calibration
- Bidirectional operation including stall
- Ferrite-free rotary transformer coupling
- Calibration & balance free of cable effects
- Unexcelled immunity to machinery magnetic fields
- mV/V output compatible with carrier amplifiers
- Titanium shaft



OPTIONS*

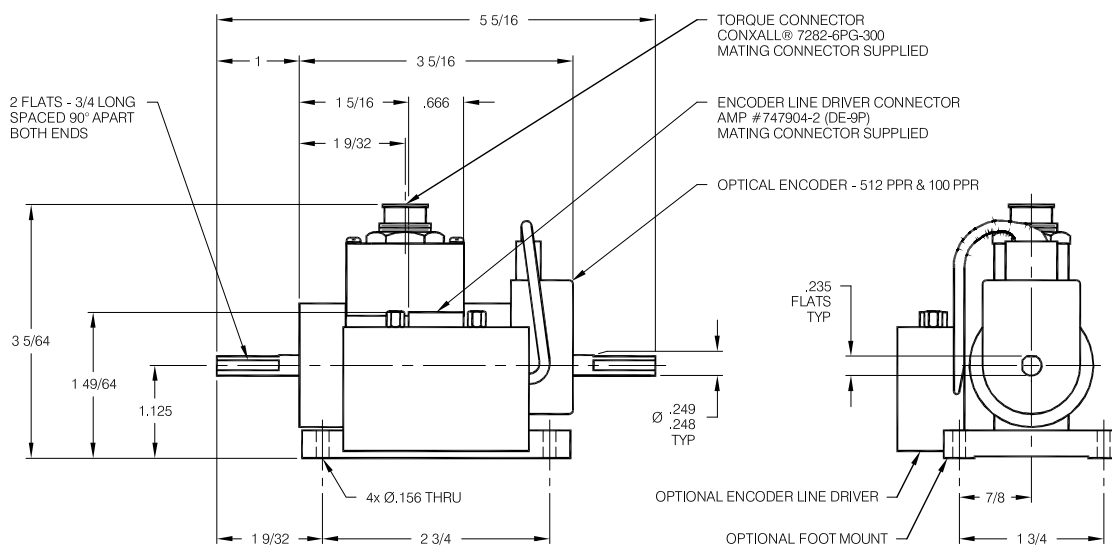
- Foot Mount (shown in photo)
- Speed Encoder with Line Driver
- Noise Hardening
- On-board Signal Conditioning**

ACCESSORIES*

- Interconnect Cables
- Digital Readout (9850)

*Please call for additional information

**Please consult factory for specifications



SPECIFICATIONS

| PARAMETERS | MODEL STANDARD |
|---|--|
| ACCURACY – (MAX ERROR) | |
| Combined Error–%FS | ±0.1 |
| Nonlinearity–%FS | ±0.1 |
| Hysteresis–%FS | ±0.1 |
| Nonrepeatability–%FS | ±0.05 |
| Stability, 6 Months–%FS | ±0.15 |
| Rotational Effect on Zero–%FS | ±0.05 |
| TEMPERATURE | |
| Effect on Zero–%FS | ±0.002 |
| Span–%FS | ±0.002 |
| Compensated Range–°F | +75 to +175 |
| Minimum Usable Range–°F | -25 to +185 |
| Storage Range–°F | -65 to +225 |
| ELECTRICAL | |
| Fully bi-directional, dual output with common characteristics, as follows | |
| Clockwise (CW) Torque | +1.5 mV/V |
| Counterclockwise (CCW) Torque | -1.5 mV/V |
| Zero Balance | ±1% of FS, nominal |
| Excitation (MAX.) | 3 - 6 V rms, 3 kHz ±10% sine wave capable of driving a 90 ohm bridge |
| Readout | Strain gage carrier amplifier |

Specifications apply to mV/V models only. When selecting the **ON-BOARD SIGNAL CONDITIONING** option please contact factory for specification details.

Standard Ratings RT14L Series Low Capacity Non-Contact Torquemeters

| TORQUE RANGE | | TORQUE OVERLOAD | | SPEED RATING | SHAFT STIFFNESS* | | ROTATING INERTIA* | | MAX. WT. |
|--------------|-------|-----------------|--------|--------------|------------------|----------|---------------------------|------------------------|----------|
| [oz-in] | [Nm] | [oz-in] | [Nm] | [rpm] | [oz-in/rad] | [Nm/rad] | [oz-in sec ²] | [Nm sec ²] | [lbs] |
| 10 | 0.071 | 20 | 0.141 | 0 to ±25,000 | 336 | 2.37 | 1.82X10 ⁻⁴ | 1.29X10 ⁻⁶ | 1.5 |
| 20 | 0.141 | 40 | 0.2823 | 0 to ±25,000 | 528 | 3.73 | 1.83X10 ⁻⁴ | 1.30X10 ⁻⁶ | 1.5 |
| 50 | 0.353 | 100 | 0.706 | 0 to ±25,000 | 1,840 | 13.00 | 1.87X10 ⁻⁴ | 1.33X10 ⁻⁶ | 1.5 |
| 100 | 0.706 | 200 | 1.412 | 0 to ±25,000 | 4,224 | 29.82 | 1.93X10 ⁻⁴ | 1.37X10 ⁻⁶ | 1.5 |
| 200 | 1.412 | 400 | 2.825 | 0 to ±25,000 | 8,080 | 57.05 | 2.01X10 ⁻⁴ | 1.43X10 ⁻⁶ | 1.5 |

Standard Ratings RT13L HIGH OVERLOAD Series Low Capacity Non-Contact Torquemeters

| TORQUE RANGE | | TORQUE OVERLOAD | | SPEED RATING | SHAFT STIFFNESS* | | ROTATING INERTIA* | | MAX. WT. |
|--------------|-------|-----------------|-------|--------------|------------------|----------|---------------------------|------------------------|----------|
| [oz-in] | [Nm] | [oz-in] | [Nm] | [rpm] | [oz-in/rad] | [Nm/rad] | [oz-in sec ²] | [Nm sec ²] | [lbs] |
| 10 | 0.071 | 40 | 0.283 | 0 to ±25,000 | 608 | 4.29 | 3.01X10 ⁻⁴ | 2.14X10 ⁻⁶ | 1.5 |
| 20 | 0.141 | 80 | 0.565 | 0 to ±25,000 | 1,616 | 11.41 | 3.07X10 ⁻⁴ | 2.18X10 ⁻⁶ | 1.5 |
| 50 | 0.353 | 200 | 1.412 | 0 to ±25,000 | 5,072 | 35.81 | 3.20X10 ⁻⁴ | 2.27X10 ⁻⁶ | 1.5 |
| 100 | 0.706 | 400 | 2.825 | 0 to ±25,000 | 8,864 | 62.59 | 3.32X10 ⁻⁴ | 2.36X10 ⁻⁶ | 1.5 |
| 200 | 1.412 | 800 | 5.649 | 0 to ±25,000 | 12,048 | 85.07 | 3.53X10 ⁻⁴ | 2.51X10 ⁻⁶ | 1.5 |

*Stiffness and inertia are conservatively rated from shaft end to end.

Model T1 Torque Coupling Rotary Torque Transducer

- Capacities from 50 to 1K Nm (442 to 8,850 lb-in)
- Shortest installed length
- Integrated double-flex disc coupling
- Hollow
- Bearingless non-contact design
- 10 kHz sample rate
- ±5 VDC output
- 16-bit resolution



OPTIONS

Enhanced Accuracy - 0.05%
 High RPM
 Speed Measurement - 30 Pulse +5V TTL
 Keyway Side 1 (Reduced max diam dA)
 ±10 VDC Output
 RS485

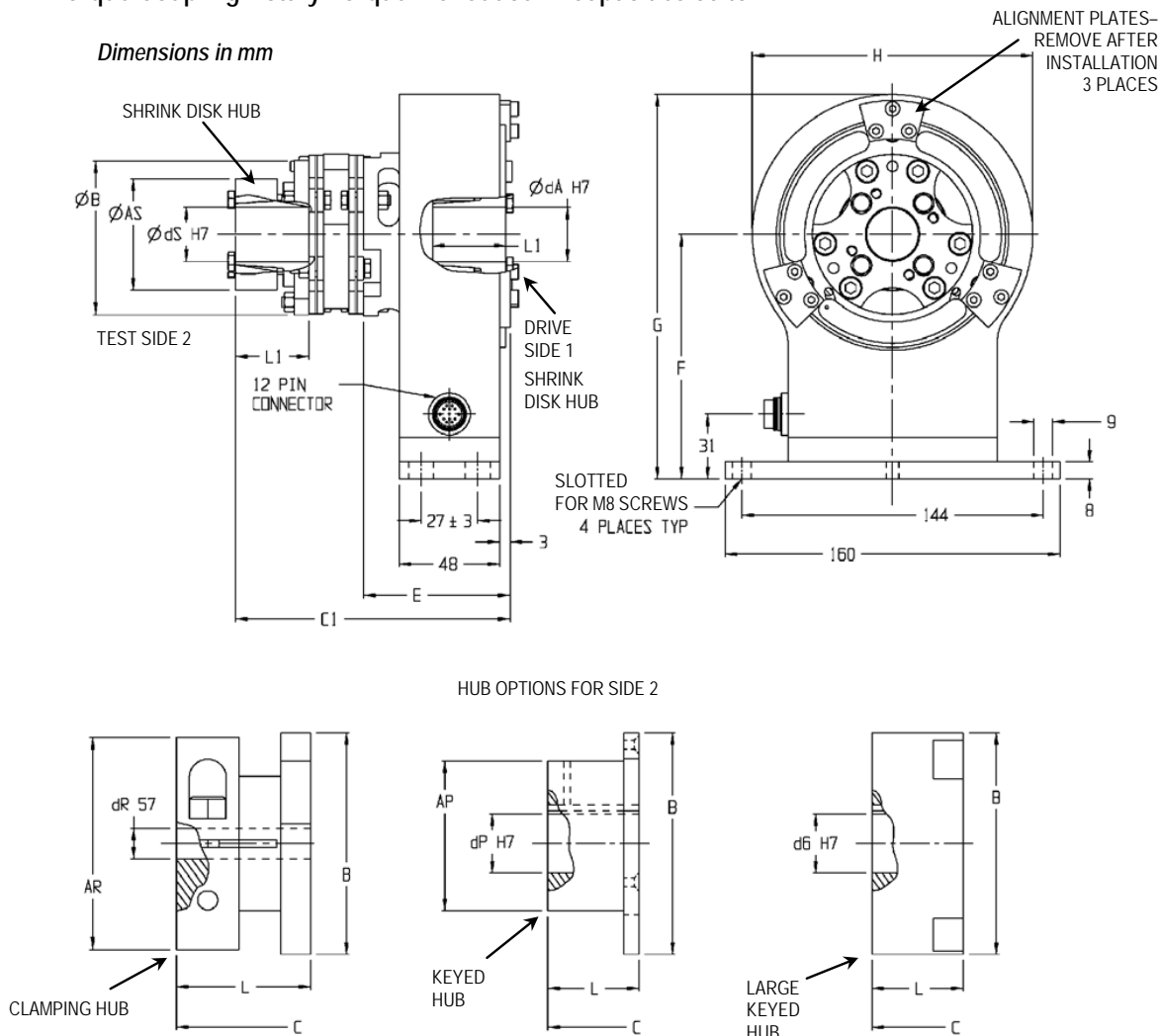
SPECIFICATIONS

| ACCURACY – (MAX ERROR) | Standard | Enhanced |
|-------------------------|--------------------|----------|
| Combined Error–% FS | ±0.15 | ±0.05 |
| Nonrepeatability–% | ±0.02 | ±0.005 |
| TEMPERATURE | | |
| Effect on Zero– % RO/°C | ±0.02 | ±0.008 |
| Effect on Output–%/°C | ±0.01 | ±0.005 |
| Rated Range–°C | +5 to +45 | |
| Operating Range–°C | 0 to 60 | |
| ELECTRICAL | | |
| Output–VDC | ±5 | |
| Bandwidth, Hz (-3dB) | 1000 | |
| Sample Rate | 10 kHz | |
| Calibration Signal–%FS | 100 | |
| Supply Voltage–VDC | 12 to 18 | |
| Supply Current–mA | <100 | |
| Electrical Connection | 12-pin | |
| Resolution | 16-bit | |
| MECHANICAL | | |
| Safe Overload–% RO | 200 | |
| Cyclic Load Rating–% RO | 70 P-P (DIN 50100) | |
| Ultimate Overload–% RO | 300 | |
| Max Speed–rpm | 13.6K - See Table | |

| SIZE | Nominal Torque | | Max Revolution | | *Max Axial Load | *Axial Displacmt Max.(mm) | *Angular Displacmt Max. (°) | *Radial Displacmt Max.(mm) | Spring-rate (Nm/rad) | Moment of Inertia (kg m ²) | |
|---------|----------------|-------|----------------|----------|-----------------|---------------------------|-----------------------------|----------------------------|----------------------|--|---------|
| | Nm | lb-in | Standard | Extended | | | | | | Side 1 | Side 2 |
| 16 (E) | 50 | 443 | 6,800 | 13,600 | 150 | 0.25 | 0.4" (0.2" per disc pack) | 0.05 | 6.3E+04 | 2.1E-03 | 1.0E-03 |
| | 100 | 885 | | | | | | | 6.9E+04 | | |
| | 150 | 1.33K | | | | | | | 6.9E+04 | | |
| 25 (F) | 150 | 1.33K | 5,900 | 11,800 | 190 | 0.25 | | 0.05 | 1.3E+05 | 4.0E-03 | 1.8E-03 |
| | 200 | 1.77K | | | | | | | 1.3E+05 | | |
| | 250 | 2.21K | | | | | | | 1.3E+05 | | |
| 40 (G) | 200 | 1.77K | 5,000 | 10,000 | 250 | 0.3 | | 0.06 | 1.5E+05 | 6.4E-03 | 3.7E-03 |
| | 300 | 2.66K | | | | | | | 1.5E+05 | | |
| | 400 | 3.54K | | | | | | | 1.5E+05 | | |
| 64 (H) | 400 | 3.54K | 4,300 | 8,500 | 450 | 0.3 | | 0.06 | 3.6E+05 | 9.3E-03 | 8.5E-03 |
| | 500 | 4.43K | | | | | 3.6E+05 | | | | |
| | 600 | 5.31K | | | | | 3.6E+05 | | | | |
| 100 (J) | 600 | 5.31K | 3,700 | 7,300 | 600 | 0.45 | 0.07 | 5.5E+05 | 1.9E-02 | 1.6E-02 | |
| | 750 | 6.64K | | | | | | 5.5E+05 | | | |
| | 1K | 8.85K | | | | | | 5.5E+05 | | | |

*Single values may not reach the maximum values simultaneously. Moments of inertia apply to clamping hub at largest bore.

T1 Torque Coupling Rotary Torque Transducer – Capacities 50 to 1K Nm



DIMENSIONS

| Size (mm) | | | | | | | | | | | | | | | | | |
|-----------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|----|-------|-----|-----|----|----|
| | AS | AR | AP | B | C | C1 | dA* | dS* | dR* | dP* | dG* | E | F | G | H | L | L1 |
| 16 | 53 | 73 | 50 | 77 | 134.2 | 129.2 | 14-26 | 14-26 | 25-35 | 16-32 | 30-45 | 64 | 117 | 184 | 134 | 40 | 35 |
| 25 | 64 | 84 | 60 | 89 | 139.4 | 134.4 | 20-36 | 20-36 | 30-40 | 20-40 | 35-55 | 68 | 122.5 | 195 | 145 | 45 | 40 |
| 40 | 74 | 97 | 70 | 104 | 153.8 | 143.8 | 25-45 | 24-45 | 30-45 | 25-50 | 45-65 | 68 | 130.5 | 211 | 161 | 55 | 45 |
| 64 | 84 | 115 | 80 | 123 | 170.2 | 155.2 | 30-34 | 30-45 | 35-55 | 30-55 | 55-75 | 68 | 140 | 230 | 180 | 65 | 50 |
| 100 | 104 | 135 | 100 | 143 | 181 | 161 | 35-55 | 35-55 | 40-68 | 35-70 | 65-95 | 68 | 150 | 250 | 200 | 75 | 55 |

Dimensions are min. – max. With an additional keyway on side 1 the max. ϕdA will reduce, see options.

Model T2 Precision Rotary Torque Transducer

- Capacities from 0.1 to 20K Nm (0.88 to 177K lb-in)
- ± 5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 10 kHz sample rate
- 16-bit resolution



OPTIONS

Speed & Angle Output - 360 Pulse TTL, 2-Tracks 90° Offset, Available on capacities up to 1,000 Nm only

Speed Output - 60 Pulse TTL, 1-Track, Available on capacities 2,000 Nm & above

+10 V Torque Output

RS485

Keyed Shafts - per DIN 6885.1

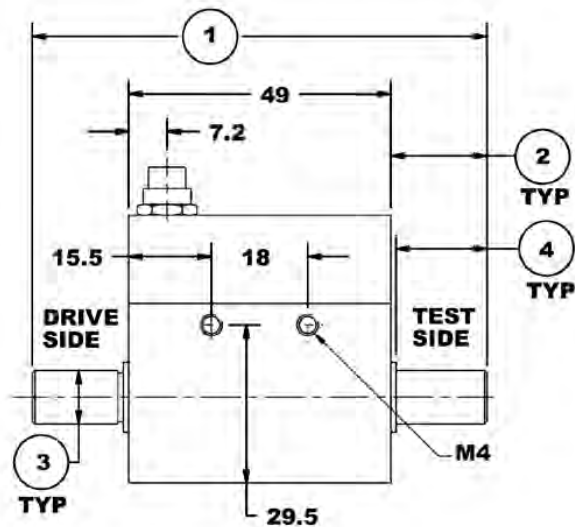
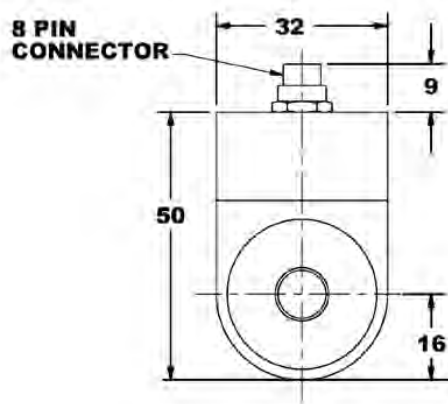
SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|------------------------------------|---------------------------------|
| Combined Error-% FS | ± 0.1 |
| Nonrepeatability-% | ± 0.02 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.02 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.01 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Calibration Signal-%RO | 100 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 8 or 12-pin |
| Resolution | 16-bit |
| Sample Rate-kHz | 10 |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cyclic Load Rating-% RO | 70 P-P (DIN 50100) |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

T2 Precision Rotary Torque Transducer – Capacities 0.1 to 15 Nm

DIMENSIONS

| Capacity (Nm) | Nominal Torque | | | |
|--------------------|------------------------------------|-----|-------------------|------|
| | 0.1, 0.2, 0.5, 1, 2, 5 | | 10, 15 | |
| Equivalent (lb-in) | 0.88, 1.77, 4.43, 8.85, 17.7, 44.3 | | 88.5, 133 | |
| | inch | mm | inch | mm |
| (1) | 3.35 | 85 | 3.35 | 85 |
| (2) | 0.71 | 18 | 0.71 | 18 |
| (3) | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 |
| (4) | 0.67 | 17 | 0.67 | 17 |

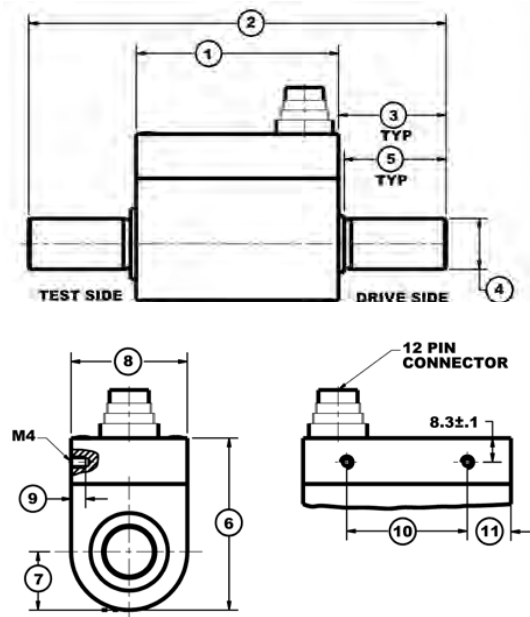


Dimensions in mm

T1 Torque Coupling Rotary Torque Transducer – Capacities 20 to 500 Nm

DIMENSIONS

| Capacity (Nm) | Nominal Torque | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|-------|
| | 20, 30 | | 50, 100 | | 200, 500 | |
| Equivalent (lb-in) | 177, 265 | | 443, 885 | | 1.77K, 4.43K | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 2.81 | 71.5 | 2.81 | 71.5 | 2.85 | 72.5 |
| (2) | 4.39 | 111.5 | 5.81 | 147.5 | 6.28 | 159.5 |
| (3) | 0.79 | 20 | 1.50 | 38 | 1.71 | 43.5 |
| (4) | 0.7084/ 0.7080 | 18 h6 | 0.7084/ 0.7080 | 18 h6 | 1.2595/ 1.2589 | 32 h6 |
| (5) | 0.71 | 18 | 1.42 | 36 | 1.50 | 38 |
| (6) | 2.32 | 59 | 2.32 | 59 | 2.99 | 76 |
| (7) | 0.79 | 20 | 0.79 | 20 | 0.79 | 29 |
| (8) | 1.57 | 40 | 1.57 | 40 | 2.28 | 58 |
| (9) | 0.20 | 5 | 0.20 | 5 | 0.24 | 6 |
| (10) | 1.63 | 41.5 | 1.63 | 41.5 | 1.16 | 29.5 |
| (11) | 0.59 | 15 | 0.59 | 15 | 0.87 | 22 |



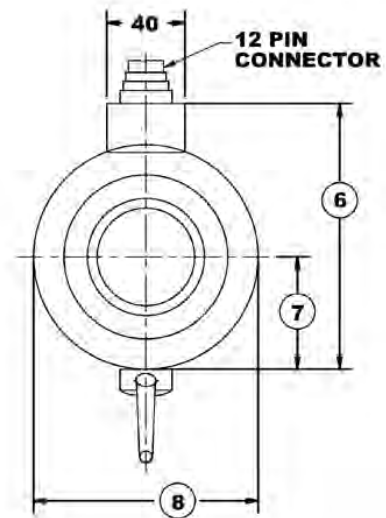
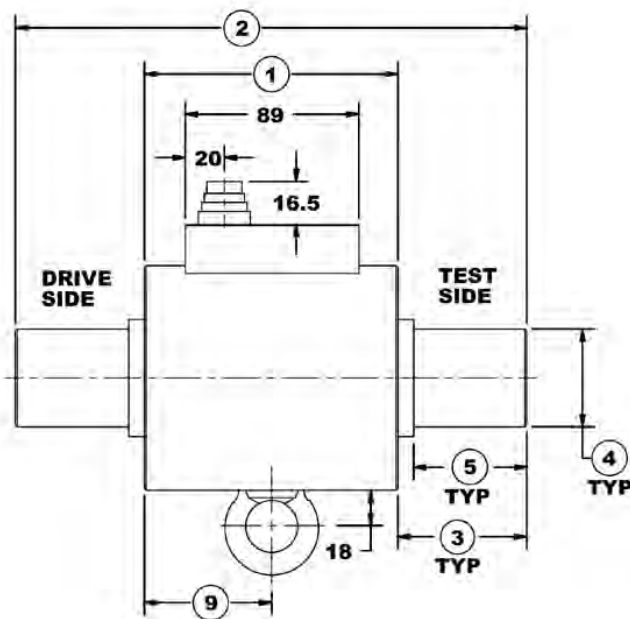
T2 Precision Rotary Torque Transducer –
Capacities 1,000 to 20,000 Nm

DIMENSIONS

| Capacity (Nm) | Nominal Torque | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|--------|
| | 1K | | 2K, 5K | | 10K, 20K | |
| Equivalent (lb-in) | 8.85K | | 17K, 44.3K | | 85.5K, 177K | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 5.12 | 130 | 5.31 | 135 | 6.70 | 170 |
| (2) | 10.31 | 262 | 14.84 | 377 | 18.50 | 470 |
| (3) | 2.60 | 66 | 4.76 | 121 | 5.51 | 140 |
| (4) | 1.9685/ 1.9675 | 50 h7 | 2.7559/ 2.7547 | 70 h7 | 4.3307/ 4.3293 | 110 h7 |
| (5) | 2.28 | 58 | 4.33 | 110 | 4.72 | 120 |
| (6) | 5.35 | 136 | 6.34 | 161 | 9.17 | 233 |
| (7) | 2.26 | 57.5 | 2.74 | 69.5 | 4.09 | 104 |
| (8) | 4.53 | 115 | 5.47 | 139 | 8.19 | 208 |
| (9) | 2.58 | 65.5 | 2.66 | 67.5 | 3.74 | 95 |



Dimensions in mm



T2 PRECISION ROTARY TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA, J (Kgxm ²) | | MAX THRUST LOAD (N) |
|------------------|---------|------------------------|---|----------------------|------------------------|
| | | | Drive Side | Test Side | |
| 0.1 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 15 |
| 0.2 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 20 |
| 0.5 | 15,000 | 1.2x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 |
| 1 | 15,000 | 1.2x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 40 |
| 2 | 15,000 | 3.6x10 ² | 1.9x10 ⁻⁶ | 2.9x10 ⁻⁷ | 50 |
| 5 | 15,000 | 6.4x10 ² | 1.9x10 ⁻⁶ | 3.0x10 ⁻⁷ | 50 |
| 10 | 15,000 | 9.3x10 ² | 2.1x10 ⁻⁶ | 3.8x10 ⁻⁷ | 50 |
| 15 | 15,000 | 9.3 x10 ² | 2.1x10 ⁻⁶ | 3.8x10 ⁻⁷ | 100 |
| 20 | 15,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 300 |
| 30 | 15,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 1,000 |
| 50 | 15,000 | 8.5x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 1,600 |
| 100 | 12,000 | 8.5x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 2,600 |
| 200 | 12,000 | 6.7x10 ⁴ | 1.0x10 ⁻⁴ | 9.0x10 ⁻⁵ | 3,200 |
| 500 | 10,000 | 7.8x10 ⁴ | 1.0x10 ⁻⁴ | 9.2x10 ⁻⁵ | 7,500 |
| 1,000 | 7,000 | 3.1x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 10,000 |
| 2,000 | 5,500 | 7.2x10 ⁵ | 5.3x10 ⁻³ | 4.3x10 ⁻³ | 18,000 |
| 5,000 | 5,500 | 8.0x10 ⁵ | 5.4x10 ⁻³ | 4.3x10 ⁻³ | 32,000 |
| 10,000 | 5,000 | 1.2x10 ⁶ | 4.1x10 ⁻² | 3.9x10 ⁻² | 125,000 |
| 20,000 | 5,000 | 2.1x10 ⁶ | 4.1x10 ⁻² | 4.3x10 ⁻² | 200,000 |

ELECTRICAL CONNECTION

| 8-Pin Electrical Connection | | |
|-----------------------------|----------------|-----------------------|
| Pin | Function | Description |
| 1 | Supply (+) | 12-28 VDC |
| 2 | Supply (GND) | 0 VDC, TTL |
| 3 | Signal (+) | ±5 VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | L < 2.0 V / H > 3.5 V |
| 6 | Option Angle A | TTL |
| 7 | Option Angle B | TTL |
| 8 | NC | - |

| 12-Pin Electrical Connection | | | 12-Pin RS485 Option | |
|------------------------------|----------------|-----------------------|---------------------|-------------|
| Pin | Function | Description | Function | Description |
| A | NC | - | NC | - |
| B | Option Angle B | TTL | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC | NC | - |
| D | Signal (GND) | 0 VDC | NC | - |
| E | Supply (GND) | 0 VDC, TTL | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 V | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL | Option Angle A | TTL |
| H | NC | - | NC | - |
| J | NC | - | RS485 Option | RS485 (B) |
| K | Cal. Control | L < 2.0 V / H > 3.5 V | NC | - |
| L | NC | - | RS485 Option | RS485 (A) |
| M | Housing | | Housing | |



Model T3 Precision Pedestal Rotary Torque Transducer

- Capacities from 0.1 to 20K Nm (0.88 to 177K lb-in)
- Speed Up To 15K RPM
- ± 5 VDC Output
- 12-28VDC Supply
- Contactless Data Transmission
- Digital Electronics with On-Shaft Shunt
- 0.1% Combined Error
- 10 kHz Sample Rate
- 16-Bit Resolution
- Stainless Steel Shaft
- Very Short Overall Length

Options

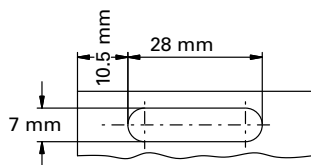
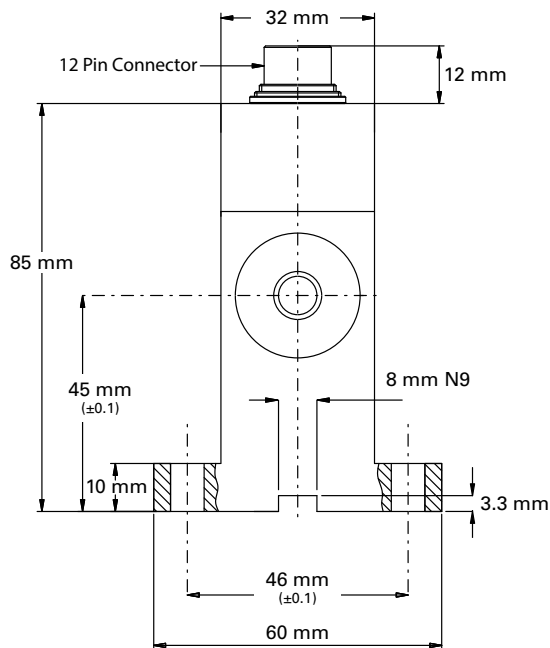
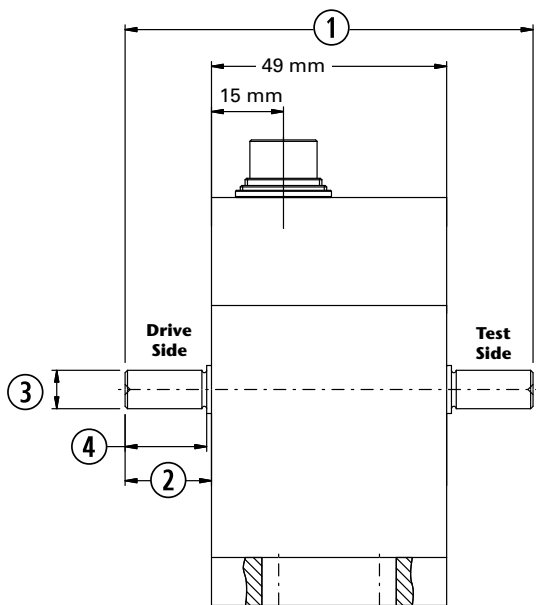
- $\pm 0.05\%$ Combined Error
- Encoder for Speed/Angle Measurement (Speed Only On 2K Nm and Above Capacities)
- Keyed Shaft Per DIN 6885.1
- Right Angle Mating Connector or Cable Assembly
- ± 10 VDC Output
- RS485 Output

Specifications

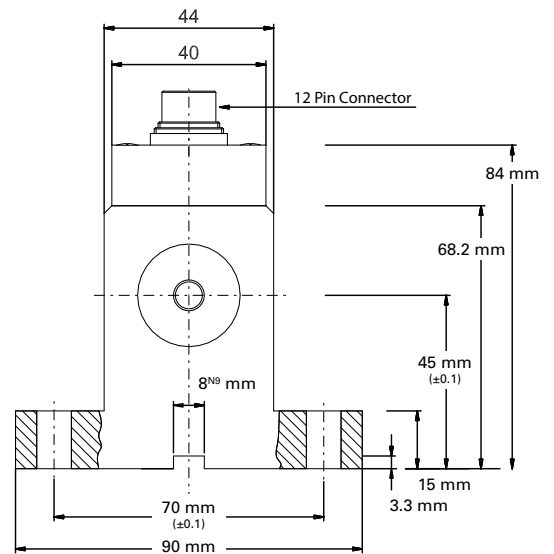
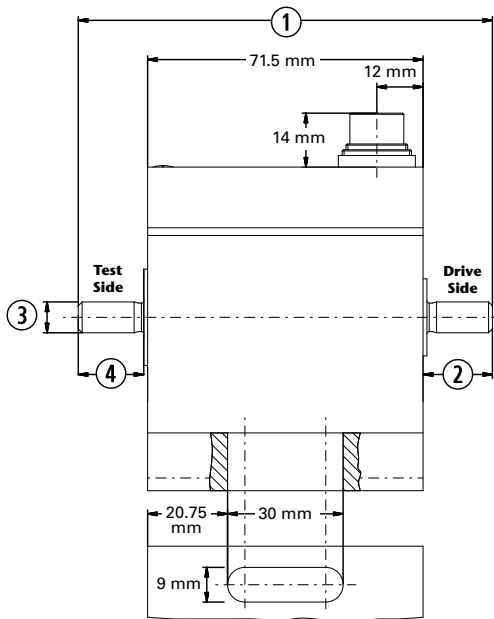
| | |
|------------------------------------|---|
| Accuracy - (MAX ERROR) | |
| Combined Error - %FS | ± 0.1 |
| Nonrepeatability - %FS | ± 0.02 |
| Resolution | 16-bit |
| Temperature | |
| Effect on Zero - %RO/ $^{\circ}$ C | ± 0.02 |
| Effect on Zero - %RO/ $^{\circ}$ F | ± 0.01 |
| Effect on Output - %/ $^{\circ}$ C | ± 0.01 |
| Effect on Output - %/ $^{\circ}$ F | ± 0.006 |
| Compensated Range - $^{\circ}$ C | +5 to +45 |
| Compensated Range - $^{\circ}$ F | +41 to +113 |
| Operating Range - $^{\circ}$ C | 0 to +60 |
| Operating Range - $^{\circ}$ F | +32 to +140 |
| Storage Range - $^{\circ}$ C | -10 to +70 |
| Storage Range - $^{\circ}$ F | +14 to +158 |
| Electrical | |
| Supply Voltage - VDC | 12 to 28 |
| Supply Current - mA | ≤ 60 |
| Output - VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Sample Rate - Hz | 10,000 |
| Calibration Signal - %FS | 100 |
| Electrical Connection | 12-pin Binder Series 581 (Includes Mate) |
| Encoder Option | |
| 0.1 – 1K Nm Capacities | 360 Pulse/Rev, 2-Track, +5V TTL, 90 $^{\circ}$ Offset, Quadrature Encoder |
| 2K – 20K Nm Capacities | 60 Pulse/Rev, 1-Track, +5V TTL |
| Mechanical | |
| Safe Overload - %RO | 200 |
| Cyclic Load Rating - %RO | 70 P-P (DIN 50100) |
| Max Speed - RPM | Varies with Capacity (See Table) |
| Shaft Material | Stainless Steel |
| Housing Material | Aluminum |

Specifications

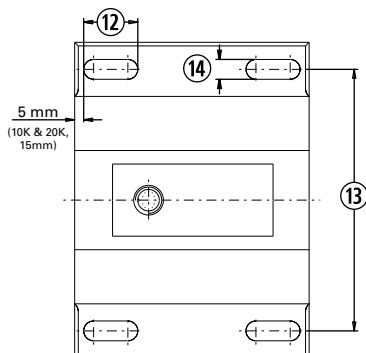
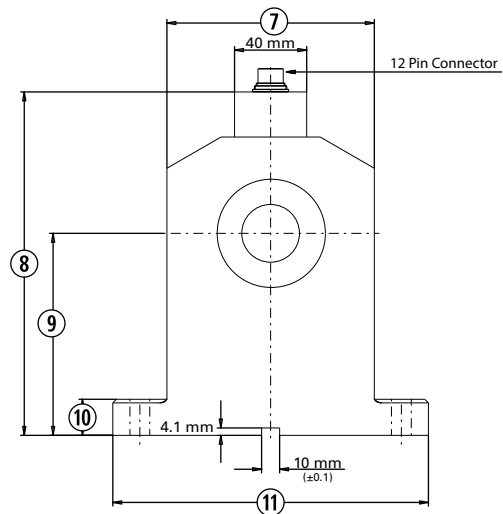
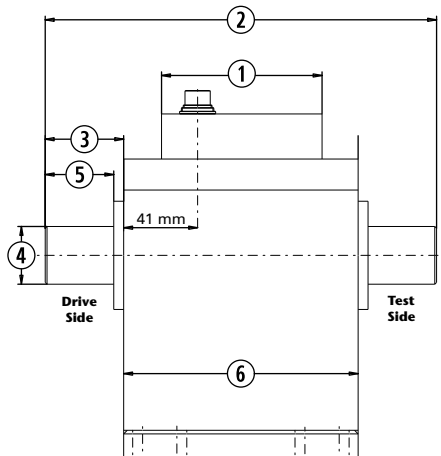
| Nominal Torque | | | | |
|----------------|------------------|-----|------------------|-----|
| Capacity | 0.1, 0.2 Nm | | 0.5, 1 Nm | |
| Equivalent | 0.88, 1.77 lb-in | | 4.43, 8.85 lb-in | |
| | inch | mm | inch | mm |
| 1 | 3.35 | 85 | 3.35 | 85 |
| 2 | 0.71 | 18 | 0.71 | 18 |
| 3 | 0.3148 / 0.3144 | 8g6 | 0.3148 / 0.3144 | 8g6 |
| 4 | 0.67 | 17 | 0.67 | 17 |



| Nominal Torque | | | | | | | | |
|----------------|--------------------|-------|--------------------|-------|--------------------|-------|--------------------|-------|
| Capacity | 2, 5 Nm | | 10 Nm | | 20, 30 Nm | | 50, 100 Nm | |
| Equivalent | 17.7, 44.3 lb-in | | 88.5 lb-in | | 177, 265 lb-in | | 443, 885 lb-in | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| 1 | 4.23 | 107.5 | 4.23 | 107.5 | 4.39 | 111.5 | 5.81 | 147.5 |
| 2 | 0.71 | 18 | 0.71 | 18 | 0.79 | 20 | 1.50 | 38 |
| 3 | 0.3148 / 0.3144 | 8g6 | 0.3935 / 0.3931 | 10g6 | 0.7087 / 0.7082 | 18h6 | 0.7087 / 0.7082 | 18h6 |
| 4 | 0.67 | 17 | 0.67 | 17 | 0.71 | 18 | 1.42 | 36 |



| Nominal Torque | | | | | | | | |
|----------------|--------------------|-------|-----------------|-------|------------------|-------|-------------------|-------|
| Capacity | 200, 500 Nm | | 1K Nm | | 2K, 5K Nm | | 10K, 20K | |
| Equivalent | 1.77K, 4.43K lb-in | | 8.85K lb-in | | 17K, 44.3K lb-in | | 85.5K, 177K lb-in | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| 1 | 3.50 | 89 | 3.50 | 89 | 3.50 | 89 | 3.50 | 89 |
| 2 | 8.54 | 217 | 10.31 | 262 | 14.84 | 377 | 18.50 | 470 |
| 3 | 1.71 | 43.5 | 2.60 | 66 | 4.76 | 121 | 5.51 | 140 |
| 4 | 1.2595 / 1.2598 | 32h6 | 1.9685 / 1.9675 | 50h7 | 2.7559 / 2.7547 | 70h7 | 4.3307 / 4.3293 | 110h7 |
| 5 | 1.5 | 38 | 2.28 | 58 | 4.33 | 110 | 4.72 | 120 |
| 6 | 5.12 | 130 | 5.12 | 130 | 5.31 | 135 | 7.48 | 190 |
| 7 | 4.53 | 115 | 4.53 | 115 | 5.47 | 139 | 8.27 | 210 |
| 8 | 7.50 | 190.4 | 7.50 | 190.4 | 9.90 | 251.5 | 12.52 | 343 |
| 9 | 4.41 | 112 | 4.41 | 112 | 6.30 | 160 | 8.46 | 215 |
| 10 | 0.79 | 20 | 0.79 | 20 | 0.98 | 25 | 1.57 | 40 |
| 11 | 6.89 | 175 | 6.89 | 175 | 8.15 | 207 | 11.81 | 300 |
| 12 | 1.18 | 30 | 1.18 | 30 | 1.42 | 36 | 1.77 | 45 |
| 13 | 5.71 | 145 | 5.71 | 145 | 6.81 | 173 | 10.24 | 260 |
| 14 | 0.43 | 11 | 0.43 | 11 | 0.51 | 13 | 0.67 | 17 |



| T3 Performance Parameters | | | | | | |
|---------------------------|---------|---------------------|--|----------------------|-----------------|----------------|
| Capacity | Max RPM | Springrate | Moment of Inertia, J (Kgx ^m ²) *1 | | Max Thrust Load | Max Sheer Load |
| Nm | | (Nm/rad) | Drive Side | Test Side | (N) | (N) |
| 0.1 | 15K | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 | 0.9 |
| 0.2 | 15K | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 | 1.2 |
| 0.5 | 15K | 1.2x10 ² | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 | 2.9 |
| 1 | 15K | 1.2x10 ² | 2.0x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 | 2.9 |
| 2 | 12K | 4.4x10 ² | 1.0x10 ⁻⁵ | 8.1x10 ⁻⁶ | 62 | 8.5 |
| 5 | 12K | 4.4x10 ² | 1.0x10 ⁻⁵ | 8.1x10 ⁻⁶ | 62 | 8.5 |
| 10 | 12K | 1.7x10 ³ | 1.0x10 ⁻⁵ | 8.2x10 ⁻⁶ | 62 | 28 |
| 20 | 12K | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 62 | 43 |
| 30 | 12K | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 62 | 64 |
| 50 | 12K | 8.5x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 62 | 64 |
| 100 | 12K | 8.4x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 62 | 64 |
| 200 | 7K | 9.2x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 760 | 350 |
| 500 | 7K | 9.2x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 760 | 420 |
| 1,000 | 7K | 3.1x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 760 | 800 |
| 2,000 | 5.5K | 7.2x10 ⁵ | 5.3x10 ⁻³ | 4.3x10 ⁻³ | 1100 | 860 |
| 5,000 | 5.5K | 8.0x10 ⁵ | 5.4x10 ⁻³ | 4.3x10 ⁻³ | 1100 | 860 |
| 10,000 | 3.5K | 3.1x10 ⁶ | 4.0x10 ⁻² | 3.7x10 ⁻² | 2800 | 2300 |
| 20,000 | 3.5K | 3.7x10 ⁶ | 4.0x10 ⁻² | 3.8x10 ⁻² | 2800 | 2300 |

*1Without Encoder Option

| Electrical Connection | | | | |
|-----------------------|----------------|----------------|---------------------|-------------|
| PIN | 12-Pin | | 12-Pin RS485 Option | |
| | Function | Description | Function | Description |
| A | NC | - | NC | - |
| B | Option Angle B | TTL | Option Angle B | TTL |
| C | Signal (+) | ±5VDC | NC | - |
| D | Signal (GND) | 0VDC | NC | - |
| E | Supply (GND) | 0VDC, TTL | Supply (GND) | 0VDC |
| F | Supply (+) | 12-28V | Supply (+) | 12-28VDC |
| G | Option Angle A | TTL | Option Angle A | TTL |
| H | NC | - | NC | - |
| J | NC | - | RS485 Option | RS485 (B) |
| K | Cal. Control | L<2.0V/H >3.5V | NC | - |
| L | NC | - | RS485 Option | RS485 (A) |
| M | Housing | - | Housing | - |

Model T4 General Purpose Rotary Torque Transducer

- Capacities from 0.1 to 1K Nm (0.88 to 8.85K lb-in)
- ± 5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 10 kHz sample rate
- 12-bit resolution



OPTIONS

Speed & Angle Output - 360 Pulse TTL, 2-tracks 90° offset, available on capacities up to 1,000 Nm only
 Speed Output - 60 Pulse TTL, 1-track, available on capacities 2,000 Nm & above
 ± 10 V torque output
 RS485
 Keyed shafts - per DIN 6885.1

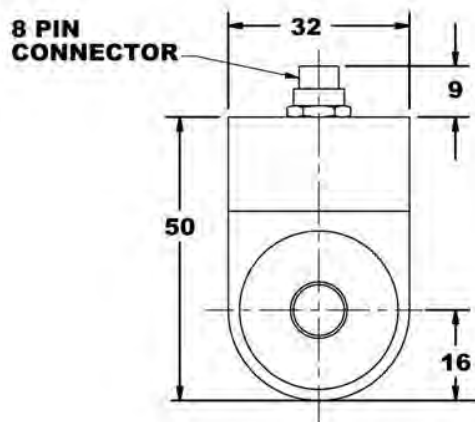
SPECIFICATIONS

| | |
|------------------------------------|---------------------------------|
| ACCURACY - (MAX ERROR) | |
| Combined Error-% FS | ± 0.2 |
| Nonrepeatability-% | ± 0.04 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.03 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.015 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Calibration Signal-%RO | 100 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 8 or 12-pin |
| Resolution | 12-bit |
| Sample Rate-kHz | 10 |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cyclic Load Rating-% RO | 70 P-P (DIN 50100) |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

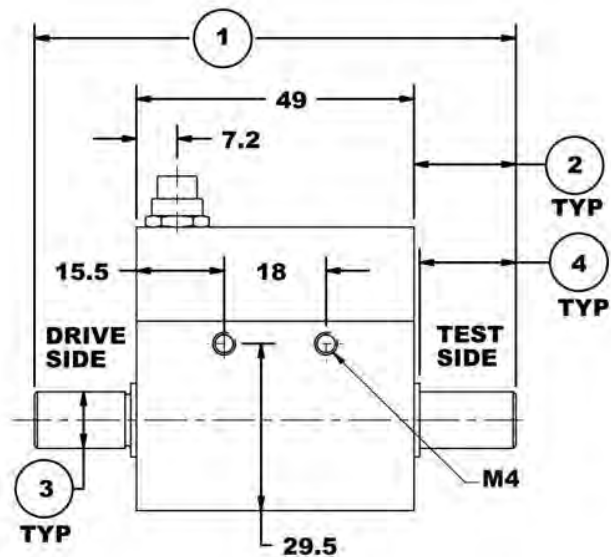
Model T4 General Purpose Rotary Torque Transducer – Capacities 0.1 to 15 Nm

DIMENSIONS

| Nominal Torque | | | | |
|--------------------|---------------------------------------|-----|-------------------|------|
| Capacity (Nm) | 0.1, 0.2, 0.5 1, 2, 5 | | 10, 15 | |
| Equivalent (lb-in) | 0.88, 1.77, 4.43, 8.85, 17.7, 44.3 | | 88.5, 133 | |
| | inch | mm | inch | mm |
| (1) | 3.35 | 85 | 3.35 | 85 |
| (2) | 0.71 | 18 | 0.71 | 18 |
| (3) | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 |
| (4) | 0.67 | 17 | 0.67 | 17 |



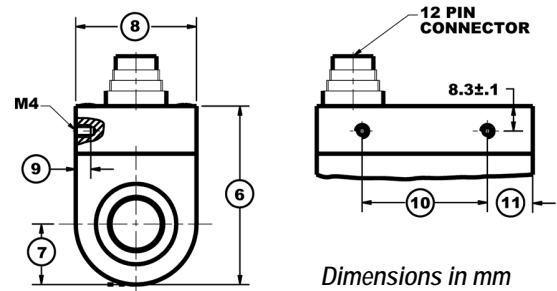
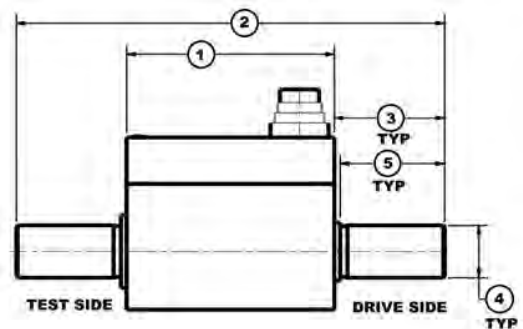
Dimensions in mm



Model T4 General Purpose Rotary Torque Transducer – Capacities 20 to 500 Nm

DIMENSIONS

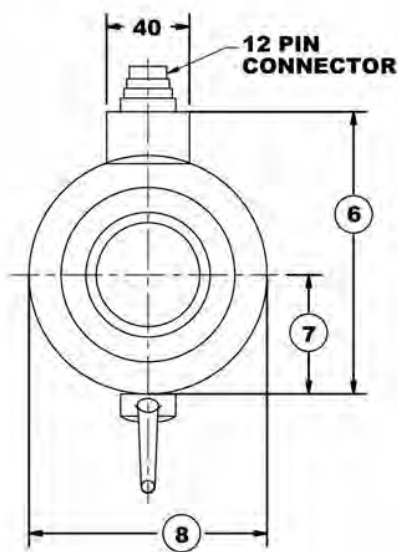
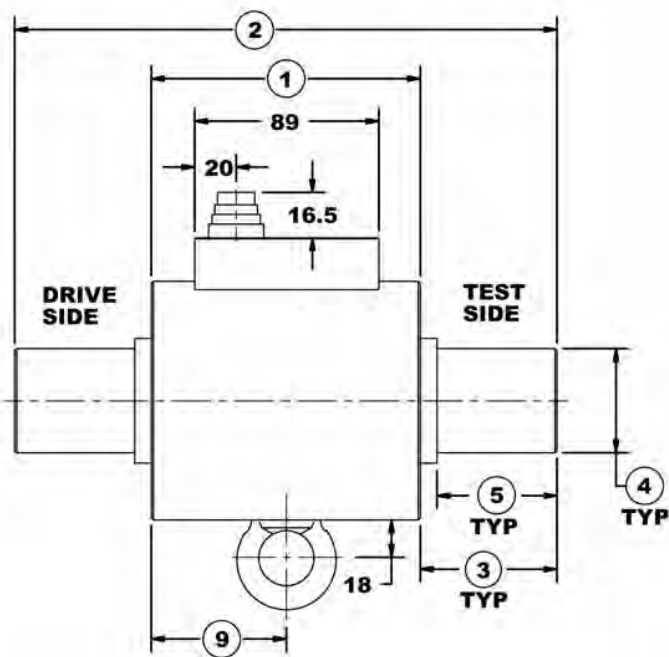
| Nominal Torque | | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|-------|
| Capacity (Nm) | 20, 30 | | 50, 100 | | 200, 500 | |
| Equivalent (lb-in) | 177, 265 | | 443, 885 | | 1.77K, 4.43K | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 2.81 | 71.5 | 2.81 | 71.5 | 2.85 | 72.5 |
| (2) | 4.39 | 111.5 | 5.81 | 147.5 | 6.28 | 159.5 |
| (3) | 0.79 | 20 | 1.50 | 38 | 1.71 | 43.5 |
| (4) | 0.7087/ 0.7082 | 18 h6 | 0.7087/ 0.7082 | 18 h6 | 1.2595/ 1.2589 | 32 h6 |
| (5) | 0.71 | 18 | 1.42 | 36 | 1.50 | 38 |
| (6) | 2.32 | 59 | 2.32 | 59 | 2.99 | 76 |
| (7) | 0.79 | 20 | 0.79 | 20 | 0.79 | 29 |
| (8) | 1.57 | 40 | 1.57 | 40 | 2.28 | 58 |
| (9) | 0.20 | 5 | 0.20 | 5 | 0.24 | 6 |
| (10) | 1.63 | 41.5 | 1.63 | 41.5 | 1.16 | 29.5 |
| (11) | 0.59 | 15 | 0.59 | 15 | 0.87 | 22 |



Model T4 General Purpose Rotary Torque Transducer – 1,000 Nm Capacity

DIMENSIONS

| Nominal Torque | | |
|--------------------|---------------|-------|
| Capacity (Nm) | 1K | |
| Equivalent (lb-in) | 8.85K | |
| | inch | mm |
| (1) | 5.12 | 130 |
| (2) | 10.31 | 262 |
| (3) | 2.60 | 66 |
| (4) | 1.9685/1.9675 | 50 h7 |
| (5) | 2.28 | 58 |
| (6) | 5.35 | 136 |
| (7) | 2.26 | 57.5 |
| (8) | 4.53 | 115 |
| (9) | 2.58 | 65.5 |



Dimensions in mm

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA , J (Kgxm ²) | | MAX THRUST LOAD (N) |
|------------------|---------|------------------------|---|----------------------|------------------------|
| | | | Drive Side | Test Side | |
| 0.1 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 15 |
| 0.2 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 20 |
| 0.5 | 15,000 | 1.2x10 ² | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 |
| 1 | 15,000 | 1.2x10 ² | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 40 |
| 2 | 15,000 | 3.6x10 ² | 1.9x10 ⁻⁶ | 2.9x10 ⁻⁷ | 50 |
| 5 | 15,000 | 6.4x10 ² | 1.9x10 ⁻⁶ | 3.0x10 ⁻⁷ | 50 |
| 10 | 15,000 | 9.3x10 ² | 2.1x10 ⁻⁶ | 3.8x10 ⁻⁷ | 50 |
| 15 | 15,000 | 9.3x10 ² | 2.1x10 ⁻⁶ | 3.8x10 ⁻⁷ | 100 |
| 20 | 15,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 300 |
| 30 | 15,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 1,000 |
| 50 | 15,000 | 8.5x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 1,600 |
| 100 | 12,000 | 8.5x10 ³ | 1.3x10 ⁻⁵ | 1.2x10 ⁻⁵ | 2,600 |
| 200 | 12,000 | 6.7x10 ⁴ | 1.0x10 ⁻⁴ | 9.0x10 ⁻⁵ | 3,200 |
| 500 | 10,000 | 7.8x10 ⁴ | 1.0x10 ⁻⁴ | 9.2x10 ⁻⁵ | 7,500 |
| 1,000 | 7,000 | 3.1x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 10,000 |

ELECTRICAL CONNECTION

| 8-Pin Electrical Connection | | |
|-----------------------------|----------------|--------------------|
| Pin | Function | Description |
| 1 | Supply (+) | 12-28 VDC |
| 2 | Supply (GND) | 0 VDC, TTL |
| 3 | Signal (+) | ±5 VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | L < 2.0 / H > 3.5V |
| 6 | Option Angle A | TTL |
| 7 | Option Angle B | TTL |
| 8 | NC | - |

| 12-Pin Electrical Connection | | | 12-Pin RS485 Option | |
|------------------------------|----------------|----------------------|---------------------|-------------|
| Pin | Function | Description | Function | Description |
| A | NC | - | NC | - |
| B | Option Angle B | TTL | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC | NC | - |
| D | Signal (GND) | 0 VDC | NC | - |
| E | Supply (GND) | 0 VDC, TTL | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 V | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL | Option Angle A | TTL |
| H | NC | - | NC | - |
| J | NC | - | RS485 Option | RS485 (B) |
| K | Cal. Control | L < 2.0 V / H > 3.5V | NC | - |
| L | NC | - | RS485 Option | RS485 (A) |
| M | Housing | | Housing | |

Model T5 General Purpose- Pedestal Rotary Torque Transducer

- Capacities from 0.1 Nm to 1K Nm (0.85 to 8.85K lb-in)
- Integral mounting base
- ± 5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 10 kHz sample rate
- 12-bit resolution



OPTIONS

Speed & Angle Measurement - 360 Pulse TTL, 2-tracks 90° offset, available on capacities up to 1,000 Nm only
 Speed Output - 60 Pulse TTL, 1-track, available on capacities 2,000 Nm & above
 +10 V torque output
 RS485
 Keyed shafts - per Din 6885.1

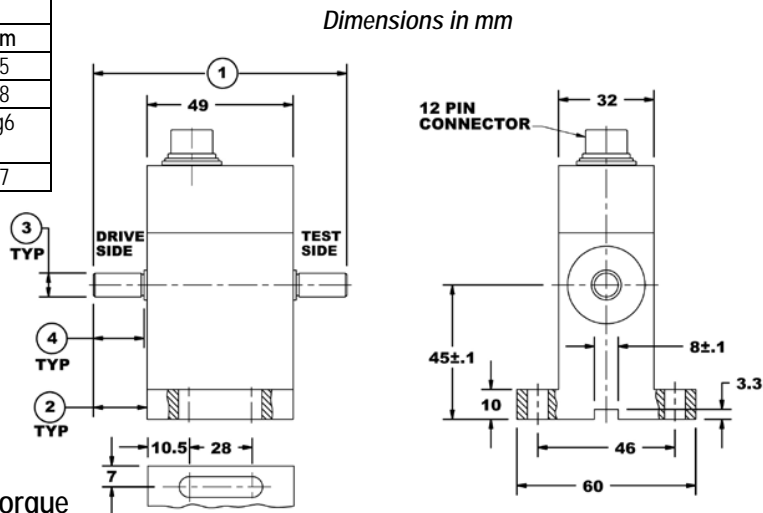
SPECIFICATIONS

| | |
|------------------------------------|---------------------------------|
| ACCURACY - (MAX ERROR) | |
| Combined Error-% FS | ± 0.2 |
| Nonrepeatability-% | ± 0.04 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.03 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.015 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz | 3 kHz-3dB |
| Calibration Signal-%RO | 100 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 12-pin |
| Resolution | 12-bit |
| Sample Rate-kHz | 10 |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cycle Load Rating-% RO | ± 70 peak |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

Model T5 General Purpose-Pedestal Rotary Torque Transducer – Capacities 0.1 to 1 Nm

DIMENSIONS

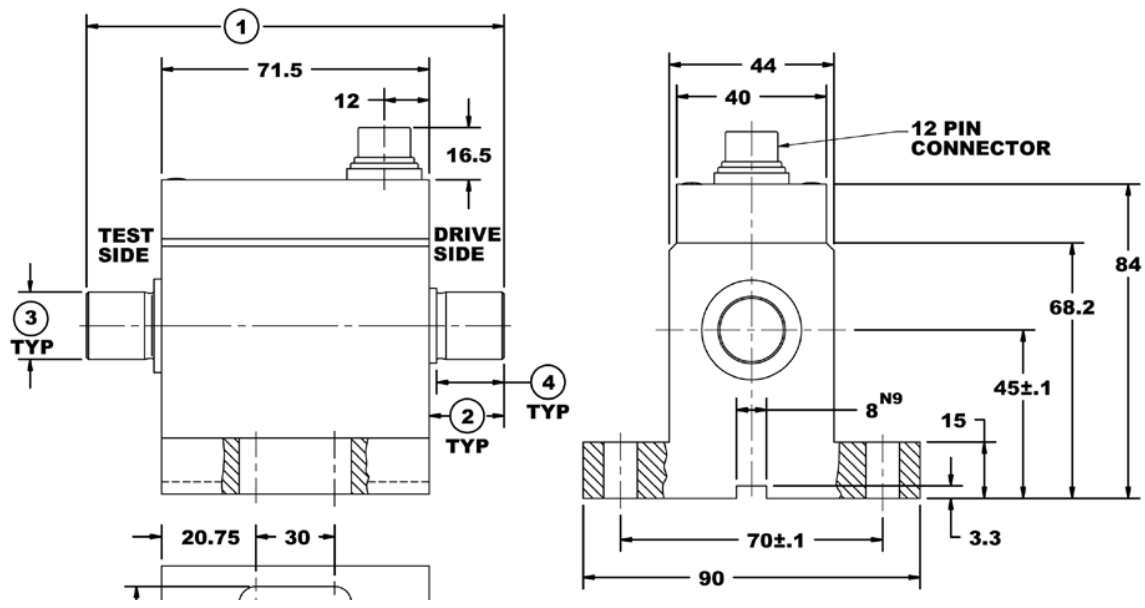
| Nominal Torque | | | | |
|--------------------|-------------------|-----|-------------------|-----|
| Capacity (Nm) | 0.1, 0.2 | | 0.5, 1 | |
| Equivalent (lb-in) | 0.85, 1.77 | | 4.43, 8.85 | |
| | inch | mm | inch | mm |
| (1) | 3.35 | 85 | 3.35 | 85 |
| (2) | 0.71 | 18 | 3.86 | 98 |
| (3) | 0.3148/ 0.3144 | 8g6 | 0.3148/ 0.3144 | 8g6 |
| (4) | 0.67 | 17 | 0.67 | 17 |



Model T5 General Purpose-Pedestal Rotary Torque Transducer – Capacities 2 to 100 Nm

DIMENSIONS

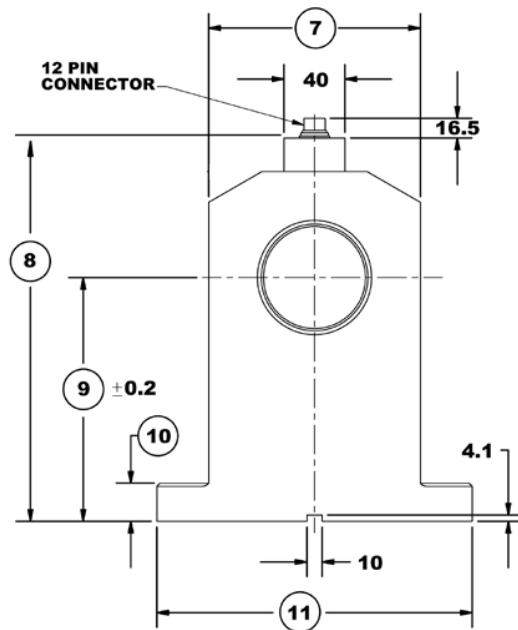
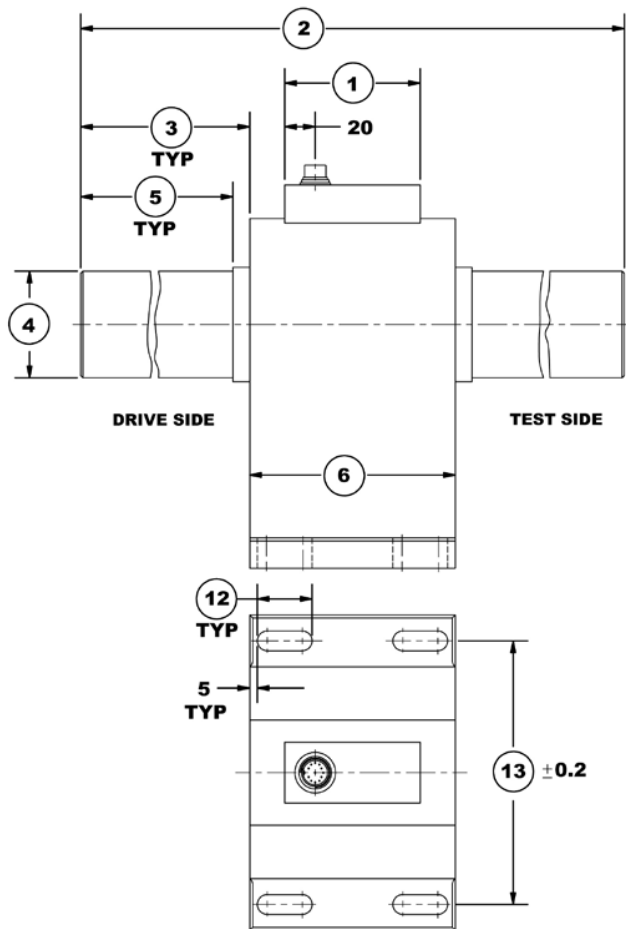
| Nominal Torque | | | | | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|--|
| Capacity (Nm) | 2, 5 | | 10, 15 | | 20, 30 | | 50, 100 | | |
| Equivalent (lb-in) | 17.7, 44.3 | | 88.5, 133 | | 177, 265 | | 443, 885 | | |
| | inch | mm | inch | mm | inch | mm | inch | mm | |
| (1) | 4.23 | 107.5 | 4.23 | 107.5 | 4.39 | 111.5 | 5.81 | 147.5 | |
| (2) | 0.71 | 18 | 0.71 | 18 | 0.79 | 20 | 1.50 | 38 | |
| (3) | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 | 0.7087/ 0.7082 | 18 h6 | 0.7087/ 0.7082 | 18 h6 | |
| (4) | 0.67 | 17 | 0.67 | 17 | 0.71 | 18 | 1.42 | 36 | |



Model T5 General Purpose-Pedestal Rotary Torque Transducer – Capacities 200 to 1,000 Nm

DIMENSIONS

| Capacity (Nm) | 200, 500 | | 1K | |
|--------------------|-------------------|-------|-------------------|-------|
| Equivalent (lb-in) | 1.77K, 4.43K | | 8.85K | |
| | inch | mm | inch | mm |
| (1) | 3.50 | 89 | 3.50 | 89 |
| (2) | 8.54 | 217 | 10.31 | 262 |
| (3) | 1.71 | 43.5 | 2.60 | 66 |
| (4) | 1.2595/ 1.2598 | 32 h6 | 1.9685/ 1.9675 | 50 h7 |
| (5) | 1.50 | 38 | 2.28 | 58 |
| (6) | 5.12 | 130 | 5.12 | 130 |
| (7) | 4.53 | 115 | 4.63 | 115 |
| (8) | 7.50 | 190.4 | 7.50 | 190.4 |
| (9) | 4.41 | 112 | 4.41 | 112 |
| (10) | 0.79 | 20 | 0.79 | 20 |
| (11) | 6.89 | 175 | 6.89 | 175 |
| (12) | 1.18 | 30 | 1.18 | 30 |
| (13) | 5.71 | 145 | 5.71 | 145 |



Dimensions in mm

T5 PRECISION ROTARY TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA , J (Kgxm ²) | | MAX THRUST LOAD (N) |
|------------------|---------|------------------------|---|----------------------|------------------------|
| | | | Drive Side | Test Side | |
| 0.1 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 15 |
| 0.2 | 15,000 | 1.8x10 ¹ | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 15 |
| 0.5 | 15,000 | 1.2x10 ² | 1.9x10 ⁻⁶ | 2.8x10 ⁻⁷ | 30 |
| 1 | 15,000 | 1.2x10 ² | 2.0x10 ⁻⁶ | 2.8x10 ⁻⁷ | 40 |
| 2 | 12,000 | 4.4x10 ² | 1.0x10 ⁻⁵ | 8.1x10 ⁻⁶ | 50 |
| 5 | 12,000 | 4.4x10 ² | 1.0x10 ⁻⁵ | 8.1x10 ⁻⁶ | 50 |
| 10 | 12,000 | 1.7x10 ³ | 1.0x10 ⁻⁵ | 8.2x10 ⁻⁶ | 50 |
| 15 | 12,000 | 1.7x10 ³ | 1.0x10 ⁻⁵ | 8.2x10 ⁻⁶ | 100 |
| 20 | 12,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 300 |
| 30 | 12,000 | 4.5x10 ³ | 1.2x10 ⁻⁵ | 9.9x10 ⁻⁶ | 1,000 |
| 50 | 12,000 | 6.1x10 ³ | 1.3x10 ⁻⁵ | 1.1x10 ⁻⁵ | 1,600 |
| 100 | 12,000 | 9.7x10 ³ | 1.4x10 ⁻⁵ | 1.2x10 ⁻⁵ | 2,600 |
| 200 | 7,000 | 9.2x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 3,200 |
| 500 | 7,000 | 9.2x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 7,500 |
| 1,000 | 7,000 | 3.1x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 10,000 |

ELECTRICAL CONNECTION

| Pin | 12-Pin | | 12-Pin RS485 Option | |
|-----|----------------|--------------------|---------------------|-------------|
| | Function | Description | Function | Description |
| A | NC | - | NC | - |
| B | Option Angle B | TTL | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC | NC | - |
| D | Signal (GND) | 0 VDC | NC | - |
| E | Supply (GND) | 0 VDC | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 VDC | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL | Option Angle A | TTL |
| H | NC | - | NC | - |
| J | NC | - | RS485 Option | RS485 (B) |
| K | Cal. Control | L < 2.0 / H > 3.5V | NC | - |
| L | NC | - | RS485 Option | RS485 (A) |
| M | Housing | | Housing | |

Model T6 Dual Range Rotary Torque Transducer

- Dual range capacities – 10:1 ratio (5/0.5 to 20K/2K Nm) (44.3/4.43 to 177K to 17.7K lb-in)
- ± 5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate - each range
- 16-bit



OPTIONS

Speed & Angle Measurement - 360 Pulse TTL, 2-tracks 90° offset, available on capacities up to 1,000 Nm only
 Speed Output - 60 Pulse TTL, 1-track, available on capacities 2,000 Nm & above
 +10 V torque output
 RS485
 Keyed shafts - per Din 6885.1

SPECIFICATIONS

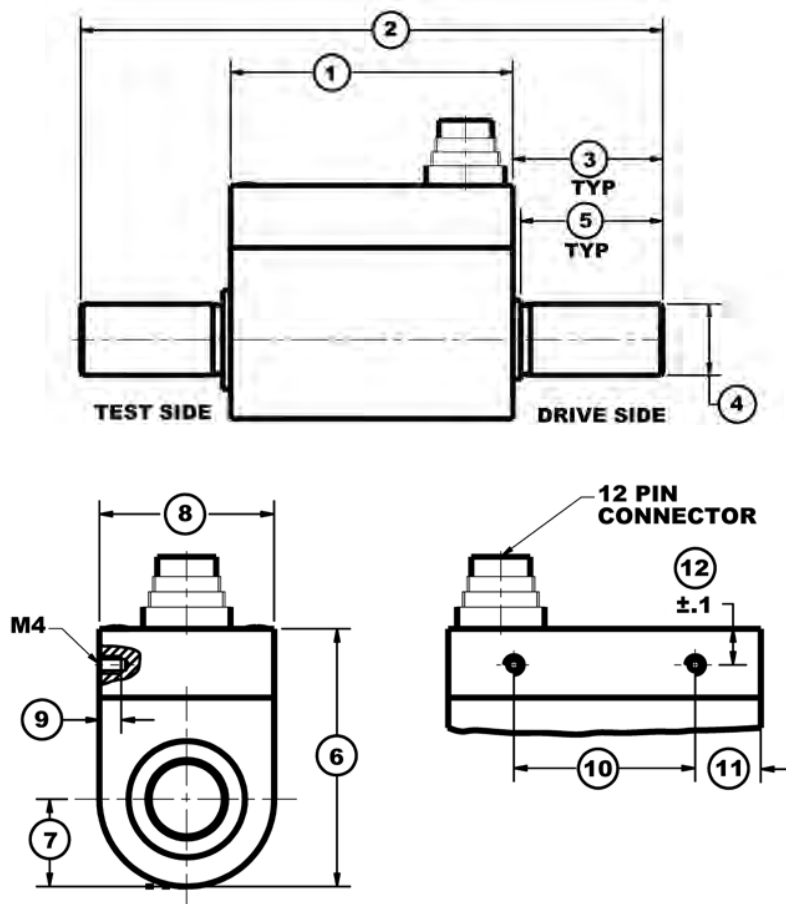
| | |
|------------------------------------|---------------------------------|
| ACCURACY - (MAX ERROR) | |
| Combined Error-% FS | ± 0.1 |
| Nonrepeatability-% | ± 0.02 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.02 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.01 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Calibration Signal-%RO | 100 |
| Speed Output - puls/rev. | 60 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 12-pin |
| Resolution | 16-bit |
| Sample Rate-kHz | 5 |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cycle Load Rating-% RO | 70 P-P (DIN 50100) |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

Model T6 Dual Range Rotary Torque Transducer –
Capacities 5/0.5 to 500/50 Nm

DIMENSIONS

| Capacity (Nm) | Nominal Torque | | | | | | | |
|--------------------|----------------------|-------|--------------------|-------|--------------------|-------|--------------------------------|-------|
| | 5/0.5, 10/1 | | 20/2, 30/3 | | 50/5, 100/10 | | 200/20, 300/30, 500/50 | |
| Equivalent (lb-in) | 44.3/4.43, 88.5/8.85 | | 177/17.7, 265/26.5 | | 443/44.3, 885/88.5 | | 1.77K/177, 2.7K/267, 4.43K/443 | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 2.81 | 71.5 | 2.81 | 71.5 | 2.81 | 71.5 | 3.17 | 80.5 |
| (2) | 4.31 | 107.5 | 4.39 | 111.5 | 5.81 | 147.5 | 6.28 | 159.5 |
| (3) | 0.71 | 18 | 0.08 | 20 | 0.08 | 38 | 0.06 | 39.5 |
| (4) | 0.31 | *g6 | 0.71 | 18 h6 | 0.71 | 18 h6 | 1.26 | 32 h6 |
| (5) | 0.67 | 17 | 0.71 | 18 | 1.42 | 36 | 1.50 | 38 |
| (6) | 2.70 | 68.5 | 2.70 | 68.5 | 2.70 | 68.5 | 3.41 | 86.5 |
| (7) | 0.79 | 20 | 0.79 | 20 | 0.79 | 20 | 1.20 | 30.5 |
| (8) | 1.57 | 40 | 1.57 | 40 | 1.57 | 40 | 2.40 | 61 |
| (9) | 0.20 | 5 | 0.20 | 5 | 0.20 | 5 | 0.20 | 5 |
| (10) | 1.63 | 41.5 | 1.63 | 41.5 | 1.63 | 41.5 | 1.16 | 29.5 |
| (11) | 0.59 | 15 | 0.59 | 15 | 0.59 | 15 | 1.02 | 26 |
| (12) | 0.69 | 17.5 | 0.69 | 17.5 | 0.69 | 17.5 | 0.69 | 17 |

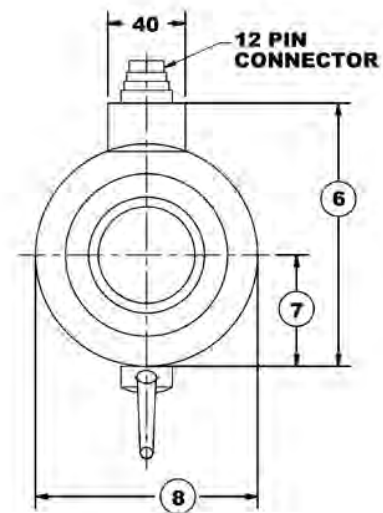
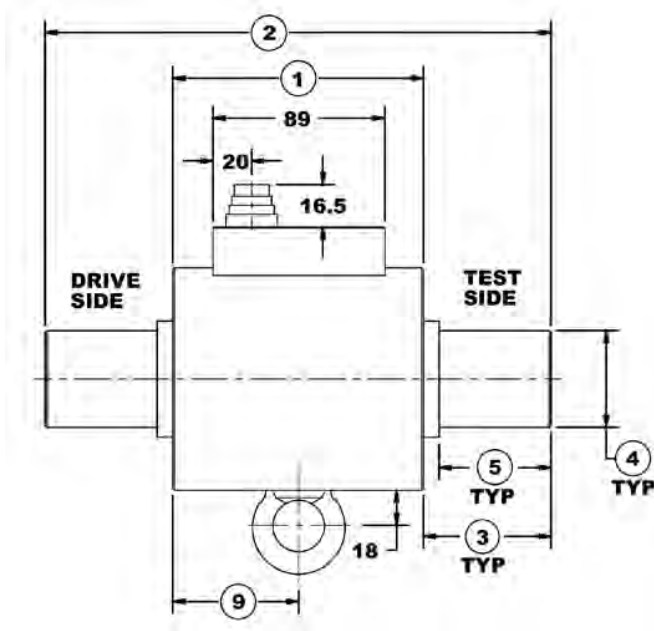
*5/0.1 Nm Capacity has 8 mm g6 shaft and 10/1 Nm Capacity has 10 mm g6 shaft



Model T6 Dual Range Rotary Torque Transducer –
Capacities 1K/100 to 20K/2K Nm

DIMENSIONS

| Capacity (Nm) | 1K/100 | | 2K/200, 5K/500 | | 10K/1K, 20K/2K | |
|--------------------|-----------|-------|--------------------------|-------|-----------------------|--------|
| Equivalent (lb-in) | 8.85K/885 | | 17.7K/1.77K, 44.3K/4.43K | | 88.5K/8.85K, 177K/17K | |
| | inch | mm | inch | mm | inch | mm |
| (1) | 5.12 | 130 | 5.31 | 135 | 7.48 | 190 |
| (2) | 10.31 | 262 | 14.84 | 377 | 18.50 | 470 |
| (3) | 2.60 | 66 | 4.76 | 121 | 5.51 | 140 |
| (4) | 1.97 | 50 h7 | 2.76 | 70 h7 | 4.33 | 110 h7 |
| (5) | 2.28 | 58 | 4.33 | 110 | 4.72 | 120 |
| (6) | 5.35 | 136 | 6.34 | 161 | 9.17 | 233 |
| (7) | 2.26 | 57.5 | 2.74 | 69.5 | 4.09 | 105 |
| (8) | 4.53 | 115 | 5.47 | 139 | 8.27 | 210 |
| (9) | 2.58 | 65.5 | 2.66 | 67.5 | 3.74 | 95 |
| (10) | 0.71 | 18 | 0.71 | 18 | 0.71 | 18 |
| (11) | 3.50 | 89 | 3.50 | 89 | 3.50 | 89 |



Dimensions in mm

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Range 1/Range 2) | MAX RPM | SPRINGRATE | MOMENT OF INERTIA , J (Kgxm ²) | | MAX THRUST LOAD (N) |
|-------------------------------|---------|---------------------|---|----------------------|------------------------|
| | | | Drive Side | Test Side | |
| (Nm) | | (Nm/rad) | | | |
| 5/0.5 | 15,000 | 6.5x10 ² | 1.9x10 ⁻⁶ | 3.0x10 ⁻⁷ | 50 |
| 10/1 | 15,000 | 8.3x10 ² | 1.1x10 ⁻⁵ | 9.8x10 ⁻⁶ | 50 |
| 20/2 | 15,000 | 8.3x10 ³ | 1.1x10 ⁻⁵ | 9.8x10 ⁻⁶ | 300 |
| 30/3 | 15,000 | 8.3x10 ³ | 1.1x10 ⁻⁵ | 9.8x10 ⁻⁶ | 1,000 |
| 50/5 | 15,000 | 5.4x10 ³ | 1.3x10 ⁻⁵ | 1.1x10 ⁻⁵ | 1,600 |
| 100/10 | 12,000 | 5.4x10 ³ | 1.3x10 ⁻⁵ | 1.1x10 ⁻⁵ | 2,600 |
| 200/20 | 12,000 | 3.4x10 ⁴ | 1.1x10 ⁻⁴ | 8.4x10 ⁻⁵ | 3,200 |
| 300/30 | 10,000 | 4.7x10 ⁴ | 1.1x10 ⁻⁴ | 8.5x10 ⁻⁵ | 4,200 |
| 500/50 | 10,000 | 3.4x10 ⁴ | 1.1x10 ⁻⁴ | 8.4x10 ⁻⁵ | 7,500 |
| 1,000/100 | 7,000 | 2.0x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 10,000 |
| 2,000/200 | 5,500 | 5.1x10 ⁵ | 5.3x10 ⁻³ | 4.2x10 ⁻³ | 18,000 |
| 5,000/500 | 5,500 | 7.2x10 ⁵ | 5.3x10 ⁻³ | 4.3x10 ⁻³ | 32,000 |
| 10,000/1,000 | 5,000 | 3.1x10 ⁶ | 4.1x10 ⁻² | 3.6x10 ⁻² | 125,000 |
| 20,000/2,000 | 5,000 | 3.7x10 ⁶ | 4.1x10 ⁻² | 3.7x10 ⁻² | 200,000 |

ELECTRICAL CONNECTION

| 12-Pin Dual Range | | |
|-------------------|----------------|--------------------|
| Pin | Function | Description |
| A | NC | - |
| B | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC |
| D | Signal (GND) | 0 VDC |
| E | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL |
| H | Signal 2 (+) | ±5 VDC |
| J | NC | - |
| K | Cal. Control | L < 2.0 / H > 3.5V |
| L | NC | - |
| M | Shield | Transducer Housing |



Model T7 Dual Range-Pedestal Rotary Torque Transducer

- Dual range capacities – 10:1 ratio
(5/0.5 to 20K/2K Nm)
(44.3/4.43 to 177K to 17.7K lb-in)
- ± 5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate - each range
- 16-bit resolution



OPTIONS

Speed & Angle Measurement - 360 Pulse TTL,
2-tracks 90° offset, available on capacities up to
1,000 Nm only
Speed Output - 60 Pulse TTL, 1-track, available on
capacities 2,000 Nm & above
+10 V torque output
RS485
Keyed shafts – per Din 6885.1

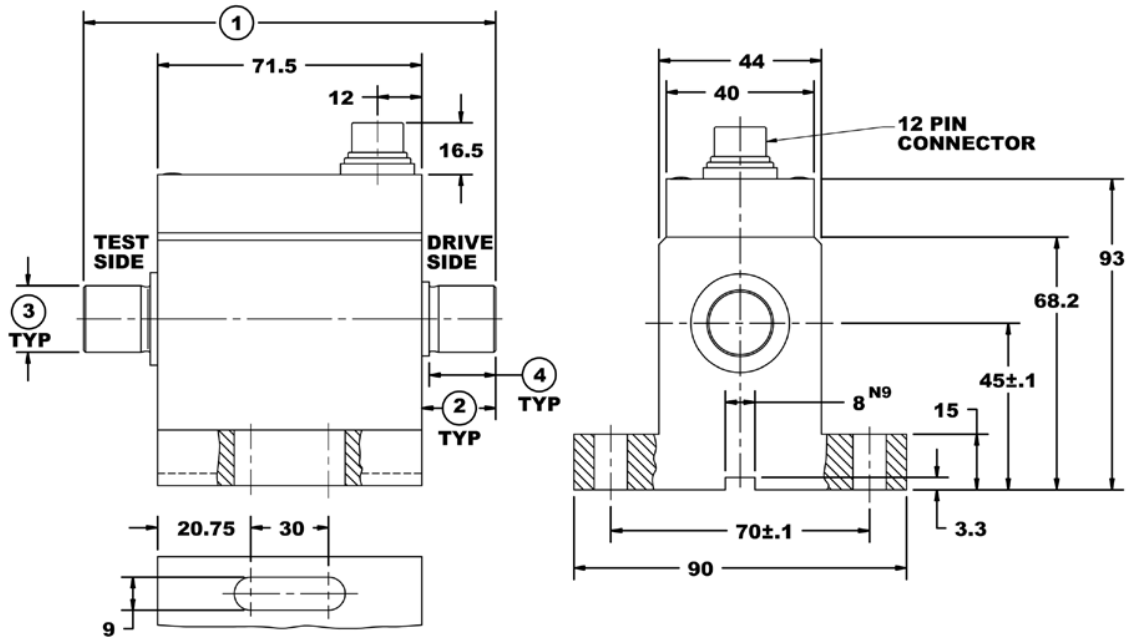
SPECIFICATIONS

| | |
|------------------------------------|---------------------------------|
| ACCURACY – (MAX ERROR) | |
| Combined Error-% FS | ± 0.1 |
| Nonrepeatability-% | ± 0.02 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.02 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.01 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz | 3 kHz-3dB |
| Calibration Signal-%RO | 100 |
| Speed Output – puls/rev. | 60 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 12-pin |
| Resolution | 16-bit |
| Sample Rate-kHz | 5, each range |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cycle Load Rating-% RO | ± 70 peak |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

Model T7 Dual Range-Pedestal Rotary Torque Transducer –
Capacities 5/0.5 to 50/5 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | |
|--------------------|-------------------|-------|-------------------|-------|--------------------|-------|--------------------|-------|
| Capacity (Nm) | 5/0.5 | | 10/1 | | 20/2, 30/3 | | 50/5, 100/10 | |
| Equivalent (lb-in) | 44.3/4.43 | | 88.5/8.85 | | 177/17.7, 265/26.5 | | 443/44.3, 885/88.5 | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 4.23 | 107.5 | 4.23 | 107.5 | 4.39 | 111.5 | 5.81 | 147.5 |
| (2) | 0.71 | 18 | 0.71 | 18 | 0.79 | 20 | 1.50 | 38 |
| (3) | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 | 0.7087/ 0.7082 | 18g6 | 0.7087/ 0.7082 | 18g6 |
| (4) | 0.67 | 17 | 0.67 | 17 | 0.71 | 18 | 1.42 | 36 |

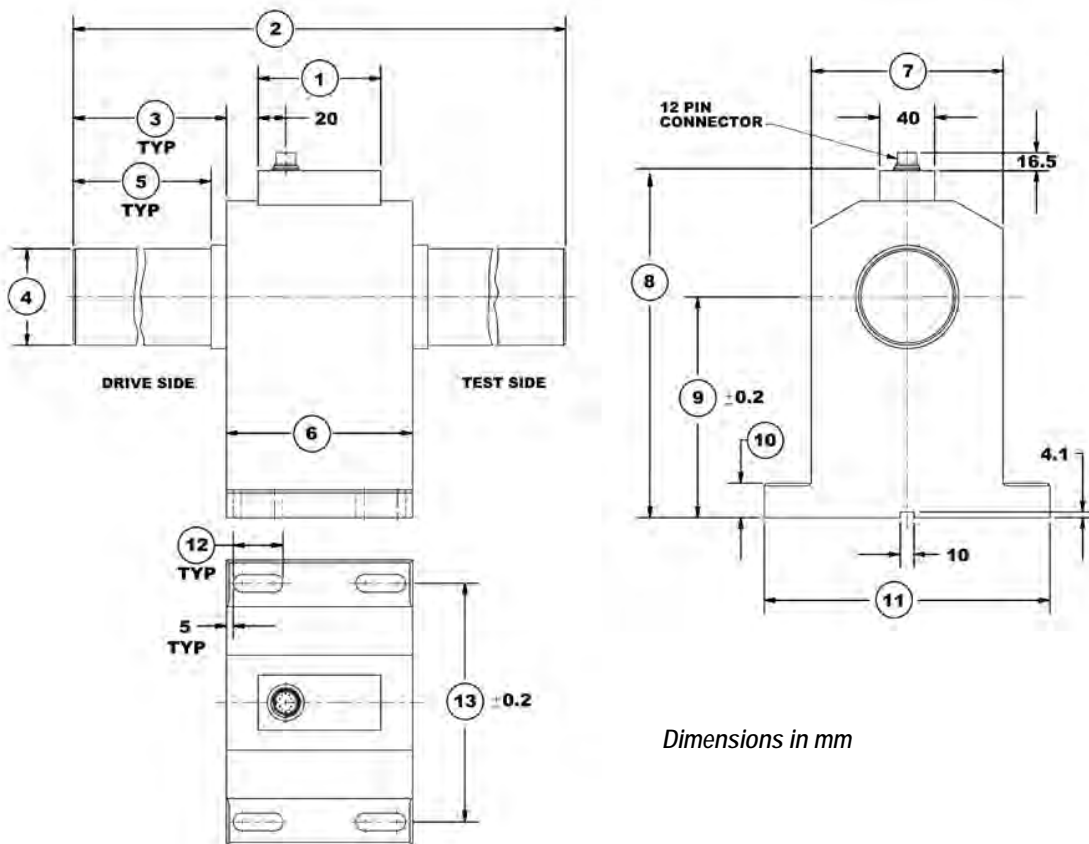


Dimensions in mm

Model T7 Dual Range-Pedestal Rotary Torque Transducer –
Capacities 5/0.5 to 50/5 Nm

DIMENSIONS

| Nominal Dual Range Torque (Range 1 / Range 2) | | | | | | | | |
|---|---------------------------------|-------|---------------|-------|---------------------------|-------|-------------------------|--------|
| Capacity (Nm) | 200/20, 300/30, 500/50 | | 1K/100 | | 2K/200, 5K/500 | | 10K/1K, 20K/2K | |
| Equivalent (lb-in) | 1.77K/177, 2.65K/265, 4.43K/443 | | 8.85K/885 | | 17.7K/1.77K, 44.3K, 4.43K | | 88.5K/8.85K, 177K/17.7K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 3.5 | 89 | 3.50 | 89 | 3.50 | 89 | 3.50 | 89 |
| (2) | 8.54 | 217 | 10.31 | 262 | 14.84 | 377 | 18.50 | 470 |
| (3) | 1.71 | 43.5 | 2.60 | 66 | 4.76 | 121 | 5.51 | 140 |
| (4) | 1.2595/1.2598 | 32 h6 | 1.9685/1.9675 | 50 h7 | 2.7559/2.7547 | 70 h7 | 4.3307/4.3293 | 110 h7 |
| (5) | 1.50 | 38 | 2.28 | 58 | 4.33 | 110 | 4.72 | 120 |
| (6) | 5.12 | 130 | 5.12 | 130 | 5.31 | 135 | 7.48 | 190 |
| (7) | 4.53 | 115 | 4.53 | 115 | 5.47 | 139 | 8.27 | 210 |
| (8) | 7.50 | 190.4 | 7.50 | 190.4 | 9.90 | 251.5 | 13.50 | 343 |
| (9) | 4.41 | 112 | 4.41 | 112 | 6.30 | 160 | 8.46 | 215 |
| (10) | 0.79 | 20 | 0.79 | 20 | 0.98 | 25 | 1.57 | 40 |
| (11) | 6.89 | 175 | 6.89 | 175 | 8.15 | 207 | 11.81 | 300 |
| (12) | 1.18 | 30 | 1.18 | 30 | 1.42 | 36 | 1.77 | 45 |
| (13) | 5.71 | 145 | 5.71 | 145 | 6.81 | 173 | 10.24 | 260 |



T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Range 1/Range 2) (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA , J (Kgxm ²) | | MAX THRUST LOAD (N) |
|---------------------------------------|---------|------------------------|---|----------------------|------------------------|
| | | | Drive Side | Test Side | |
| 5/0.5 | 12,000 | 2.4x10 ² | 9.7x10 ⁻⁶ | 7.9x10 ⁻⁶ | 50 |
| 10/1 | 12,000 | 7.2x10 ² | 1.0x10 ⁻⁵ | 7.9x10 ⁻⁶ | 50 |
| 20/2 | 12,000 | 2.2x10 ³ | 1.1x10 ⁻⁵ | 9.9x10 ⁻⁶ | 300 |
| 30/3 | 12,000 | 2.8x10 ³ | 1.1x10 ⁻⁵ | 9.9x10 ⁻⁶ | 1,000 |
| 50/5 | 12,000 | 5.4x10 ³ | 1.4x10 ⁻⁵ | 1.1x10 ⁻⁵ | 1,600 |
| 100/10 | 12,000 | 8.0x10 ³ | 1.4x10 ⁻⁵ | 1.2x10 ⁻⁵ | 2,600 |
| 200/20 | 7,000 | 3.7x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 3,200 |
| 300/30 | 7,000 | 5.4x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 7,500 |
| 500/50 | 7,000 | 8.1x10 ⁴ | 1.3x10 ⁻³ | 8.0x10 ⁻⁴ | 7,500 |
| 1,000/100 | 7,000 | 1.9x10 ⁵ | 1.6x10 ⁻³ | 1.1x10 ⁻³ | 10,000 |
| 2,000/200 | 5,500 | 5.1x10 ⁵ | 5.4x10 ⁻³ | 4.2x10 ⁻³ | 18,000 |
| 5,000/500 | 5,500 | 7.8x10 ⁵ | 5.5x10 ⁻³ | 4.3x10 ⁻⁴ | 32,000 |
| 10,000/1,000 | 3,500 | 3.1x10 ⁶ | 4.1x10 ⁻² | 3.6x10 ⁻² | 125,000 |
| 20,000/2,000 | 3,500 | 3.7x10 ⁶ | 4.1x10 ⁻² | 3.7x10 ⁻² | 200,000 |

ELECTRICAL CONNECTION

| 12-Pin Dual Range | | |
|-------------------|----------------|--------------------|
| Pin | Function | Description |
| A | NC | - |
| B | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC |
| D | Signal (GND) | 0 VDC |
| E | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL |
| H | Signal 2 (+) | ±5 VDC |
| J | NC | - |
| K | Cal. Control | L < 2.0 / H > 3.5V |
| L | NC | - |
| M | Shield | Transducer Housing |

Model T8 ECO Rotary Torque Transducer

- Capacities from 0.2 to 200 Nm
(1.77 to 1.77K lb-in)
- Stainless steel shaft
- ± 5 VDC output
- 12 to 28 VDC supply
- Contactless



SPECIFICATIONS

| | |
|------------------------------------|---------------------------------|
| ACCURACY – (MAX ERROR) | |
| Combined Error-% FS | ± 0.25 |
| Nonrepeatability-% | ± 0.05 |
| TEMPERATURE | |
| Effect on Zero- % RO/ $^{\circ}$ C | ± 0.04 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.02 |
| Rated Range- $^{\circ}$ C | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 90 |
| Electrical Connection | Integral cable, 3-ft |
| Resolution | Analog |
| MECHANICAL | |
| Safe Overload-% RO | 180 |
| Cyclic Load Rating-% RO | 70 P-P (DIN 50100) |
| Max Speed-rpm | Varies with capacity. See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

OPTIONS

- Extra Cable Length
- Keyed shafts – per Din 6885.1

| T8 INTEGRAL CABLE WIRING CODE | | |
|-------------------------------|--------------|--------|
| Function | Description | Color |
| Supply (+) | 12 to 28 VDC | Brown |
| Supply (GND) | 0 VDC | Green |
| Signal (+) | ± 5 VDC | Yellow |
| Signal (GND) | 0 VDC | White |
| Shield | Shield | Shield |

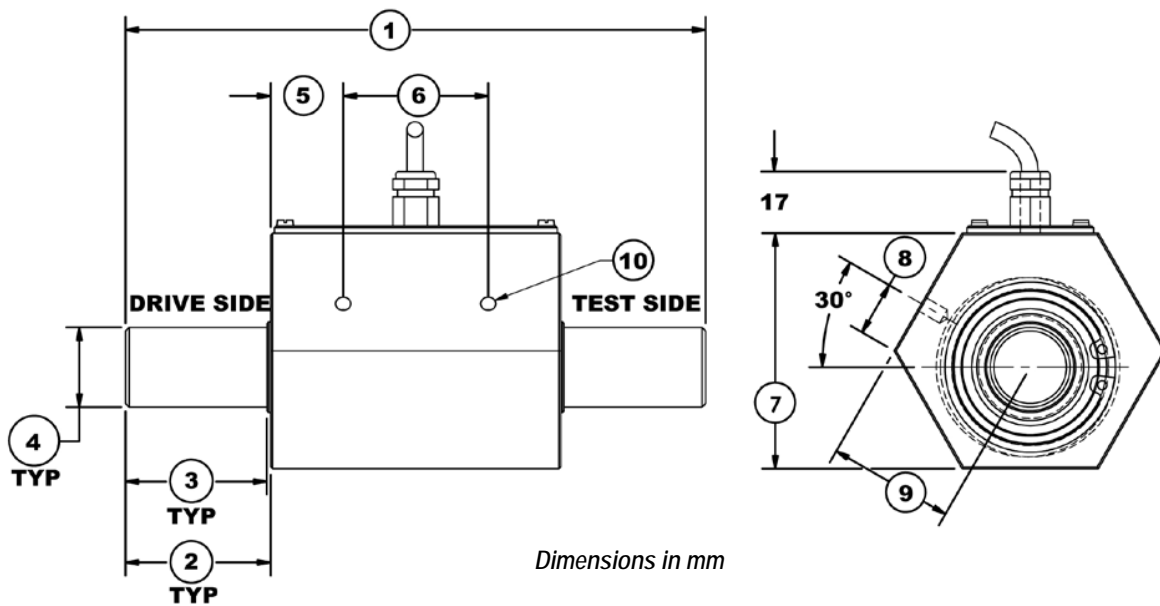
PERFORMANCE PARAMETERS

| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA, J (Kgxm ²) | | MAX. THRUST LOAD (N) |
|------------------|---------|------------------------|---|----------------------|-------------------------|
| | | | Drive Side | Test Side | |
| 0.2 | 8,000 | 1.8×10^1 | 1.6×10^{-6} | 1.0×10^{-6} | 20 |
| 0.5 | 8,000 | 1.1×10^2 | 1.6×10^{-6} | 1.0×10^{-6} | 30 |
| 1 | 8,000 | 3.6×10^2 | 1.6×10^{-6} | 1.1×10^{-6} | 40 |
| 2 | 8,000 | 8.9×10^2 | 1.6×10^{-6} | 1.1×10^{-6} | 40 |
| 5 | 8,000 | 8.9×10^2 | 1.7×10^{-6} | 1.1×10^{-6} | 50 |
| 10 | 8,000 | 8.9×10^2 | 1.7×10^{-6} | 1.1×10^{-6} | 50 |
| 15 | 8,000 | 8.4×10^3 | 1.7×10^{-6} | 1.1×10^{-6} | 50 |
| 20 | 6,000 | 8.4×10^3 | 4.2×10^{-5} | 2.1×10^{-5} | 1,600 |
| 50 | 6,000 | 8.4×10^3 | 4.2×10^{-5} | 2.1×10^{-5} | 1,600 |
| 100 | 6,000 | 2.0×10^4 | 4.7×10^{-5} | 2.7×10^{-5} | 3,000 |
| 200 | 6,000 | 2.0×10^4 | 4.7×10^{-5} | 2.7×10^{-5} | 3,000 |

Model T8 ECO Rotary Torque Transducer –
Capacities 0.2 to 200 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | |
|--------------------|--------------------------|------|-------------------|------|-------------------|------|-------------------|------|
| Capacity (Nm) | 0.2, 0.5, 1, 2 | | 5, 10, 15 | | 20, 50 | | 100, 200 | |
| Equivalent (lb-in) | 1.77, 4.43 8.85, 17.7 | | 44.3, 88.5, 133 | | 177, 443 | | 885, 1.77K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 3.94 | 100 | 3.94 | 100 | 5.51 | 140 | 6.30 | 160 |
| (2) | 0.71 | 18 | 0.71 | 18 | 1.18 | 30 | 1.57 | 40 |
| (3) | 0.67 | 17 | 0.67 | 17 | 1.14 | 29 | 1.53 | 39 |
| (4) | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 | 0.7087/ 0.7082 | 18g6 | 0.8659/ 0.8654 | 22g6 |
| (5) | 0.57 | 14.5 | 0.57 | 14.5 | 0.79 | 20 | 0.79 | 20 |
| (6) | 1.38 | 35 | 1.38 | 35 | 1.57 | 40 | 1.57 | 40 |
| (7) | 1.81 | 46 | 1.81 | 46 | 2.56 | 65 | 2.56 | 65 |
| (8) | 0.31 | 8 | 0.31 | 8 | 0.59 | 15 | 0.59 | 15 |
| (9) | 1.02 | 26 | 1.02 | 26 | 1.37 | 34.8 | 1.37 | 34.8 |
| (10) | M4 | M4 | M4 | M4 | M5 | M5 | M5 | M5 |



Model T11 Bearingless Rotary Torque Transducer

- Capacities from 0.005 to 150 Nm (0.04 to 1,327 lb-in)
- Bearingless
- High speed – to 30K RPM
- ±5 VDC output
- Very low range
- Eliminates bearing friction effects
- 10 kHz sample rate
- 12 to 28 VDC supply
- 16-bit resolution



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|-------------------------|--------------------|
| Combined Error–% FS | ±0.1 |
| Nonrepeatability–% | ±0.02 |
| TEMPERATURE | |
| Effect on Zero– % RO/°C | ±0.02 |
| Effect on Output–%/°C | ±0.01 |
| Rated Range–°C | +5 to +45 |
| Operating Range–°C | 0 to +60 |
| ELECTRICAL | |
| Output–VDC | ±5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Calibration Signal–% RO | 100 |
| Supply Voltage–VDC | 12 to 28 |
| Supply Current–mA | 60 |
| Electrical Connection | 8-pin |
| Resolution | 16-bit |
| Sample Rate–kHz | 10 |
| MECHANICAL | |
| Safe Overload–% RO | 200 |
| Cyclic Load Rating–% RO | 70 P-P (DIN 50100) |
| Max Speed–rpm | 30K - See Table |
| Shaft | Stainless Steel |
| Housing | Aluminum |

OPTIONS

- +10 VDC output
- Speed output – 6 Pulse TTL, 1-Track

PERFORMANCE PARAMETERS

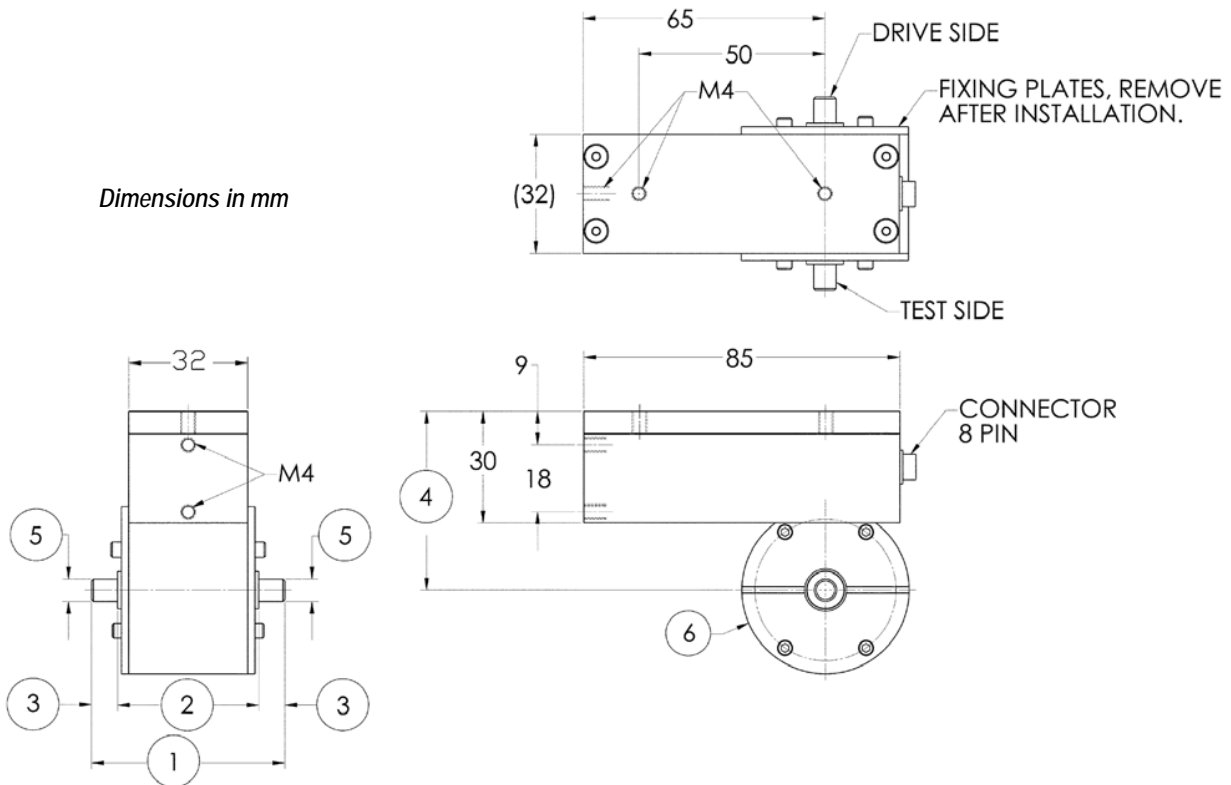
| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA, J (Kgx ^m ²) | | MAX. THRUST LOAD (N) |
|---------------|---------|----------------------|---|----------------------|----------------------|
| | | | Drive Side | Test Side | |
| 0.005 | 20,000 | 4.6x10 ⁻¹ | 7.5x10 ⁻⁷ | 1.1x10 ⁻⁸ | 3 |
| 0.01 | 20,000 | 4.6x10 ⁻¹ | 7.5x10 ⁻⁷ | 1.1x10 ⁻⁸ | 3 |
| 0.02 | 30,000 | 3.7x10 ⁻¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 10 |
| 0.05 | 30,000 | 3.7x10 ⁻¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 10 |
| 0.1 | 30,000 | 1.7x10 ¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 15 |
| 0.2 | 30,000 | 1.7x10 ¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 20 |
| 0.5 | 30,000 | 9.8x10 ¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 30 |
| 1 | 30,000 | 9.8x10 ¹ | 7.6x10 ⁻⁷ | 1.3x10 ⁻⁸ | 40 |
| 2 | 30,000 | 5.0x10 ² | 9.1x10 ⁻⁷ | 8.3x10 ⁻⁸ | 50 |
| 5 | 30,000 | 5.0x10 ² | 9.1x10 ⁻⁷ | 8.3x10 ⁻⁸ | 50 |
| 10 | 30,000 | 5.8x10 ² | 9.7x10 ⁻⁷ | 1.5x10 ⁻⁷ | 50 |
| 20 | 20,000 | 4.9x10 ³ | 1.2x10 ⁻⁵ | 3.6x10 ⁻⁶ | 100 |
| 50 | 20,000 | 9.3x10 ³ | 1.2x10 ⁻⁵ | 3.9x10 ⁻⁶ | 200 |

Model T11 Bearingless Rotary Torque Transducer – Capacities 0.005 to 150 Nm

DIMENSIONS

| NOMINAL TORQUE | | | | | | | | | | |
|--------------------|-------------------|-----|--------------------------------------|-----|-------------------|-----|-------------------|------|----------------------|------|
| Capacity (Nm) | 0.005, 0.01 | | 0.02, 0.05, 0.1 0.2, 0.5, 1 | | 2, 5 | | 10 | | 20, 50, 100, 150 | |
| Equivalent (lb-in) | 0.04, 0.62 | | 0.18, 0.44, 0.85 1.77, 4.43, 8.85 | | 17.7, 44.3 | | 88.5 | | 177, 443, 885, 1.33K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 1.89 | 48 | 2.05 | 52 | 2.68 | 68 | 2.68 | 68 | 4.80 | 122 |
| (2) | 1.50 | 38 | 1.50 | 38 | 1.50 | 38 | 1.50 | 38 | 1.97 | 50 |
| (3) | 0.20 | 5 | 0.28 | 7 | 0.59 | 15 | 0.59 | 15 | 1.42 | 36 |
| (4) | 1.89 | 48 | 1.89 | 48 | 1.89 | 48 | 1.89 | 48 | 2.09 | 53 |
| (5) | 0.1573/ 0.1570 | 4g6 | 0.2361/ 0.2357 | 6g6 | 0.3148/ 0.3144 | 8g6 | 0.3935/ 0.3931 | 10g6 | 0.7084/ 0.7080 | 18g6 |
| (6) | 1.77 | 45 | 1.77 | 45 | 1.77 | 45 | 1.77 | 45 | 2.34 | 59.5 |

Dimensions in mm



ELECTRICAL CONNECTION

| 8-PIN ELECTRICAL CONNECTION | | |
|-----------------------------|----------------|---------------------|
| Pin | Function | Description |
| 1 | Supply (+) | 12 to 28 VDC |
| 2 | Supply (GND) | 0 VDC |
| 3 | Signal (+) | ±5 VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | L < 2.0 / H > 3.5 V |
| 6 | Option Angle A | TTL |
| 7 | Option Angle B | TTL |
| 8 | NC | - |

Model T12 Square Drive Torque Transducer

- Capacities from 0.10 to 5K Nm (0.88 to 44K lb-in)
- ± 5 VDC output
- 12 to 28 VDC supply
- Contactless - no slip rings



OPTIONS

Angle measurement - 360 pulse TTL,
2-tracks 90° offset, available on capacities up to
1,000 Nm only
+10 V torque output

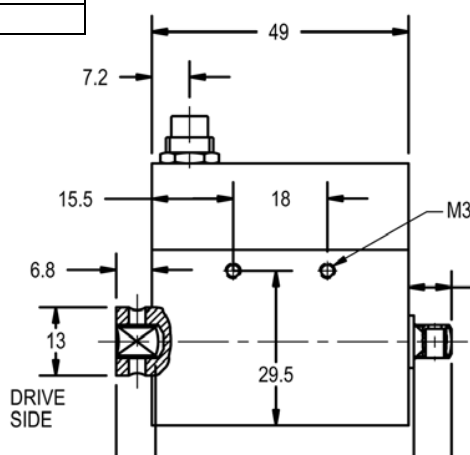
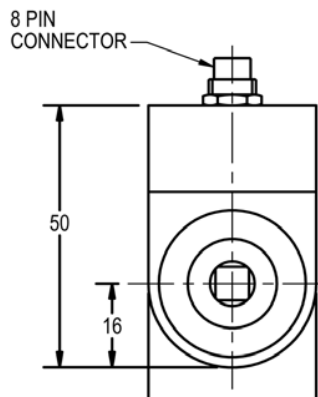
Enhanced accuracy - combined error $\pm 0.1\%$
RS485 output (requires enhanced accuracy)
USB Output with Software

Model T12 Square Drive Torque Transducer

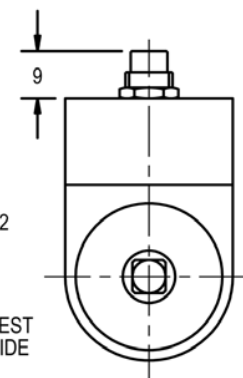
- Capacities 0.1 to 20 Nm - 1/4" Drive

DIMENSIONS

| See Drawing | 1/4" Drive - Nominal Torque | |
|-------------|-----------------------------|--------------------|
| | CAPACITY (Nm) | EQUIVALENT (lb-in) |
| | 0.1 | 0.85 |
| | 0.2 | 1.77 |
| | 0.5 | 4.43 |
| | 1 | 8.85 |
| | 2 | 17.7 |
| | 5 | 44.3 |
| | 10 | 88.5 |
| | 15 | 133 |
| | 20 | 177 |



Dimensions in mm



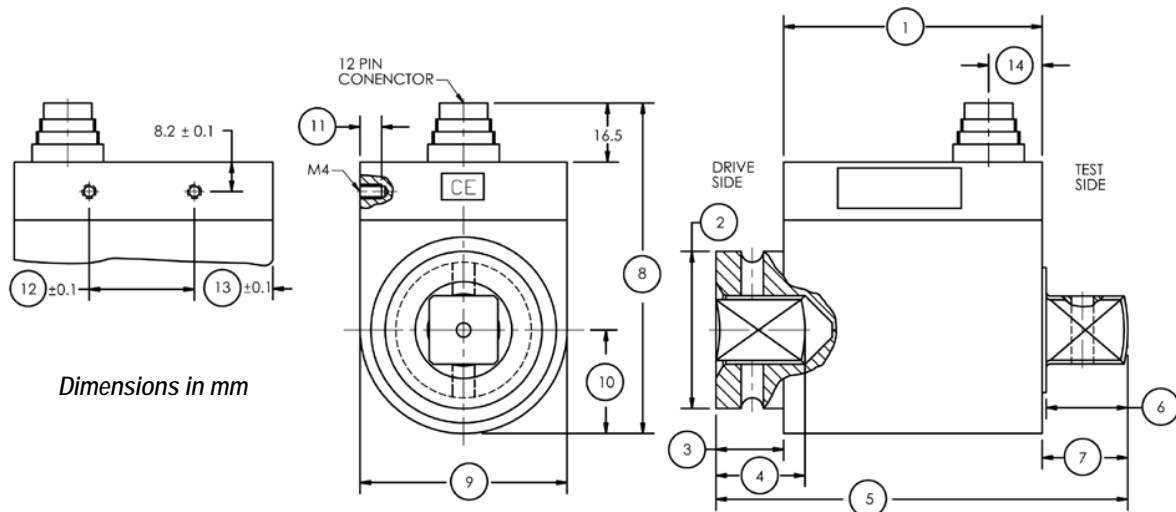
SPECIFICATIONS

| ACCURACY - (MAX ERROR) | Standard | Enhanced |
|-----------------------------------|---------------|---------------|
| Combined Error-% FS | ± 0.25 | ± 0.1 |
| Nonrepeatability-% | ± 0.05 | ± 0.02 |
| TEMPERATURE | | |
| Effect on Zero-% RO/ $^{\circ}$ C | ± 0.05 | ± 0.02 |
| Effect on Output-%/ $^{\circ}$ C | ± 0.02 | ± 0.01 |
| Rated Range- $^{\circ}$ C | +5 to +45 | +5 to +45 |
| Operating Range- $^{\circ}$ C | 0 to +60 | 0 to +60 |
| ELECTRICAL | | |
| Torque Output-VDC | ± 5 | ± 5 |
| Bandwidth, Hz | 1 kHz-3dB | 3 kHz-3dB |
| Calibration Signal-%RO | 100 | 100 |
| Supply Voltage-VDC | 12 to 28 | 12 to 28 |
| Supply Current-mA | 60 | 60 |
| Electrical Connection | 8 or 12-pin | 8 or 12-pin |
| Resolution | 12-bit | 16-bit |
| Sample Rate-kHz | 10 | 10 |
| MECHANICAL | | |
| Safe Overload-% RO | 200 | 200 |
| Cycle Load Rating-% RO | ± 70 peak | ± 70 peak |
| Max Speed-rpm | See Table | See Table |
| Housing | Aluminum | Aluminum |

Model T12 Square Drive Torque Transducer –
Capacities 35 to 1,000 Nm

DIMENSIONS

| Capacity (Nm) | Nominal Torque | | | | | | | |
|---------------|--------------------|------|-------------------|-------|--------------|-------|-------|-------|
| | 35, 50, 63 | | 100, 160, 200 | | 300, 500 | | 1K | |
| | Equivalent (lb-in) | | 885, 1.41K, 1.77K | | 2.26K, 4.43K | | 8.85K | |
| Square | 3/8" | | 1/2" | | 3/4" | | 1" | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 2.82 | 71.5 | 2.82 | 71.5 | 2.86 | 72.5 | 2.86 | 72.5 |
| (2) | 0.87 | 22 | 1.17 | 29.8 | 1.73 | 44 | 2.13 | 54 |
| (3) | 0.43 | 11 | 0.51 | 13 | 0.75 | 19 | 1.14 | 29 |
| (4) | 0.44 | 11.2 | 0.63 | 15.9 | 0.94 | 23.9 | 1.13 | 28.6 |
| (5) | 3.72 | 94.5 | 3.96 | 100.5 | 4.55 | 115.5 | 5.14 | 130.5 |
| (6) | 0.40 | 10.7 | 0.61 | 15.4 | 0.90 | 22.9 | 1.09 | 27.6 |
| (7) | 0.47 | 12 | 0.63 | 16 | 0.95 | 24 | 1.14 | 29 |
| (8) | 2.32 | 59 | 2.32 | 59 | 2.99 | 76 | 2.99 | 76 |
| (9) | 1.58 | 40 | 1.58 | 40 | 2.29 | 58 | 2.29 | 58 |
| (10) | 0.79 | 20 | 0.79 | 20 | 1.14 | 29 | 1.14 | 29 |
| (11) | 0.20 | 5 | 0.20 | 5 | 0.24 | 6 | 0.24 | 6 |
| (12) | 1.64 | 41.5 | 1.64 | 41.5 | 1.16 | 29.5 | 1.16 | 29.5 |
| (13) | .591 | 15 | .591 | 15 | 0.87 | 22 | 0.87 | 22 |
| (14) | 0.47 | 12 | 0.47 | 12 | 0.59 | 15 | 0.59 | 15 |

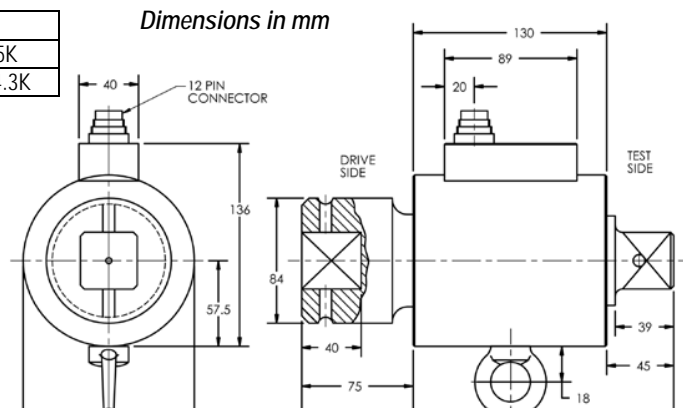


Dimensions in mm

Model T12 Square Drive Torque Transducer –
Capacities 2K to 5K Nm – 1 1/2" Drive

DIMENSIONS

| See Drawing | 1 1/2" Drive – Nominal Torque | | |
|-------------|-------------------------------|-----|-------|
| | Capacity (Nm) | 2K | 5K |
| | Equivalent (lb-in) | 17K | 44.3K |



Dimensions in mm

T12 SQUARE DRIVE TORQUE TRANSDUCER PERFORMANCE PARAMETERS

| CAPACITY (Nm) | SQUARE (INCH) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA, J (Kgx ^m ²) | | MAX THRUST LOAD (N) |
|------------------|------------------|---------|------------------------|--|----------------------|---------------------------|
| | | | | Drive Side | Test Side | |
| 0.1 | 1/4 | 3,000 | 1.8x10 ¹ | 2.1x10 ⁻⁶ | 2.3x10 ⁻⁷ | 15 |
| 0.2 | 1/4 | 3,000 | 1.8x10 ¹ | 2.1x10 ⁻⁶ | 2.3x10 ⁻⁷ | 20 |
| 0.5 | 1/4 | 3,000 | 1.2x10 ² | 2.1x10 ⁻⁶ | 2.3x10 ⁻⁷ | 30 |
| 1 | 1/4 | 4,000 | 1.2x10 ² | 2.1x10 ⁻⁶ | 2.3x10 ⁻⁷ | 40 |
| 2 | 1/4 | 4,000 | 3.0x10 ² | 2.1x10 ⁻⁶ | 2.4x10 ⁻⁷ | 50 |
| 5 | 1/4 | 4,000 | 3.5x10 ² | 2.1x10 ⁻⁶ | 2.4x10 ⁻⁷ | 50 |
| 10 | 1/4 | 4,000 | 7.3x10 ² | 2.1x10 ⁻⁶ | 2.7x10 ⁻⁷ | 50 |
| 15 | 1/4 | 4,000 | 7.3x10 ² | 2.1x10 ⁻⁶ | 2.7x10 ⁻⁷ | 100 |
| 20 | 1/4 | 4,000 | 7.3x10 ² | 2.1x10 ⁻⁶ | 2.7x10 ⁻⁷ | 100 |
| 35 | 3/8 | 3,000 | 8.6x10 ³ | 9.8x10 ⁻⁶ | 1.1x10 ⁻⁵ | 1,300 |
| 50 | 3/8 | 3,000 | 1.0x10 ⁴ | 9.9x10 ⁻⁶ | 1.1x10 ⁻⁵ | 1,600 |
| 63 | 3/8 | 3,000 | 1.1x10 ⁴ | 1.0x10 ⁻⁵ | 1.1x10 ⁻⁵ | 1,900 |
| 100 | 1/2 | 2,500 | 1.2x10 ⁴ | 1.6x10 ⁻⁵ | 1.1x10 ⁻⁵ | 2,600 |
| 160 | 1/2 | 2,500 | 1.5x10 ⁴ | 1.6x10 ⁻⁵ | 1.2x10 ⁻⁵ | 3,200 |
| 200 | 1/2 | 2,500 | 1.5x10 ⁴ | 1.6x10 ⁻⁵ | 1.2x10 ⁻⁵ | 3,200 |
| 300 | 3/4 | 2,500 | 8.8x10 ⁴ | 9.8x10 ⁻⁵ | 7.7x10 ⁻⁵ | 5,500 |
| 500 | 3/4 | 2,500 | 8.8x10 ⁴ | 9.8x10 ⁻⁵ | 7.7x10 ⁻⁵ | 7,500 |
| 1,000 | 1 | 1,500 | 1.3x10 ⁵ | 2.1x10 ⁻⁴ | 1.1x10 ⁻⁴ | 10,000 |
| 2,000 | 1 1/2 | 1,000 | 2.1x10 ⁵ | 3.5x10 ⁻³ | 1.8x10 ⁻³ | 18,000 |
| 3,000 | 1 1/2 | 1,000 | 2.3x10 ⁵ | 3.5x10 ⁻³ | 1.8x10 ⁻³ | 22,500 |
| 5,000 | 1 1/2 | 1,000 | 2.7x10 ⁵ | 3.5x10 ⁻³ | 1.8x10 ⁻³ | 32,000 |

ELECTRICAL CONNECTION

| 8-Pin Electrical Connection | | |
|-----------------------------|----------------|--------------------|
| Pin | Function | Description |
| 1 | Supply (+) | 12-28 VDC |
| 2 | Supply (GND) | 0 VDC |
| 3 | Signal (+) | ±5 VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | L < 2.0 / H > 3.5V |
| 6 | Option Angle A | TTL |
| 7 | Option Angle B | TTL |
| 8 | NC | - |

| 12-Pin Electrical Connection | | | 12-Pin RS485 Option | |
|------------------------------|----------------|--------------------|---------------------|-------------|
| Pin | Function | Description | Function | Description |
| A | NC | - | NC | - |
| B | Option Angle B | TTL | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC | NC | - |
| D | Signal (GND) | 0 VDC | NC | - |
| E | Supply (GND) | 0 VDC | Supply (GND) | 0 VDC |
| F | Supply (+) | 12-28 V | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL | Option Angle A | TTL |
| H | NC | - | NC | - |
| J | NC | - | RS485 Option | RS485 (B) |
| K | Cal. Control | L < 2.0 / H > 3.5V | NC | - |
| L | NC | - | RS485 Option | RS485 (A) |
| M | Housing | | Housing | |

Model T14 Slip-Ring Rotary Torque Transducer

- Capacities from 1 to 500 Nm (8.85 to 4.4K lb-in)
- Integrated speed and angle measurement option
- Keyed shaft
- mV/V output
- Small, compact size



OPTIONS

Speed & Angle Measurement – 360 Pulse TTL, 2-Tracks 90° Offset
Internal R-CAL, 100%

| BRUSH LIFE | | | |
|-------------|---------------|-------------|-----------|
| SPEED (rpm) | CAPACITY (Nm) | | |
| | 1, 2, 5, 10 | 20, 50, 100 | 200, 500 |
| 10 | 10 years | 7.6 years | 5.7 years |
| 100 | 138 days | 62 days | 55 days |
| 500 | 233 hours | 166 hours | 100 hours |
| 1000 | 83 hours | 50 hours | 33 hours |
| 1500 | 44 hours | 27 hours | - |
| 2000 | 25 hours | - | - |

SPECIFICATIONS

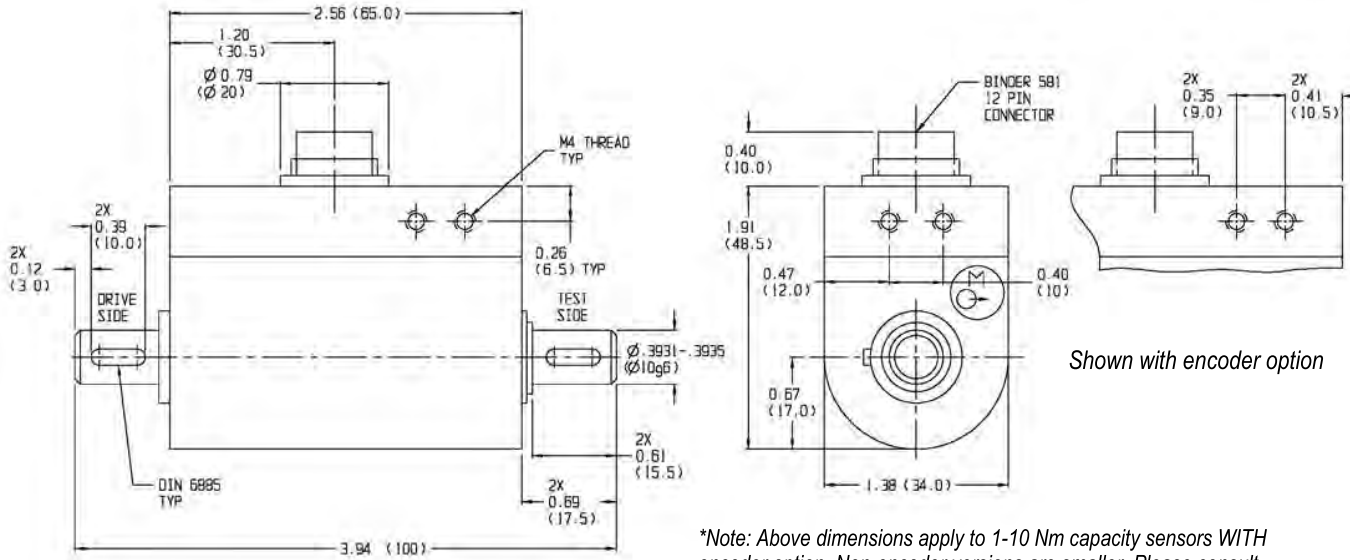
| | |
|-------------------------------|-------------------|
| ACCURACY – (MAX ERROR) | |
| Combined Error–% FS | ±0.1 |
| Nonrepeatability–% | ±0.05 |
| TEMPERATURE | |
| Effect on Zero–% RO/C° | ±0.02 |
| Effect on Output–%/C° | ±0.01 |
| Rated Range–°C | +5 to +50 |
| Compensated Range–°C | -10 to +60 |
| ELECTRICAL | |
| Output–mV/V | |
| 1-2 Nm | 0.5 |
| 5-500 Nm | 2.0 |
| Bridge Resistance–Ohm | 350 |
| Electrical Connection | 12-pin |
| MECHANICAL | |
| Safe Overload–% RO | 130 |
| Cyclic Load Rating–% RO | 70P-P (DIN 50100) |
| Shaft | Stainless Steel |
| Housing | Aluminum |

PERFORMANCE PARAMETERS

| CAPACITY (Nm) | SENSITIVITY (mV/V) | CONTINUOUS MAX SPEED (min ⁻¹) | SPRINGRATE (Nm/rad) | MAXIMUM LATERAL LOAD (N) | MOMENT OF INERTIA, J (Kgxm ²) – Drive Side | WEIGHT (Kg) |
|---------------|--------------------|---|---------------------|--------------------------|--|-------------|
| 1 | 0.5 | 2,000 | 2.3x10 ² | 4 | 3.3x10 ⁻⁶ | 0.5 |
| 2 | 0.5 | 2,000 | 2.3x10 ² | 5 | 3.3x10 ⁻⁶ | 0.5 |
| 5 | 2 | 2,000 | 2.9x10 ² | 7 | 3.3x10 ⁻⁶ | 0.5 |
| 10 | 2 | 2,000 | 5.6x10 ² | 7.5 | 1.1x10 ⁻⁵ | 0.5 |
| 20 | 2 | 1500 | 1.6x10 ³ | 12 | 1.1x10 ⁻⁵ | 0.6 |
| 50 | 2 | 1500 | 4.1x10 ³ | 28 | 1.1x10 ⁻⁵ | 0.6 |
| 100 | 2 | 1500 | 7.9x10 ³ | 65 | 1.3x10 ⁻⁵ | 0.6 |
| 200 | 2 | 1000 | 2.8x10 ⁴ | 80 | 1.0x10 ⁻⁴ | 1.3 |
| 500 | 2 | 1000 | 5.3x10 ⁴ | 200 | 1.0x10 ⁻⁴ | 1.3 |

DIMENSIONS

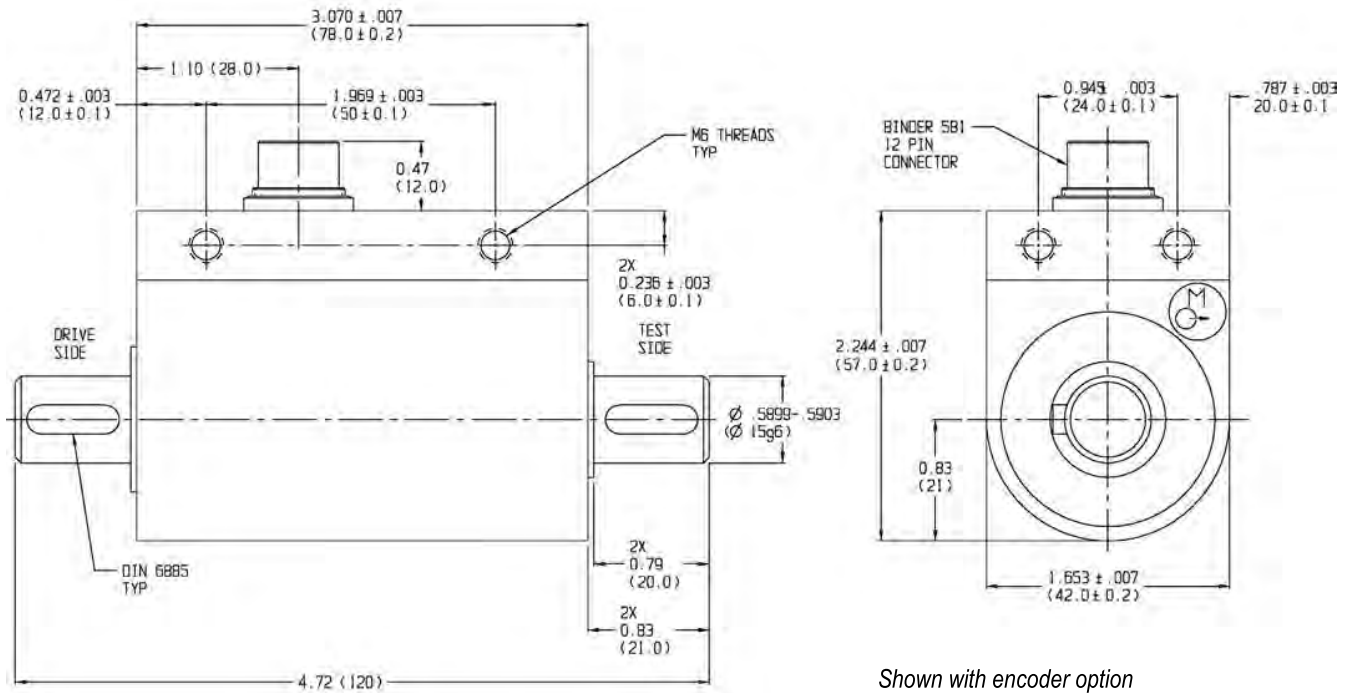
Model T14 Slip-Ring Rotary Torque Transducer – Capacities 1 - 10 Nm (8.85 to 88.5 lb-in)



*Note: Above dimensions apply to 1-10 Nm capacity sensors WITH encoder option. Non-encoder versions are smaller. Please consult the factory for complete dimensions.

DIMENSIONS

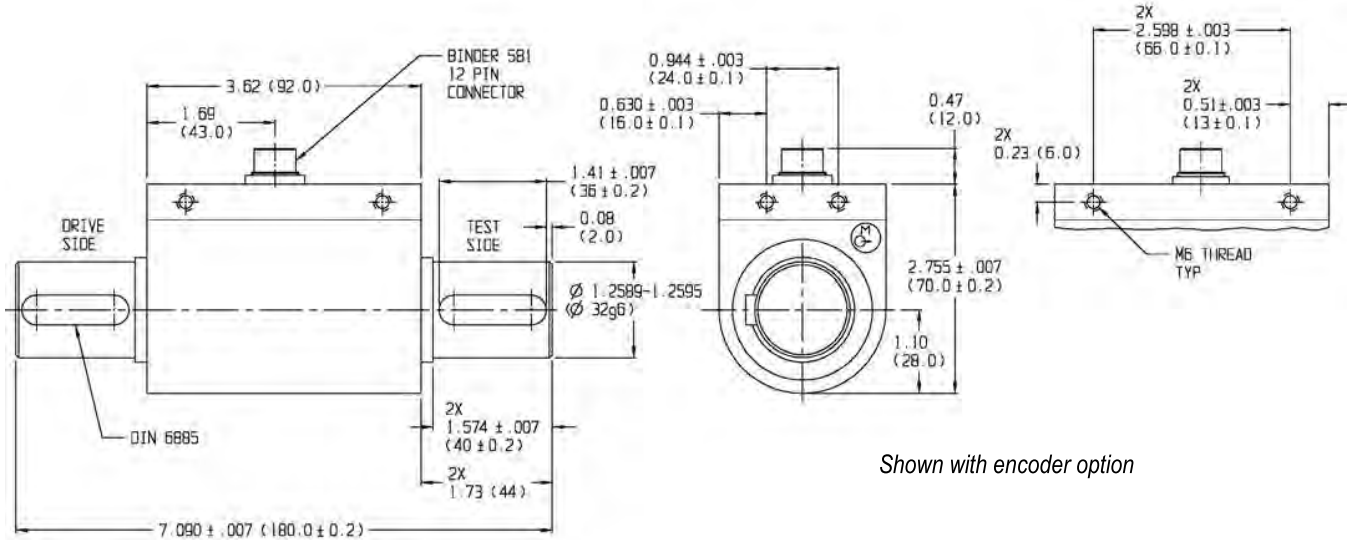
Model T14 Slip-Ring Rotary Torque Transducer – Capacities 20 - 100 Nm (177 to 885 lb-in)



Shown with encoder option

DIMENSIONS

Model T14 Slip-Ring Rotary Torque Transducer – Capacities 200 - 500 Nm (1.77K to 4.4K lb-in)



| T14 with 12-Pin with Encoder | | |
|------------------------------|-------------------|------------------|
| Pin | Function | Description |
| A | Excitation (-) | 0 V |
| B | Excitation (+) | 2-12 V |
| C | Signal (+) | + Output |
| D | Signal (-) | - Output |
| E | Excitation Angle | 0 V |
| F | Excitation Angle | +5 V |
| G | Angle A | TTL |
| H | Angle B | TTL |
| J | Angle | 0 V |
| K | 100% R-Cal Option | Connect to Pin B |
| L | NC | - |
| M | Shield | |

| T14 6-Pin without Encoder | | |
|---------------------------|-------------------|------------------|
| Pin | Function | Description |
| 1 | Excitation (-) | 0 V |
| 2 | Excitation (+) | 2-12 V |
| 3 | Shield | |
| 4 | Signal (+) | + Output |
| 5 | Signal (-) | - Output |
| 6 | 100% R-Cal Option | Connect to Pin 2 |

Model T15 Hex Drive Rotary Torque Transducer

Why the Interface model T15 Hex Drive Rotary Torque Transducer is the best in class:

- Capacities from 0.2 to 20 Nm (1.77 to 177 lbf-in)
- Contactless - no slip rings
- High-level $\pm 5V$ output
- 12-28V supply
- Angle measurement option
- Quick-Connect chuck
- 16-bit resolution



T15 Hex Drive Rotary Torque Transducer

OPTIONS

Angle Measurement - 360 Pulse TTL, 2-Tracks 90° Offset
 $\pm 10V$ Torque Output
 Enhanced Accuracy - Combined Error $\pm 0.1\%$
 RS485 Output (Uses 12-pin connector, replaces $\pm 5V$)
 USB Output with Software

ELECTRICAL CONNECTION

8-PIN T12 ELECTRICAL CONNECTION

| Pin | Function | Description |
|-----|----------------|-----------------------|
| 1 | Supply (+) | 12-28 VDC |
| 2 | Supply (GND) | 0 VDC, TTL |
| 3 | Signal (+) | ± 5 VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | $L < 2.0 / H > 3.5 V$ |
| 6 | Option Angle A | TTL |
| 7 | Option Angle B | TTL |
| 8 | NC | - |

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | Standard | Enhanced |
|----------------------------------|--------------------|------------|
| Combined Error-% FS | ± 0.25 | ± 0.1 |
| Nonrepeatability-% | ± 0.05 | ± 0.02 |
| TEMPERATURE | | |
| Effect on Zero-% RO/ $^{\circ}C$ | ± 0.05 | ± 0.02 |
| Effect on Output-%/ $^{\circ}C$ | ± 0.02 | ± 0.01 |
| Rated Range- $^{\circ}C$ | +5 to +45 | +5 to +45 |
| Operating Range- $^{\circ}C$ | 0 to +60 | 0 to +60 |
| ELECTRICAL | | |
| Output-VDC | ± 5 | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 | 1000 |
| Calibration Signal-% RO | 100 | 100 |
| Supply Voltage-VDC | 12 to 28 | 12 to 28 |
| Supply Current-mA | 60 | 60 |
| Electrical Connection | 8-pin | 8-pin |
| MECHANICAL | | |
| Safe Overload-% RO | 200 | 200 |
| Cyclic Load Rating-% RO | 70 p-P (DIN 50100) | |
| Max Speed - rpm | See table | See table |
| Housing | Aluminum | Aluminum |

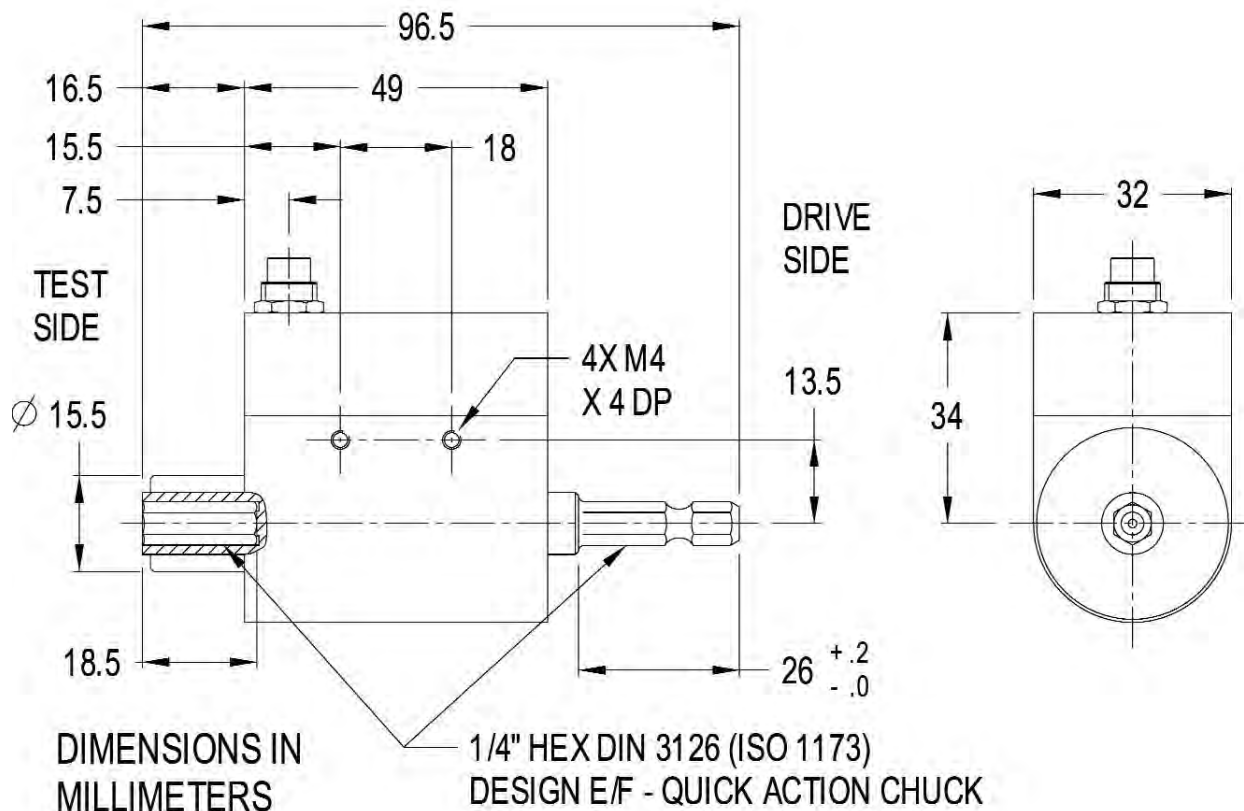
**T15 HEX DRIVE ROTARY TORQUE TRANSDUCER
PERFORMANCE PARAMETERS**

| CAPACITY (Nm) | HEXAGON (INCH) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA (Kgx ^m ²) | | MAX. THRUST LOAD (N) |
|---------------|----------------|---------|---------------------|--|----------------------|----------------------|
| | | | | Drive Side | Test Side | |
| 0.1 | 0.25 | 3,000 | 1.0 | 2.5x10 ⁻⁶ | 2.9x10 ⁻⁷ | 15 |
| 0.2 | 0.25 | 3,000 | 1.0 | 2.5x10 ⁻⁶ | 2.9x10 ⁻⁷ | 20 |
| 0.5 | 0.25 | 3,000 | 5.8 | 2.5x10 ⁻⁶ | 2.9x10 ⁻⁷ | 30 |
| 1 | 0.25 | 4,000 | 2.3x10 ² | 2.6x10 ⁻⁶ | 3.0x10 ⁻⁷ | 40 |
| 2 | 0.25 | 4,000 | 2.9x10 ² | 2.6x10 ⁻⁶ | 3.0x10 ⁻⁷ | 50 |
| 5 | 0.25 | 4,000 | 4.6x10 ² | 2.6x10 ⁻⁶ | 3.1x10 ⁻⁷ | 50 |
| 10 | 0.25 | 4,000 | 5.2x10 ² | 2.6x10 ⁻⁶ | 3.3x10 ⁻⁷ | 50 |
| 15 | 0.25 | 4,000 | 5.2x10 ² | 2.6x10 ⁻⁶ | 3.3x10 ⁻⁷ | 100 |
| 20 | 0.25 | 4,000 | 5.2x10 ² | 2.6x10 ⁻⁶ | 3.3x10 ⁻⁷ | 100 |

T15 Hex Drive Rotary Torque Transducer -
Capacities 0.2 to 20 Nm

DIMENSIONS

| Nominal Torque | | | | | | | |
|--------------------|------|------|------|------|------|------|-----|
| Capacity (Nm) | 0.2 | 0.5 | 1 | 2 | 5 | 10 | 20 |
| Equivalent (lb-in) | 1.77 | 4.43 | 8.85 | 17.7 | 44.3 | 88.5 | 177 |
| See Drawing | | | | | | | |



Model T22 Pulley Rotary Torque Transducer

- Capacities from 20 to 5K Nm (177 to 44K lb-in)
- ±5 VDC output
- Digital electronics
- 10 kHz sample rate
- Contactless
- 16-bit resolution



OPTIONS

Speed & Angle Measurement - 360 Pulse TTL, 2-Tracks 90° Offset, Available on capacities up to 1,000 Nm only
 Speed Output - 60 Pulse TTL, 1-Track, Available on capacities 2,000 Nm & above
 ±10 V Torque Output.
 USB Output & Software

ELECTRICAL CONNECTION

| 12-Pin T22 PULLEY | | |
|-------------------|----------------|---------------------|
| Pin | Function | Description |
| A | NC | - |
| B | Option Angle B | TTL |
| C | Signal (+) | ±5 VDC |
| D | Signal (GND) | 0 VDC |
| E | Supply (GND) | 0 VDC, TTL |
| F | Supply (+) | 12-28 VDC |
| G | Option Angle A | TTL |
| H | NC | - |
| J | NC | - |
| K | Cal. Control | L < 2.0 / H > 3.5 V |
| L | NC | - |
| M | Shield | Transducer Housing |

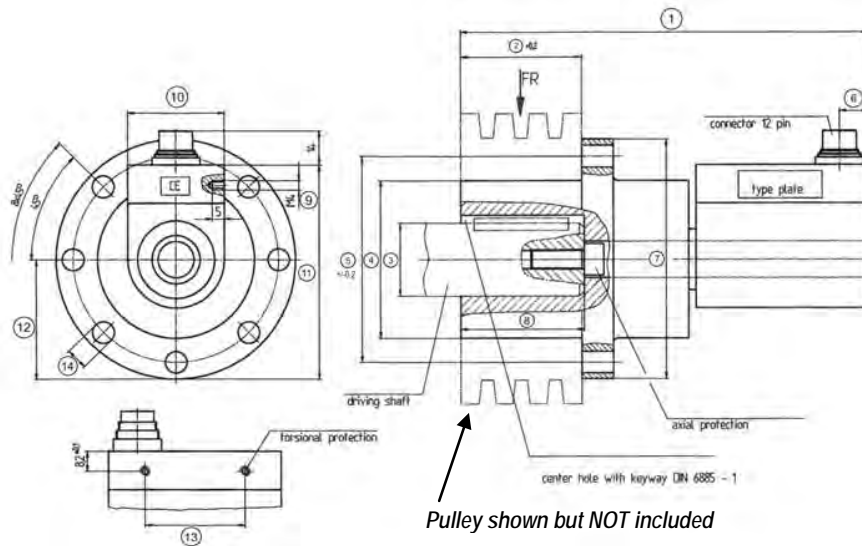
SPECIFICATIONS

| ACCURACY - (MAX ERROR) | |
|-------------------------|---------------------------------|
| Combined Error-% FS | ±0.1 |
| Nonrepeatability-% | ±0.02 |
| TEMPERATURE | |
| Effect on Zero- % RO/°C | ±0.02 |
| Effect on Output-%/°C | ±0.01 |
| Rated Range-°C | +5 to +45 |
| Operating Range-°C | 0 to +60 |
| ELECTRICAL | |
| Output-VDC | ±5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Calibration Signal-% RO | 100 |
| Supply Voltage-VDC | 12 to 28 |
| Supply Current-mA | 60 |
| Electrical Connection | 12-pin |
| MECHANICAL | |
| Safe Overload-% RO | 200 |
| Cyclic Load Rating-% RO | 70 P-P (DIN 50100) |
| Max Speed-rpm | Varies with capacity. See Table |
| Housing | Aluminum |

Model T22 Pulley Rotary Torque Transducer – Capacities 20 to 5K Nm (177 to 44K lb-in)

DIMENSIONS

| Nominal Range Torque | | | | | | | | |
|----------------------|----------------------|--------|-------|--------|-------|--------|----------------|--------|
| Capacity (Nm) | 20, 50, 100, 200 | | 500 | | 1000 | | 2000, 5000 | |
| Equivalent (lb-in) | 177, 443, 885, 1,770 | | 4,425 | | 8,850 | | 17,700, 44,254 | |
| See Drawing | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 6.63 | 168.5 | 8.96 | 227.5 | 8.96 | 227.5 | 11.32 | 287.5 |
| (2) | 1.97 | 50 | 2.36 | 60 | 2.36 | 60 | 4.43 | 110 |
| (3) | 0.59 | 15 H7/ | 1.57 | 40 H7/ | 1.97 | 50 H7/ | 2.36 | 60 H7/ |
| | 1.18 | 30 H7 | 2.17 | 55H7 | 2.17 | 55 H7 | 3.35 | 85 H7 |
| (4) | 2.56 | 65g6 | 5.51 | 140g6 | 5.51 | 140g6 | 6.69 | 170g6 |
| (5) | 3.35 | 85 | 6.22 | 158 | 6.22 | 158 | 7.68 | 195 |
| (6) | 0.47 | 12 | 0.59 | 15 | 0.59 | 15 | 0.59 | 15 |
| (7) | 3.90 | 99 | 6.93 | 176 | 6.93 | 176 | 8.66 | 220 |
| (8) | 2.01 | 51 | 3.15 | 80 | 3.15 | 80 | 5.12 | 130 |
| (9) | M8 | M8 | M12 | M12 | M12 | M12 | M16 | M16 |
| (10) | 1.57 | 40 | 2.28 | 58 | 2.28 | 58 | 2.28 | 58 |
| (11) | 3.48 | 88.5 | 5.31 | 135 | 5.31 | 135 | 6.18 | 157 |
| (12) | 1.95 | 49.5 | 3.43 | 88 | 3.43 | 88 | 4.33 | 110 |
| (13) | 1.63 | 41.5 | 1.16 | 29.5 | 1.16 | 29.5 | 1.16 | 29.5 |
| (14) | 0.35 | 9 | 0.43 | 11 | 0.43 | 11 | 0.51 | 13 |



PERFORMANCE PARAMETERS

| CAPACITY (Nm) | MAX RPM | SPRINGRATE (Nm/rad) | MOMENT OF INERTIA, J (Kgxm ²) | | MAX. RADIAL LOAD, FR (N) |
|---------------|---------|---------------------|---|----------------------|--------------------------|
| | | | Drive Side | Test Side | |
| 20 | 12,000 | 1.3x10 ⁴ | 1.6x10 ⁻⁴ | 1.7x10 ⁻³ | 11,000 |
| 50 | 12,000 | 2.6x10 ⁴ | 1.6x10 ⁻⁴ | 1.7x10 ⁻³ | 11,000 |
| 100 | 12,000 | 5.3x10 ⁴ | 1.6x10 ⁻⁴ | 1.7x10 ⁻³ | 11,000 |
| 200 | 12,000 | 1.1x10 ⁵ | 1.6x10 ⁻⁴ | 1.7x10 ⁻³ | 11,000 |
| 500 | 10,000 | 3.1x10 ⁵ | 2.4x10 ⁻³ | 4.6x10 ⁻² | 37,000 |
| 1,000 | 10,000 | 6.7x10 ⁵ | 2.4x10 ⁻³ | 4.6x10 ⁻² | 37,000 |
| 2,000 | 5,000 | 9.4x10 ⁵ | 1.8x10 ⁻² | 1.2x10 ⁻¹ | 48,000 |
| 5,000 | 5,000 | 2.5x10 ⁶ | 1.8x10 ⁻² | 1.2x10 ⁻¹ | 48,000 |

Model T23 LC Rotary Torque Transducer

Why the Interface model T23 LC Rotary Torque Transducer is the best in class:

- Capacities from 300 and 500 Nm (2.65K to 4.42K lb-in)
- Stainless steel shaft
- ± 5 VDC output
- 12-28 VDC supply
- Contactless



T23 LC Rotary Torque Transducer

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error–% FS ± 0.25
Nonrepeatability–% ± 0.05

TEMPERATURE

Effect on Zero–% RO/°C ± 0.04
Effect on Output–%/°C ± 0.02
Rated Range–°C+5 to +45
Operating Range–°C0 to +60

ELECTRICAL

Output–VDC ± 5
Bandwidth, Hz (-3dB)1000
Supply Voltage–VDC11 to 28
Supply Current–mA90
Electrical ConnectionIntegral cable,
3-ft

MECHANICAL

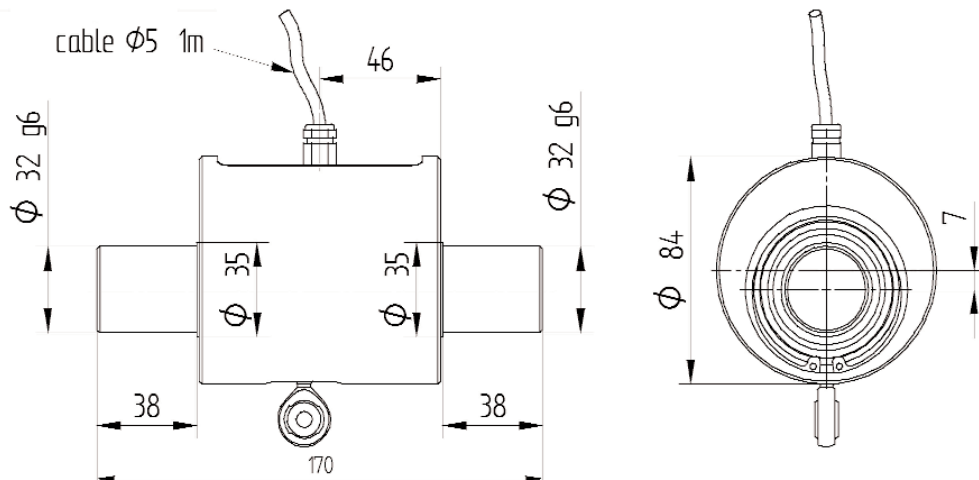
Safe Overload–% RO180
Cyclic Load Rating–% RO70 P-P (DIN 50100)
Max Speed - rpm3500
ShaftStainless steel
HousingAluminum

OPTIONS

Extra Cable Length

T23 INTEGRAL CABLE WIRING CODE

| Function | Description | Color |
|--------------|--------------|--------|
| Supply (+) | 12 to 28 VDC | Brown |
| Supply (GND) | 0 VDC | Red |
| Signal (+) | ± 5 VDC | White |
| Signal (GND) | 0 VDC | Green |
| Shield | Shield | Shield |



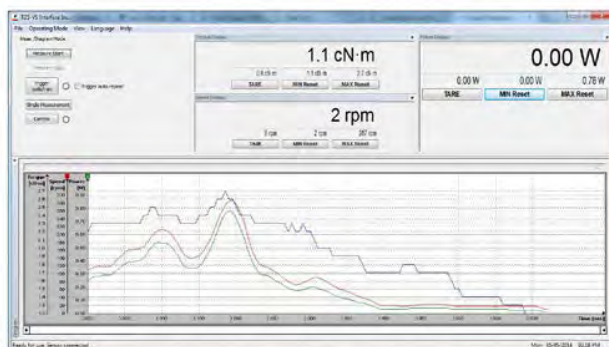
Model T25 High Speed Rotary Torque Transducer

- Capacities from 0.1 to 5K Nm (0.885 to 44.3K lb-in)
- 0.1% combined error
- Speed up to 30K RPM
- Unique design eliminates RPM dependent bearing friction effects
- Foot or float mount
- Remote activated on-shaft shunt calibration
- ± 5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics
- 10 kHz sample rate
- 16-bit resolution



OPTIONS

- $\pm 0.05\%$ combined error
- Encoder for speed/angle measurement
- Keyed shaft per DIN 6885.1
- Right angle mating connector or cable assembly
- ± 10 VDC output
- RS485 output
- USB output – includes encoder option and display, graphing and logging software (replaces ± 5 V output)



SPECIFICATIONS

| | |
|-----------------------------------|---|
| ACCURACY – (MAX ERROR) | |
| Combined Error–% FS | ± 0.1 |
| Nonrepeatability–% RO | ± 0.02 |
| Resolution | 16-bit |
| TEMPERATURE | |
| Effect on Zero–% RO/ $^{\circ}$ C | ± 0.02 |
| Effect on Zero–% RO/ $^{\circ}$ F | ± 0.01 |
| Effect on Output–%/ $^{\circ}$ C | ± 0.01 |
| Effect on Output–%/ $^{\circ}$ F | ± 0.006 |
| Compensated Range– $^{\circ}$ C | 5 to 45 |
| Compensated Range– $^{\circ}$ F | 41 to 113 |
| Operating Range– $^{\circ}$ C | 0 to 60 |
| Operating Range– $^{\circ}$ F | 32 to 140 |
| Storage Range– $^{\circ}$ C | -10 to 70 |
| Storage Range– $^{\circ}$ F | 14 to 158 |
| ELECTRICAL | |
| Supply Voltage– VDC | 12 to 28 |
| Supply Current– mA | ≤ 60 |
| Output– VDC | ± 5 |
| Bandwidth, Hz (-3dB) | 1000 |
| Sample Rate– Hz | 10,000 |
| Calibration Signal–%FS | 100 |
| Electrical Connection | 12-pin Binder series 581 (includes mate) |
| ENCODER OPTION | 360 pulse/rev, 2-track, +5V TTL, 90 $^{\circ}$ offset, quadrature encoder |
| MECHANICAL | |
| Safe Overload–%RO | 200 |
| Cyclic Load Rating–%RO | 70 P-P (DIN 50100) |
| Max Speed– RPM | Varies with capacity–see table |
| Shaft Material | Stainless Steel |
| Housing Material | Aluminum |

DIMENSIONS

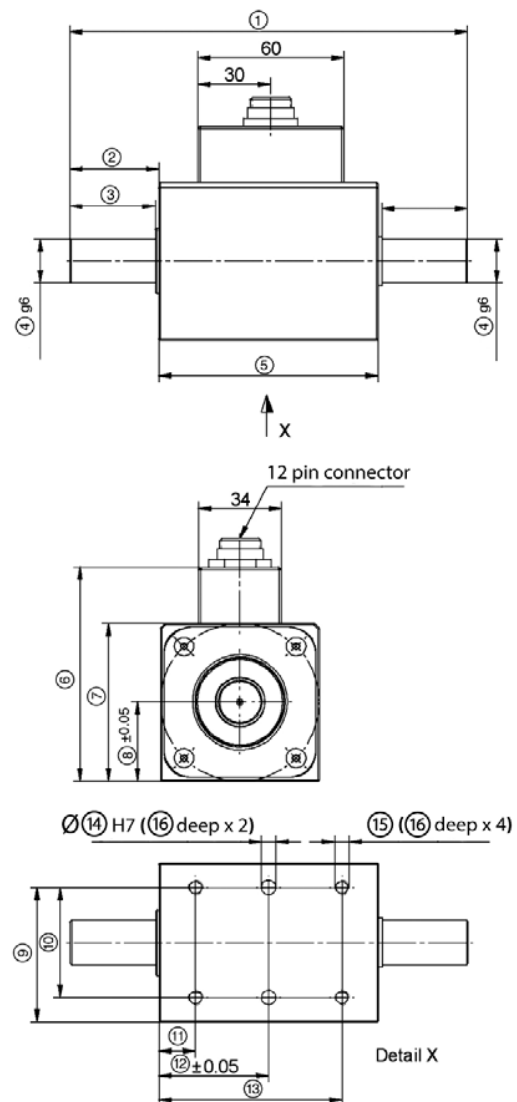
| Capacity (Nm) | 0.1, 0.2, 0.5 1, 2, 5 | | 10 | | 20, 30, 50, 100 | | 200, 500 | | 1K | | 2K, 5K | |
|--------------------|---------------------------------------|------|--------|------|--------------------|------|------------|------|---------|------|--------------|-----|
| Equivalent (lb-in) | 0.885, 1.77, 4.43 8.85, 17.7, 44.3 | | 88.5 | | 177, 266, 443, 885 | | 1770, 4425 | | 8.85K | | 17.7K, 44.3K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| 1 | 4.33 | 110 | 4.33 | 110 | 6.42 | 163 | 9.21 | 234 | 9.21 | 234 | 14.6 | 372 |
| 2 | 0.75 | 19 | 0.75 | 19 | 1.44 | 36.5 | 2.22 | 56.5 | 2.22 | 56.5 | 4.49 | 114 |
| 3 | 0.70 | 17 | 0.70 | 17 | 1.38 | 35 | 2.17 | 55 | 2.17 | 55 | 4.33 | 110 |
| 4 | 0.31 | 8 | 0.40 | 10 | 0.71 | 18 | 1.30 | 32 | 1.65 | 42 | 2.76 | 70 |
| 5 | 2.80 | 71 | 2.80 | 71 | 3.54 | 90 | 4.72 | 120 | 4.72 | 120 | 5.67 | 144 |
| 6 | 2.48 | 63 | 2.48 | 63 | 3.46 | 88 | 4.65 | 118 | 4.65 | 118 | 6.42 | 163 |
| 7 | 1.57 | 40 | 1.57 | 40 | 2.56 | 65 | 3.74 | 95 | 3.74 | 95 | 5.51 | 140 |
| 8 | 0.79 | 20 | 0.79 | 20 | 1.28 | 32.5 | 1.87 | 47.5 | 1.87 | 47.5 | 2.76 | 70 |
| 9 | 1.38 | 35 | 1.38 | 35 | 2.17 | 55 | 3.25 | 82.5 | 3.25 | 82.5 | 4.72 | 120 |
| 10 | 1.18 | 30 | 1.18 | 30 | 1.77 | 45 | 2.76 | 70 | 2.76 | 70 | 3.94 | 100 |
| 11 | 0.47 | 12 | 0.47 | 12 | 0.59 | 15 | 0.79 | 20 | 0.79 | 20 | 0.98 | 25 |
| 12 | 1.40 | 35.5 | 1.40 | 35.5 | 1.77 | 45 | 2.36 | 60 | 2.36 | 60 | 2.83 | 72 |
| 13 | 2.32 | 59 | 2.32 | 59 | 2.95 | 75 | 3.94 | 100 | 3.94 | 100 | 4.68 | 119 |
| 14 | 0.16 | 4 | 0.16 | 4 | 0.24 | 6 | 0.31 | 8 | 0.31 | 8 | 0.47 | 12 |
| 15 | M4x0.7 | | M4x0.7 | | M6x1 | | M8x1.25 | | M8x1.25 | | M12x1.75 | |
| 16 | 0.31 | 8 | 0.31 | 8 | 0.31 | 8 | 0.55 | 14 | 0.55 | 14 | 0.79 | 20 |

PERFORMANCE PARAMETERS

| Measuring Range (Nm) | Weight (kg) | Max Speed (RPM) | Springrate (Nm/rad) | Moment of Inertia (kg x m ²) | | MAX Thrust ** | MAX Shear ** |
|----------------------|-------------|-----------------|---------------------|--|------------|---------------|--------------|
| | | | | Drive Side | Test Side* | | |
| 0.1 | 0.5 | 30,000 | 1.80E+01 | 9.20E-06 | 2.50E-07 | 40 | 0.5 |
| 0.2 | 0.5 | 30,000 | 1.80E+01 | 9.20E-06 | 2.50E-07 | 40 | 0.5 |
| 0.5 | 0.5 | 30,000 | 9.40E+01 | 9.20E-06 | 2.50E-07 | 120 | 1.5 |
| 1 | 0.5 | 30,000 | 9.40E+01 | 9.20E-06 | 2.50E-07 | 120 | 1.5 |
| 2 | 0.5 | 30,000 | 3.70E+02 | 9.20E-06 | 2.50E-07 | 250 | 3.5 |
| 5 | 0.5 | 30,000 | 7.70E+02 | 9.20E-06 | 2.60E-07 | 450 | 8 |
| 10 | 0.6 | 30,000 | 8.80E+02 | 9.30E-06 | 3.40E-07 | 550 | 10 |
| 20 | 1.5 | 20,000 | 5.10E+03 | 1.20E-04 | 6.80E-06 | 1200 | 22 |
| 30 | 1.5 | 20,000 | 5.10E+03 | 1.20E-04 | 6.80E-06 | 1200 | 22 |
| 50 | 1.5 | 20,000 | 9.60E+03 | 1.20E-04 | 7.40E-06 | 2500 | 70 |
| 100 | 1.5 | 20,000 | 9.60E+03 | 1.20E-04 | 7.40E-06 | 2500 | 70 |
| 200 | 4.8 | 15,000 | 8.90E+04 | 5.40E-04 | 4.40E-04 | 5000 | 140 |
| 500 | 4.8 | 15,000 | 1.30E+05 | 5.40E-04 | 4.40E-04 | 6800 | 200 |
| 1K | 5.1 | 15,000 | 1.70E+05 | 6.40E-04 | 5.30E-04 | 10000 | 450 |
| 2K | 19 | 12,000 | 6.30E+5 | 5.70E-03 | 5.10E-03 | 17000 | 600 |
| 5K | 19 | 12,000 | 9.60E+05 | 5.80E-03 | 5.20E-03 | 32000 | 1500 |

* With encoder option

** Allowable without significant effect on measurement and applies to unsupported shaft only



Model T27 Hollow Flange Rotary Torque Transducer

- Capacities from 5 Nm to 5000 Nm
- $\pm 5V$ output
- Very short axial length
- Large thru-hole design
- Bearingless



OPTIONS

$\pm 10V$ output
Speed measurement – 30 pulse, +5V TTL

SPECIFICATIONS

| | |
|-------------------------------|--------------------|
| ACCURACY – (MAX ERROR) | |
| Combined Error - %FS | +/-0.1 |
| Nonrepeatability - % RO | +/-0.02 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.01 |
| Compensated Range - °C | 5 to +45 |
| Operating Range - °C | 0 to +60 |
| ELECTRICAL | |
| Output - VDC | +/-5 |
| Bandwidth - Hz | 1 kHz - 3dB |
| Supply Voltage - VDC | 12-28 |
| Supply Current - mA | 90 |
| Electrical Connection | 12 pin Binder |
| Resolution | Analog |
| MECHANICAL | |
| Safe Overload - % RO | 200 |
| Cyclic Load Rating - % RO | 70 P-P (DIN 50100) |
| Balance Grade - DIN ISO 1940 | 6.3 |
| IP Rating | 54 |

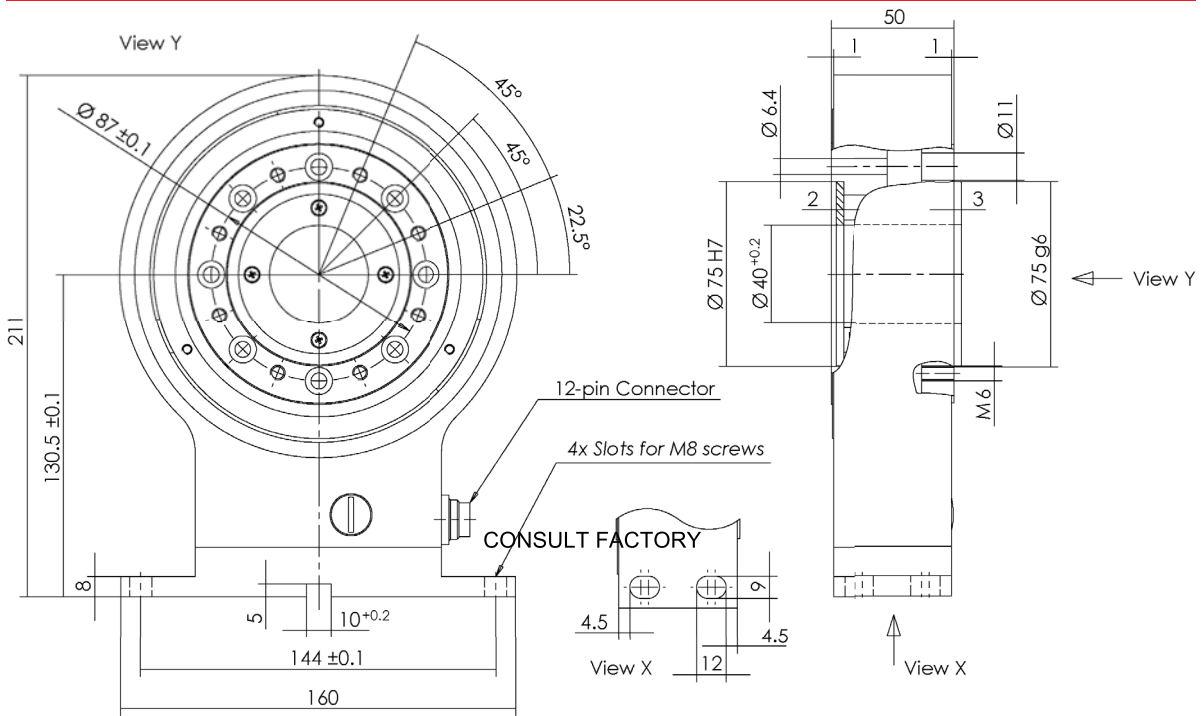
DIMENSIONS

T27 Hollow Flange Rotary Torque Transducer Performance Parameters

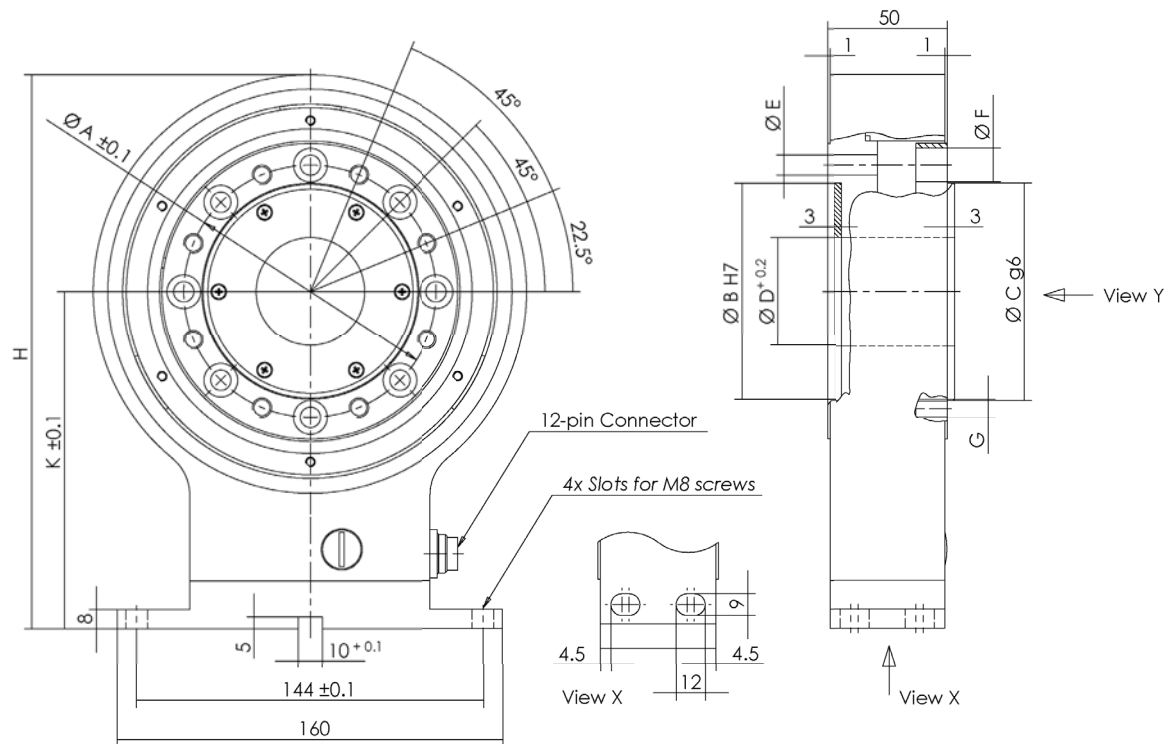
| Capacity (N·m) | Max RPM | Springrate (Nm/rad) | Mass Moment of Inertia (kg·m ²) ¹ | | Max Thrust Load (N) | Max Shear Force (N) |
|----------------|-----------------|---------------------|--|-----------|---------------------|---------------------|
| | | | Drive Side | Test Side | | |
| 50 | 15000 | 8.3E+04 | 5.8E-03 | 1.1E-03 | 650 | 150 |
| 100 | 15000 | 1.4E+05 | 5.8E-03 | 1.1E-03 | 1000 | 250 |
| 200 | 15000 | 3.2E+05 | 9.2E-03 | 1.8E-03 | 1200 | 400 |
| 500 | 12000 | 1.1E+06 | 1.3E-02 | 4.0E-03 | 1300 | 700 |
| 1000 | 12000 | 3.5E+06 | 1.3E-02 | 4.1E-03 | 2000 | 1800 |
| 2000 | CONSULT FACTORY | | | | | |
| 5000 | | | | | | |

¹ Without optional speed measurement

DIMENSIONS



| | |
|-----------------------|----------|
| Capacity (N·m) | 50 / 100 |
|-----------------------|----------|



| Capacity (N·m) | Dimensions (mm) | | | | | | | | |
|----------------|-----------------|--------|--------|---------|-----|-----|-----|-----|-------|
| | Tk Ø A±0.1 | Ø B H7 | Ø C g6 | Ø D+0.2 | Ø E | Ø F | G | H | K±0.1 |
| 200 | 105 | 90 | 90 | 45 | 8.4 | 14 | M8 | 230 | 140 |
| 500 / 1000 | 133 | 110 | 110 | 70 | 13 | 20 | M12 | 250 | 150 |
| 2000 / 5000 | CONSULT FACTORY | | | | | | | | |

Model HRDT High Resolution Digital Telemetry Rotary Torque Transducer

- Capacities from 250 to 10K Nm (2,200 to 88,500 lb-in)
- Full 18-bit useable resolution (24 bit internal)
- 2,000 fully processed results per second
- 4X safe overload (2x for DIN 90 size)
- Easy stator alignment
- Push button configuration – No PC required for basic set-up and installation
- Output module with digital display
- Bearingless non-contact design
- Outputs include fully scalable $\pm 5V$, $\pm 10V$, 4-20 mA, Frequency
- Short, stiff design with low rotational inertia
- Full selection of filters including Bessel, Butterworth Chebychev, Exponential, Triggered average
- Reliable digital data transmission
- Multiple independent outputs option
- Power calculation (requires speed input)



HRDT Rotary Torque Transducer
Stator, Rotor & Output Module Shown

STANDARD COMPONENTS

Rotor, stator, output module, software & cables

OPTIONS

Two or more output modules to deliver multiple simultaneous outputs or independent ranges

Integral couplings

NEMA 4X enclosure for output module

Balancing

Speed measurement



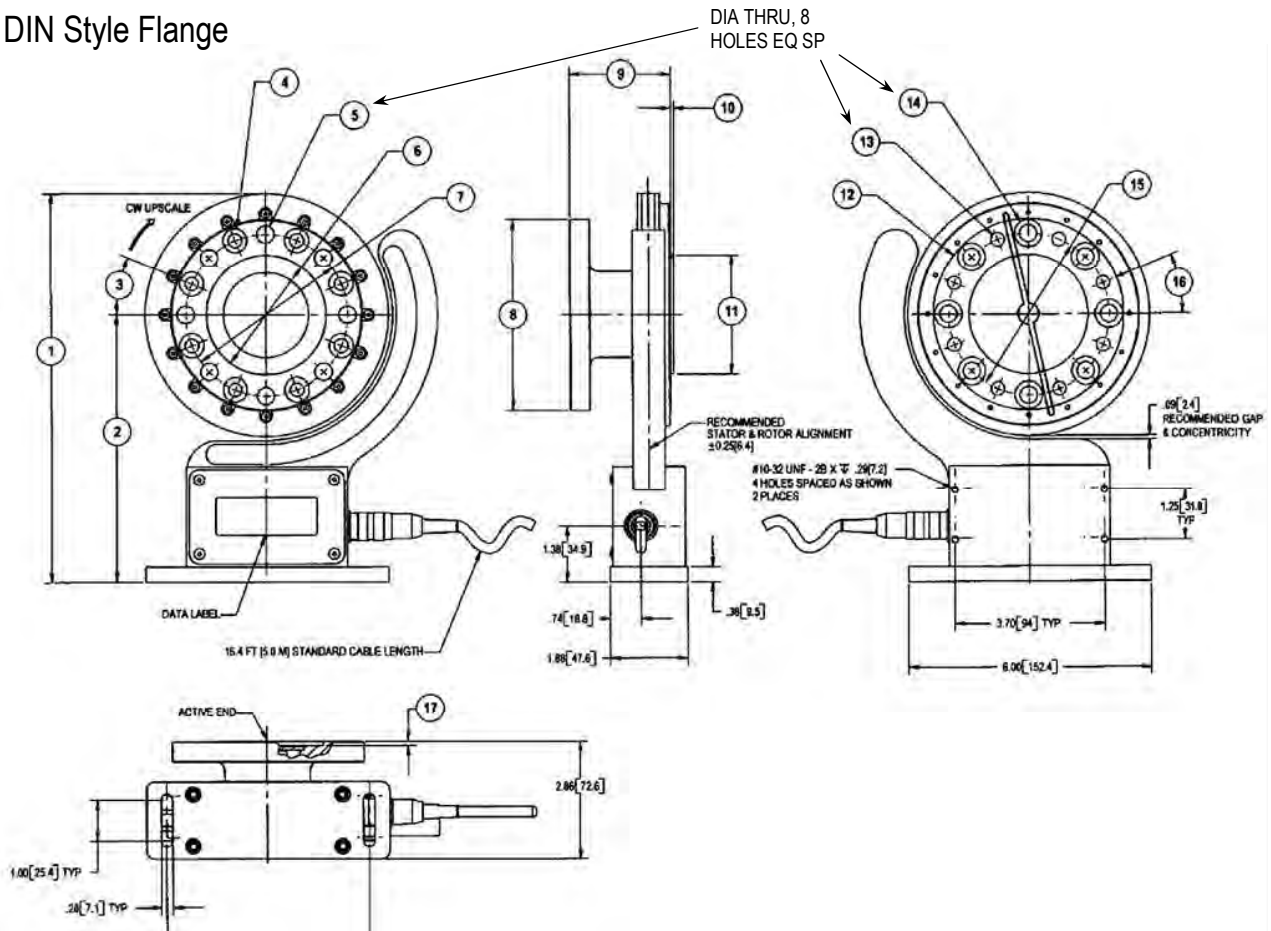
HRDTC Integral
Coupling Option

SPECIFICATIONS

| | |
|-----------------------------|---|
| ACCURACY | |
| Nonlinearity - % FS | ± 0.05 |
| Linear Overrange - % FS | 120 |
| Resolution | 18-bit |
| Data Rate - Fully Processed | 2,000 results/sec |
| TEMPERATURE | |
| Operating Range °F | 0 to 158 |
| Compensated Range °F | +15 to +122 |
| Effect on Zero - %RO/°F | ± 0.005 |
| Effect on Span - %/°F | ± 0.005 |
| ELECTRICAL | |
| VDC Output | ± 10 , ± 5 |
| mA Output | 12 ± 8 |
| kHz Output | 10 ± 5 , 60 ± 20 or 60 ± 30 |
| Power Supply - VDC | 24V |
| Linearization | 9-point |
| MECHANICAL | |
| Protection Class | |
| Rotor and Stator | IP54 |
| Control Module | IP40 (IP66 option) |

| Model | DIN Size | Capacity (Nm) | Material | RPM |
|-------|----------|---------------|----------|-----|
| HRDT1 | 90 | 250, 500 | Aluminum | 15K |
| HRDT2 | 120 | 1K, 2K | Steel | 15K |
| HRDT3 | 150 | 3K, 4K | Steel | 12K |
| HRDT4 | 180 | 5K | Steel | 10K |
| HRDT5 | 225 | 10K | Steel | 8K |

HRDT Stator & Rotor
DIN Style Flange

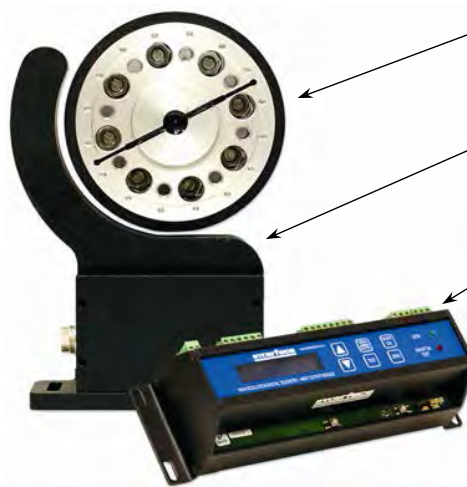


DIMENSIONS

| Model | DIN 90 | | DIN 120 | | DIN 150 | | DIN 180 | | DIN 225 | |
|--------------------|-------------|-------|--------------|-------|--------------|-------|------------|--------|----------|--------|
| Capacity (Nm) | 250, 500 | | 1K, 2K | | 3K, 4K | | 5K | | 10K | |
| Equivalent (lb-in) | 2.2K, 4.43K | | 8.85K, 17.7K | | 26.5K, 35.4K | | 44.3K | | 88.5K | |
| | Inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 8.47 | 215.1 | 9.62 | 244.3 | 11.82 | 274.8 | 11.63 | 295.4 | 14.07 | 357.3 |
| (2) | 6.09 | 154.8 | 6.62 | 168.1 | 7.22 | 183.3 | 7.63 | 193.9 | 8.84 | 224.6 |
| (3) | N/A | | 22.5° | | 22.5° | | 22.5° | | 22.5° | |
| (4) | N/A | N/A | 0.59 | 15 | 0.67 | 17 | 0.79 | 20 | 1.00 | 25.5 |
| (5) | 0.35 | 8.80 | 0.43 | 10.8 | 0.50 | 12.8 | 0.58 | 14.8 | 0.66 | 16.7 |
| (6) | 1.8504 | 47 H7 | 2.9528 | 75 H7 | 3.5433 | 90 H7 | 4.3307 | 110 H7 | 5.5118 | 140 H7 |
| (7) | 2.93 | 74.5 | 4.00 | 101.5 | 5.12 | 130 | 6.12 | 155.5 | 7.72 | 196 |
| (8) | 3.54 | 90 | 4.72 | 120 | 5.91 | 150 | 7.09 | 180 | 8.86 | 225 |
| (9) | 2.16 | 54.8 | 2.44 | 62 | 2.44 | 62 | 2.50 | 63.5 | 2.52 | 64 |
| (10) | 0.08 | 2 | 0.08 | 2 | 0.08 | 2 | 0.08 | 2 | 0.08 | 2 |
| (11) | 1.8504 | 47g6 | 2.9528 | 75g6 | 3.5433 | 90g6 | 4.3307 | 110g6 | 5.5118 | 140g6 |
| (12) | 3.54 | 90 | 4.72 | 120 | 5.91 | 90 | 7.09 | 180 | 8.86 | 225 |
| (13) | M8x1.25-6H | | M10x1.5-6H | | M12x1.75-6H | | M14x2.0-6H | | M16x2.6H | |
| (14) | 0.56 | 14.2 | 0.68 | 17.3 | 0.76 | 19.2 | 0.89 | 22.5 | 1.00 | 25.5 |
| (15) | 2.93 | 74.5 | 4.00 | 101.5 | 5.12 | 130 | 6.12 | 155.5 | 7.72 | 196 |
| (16) | 22.5° | | 22.5° | | 22.5° | | 22.5° | | 22.5° | |
| (17) | 0.10 | 2.50 | 0.11 | 2.80 | 0.13 | 3.20 | 0.15 | 3.80 | 0.21 | 5.3 |

HRDT High Resolution Digital Telemetry Parts Guide

Out of the Box: The HRDT system is configured ready-to-run. Simply connect the components together and apply power. Rotor calibration data and system configuration files are backed-up on a supplied USB memory stick. Multiple output modules can be used to provide independently scalable simultaneous dual outputs. Stator-to-output module and PC interconnect cables are included.



Rotor Module: Strain gage based rotary torque sensor with inductive power loop and on-board 2.4GHz radio transceiver for data transfer.

Stator Module: Supplies inductive power to the Rotor Module and houses a 2.4GHz radio transceiver for communication with the Rotor.

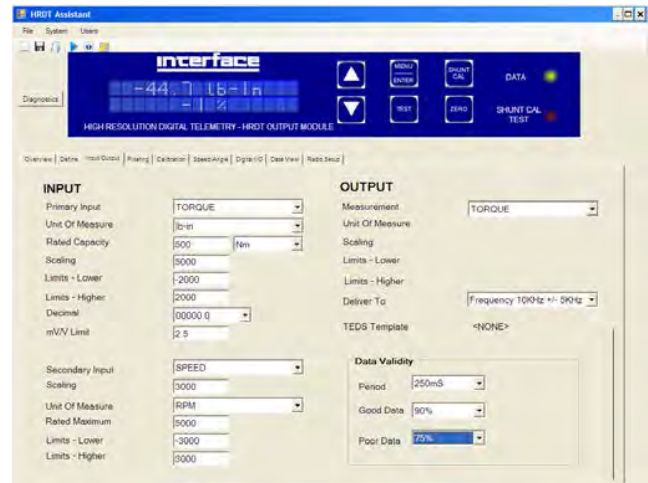
Output & Control Module: Windows CE computer providing system control, scaled outputs, digital readout for torque, speed or power and menu commands. The Output Module is connected to the Stator by a 5m cable. Longer cable lengths are optional. No minimum cable length.

HRDT Assistant Software



OVERVIEW

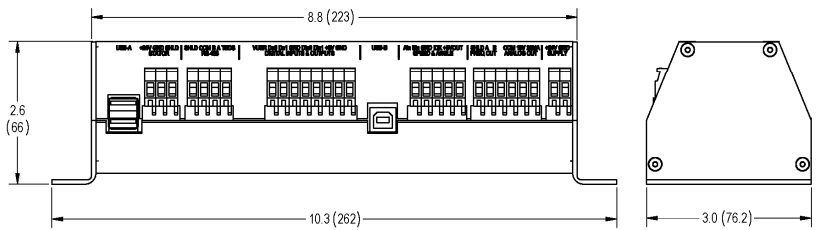
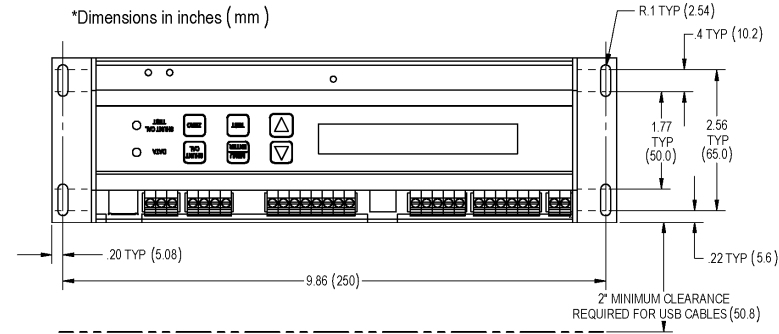
Overview screen shows specific details of the current configuration such as scaling, filter and output settings.



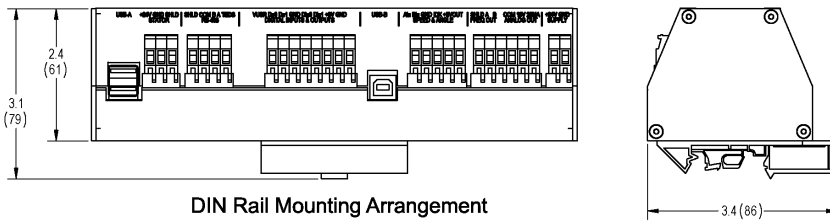
INPUT/OUTPUT

Input/Output screen allows user adjustment of scaling and output.

Output Module Dimensions



Standard Mounting Arrangement

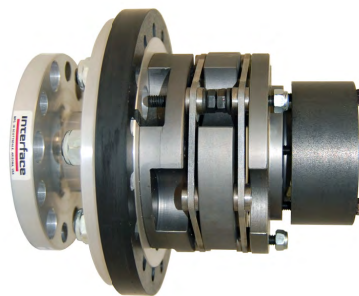


DIN Rail Mounting Arrangement

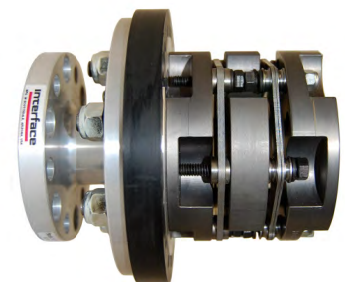
HRDTC Integral Coupling Option



Keyed Hubs



Shrink-Disk Hubs
(for smooth shafts)

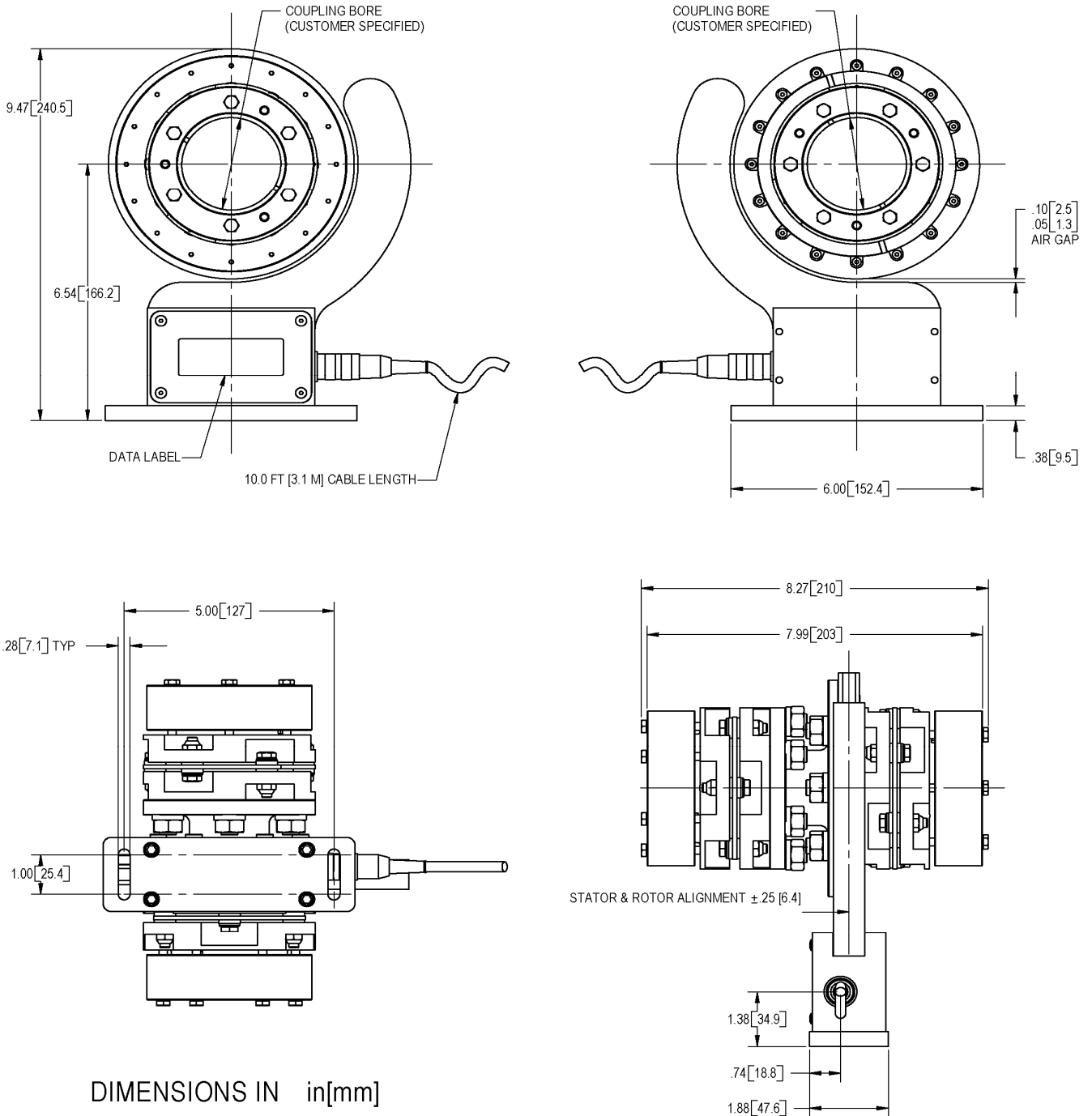


Flange Hub

Consult Factory for Hub and Configuration Options

HRDTC Integral Coupling Option 250 or 500 Nm with Shrink-Disk Hubs

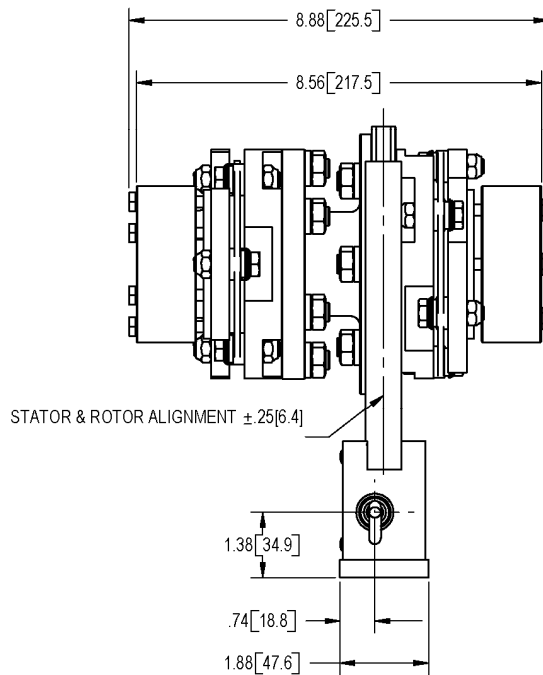
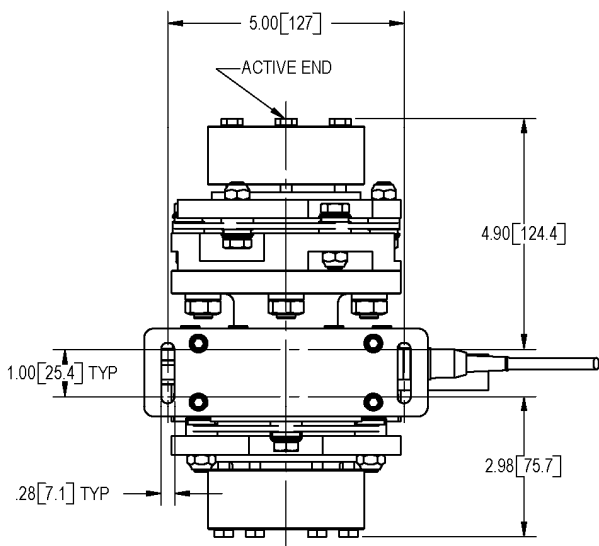
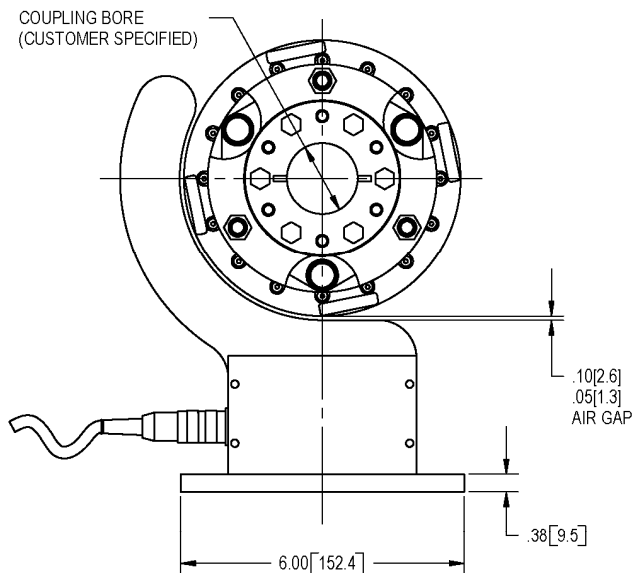
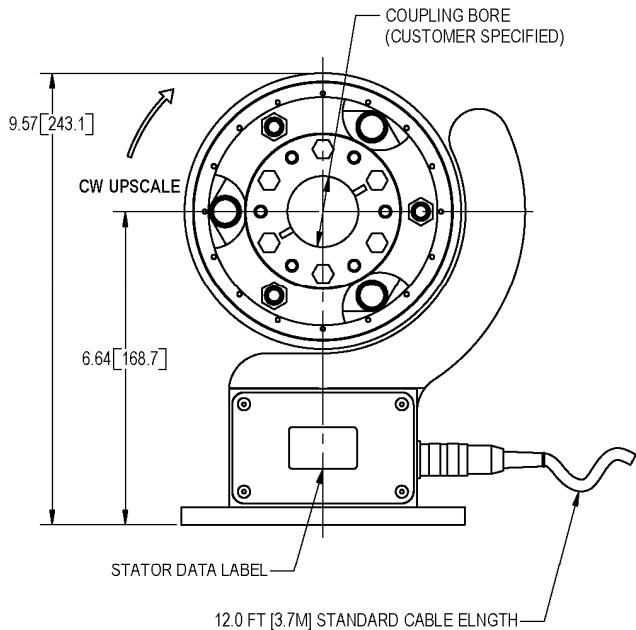
SAMPLE DRAWING ONLY:
Consult Factory for Hub and Configuration Options



Note: Refer to Roba DS Coupling Catalog for details.
250 Nm uses size 40 HF coupling, pages 26-43.
500 Nm uses size 40 HT coupling, pages 12-25.

HRDTC Integral Coupling Option 1K Nm with Shrink-Disk Hubs

SAMPLE DRAWING ONLY:
Consult Factory for Hub and Configuration Options



DIMENSIONS IN in[mm]

Note: Refer to Roba DS Coupling Catalog for details.
1000 Nm uses size 64 HT coupling, pages 12-25.

Model TS11 Flange Style Reaction Torque Transducer

Why the Interface model TS11 Flange Style Reaction Torque Transducer is the best in class:

- Capacities from 10 to 20K Nm (88.5 to 177K lb-in)
- Compact
- Thru-hole design
- Threaded mounting holes



TS11 Flange Style Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)

ELECTRICAL CONNECTION

| 6-PIN TS12 ELECTRICAL CONNECTION | |
|----------------------------------|---|
| Pin | Function |
| 1 | Excitation (-) |
| 2 | Excitation (+) |
| 3 | Shield |
| 4 | Signal (+) |
| 5 | Signal (GND) |
| 6 | Cal. Control (Option) Connect to Pin 2 |

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error—% FS±0.1
Nonrepeatability—%±0.02

TEMPERATURE

Effect on Zero—% RO/°C±0.02
Effect on Output—%/°C±0.01
Rated Range—°C-5 to +45
Operating Range—°C-15 to +55

ELECTRICAL

Output—mV/V
10 Nm0.5
25 to 20K Nm1.0
Excitation Voltage—VDC MAX12
Bridge Resistance—Ohm350
Electrical Connection6 pin

MECHANICAL

Safe Overload—% RO150
Safe Overhung Moment—% FS50
Deflection at Capacity—rad0.003
Angular Deflection at Rated Torque—°<0.2
Cyclic Load Rating—% RO70 P-P (DIN 50100)
MaterialStainless steel

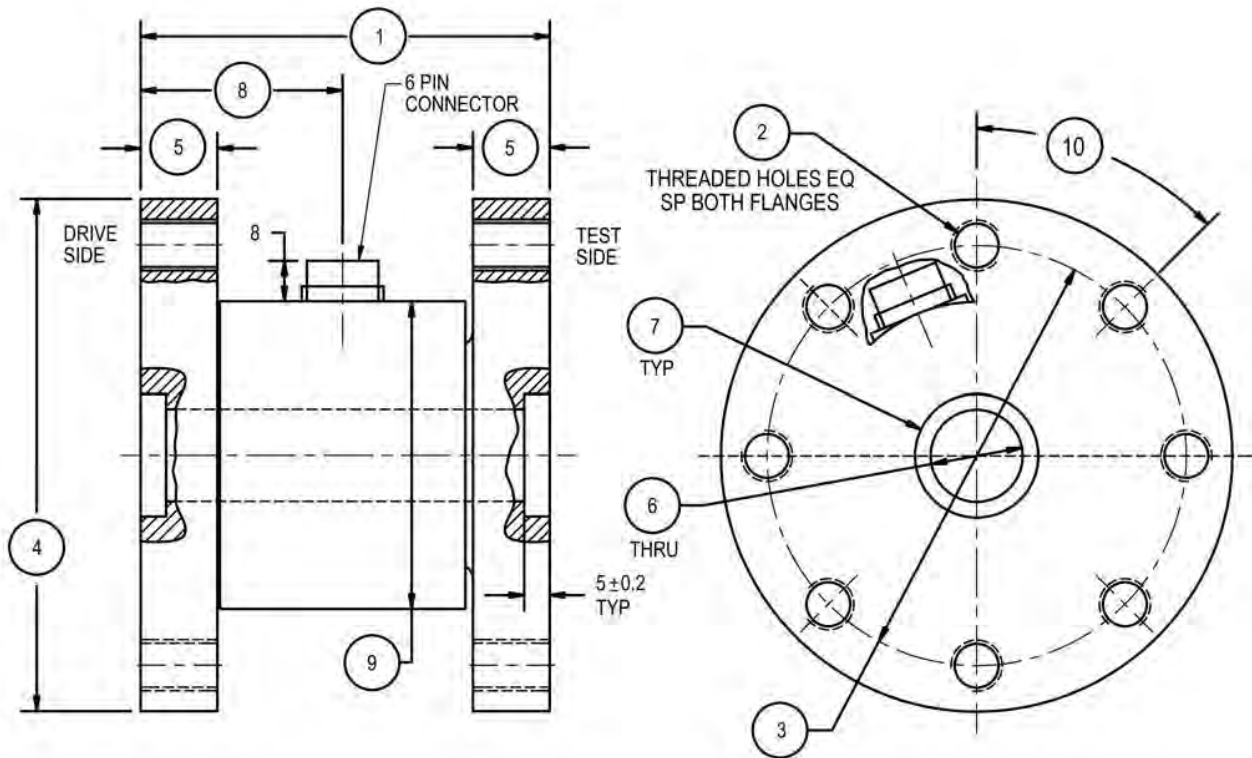
TS11 Flange Style Reaction Torque Transducer - Capacities 10 to 20,000 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | | | |
|--------------------|------------------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|--------|
| Capacity (Nm) | 10, 25, 50, 100, 200 | | 500, 1K | | 2K | | 5K | | 10K, 20K | |
| Equivalent (lb-in) | 88.5, 221, 443 885, 1.77K | | 4.43K, 8.85K | | 17K | | 44.3K | | 88.5K, 177K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 2.56 | 65 | 3.15 | 80 | 3.94 | 100 | 3.94 | 100 | 4.88 | 124 |
| ② | M8, 6 places | | M10, 8 places | | M12, 12 places | | M12, 12 places | | M24, 8 places | |
| ③ | 2.28 | 58 | 3.23 | 82 | 3.94 | 100 | 3.94 | 100 | 8.43 | 210 |
| ④ | 2.76 | 70 | 3.94 | 100 | 5.12 | 130 | 5.12 | 130 | 10.24 | 260 |
| ⑤ | 0.47 | 12 | 0.59 | 15 | 0.79 | 20 | 0.79 | 20 | 1.26 | 32 |
| ⑥ | 0.39 | 10 | 0.71 | 18 | 0.79 | 20 | N/A | N/A | 4.13 | 105 |
| ⑦ | 0.7874/ 0.7866 | 20 H7 | 0.7874/ 0.7866 | 20 H7 | 2.9528/ 2.9516 | 75 H7 | 2.9528/ 2.9516 | 75 H7 | 4.1139/ 4.1325 | 105 H7 |
| ⑧ | 1.30 | 33 | 1.56 | 39.5 | 1.77 | 45 | 1.77 | 45 | 2.66 | 67.5 |
| ⑨ | 1.77 | 45 | 2.36 | 60 | 3.15 | 80 | 3.15 | 80 | 5.71 | 145 |
| ⑩ | 60° | | 45° | | 30° | | 30° | | 45° | |



TS11 Flange Style
Reaction Torque Transducer



Dimensions in mm

Model TS12 Shaft Style Reaction Torque Transducer

Why the Interface model TS12 Shaft Style Reaction Torque Transducer is the best in class:

- Capacities from 0.005 to 20K Nm (0.04 to 177K lb-in)
- Stainless steel shafts
- Compact



TS12 Shaft Style Reaction Torque Transducer

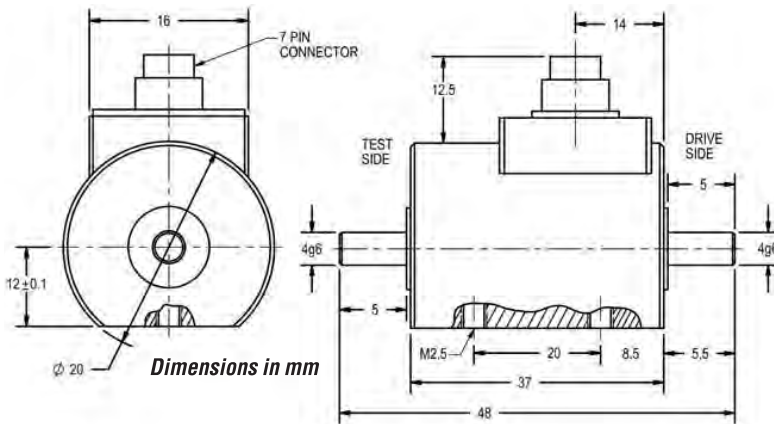
OPTIONS

100 % Control Signal (RCAL)

TS12 Shaft Style Reaction Torque Transducer - Capacities 0.005, 0.01 & 0.02 Nm

DIMENSIONS

| Nominal Torque | | | |
|--------------------|-------|------|------|
| Capacity (Nm) | 0.005 | 0.01 | 0.02 |
| Equivalent (lb-in) | .044 | .089 | .177 |
| See Drawing | | | |



SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.1
Nonrepeatability-%±0.02

TEMPERATURE

Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C-5 to +45
Operating Range-°C-15 to +55

ELECTRICAL

Output-mV/V
0.005 Nm to 0.1 Nm0.5
0.2 Nm to 5,000 Nm0.8
10K Nm to 20K Nm1.5
Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm1,000
Electrical Connection6 or 7 pin

MECHANICAL

Safe Overload-% RO
0.005 Nm to 0.1 Nm300
0.2 Nm to 5K Nm200
10K Nm to 20K Nm150
Safe Overhung Moment-% FS50
Cyclic Load Rating-% RO
0.005 Nm to 0.1 Nm80 P-P
0.2 Nm to 20K Nm70 P-P (DIN 50100)
Shaft.....Stainless steel
HousingAluminum

ELECTRICAL CONNECTION

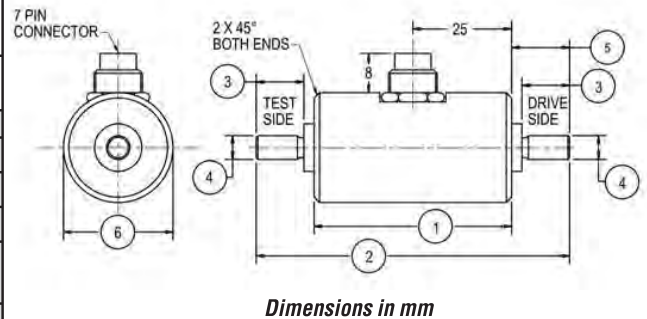
| 6-PIN TS12 ELECTRICAL CONNECTION | |
|----------------------------------|---|
| Pin | Function |
| 1 | Excitation (-) |
| 2 | Excitation (+) |
| 3 | Shield |
| 4 | Signal (+) |
| 5 | Signal (GND) |
| 6 | Cal. Control (Option) Connect to Pin 2 |

| 7-PIN TS12 ELECTRICAL CONNECTION | |
|----------------------------------|---|
| Pin | Function |
| 1 | Excitation (-) |
| 2 | Excitation (+) |
| 3 | Shield |
| 4 | Signal (+) |
| 5 | Signal (GND) |
| 6 | Cal. Control (Option) Connect to Pin 2 |
| 7 | NC |

TS12 Shaft Style Reaction Torque Transducer - Capacities 0.03 to 15 Nm

DIMENSIONS

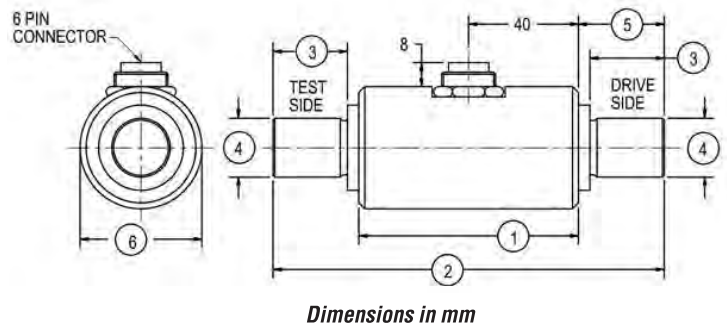
| Nominal Torque | | | | | | |
|--------------------|-------------------|------|--|------|-------------------|-------|
| Capacity (Nm) | 0.03, 0.05 | | 0.1, 0.2, 0.3, 0.5, 1, 2, 5 | | 10, 15 | |
| Equivalent (lb-in) | 0.26, 0.44 | | 0.85, 1.77, 2.66 4.43, 8.85, 17.7, 44.3 | | 88.5, 133 | |
| | inch | mm | inch | mm | inch | mm |
| ① | 1.89 | 48 | 1.89 | 48 | 1.89 | 48 |
| ② | 2.56 | 65 | 3.35 | 85 | 3.35 | 85 |
| ③ | 0.28 | 7 | 0.67 | 17 | 0.67 | 17 |
| ④ | 0.2361/ 0.2357 | 6 g6 | 0.3148/ 0.3144 | 8 g6 | 0.3935/ 0.3931 | 10 g6 |
| ⑤ | 0.32 | 8 | 0.71 | 18 | 0.71 | 18 |
| ⑥ | 1.26 | 32 | 1.26 | 32 | 1.26 | 32 |



TS12 Shaft Style Reaction Torque Transducer - Capacities 20 to 500 Nm

DIMENSIONS

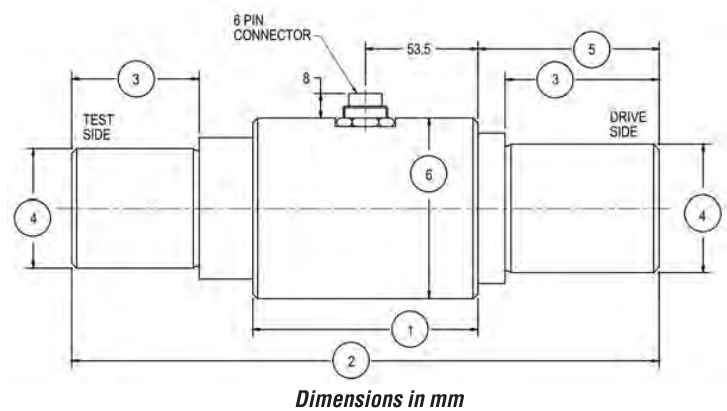
| Nominal Torque | | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|-------|
| Capacity (Nm) | 20, 30 | | 50, 100 | | 200, 500 | |
| Equivalent (lb-in) | 177, 265 | | 443, 885 | | 1.77K 4.43K | |
| | inch | mm | inch | mm | inch | mm |
| ① | 2.87 | 73 | 2.87 | 73 | 3.13 | 79.5 |
| ② | 4.39 | 111.5 | 5.81 | 147.5 | 6.28 | 159.5 |
| ③ | 0.71 | 18 | 1.42 | 36 | 1.50 | 38 |
| ④ | 0.7087/ 0.7082 | 18 h6 | 0.7087/ 0.7082 | 18 h6 | 1.2598/ 1.2592 | 32 h6 |
| ⑤ | 0.75 | 19 | 1.46 | 37 | 1.58 | 40 |
| ⑥ | 2.01 | 51 | 2.01 | 51 | 2.60 | 66 |



TS12 Shaft Style Reaction Torque Transducer - Capacities 1,000 to 20,000 Nm

DIMENSIONS

| Nominal Torque | | | | | | |
|--------------------|-------------------|-------|-------------------|-------|-------------------|--------|
| Capacity (Nm) | 1K | | 2K, 5K | | 10K, 20K | |
| Equivalent (lb-in) | 8.85K | | 17K, 44.3K | | 85.5K 177K | |
| | inch | mm | inch | mm | inch | mm |
| ① | 4.21 | 107 | 5.32 | 135 | 5.51 | 140 |
| ② | 10.32 | 262 | 14.84 | 377 | 18.50 | 470 |
| ③ | 2.28 | 58 | 4.33 | 110 | 4.72 | 120 |
| ④ | 1.9685/ 1.9675 | 50 h7 | 2.7559/ 2.7549 | 70 h7 | 4.3307/ 4.3293 | 110 h7 |
| ⑤ | 2.60 | 66 | 4.96 | 126 | 6.30 | 160 |
| ⑥ | 3.82 | 97 | 4.41 | 112 | 6.81 | 173 |



Model TS14 Square Drive Reaction Torque Transducer

Why the Interface model TS14 Square Drive Reaction Torque Transducer is the best in class:

- Capacities from 2 to 5K Nm (17.7 to 44.2 lbf-in)
- Simple operation - no moving parts
- Useful for auditing fastener torques
- Fits standard socket wrenches



TS14 Square Drive Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)
Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.2
Nonrepeatability-%±0.02

TEMPERATURE

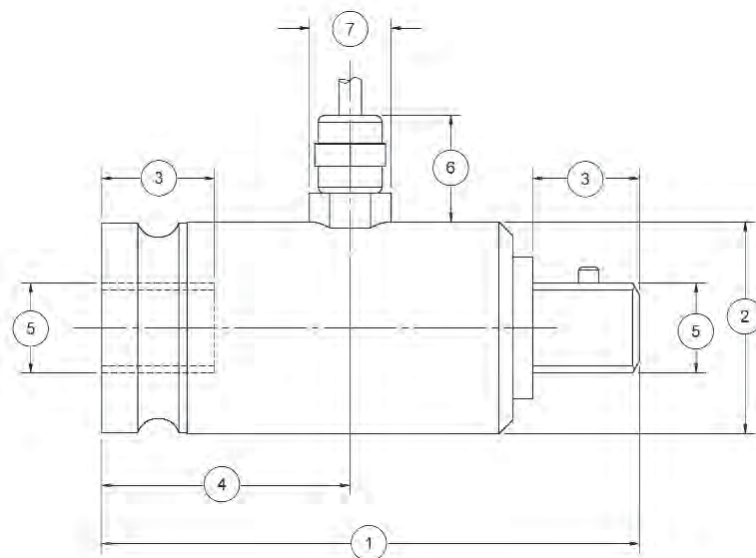
Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C-5 to +45
Operating Range-°C-15 to +55

ELECTRICAL

Output-mV/V1
Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm350
Cable Length-m3

MECHANICAL

Safe Overload-% RO150
Cyclic Load Rating-% RO.....70 P-P (DIN 50100)



TS14 Square Drive Reaction Torque Transducer - Capacities 2 to 5,000 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | | | | | |
|--------------------|-----------------|------|----------|------|------------|------|-------------|-------|-------|------|--------------|------|
| Capacity (Nm) | 2, 5, 12 | | 25, 63 | | 100, 160 | | 250, 500 | | 1K | | 2K, 5K | |
| Equivalent (lb-in) | 17.7, 44.3, 106 | | 221, 560 | | 885, 1.41K | | 2.2K, 4.42K | | 8.85K | | 17.7K, 44.3K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 2.52 | 64 | 2.80 | 71 | 2.99 | 76 | 3.94 | 100 | 5.20 | 132 | 9.84 | 250 |
| ② | 0.59 | 15 | 1.18 | 30 | 1.18 | 30 | 1.93 | 49 | 1.93 | 49 | 3.94 | 100 |
| ③ | 0.28 | 7.2 | 0.41 | 10.4 | 0.59 | 15.1 | 0.89 | 22.6 | 1.08 | 27.4 | 1.55 | 39.3 |
| ④ | 0.89 | 22.7 | 1.36 | 34.6 | 1.38 | 35.1 | 1.81 | 46 | 2.36 | 60 | 4.72 | 120 |
| ⑤ | 1/4" | 6.35 | 3/8" | 9.53 | 1/2" | 12.7 | 3/4" | 19.05 | 1" | 25.4 | 1 1/2" | 38.1 |
| ⑥ | 0.39 | 10 | 0.59 | 15 | 0.59 | 15 | 0.59 | 15 | 0.59 | 15 | 2.17 | 55 |
| ⑦ | 0.39 | 10 | 0.39 | 10 | 0.39 | 10 | 0.39 | 10 | 0.39 | 10 | 0.75 | 19 |

Model TS15 Square Flange Style Reaction Torque Transducer

Why the Interface model TS15 Square Flange Style Reaction Torque Transducer is the best in class:

- Capacities from 2 to 2K Nm (17.7 to 17.7K lbf-in)
- Convenient flange mounting
- Useful for checking torque wrenches



TS15 Square Flange Style Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)
Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.2
Nonrepeatability-%±0.02

TEMPERATURE

Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C-5 to +45
Operating Range-°C-15 to +55

ELECTRICAL

Output-mV/V1
Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm350
Electrical Connection6-pin binder

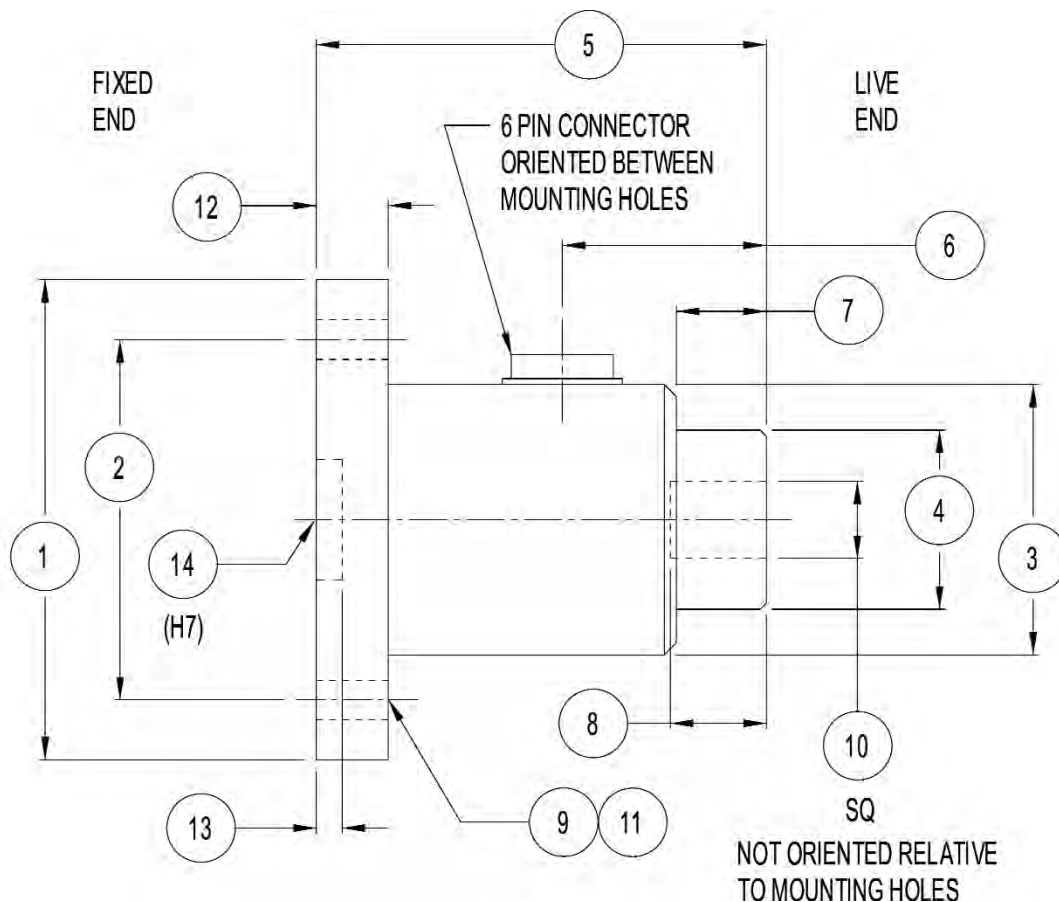
MECHANICAL

Safe Overload-% RO150
Angular Deflection @ Rated Torque°<0.2
Cyclic Load Rating-% RO.....70 P-P (DIN 50100)

TS15 Square Flange Style Reaction Torque Transducer - Capacities 2 to 5,000 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | | | | | | | |
|--------------------|-----------------|------|---------|------|-------|------|-------|-------|-------|------|--------|-------|--------------|-------|
| Capacity (Nm) | 2, 5, 12 | | 25, 63 | | 160 | | 500 | | 1K | | 2K, | | 3K, 5K | |
| Equivalent (lb-in) | 17.7, 44.3, 106 | | 221, 1K | | 1.41K | | 4.43K | | 8.85K | | 17.7K, | | 26.6K, 44.3K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 2.76 | 70 | 2.76 | 70 | 3.15 | 80 | 3.94 | 100 | 4.72 | 120 | 5.71 | 145 | 7.87 | 200 |
| ② | 1.97 | 50 | 1.97 | 50 | 2.36 | 60 | 3.15 | 80 | 3.94 | 100 | 4.72 | 120 | 6.69 | 170 |
| ③ | 1.53 | 39 | 1.53 | 39 | 1.77 | 45 | 2.32 | 59 | 2.72 | 69 | 3.54 | 90 | 4.92 | 125 |
| ④ | 0.87 | 22 | 0.87 | 22 | 1.17 | 29.8 | 1.73 | 44 | 2.12 | 54 | 2.99 | 76 | 3.74 | 95 |
| ⑤ | 2.52 | 64 | 2.52 | 64 | 2.95 | 75 | 3.46 | 88 | 3.70 | 94 | 4.90 | 124.5 | 5.10 | 129.5 |
| ⑥ | 1.10 | 28 | 1.10 | 28 | 1.34 | 34 | 1.69 | 43 | 1.93 | 49 | 2.74 | 69.5 | 2.85 | 72.5 |
| ⑦ | 0.12 | 3 | 0.12 | 3 | 0.59 | 15 | 0.12 | 3 | 0.20 | 5 | 0.20 | 5 | 0.20 | 5 |
| ⑧ | 0.31 | 8 | 0.45 | 11.5 | 0.63 | 16 | 0.94 | 24 | 1.13 | 28.6 | 1.63 | 41.5 | 1.63 | 41.5 |
| ⑨ | 0.22 | 5.5 | 0.22 | 5.5 | 0.26 | 6.6 | 0.35 | 9 | 0.43 | 11 | 0.51 | 13 | 0.67 | 17 |
| ⑩ | 1/4" | 6.35 | 3/8" | 9.53 | 1/2" | 12.7 | 3/4" | 19.05 | 1" | 25.4 | 1 1/2" | 38.1 | 1 1/2" | 38.1 |
| ⑪ | 4x90° | | 4x90° | | 4x90° | | 6x60° | | 8x45° | | 8x45° | | 8x45° | |
| ⑫ | 0.39 | 10 | 0.39 | 10 | 0.47 | 12 | 0.59 | 15 | 0.59 | 15 | 0.79 | 20 | 0.98 | 25 |
| ⑬ | 45° | | 45° | | 45° | | 30° | | 22.5° | | 22.5° | | 22.5° | |
| ⑭ | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.16 | 4 |
| ⑮ | 0.79 | 20 | 0.79 | 20 | 0.79 | 20 | 0.79 | 20 | 0.79 | 20 | 0.79 | 20 | 4.13 | 105 |



Model TS16 Square Flange Style Reaction Torque Transducer

Why the Interface model TS16 Square Flange Style Reaction Torque Transducer is the best in class:

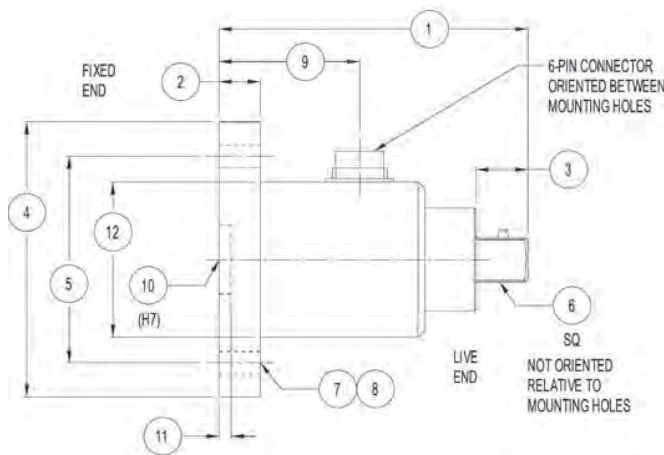
- Capacities from 2 to 2K Nm (17.7 to 17.7K lbf-in)
- Convenient flange mounting
- Accepts standard sockets



TS16 Square Flange Style Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)
Combined Error 0.1% FS



SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error—% FS±0.2
Nonrepeatability—%±0.02

TEMPERATURE

Effect on Zero—% RO/°C±0.02
Effect on Output—%/°C±0.01
Rated Range—°C-5 to +45
Operating Range—°C-15 to +55

ELECTRICAL

Output—mV/V1
Excitation Voltage—VDC MAX12
Bridge Resistance—Ohm350
Electrical Connection6-pin binder

MECHANICAL

Safe Overload—% RO150
Angular Deflection @ Rated Torque°<0.2
Cyclic Load Rating—% RO70 P-P (DIN 50100)

TS16 Square Flange Style Reaction Torque Transducer - Capacities 2 to 2,000 Nm

DIMENSIONS

| Nominal Torque | | | | | | | | | | | | |
|--------------------|-----------------|------|---------|------|-------|------|-------|-------|-------|------|--------|------|
| Capacity (Nm) | 2, 5, 12 | | 25, 63 | | 160 | | 500 | | 1K | | 2K | |
| Equivalent (lb-in) | 17.7, 44.3, 106 | | 221, 1K | | 1.41K | | 4.43K | | 8.85K | | 17.7K | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 2.76 | 70 | 2.76 | 70 | 3.54 | 90 | 4.72 | 120 | 5.51 | 140 | 7.09 | 180 |
| ② | 0.39 | 10 | 0.39 | 10 | 0.47 | 12 | 0.59 | 15 | 0.59 | 15 | 0.79 | 20 |
| ③ | 0.28 | 7.2 | 0.41 | 10.4 | 0.59 | 15.1 | 0.89 | 22.6 | 1.08 | 27.4 | 1.55 | 39.3 |
| ④ | 2.76 | 70 | 2.76 | 70 | 3.15 | 80 | 3.94 | 100 | 4.72 | 120 | 5.71 | 145 |
| ⑤ | 1.97 | 50 | 1.97 | 50 | 2.36 | 60 | 3.15 | 80 | 3.94 | 100 | 4.72 | 120 |
| ⑥ | 1/4" | 6.35 | 3/8" | 9.53 | 1/2" | 12.7 | 3/4" | 19.05 | 1" | 25.4 | 1 1/2" | 38.1 |
| ⑦ | 4x90° | | 4x90° | | 4x90° | | 6x60° | | 8x45° | | 8x45° | |
| ⑧ | 0.22 | 5.5 | 0.22 | 5.5 | 0.26 | 6.6 | 0.35 | 9 | 0.43 | 11 | 0.51 | 13 |
| ⑨ | 1.42 | 36 | 1.42 | 36 | 1.61 | 41 | 2.36 | 60 | 2.76 | 70 | 3.23 | 82 |
| ⑩ | 1.53 | 39 | 1.57 | 40 | 1.77 | 45 | 1.93 | 49 | 2.32 | 59 | 2.76 | 70 |
| ⑪ | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 | 0.12 | 3 |

Model TS17 Hex Drive Reaction Torque Transducer

Why the Interface model TS17 Hex Drive Reaction Torque Transducer is the best in class:

- Capacities from 0.2 to 20 Nm (1.77 to 177 lb-in)
- Simple operation - no moving parts
- Useful for auditing fastener torques
- Quick-connect chuck



TS17 Hex Drive Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)

TS17 Hex Drive Reaction Torque Transducer -
Capacities 0.2 to 20 Nm

DIMENSIONS

| Nominal Torque | | | | | | | |
|--------------------|------|------|------|------|------|------|-----|
| Capacity (Nm) | 0.2 | 0.5 | 1 | 2 | 5 | 10 | 20 |
| Equivalent (lb-in) | 1.77 | 4.43 | 8.85 | 17.7 | 44.3 | 88.5 | 177 |
| See Drawing | | | | | | | |

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.1
Nonrepeatability-%±0.05

TEMPERATURE

Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C+5 to +50
Operating Range-°C-10 to +60

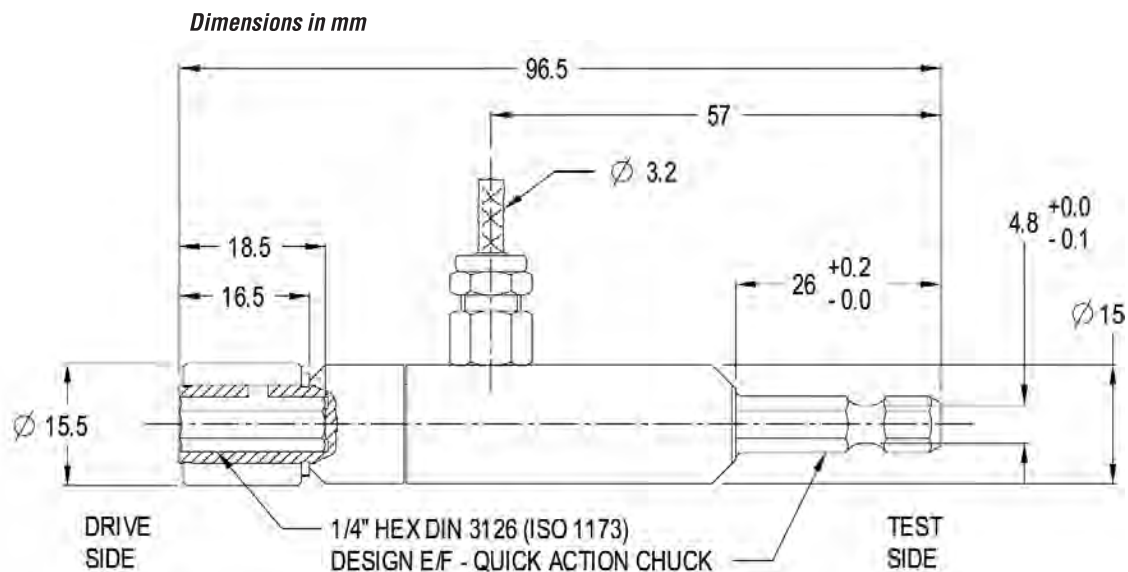
ELECTRICAL

Output-mV/V1 (0.2-5 Nm),
2 (10 & 20 Nm)

Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm350
Cable Length-m3

MECHANICAL

Safe Overload-% RO130
Cyclic Load Rating-% RO.....70 P-P (DIN 50100)



Model TS18 Shaft to Flange Style Reaction Torque Transducer

Why the Interface model TS18 Shaft to Flange Style Torque Transducer is the best in class:

- Capacities from 5 to 5K Nm (44.3 to 44.3K lbf-in)
- Keyed shaft per DIN 6885.1
- Convenient flange mounting



TS18 Shaft to Flange Style Reaction Torque Transducer

TS18 Shaft to Flange Style Reaction Torque Transducer -
Capacities 5 to 1,000 Nm

OPTIONS

100 % Control Signal (RCAL)
Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.2
Nonrepeatability-%±0.02

TEMPERATURE

Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C-5 to +45
Operating Range-°C-15 to +55

ELECTRICAL

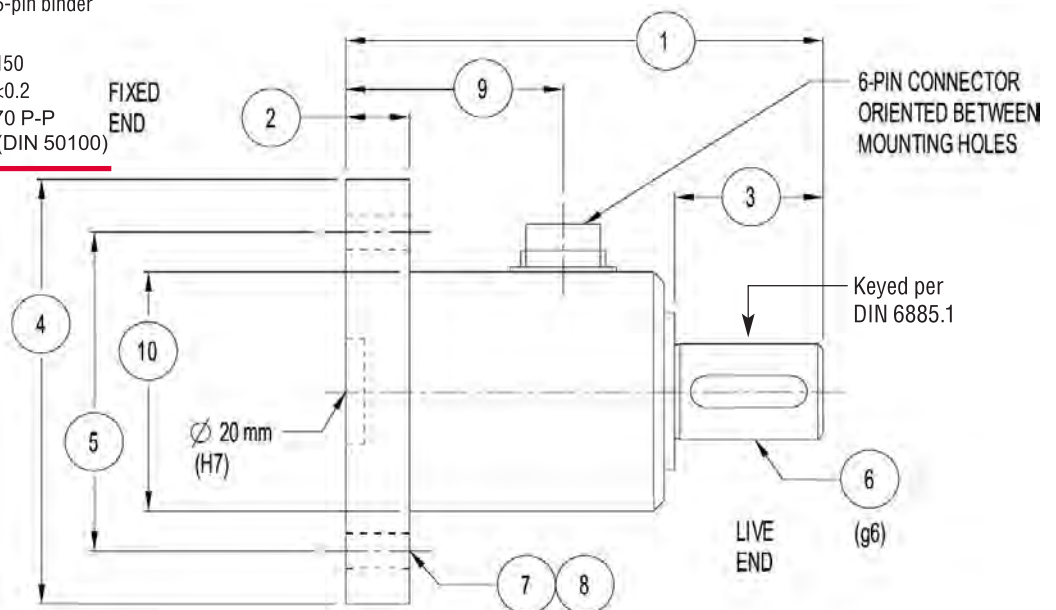
Output-mV/V1
Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm350
Electrical Connection6-pin binder

MECHANICAL

Safe Overload-% RO150
Angular Deflection @ Rated Torque°<0.2
Cyclic Load Rating-% RO.....70 P-P
(DIN 50100)

DIMENSIONS

| Capacity (Nm) Equivalent (lb-in) | Nominal Torque | | | | | | | |
|-------------------------------------|----------------|-----|---------|-----|---------|-----|-------|-----|
| | 5, 10, 25 | | 50, 100 | | 200,500 | | 1K | |
| | inch | mm | inch | mm | inch | mm | inch | mm |
| ① | 2.75 | 70 | 3.54 | 90 | 4.72 | 120 | 5.51 | 140 |
| ② | 0.39 | 10 | 0.47 | 12 | 0.59 | 15 | 0.59 | 15 |
| ③ | 0.59 | 15 | 1.10 | 28 | 1.97 | 50 | 2.75 | 70 |
| ④ | 2.75 | 70 | 3.15 | 80 | 3.93 | 100 | 4.72 | 120 |
| ⑤ | 1.97 | 50 | 2.36 | 60 | 3.15 | 80 | 3.93 | 100 |
| ⑥ | 0.47 | 12 | 0.71 | 18 | 1.18 | 30 | 1.57 | 40 |
| ⑦ | 4x90° | | 4x90° | | 6x60° | | 6x60° | |
| ⑧ | 0.22 | 5.5 | 0.26 | 6.6 | 0.35 | 9 | 0.43 | 11 |
| ⑨ | 1.42 | 36 | 1.61 | 41 | 1.69 | 43 | 1.61 | 41 |
| ⑩ | 1.57 | 40 | 1.77 | 45 | 2.28 | 58 | 2.56 | 65 |



Model TS19 Short Hollow Flange Style Reaction Torque Transducer

Why the Interface model TS19 Short Flange Style Reaction Torque Transducer is the best in class:

- Capacities from 100 to 5K Nm (885 to 44.3K lbf-in)
- Short, rugged, compact design
- Both ends with flange
- Hollow



TS19 Short Flange Style Reaction Torque Transducer

OPTIONS

100 % Control Signal (RCAL)

SPECIFICATIONS

ACCURACY – (MAX ERROR)

Combined Error-% FS±0.1
Nonrepeatability-%±0.02

TEMPERATURE

Effect on Zero-% RO/°C±0.02
Effect on Output-%/°C±0.01
Rated Range-°C-5 to +45
Operating Range-°C-15 to +55

ELECTRICAL

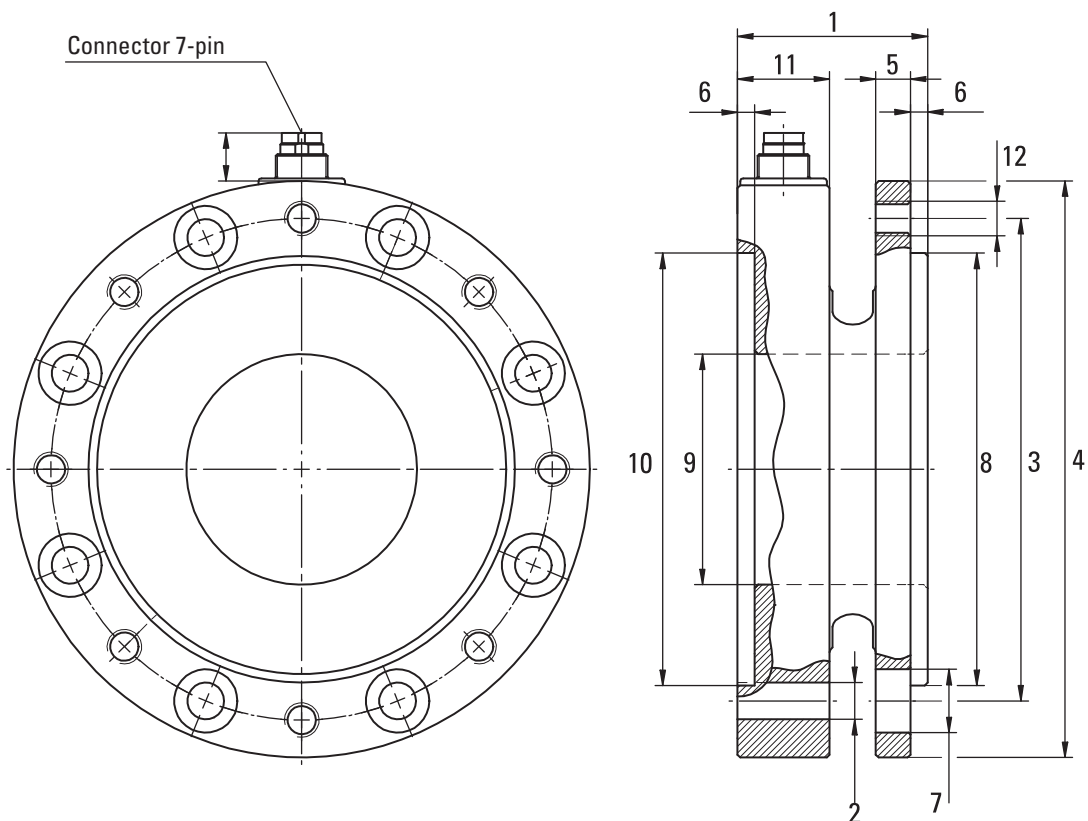
Output-mV/V1.5
Excitation Voltage-VDC MAX12
Bridge Resistance-Ohm350
Electrical Connection6 pin LEMO
ERA 1S 306 CLL

MECHANICAL

Safe Overload-% RO150
Safe Overhung Moment-% FS50
Cyclic Load Rating-% RO.....70 P-P (DIN 50100)
MaterialStainless steel

Model TS19 Short Flange Style Reaction Torque Transducer-
Capacities 100 to 5K Nm

| Capacity (Nm) | Nominal Torque | | | | |
|---------------|----------------|-------|----------|--------|--------|
| | 100 | 200 | 500 / 1k | 2k | 5k |
| | Metric / mm | | | | |
| 1 | 33 | 38.5 | 43.5 | 45.5 | 67 |
| 2 | 6.4 | 8.4 | 13 | 15 | 19 |
| 3 | 87 | 105 | 133 | 165 | 206 |
| 4 | 100 | 121 | 156 | 191 | 238 |
| 5 | 6 | 8 | 12 | 14 | 20 |
| 6 | 3 | 3 | 3 | 3 | 3 |
| 7 | 11 | 14 | 20 | 24 | 30 |
| 8 | 75 | 90 | 110 | 140 | 170 |
| 9 | 40 | 45 | 70 | 75 | 79 |
| 10 | 75 | 90 | 110 | 140 | 174 |
| 11 | 16 | 17 | 18 | 18 | 29 |
| 12 | 8x M6 | 8x M8 | 8x M12 | 8x M14 | 8x M18 |



Model TS20 Hollow Flange Reaction Torque Transducer

- Capacities from 10 Nm to 200 Nm
- Very short axial length
- Thru-hole



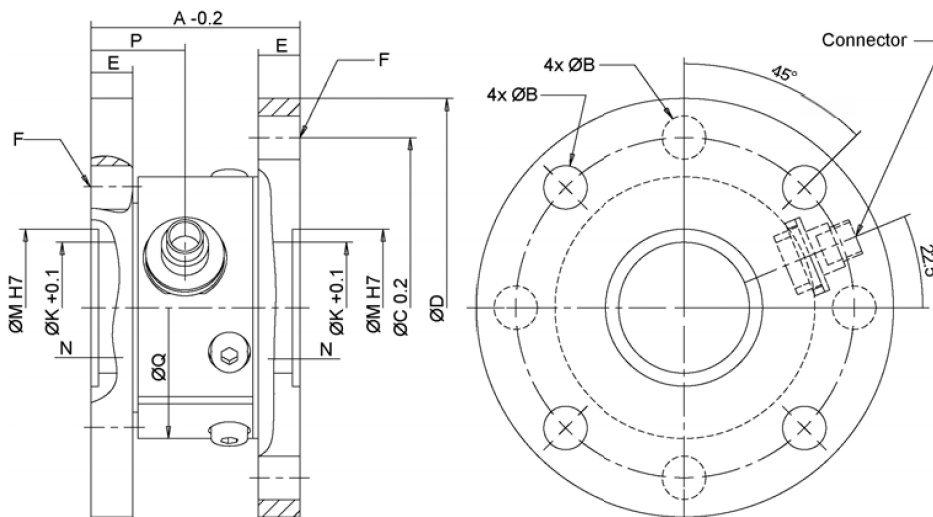
OPTIONS

Enhanced Accuracy – 0.05% nonlinearity & hysteresis
Internal Shunt Resistor – 100% output

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|--------------------------------------|--------------------|
| Nonlinearity - %FS | +/-0.1 |
| Hysteresis - %FS | +/-0.1 |
| Nonrepeatability - % RO | +/-0.02 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.01 |
| Compensated Range - °C | -5 to +45 |
| Operating Range - °C | -15 to +55 |
| ELECTRICAL | |
| Output – mV/V | 1 +/-0.1% |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 350 |
| Electrical Connection | 7 pin Binder |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| Angular Deflection at Rated Torque - | <0.2 |
| Cyclic Load Rating - % RO | 70 P-P (DIN 50100) |
| IP Rating | 50 |

DIMENSIONS



| Measuring range [N·m] | Dimensions [mm] | | | | | | | | | | | |
|-----------------------|-----------------|-----|----|----|---|-------|----|-----|----|----|----|--|
| | A | B | ØC | ØD | E | F | ØM | N | ØK | P | ØQ | |
| 10 / 20 / 30 / 50 | 40 | 6,3 | 65 | 80 | 8 | 4x90° | 30 | 1,5 | 25 | 18 | 50 | |
| 100 / 200 | 40 | 8,3 | 65 | 80 | 8 | 4x90° | 30 | 1,5 | 25 | 18 | 50 | |

Model TS21 Miniature Shaft Style Reaction Torque Transducer

- Capacities from 1 Nm to 100 Nm
- Shaft ends with keys
- Very small measuring ranges



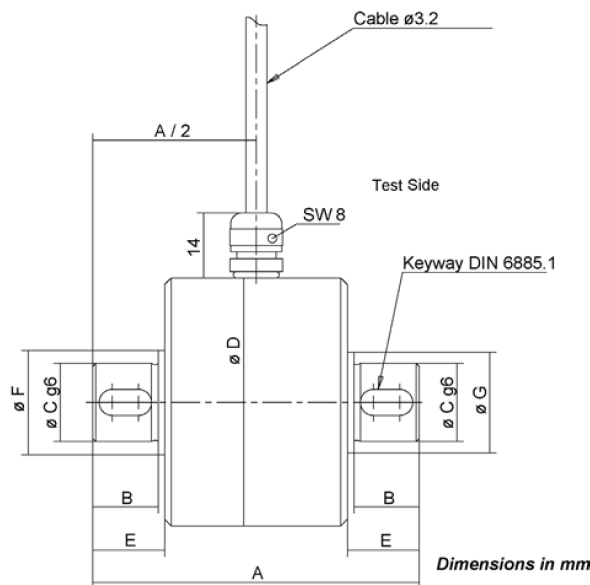
OPTIONS

Enhanced Accuracy – 0.1% nonlinearity & hysteresis
Internal Shunt Resistor – 100% output

SPECIFICATIONS

| | |
|--------------------------------------|--------------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity - %FS | +/-0.2 |
| Hysteresis - %FS | +/-0.2 |
| Nonrepeatability - % RO | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.01 |
| Compensated Range - °C | -5 to +45 |
| Operating Range - °C | -15 to +55 |
| ELECTRICAL | |
| Output – mV/V | 1 |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 350 |
| Electrical Connection | 3 meter cable |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| Angular Deflection at Rated Torque - | <0.2 |
| Cyclic Load Rating - % RO | 70 P-P (DIN 50100) |
| IP Rating | 50 |

DIMENSIONS



| Measuring range [N·m] | A | B | C | D | E | F | G |
|-------------------------------|----|----|----|----|------|----|------|
| 1 / 2 / 5 / 10 / 12 / 15 / 20 | 50 | 10 | 12 | 38 | 11 | 16 | 15.4 |
| 50 / 100 | 70 | 20 | 18 | 49 | 21,5 | 21 | 20.5 |

Model TS22 Miniature Reaction Torque Transducer

- Capacities from 0.005 Nm to 20 Nm
- 5X safe overload on capacities up to 2 Nm
- Very small measuring ranges



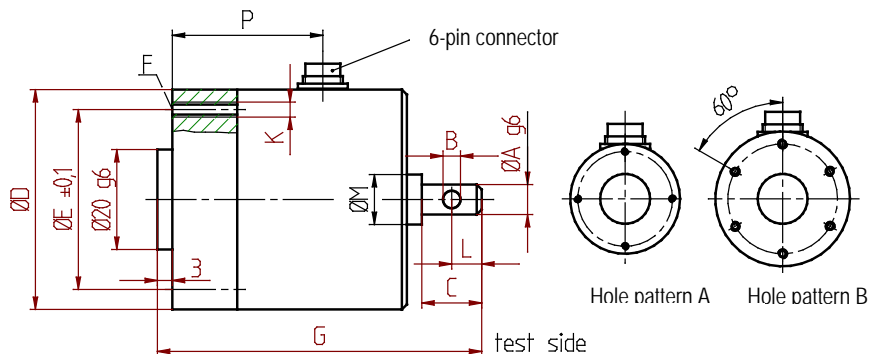
OPTIONS

Enhanced Accuracy – 0.1% nonlinearity & hysteresis
Internal Shunt Resistor – 100% output

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|--------------------------------------|--------------------|
| Nonlinearity - %FS | +/-0.2 |
| Hysteresis - %FS | +/-0.2 |
| Nonrepeatability - % RO | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.01 |
| Compensated Range - °C | -5 to +45 |
| Operating Range - °C | -15 to +55 |
| ELECTRICAL | |
| Output – mV/V | |
| 0.005 Nm to 2 Nm | 0.5 |
| 1 Nm to 20 Nm | 1.0 |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 350 |
| Electrical Connection | 6 pin Binder |
| MECHANICAL | |
| Safe Overload - % RO | |
| 0.005 Nm to 2 Nm | 500 |
| 1 Nm to 20 Nm | 200 |
| Angular Deflection at Rated Torque - | <0.2 |
| Cyclic Load Rating - % RO | 70 P-P (DIN 50100) |
| IP Rating | 50 |

DIMENSIONS



| Meas. range [N·m] | A | B | C | D | E | F | G | K | L | M | P | Hole pattern |
|---------------------------------------|----|-----|----|----|----|-------|----|-----|---|----|----|--------------|
| 0.005, 0.01 | 3 | - | 5 | 44 | 38 | 4x90° | 58 | M 3 | - | 10 | 30 | A |
| 0.02, 0.03, 0.05, 0.1, 0.2, 0.5, 1, 2 | 6 | 2.5 | 12 | 44 | 38 | 4x90° | 65 | M 3 | 6 | 10 | 30 | A |
| 5, 10, 12, 15, 20 | 12 | 4 | 18 | 54 | 44 | 6x60° | 65 | M 4 | 8 | 14 | 28 | B |

Model 5330 Hollow Flange Reaction Torque Transducer

- High torsional stiffness
- Extraneous load resistance
- Compact size
- Large thru-hole



DIMENSIONS

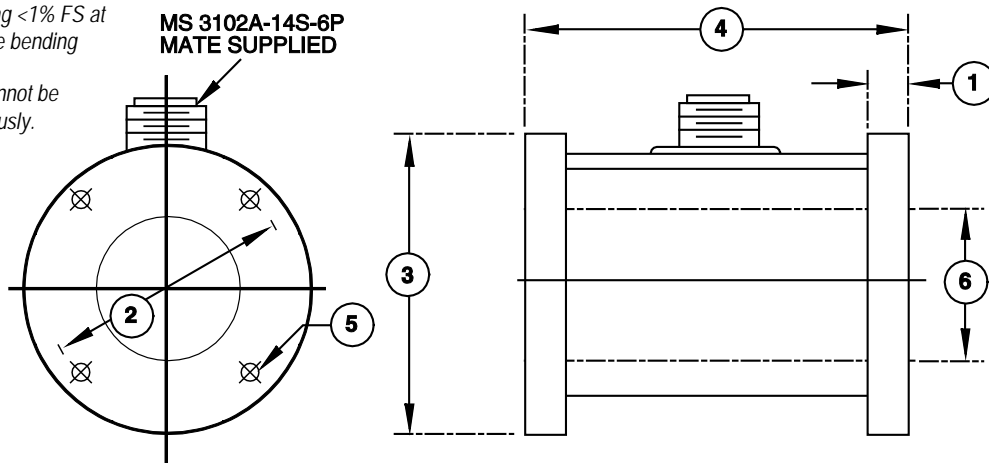
| See Drawing | MODEL 5330 HOLLOW FLANGE TYPE | | | | |
|-------------|----------------------------------|--------------------|---------------------|-----------------------|--------------------|
| | CAPACITY (lb-in) | | | | |
| | 60, 120, 240 | 600, 1200 | 3K, 6K | 10K, 20K | 50K, 100K |
| | inch | inch | inch | inch | inch |
| (1) | 0.3125 | 0.3125 | 0.3125 | 0.625 | 0.625 |
| (2) | 2 | 2.5 | 3.375 | 4.375 | 7.00 |
| (3) | 2.5 | 3.25 | 4 | 5 | 8.5 |
| (4) | 2.125 | 2.125 | 2.125 | 3.5 | 3.5 |
| (5) | 0.203 thru 2 places | 0.39 thru 2 places | 0.406 thru 4 places | 3/8 - 24 UNF 6 places | 0.63 thru 8 places |
| (6) | .875 thru | 1.375 thru | 2.375 thru | 3.375 thru | 3.375 thru |

| 5330 EXTRANEOUS LOADS | | |
|-----------------------|-------------|-----------------|
| Capacity (lb-in) | Thrust (lb) | Bending (lb-in) |
| 60 | 100 | 50 |
| 120 | 120 | 60 |
| 240 | 240 | 120 |
| 600 | 600 | 300 |
| 1200 | 1200 | 600 |
| 3000 | 3000 | 1500 |
| 6000 | 6000 | 3000 |
| 10,000 | 2500 | 2250 |
| 20,000 | 5000 | 4500 |
| 50,000 | 10,000 | 10,000 |
| 100,000 | 20,000 | 20,000 |

SPECIFICATIONS

| ACCURACY - (MAX ERROR) | |
|---------------------------------|-------------|
| Nonlinearity-% FS | ±0.1 |
| Hysteresis-% FS | ±0.25 |
| Nonrepeatability-% RO | ±0.05 |
| TEMPERATURE | |
| Compensated Range-°F | +75 to +175 |
| Compensated Range-°C | +24 to +80 |
| Operating Range-°F | -65 to +225 |
| Operating Range-°C | -54 to +107 |
| Effect on Output-%/°F - MAX | ±0.002 |
| Effect on Zero-% RO/°F - MAX | ±0.002 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.0 |
| (5330-60 thru 6K) | 1.0 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| (5330-3K thru 100K) | 700 |
| Excitation Voltage-VDC MAX | 10 |
| MECHANICAL | |
| Calibration | CW & CCW |
| Safe Overload-%CAP | 200 |

Error due to bending <1% FS at maximum allowable bending load.
Allowable loads cannot be applied simultaneously.



Model 5350 & 5355 Solid Flange Reaction Torque Transducer

- Threaded mounting holes
- Compact size
- Optional ± 10 VDC output available on 100 oz-in and above



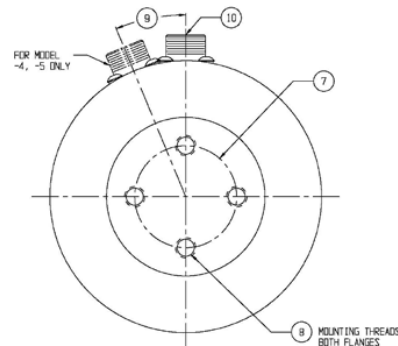
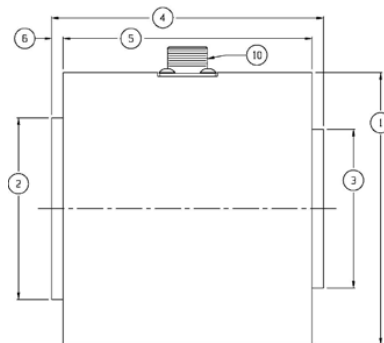
DIMENSIONS

| See Drawing | SOLID FLANGE TYPE | | |
|-------------|--------------------------|---------------------------|---------------------------|
| | 5350 | 5355 | |
| | CAPACITY (oz-in) | CAPACITY (lb-in) | |
| | 10, 20, 50, 100, 200 | 10, 20, 50 | 100, 200, 500 |
| | inch | inch | inch |
| (1) | 1.50 | 2.00 | 2.75 |
| (2) | 1.00 | 1.375 | 2.000 |
| (3) | 0.875 | 1.250 | 1.875 |
| (4) | 1.50 | 2.125 | 2.75 |
| (5) | 1.375 | 1.875 | 2.375 |
| (6) | .0625 | 0.125 | 0.188 |
| (7) | 0.563 | 0.750 | 1.250 |
| (8) | #4-40 UNC-2B 2 places | #10-32 UNF-2B 2 places | 1/4-20 UNC-2B 4 places |
| (9) | 0° | 0° | 0° |
| (10) | Conxall 7282-GPG-300 | CF3102E-14S-6P | CF3102E-14S-6P |

| See Drawing | 5355 | | |
|-------------|-----------------------------|------------------------------|----------------|
| | CAPACITY (lb-in) | | |
| | 1K, 2K, 5K | 10K, 20K | 50K, 100K |
| | inch | inch | inch |
| (1) | 4.50 | 6.00 | 8.00 |
| (2) | 3.875 | 5.375 | 7.375 |
| (3) | 3.750 | 5.25 | 7.250 |
| (4) | 3.50 | 4.50 | 5.50 |
| (5) | 3.00 | 3.75 | 4.75 |
| (6) | 0.25 | 0.375 | 0.375 |
| (7) | 2.750 | 4.000 | 5.750 |
| (8) | 3/8-24 UNF-2B - 4 places | 7/16-20 UNF-2B - 8 places | 5/8-18 UNF-2B |
| (9) | 0° | 22.5° | 15° |
| (10) | CF3102E-14S-6P | CF3102E-14S-6P | CF3102E-14S-6P |

SPECIFICATIONS

| | |
|---------------------------------|-------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ± 0.1 |
| Hysteresis-% FS | ± 0.1 |
| Nonrepeatability-% RO | ± 0.05 |
| TEMPERATURE | |
| Compensated Range-°F | +75 to +175 |
| Compensated Range-°C | +24 to +80 |
| Operating Range-°F | -65 to +225 |
| Operating Range-°C | -54 to +107 |
| Effect on Output-%/°F - MAX | ± 0.002 |
| Effect on Zero-% RO/°F - MAX | ± 0.002 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.0 |
| (5350-10) | 1.3 |
| Bridge Resistance-Ohm (Nominal) | 350 |
| Excitation Voltage-VDC MAX | 10 |
| MECHANICAL | |
| Calibration | CW & CCW |
| Safe Overload-%CAP | 200 |



Model 5400 Solid Flange Reaction Torque Transducer

- Capacities from 1K to 500K lb-in
- Metric capabilities from 110 to 55K Nm
- High torsional stiffness
- Flange mount
- Low deflection
- Metric models have mounting holes sized for metric fasteners



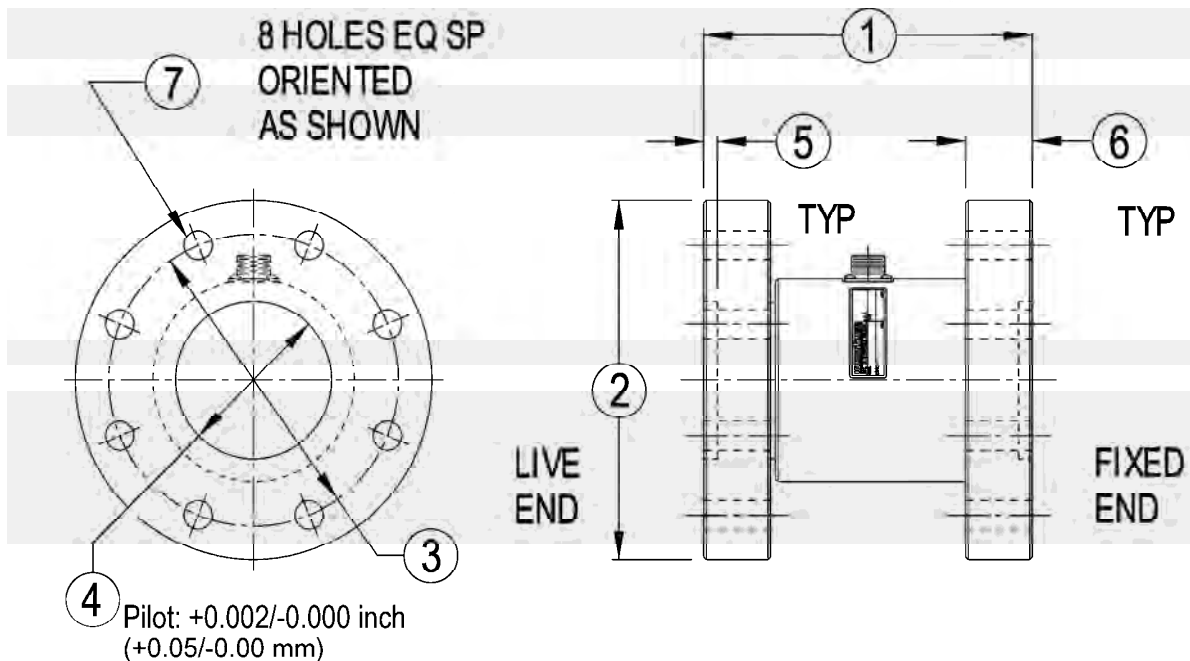
SPECIFICATIONS

| PARAMETERS | MODEL | | | | |
|---------------------------------|-----------------|----------------|----------------|----------------|----------------|
| | 5410 | 5411 | 5412 | 5413 | 5414 |
| | CAPACITY | | | | |
| Capacity (lb-in) | 1K, 2K, 5K | 10K, 20K | 50K, 100K | 200K | 300K, 500K |
| (Nm) | 110, 220, 550 | 1.1k, 2.2k | 5.5k, 11k | 22k | 33k, 55k |
| ACCURACY – (MAX ERROR) | | | | | |
| Nonlinearity-% FS | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Combined Error-% FS | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Nonrepeatability-% RO | ±0.02 | ±0.02 | ±0.02 | ±0.02 | ±0.02 |
| TEMPERATURE | | | | | |
| Compensated Range-°F | +70 to +170 | +70 to +170 | +70 to +170 | +70 to +170 | +70 to +170 |
| Compensated Range-°C | +21 to +77 | +21 to +77 | +21 to +77 | +21 to +77 | +21 to +77 |
| Operating Range-°F | -65 to +200 | -65 to +200 | -65 to +200 | -65 to +200 | -65 to +200 |
| Operating Range-°C | -54 to +93 | -54 to +93 | -54 to +93 | -54 to +93 | -54 to +93 |
| Effect on Zero-%RO/°F-MAX | ±0.002 | ±0.002 | ±0.002 | ±0.002 | ±0.002 |
| Effect on Zero-%RO/°C-MAX | ±0.004 | ±0.004 | ±0.004 | ±0.004 | ±0.004 |
| Effect on Output-%/°F-MAX | ±0.002 | ±0.002 | ±0.002 | ±0.002 | ±0.002 |
| Effect on Output-%/°C-MAX | ±0.004 | ±0.004 | ±0.004 | ±0.004 | ±0.004 |
| ELECTRICAL | | | | | |
| Rated Output-mV/V (Nominal) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Excitation Voltage-VDC MAX | 20 | 20 | 20 | 20 | 20 |
| Bridge Resistance-Ohm (Nominal) | 350 | 350 | 350 | 350 | 350 |
| Electrical Connection | MS3102E-14S-5P | MS3102E-14S-5P | MS3102E-14S-5P | MS3102E-14S-5P | MS3102E-14S-5P |
| MECHANICAL | | | | | |
| Safe Overload-% CAP | ±150 | ±150 | ±150 | ±150 | ±150 |
| Deflection at Capacity-rad | .005 | .004 | .006, .005 | .006 | .005 |
| Overhung Moment-lb-in MAX | 500, 1K, 2K | 5K, 10K | 24K, 50K | 90K | 150K, 200K |
| Side load-lbf MAX | 1K, 1.5K, 2K | 4K, 6.5K | 12K, 20K | 30K | 42K, 55K |
| Axial load-lbf MAX | 1.5K, 2K, 3K | 6K, 10K | 18K, 30K | 40K | 60K, 80K |

DIMENSIONS

| Capacity | MODEL | | | | | | | | | |
|--|-----------------|------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
| | 5410 | | 5411 | | 5412 | | 5413 | | 5414 | |
| | U.S. (lb-in) | Metric (Nm) | U.S. (lb-in) | Metric (Nm) | U.S. (lb-in) | Metric (Nm) | U.S. (lb-in) | Metric (Nm) | U.S. (lb-in) | Metric (Nm) |
| | 1K, 2K, 5K | 110, 220, 550 | 10K, 20K | 1.1k, 2.2k | 50K, 100K | 5.5k, 11k | 200K | 22k | 300K, 500K | 33k, 55k |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm |
| (1) | 3.00 | 76.2 | 3.50 | 88.9 | 7.38 | 187.5 | 8.50 | 215.9 | 10.50 | 266.7 |
| (2) | 4.00 | 101.6 | 5.00 | 127.0 | 8.00 | 203.2 | 9.75 | 247.7 | 14.00 | 355.6 |
| (3) | 3.25 | 82.6 | 4.25 | 108.0 | 6.50 | 165.1 | 8.00 | 203.2 | 11.00 | 279.4 |
| (4) | 1.500 | 38.10 | 2.000 | 50.80 | 3.500 | 88.90 | 4.000 | 101.60 | 6.000 | 152.40 |
| (5) | 0.13 | 3.3 | 0.25 | 6.4 | 0.31 | 7.9 | 0.31 | 7.9 | 0.31 | 7.9 |
| (6) | 0.50 | 12.7 | 0.75 | 19.1 | 1.50 | 38.1 | 1.50 | 38.1 | 2.00 | 50.8 |
| (7) | 0.328 | 8.33 | 0.390 | 10.41* | 0.650 | 16.51 | 0.781* | 20.65 | 1.031 | 24.64* |
| Recommended mtg screw size | 5/16 - 24 | M8 x 1.25 | 3/8 - 24 | M10 x 1.5 | 5/8 - 18 | M16 x 2 | 3/4 - 16 | M20 x 2.5 | 1 - 12 | M24 x 3 |
| Recommended mtg torque (lb-in) (Nm) | 300 | 34 | 600 | 68 | 2400 | 270 | 4400 | 500 | 9000 | 1000 |

* Metric Model 5411, 5413 & 5414 have larger mounting holes than their U.S. equivalents to accommodate standard metric fasteners





Model MRTP

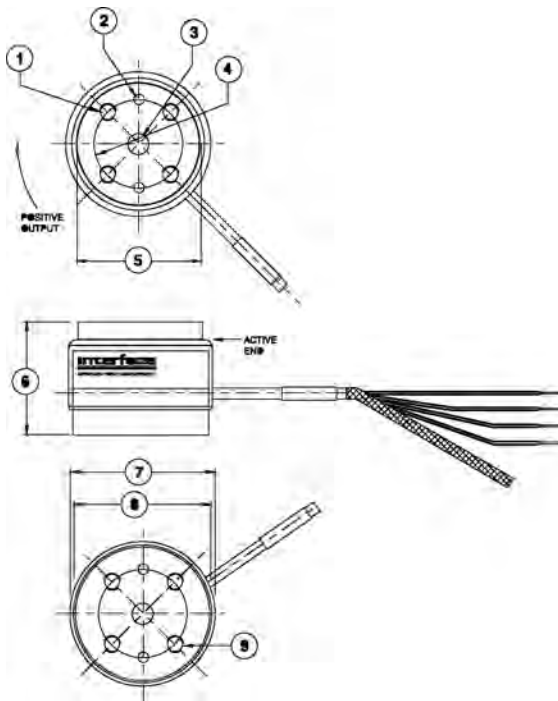
Model MRT Miniature Reaction Torque Transducer

- Capacity 5 Nm to 50 Nm
- Proprietary Interface Temperature Compensated Strain Gages
- Small Size - 70mm x 58mm (2.75" OD x 2.25" ID)
- Excellent Linearity & Repeatability
- Low Deflection - High Torsional Stiffness

Specifications

| Model | MRTP |
|-------------------------------------|---|
| Capacity | 0.2, 2, 5, 10, & 20 Nm (1.77, 17.7, 44, 89, 177 lb-in) |
| Accuracy - (MAX ERROR) | |
| Nonlinearity - %FS | ±0.10 |
| Hysteresis - %FS | ±0.10 |
| Nonrepeatability - %RO | ±0.05 |
| Creep, in 20 Min - % | ±0.10 |
| Temperature | |
| Compensated Temperature Range - °F | 15 – 115 |
| Compensated Temperature Range - °C | -10 – 45 |
| Operating Temperature Range - °F | -65 – 200 |
| Operating Temperature Range - °C | -55 – 90 |
| Effect on Zero - % RO/100°F | ±0.20 |
| Effect on Output - %/100°F | ±0.10 |
| Electrical | |
| Rated Output - mV/V (Nominal) | 2.00 ±0.30 |
| Zero Balance - % RO | ±1.0 |
| Input Resistance - Ω | 700 + 100/-7 |
| Output Resistance - Ω | 700 ±7 |
| Insulation Resistance - MΩ | >5000 |
| Excitation - VDC (Nominal) | 10VDC |
| Excitation - VDC (MAX) | 20VDC |
| Mechanical | |
| - Safe Torsion - %CAP | ±150 |
| - Safe Side Load - N (lbf) | 13 N, 110, 160, 280, & 400 N (3, 25, 36, 63, & 90 lbf) |
| - Safe Overhung Moment - %CAP | 100 |
| - Safe Mounting Torque - Nm (lb-in) | 0.3, 3, 5, 6, & 9 Nm (2.7, 27.44, 55, & 80 lb-in) |
| Deflection at Capacity - Radian | 0.007, 0.003, 0.003, 0.003, 0.003 |
| Cable Length - ft (m) | 5 ft (1.5m) |
| Load Cell Material | Aluminum |

Accessories



Specifications are subject to change without notice.

Custom Sizes and Capacities Available.



Model MRTP

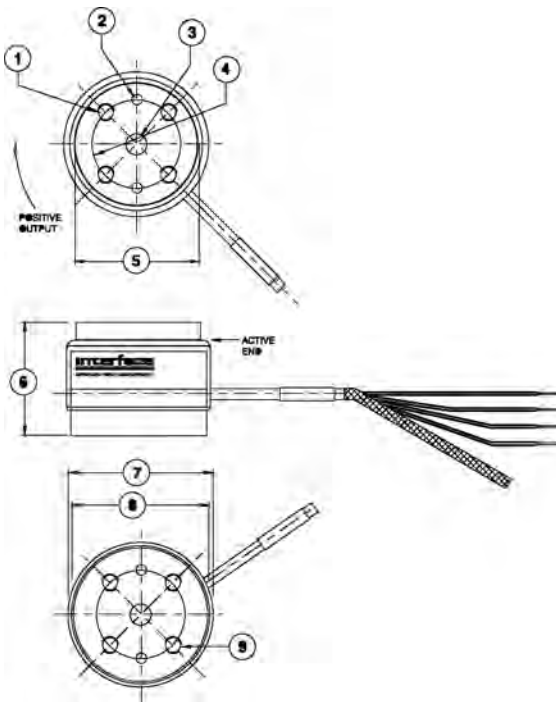
Model MRTP Miniature Overload Protected Torque Transducer

- Capacity 0.2 Nm
- 7x Overload Protection
- Proprietary Interface Temperature Compensated Strain Gages
- Small Size - 41mm x 32mm (1.6" OD x 1.25" ID)
- Excellent Linearity & Repeatability
- Low Deflection - High Torsional Stiffness

Specifications

| Model | M RTP |
|-------------------------------------|----------------------------|
| Capacity | 0.2 Nm (1.77 lb-in) |
| Accuracy - (MAX ERROR) | |
| Nonlinearity - %FS | ±0.10 |
| Hysteresis - %FS | ±0.10 |
| Nonrepeatability - %RO | ±0.05 |
| Creep, in 20 Min - % | ±0.10 |
| Temperature | |
| Compensated Temperature Range - °F | 15 – 115 |
| Compensated Temperature Range - °C | -10 – 45 |
| Operating Temperature Range - °F | -65 – 200 |
| Operating Temperature Range - °C | -55 – 90 |
| Effect on Zero - % RO/100°F | ±0.20 |
| Effect on Output - %/100°F | ±0.10 |
| Electrical | |
| Rated Output - mV/V (Nominal) | 2.00 ±0.30 |
| Zero Balance - % RO | ±1.0 |
| Input Resistance - Ω | 700 + 100/-7 |
| Output Resistance - Ω | 700 ±7 |
| Insulation Resistance - MΩ | >5000 |
| Excitation - VDC (Nominal) | 10VDC |
| Excitation - VDC (MAX) | 20VDC |
| Mechanical | |
| - Safe Torsion - %CAP | ±700 |
| - Safe Side Load - N (lbf) | 13 N (3 lbf) |
| - Safe Overhung Moment - %CAP | 100 |
| - Safe Mounting Torque - Nm (lb-in) | 0.3 Nm (2.7 lb-in) |
| Deflection at Capacity - Radian | 0.007 |
| Cable Length - ft (m) | 5 ft (1.5m) |

Accessories



Specifications are subject to change without notice.

Custom Sizes and Capacities Available.

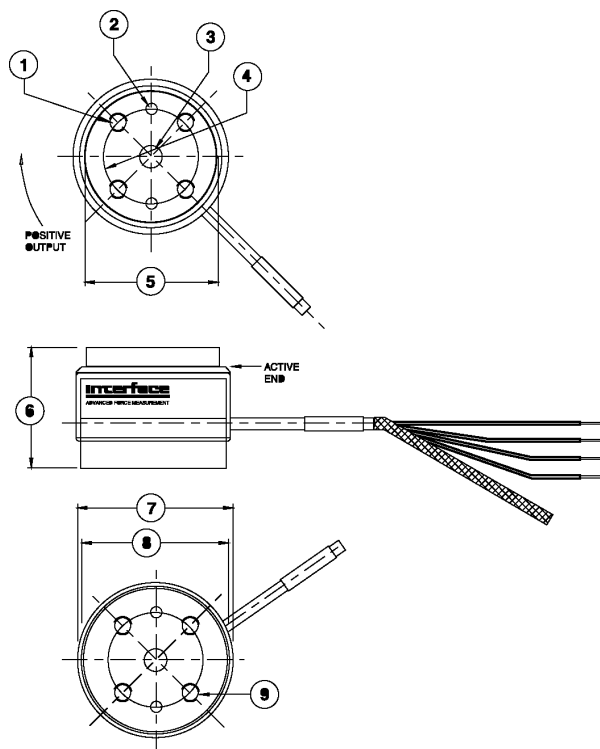
MRT Miniature Reaction Torque Transducer

- Low capacity – 0.2 to 20 Nm
- Proprietary Interface temperature compensated strain gages
- Small size – 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness



DIMENSIONS

| See Drawing | CAPACITY (Nm) 0.2, 2, 5, 10, 20 inch (mm) |
|-------------|---|
| (1) | M5 x 0.8 – 6H x 0.20 Deep |
| (2) | .119 ±0.001 (3.02 ±0.03) |
| (3) | .237 thru (6.02) |
| (4) | .984 (24.99) |
| (5) | 1.375 (34.95) |
| (6) | 1.25 (31.8) |
| (7) | 1.60 (40.6) |
| (8) | 1.50 (38.1) |
| (9) | M5 x 0.8 – 6H x 0.20 Deep |



SPECIFICATIONS

| | |
|-------------------------------|-----------------------------------|
| STANDARD CAPACITIES (Nm) | 0.2, 2, 5, 10, 20 |
| EQUIVALENT (lb-in) | 1.77, 17.7, 44, 89, 177 |
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ±0.10 |
| Hysteresis-% FS | ±0.10 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.10 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Zero-% RO/100F° | ±0.20 |
| Effect on Output-%/100F° | ±0.10 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.00 ±0.30 |
| Zero Balance-% RO | ±1.0 |
| Input Resistance-Ohms | 700 + 100/-7 |
| Output Resistance-Ohms | 700 ±7 |
| Insulation Resistance-Megohm | >5000 |
| Excitation, Nominal | 10 VDC |
| Excitation, Maximum | 20 VDC |
| MECHANICAL | |
| Overload: | |
| -safe torsion-% CAP | ±150 |
| -ultimate torsion-% CAP | ±400 |
| -safe side load-N | 13, 110, 160, 280, 400 |
| -lbf | 3, 25, 36, 63, 90 |
| -safe overhung moment-% CAP | 100 |
| - safe mounting torque-Nm | 0.3, 3, 5, 6, 9 |
| -in-lb | 2.7, 27, 44, 55, 80 |
| Deflection at capacity-radian | 0.007, 0.003, 0.003, 0.003, 0.003 |
| Cable length-feet | 5 |

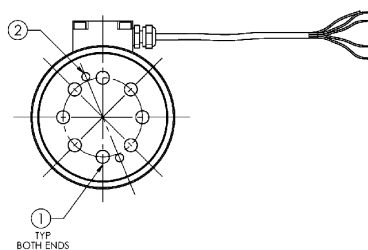
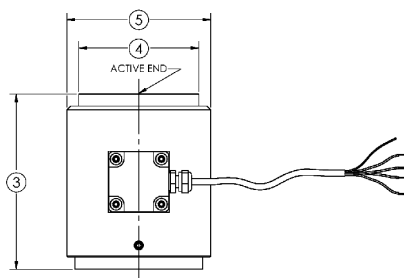
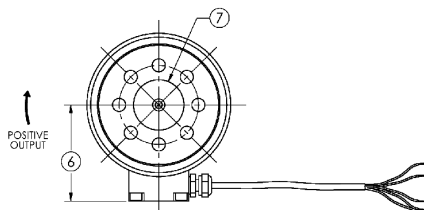
MRT2 Miniature Reaction Torque Transducer

- Capacities from 5 to 50 Nm
- Proprietary Interface temperature compensated strain gages
- Small size – 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity and repeatability
- Low deflection – high torsional stiffness



DIMENSIONS

| See Drawing | CAPACITY (Nm) | |
|-------------|--|--|
| | 5, 10, 20, 50 | |
| | Inch (mm) | |
| (1) | M5 x 0.8 – 6H x 0.32 Deep 8 PL EQ SP on 1.240 B.C. | |
| (2) | .125 + .0005/- .0000 2 PL EQ SP on 1.375 B.C. | |
| (3) | 2.75 | |
| (4) | 1.875 | |
| (5) | 2.25 | |
| (6) | 1.50 | |
| (7) | .7874 + .0008/- .0000 | |



SPECIFICATIONS

| | | | | |
|------------------------------|-------------------|-------|-------|-------|
| Standard Capacities (Nm) | 5 | 10 | 20 | 50 |
| Equivalent (lb-in) | 44 | 88.5 | 177 | 443 |
| ACCURACY- (MAX ERROR) | | | | |
| Nonlinearity-% FS | ±0.10 | | | |
| Hysteresis-% FS | ±0.10 | | | |
| Nonrepeatability-% RO | ±0.05 | | | |
| TEMPERATURE | | | | |
| Effect on Zero- % /100°F | ±0.20 | | | |
| Effect on Output- %RO/100°F | ±0.10 | | | |
| Operating Range-°F | -65 to 200 | | | |
| Compensated Range-°F | 15 to 115 | | | |
| ELECTRICAL | | | | |
| Output-mV/V | 2.00 ±0.30 | | | |
| Excitation - VDC MAX | 20 | | | |
| Bridge Resistance - Ohms | 700 ±7 | | | |
| Electrical Connection | 5' integral cable | | | |
| MECHANICAL | | | | |
| Safe Torsion - % RO | 150 | 150 | 150 | 150 |
| Deflection at Capacity - rad | 0.003 | 0.003 | 0.003 | 0.002 |
| Overhung Moment - %CAP MAX | 100 | 100 | 100 | 100 |
| Shear - N MAX | 225 | 333 | 400 | 900 |
| Material | Aluminum | | | |

Model MRTP Miniature Overload Protected Torque Transducer

- Capacity 0.2 Nm
- 7x overload protection
- Proprietary Interface temperature compensated strain gages
- Small size - 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness

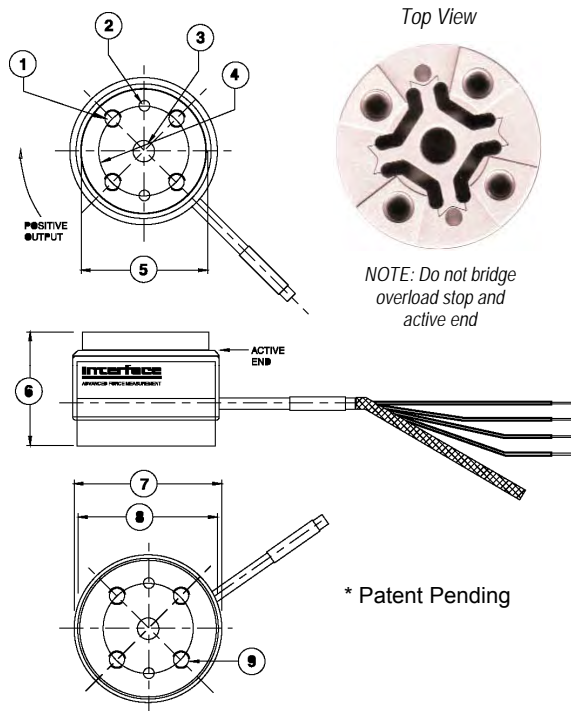


DIMENSIONS

| See Drawing | CAPACITY (Nm) 0.2 inch (mm) |
|-------------|-----------------------------------|
| (1) | M5 x 0.8 – 6H x 0.20 Deep |
| (2) | .119 ±0.001 (3.02 ±0.03) |
| (3) | .237 thru (6.02) |
| (4) | .984 (24.99) |
| (5) | 1.375 (34.95) |
| (6) | 1.25 (31.8) |
| (7) | 1.60 (40.6) |
| (8) | 1.50 (38.1) |
| (9) | M5 x 0.8 – 6H x 0.20 Deep |

STANDARD CONFIGURATIONS

5-ft integral cable MRTP – 0.2 Nm



SPECIFICATIONS

| | |
|-------------------------------|--------------|
| Standard Capacities (Nm) | 0.2 |
| Equivalent (lb-in) | 1.77 |
| ACCURACY – (MAX ERROR) | |
| Nonlinearity-% FS | ±0.10 |
| Hysteresis-% FS | ±0.10 |
| Nonrepeatability-% RO | ±0.05 |
| Creep, in 20 min-% | ±0.10 |
| TEMPERATURE | |
| Compensated Range-°F | 15 to 115 |
| Compensated Range-°C | -10 to 45 |
| Operating Range-°F | -65 to 200 |
| Operating Range-°C | -55 to 90 |
| Effect on Zero-% RO/100F° | ±0.20 |
| Effect on Output-%/100F° | ±0.10 |
| ELECTRICAL | |
| Rated Output-mV/V (Nominal) | 2.00 ±0.30 |
| Zero Balance-% RO | ±1.0 |
| Input Resistance-Ohms | 700 + 100/-7 |
| Output Resistance-Ohms | 700 ±7 |
| Insulation Resistance-Megohm | >5000 |
| Excitation, Nominal | 10 VDC |
| Excitation, Maximum | 20 VDC |
| MECHANICAL | |
| Overload: | |
| -safe torsion-% CAP | ±700 |
| -safe side load-N | 13 |
| -lbf | 3 |
| -safe overhung moment-% CAP | 100 |
| - safe mounting torque-Nm | 0.3 |
| -lb-in | 2.7 |
| Deflection at capacity-radian | 0.007 |
| Cable length-feet | 5 |

OPTIONS

Extra cable length

ACCESSORIES

Instrumentation

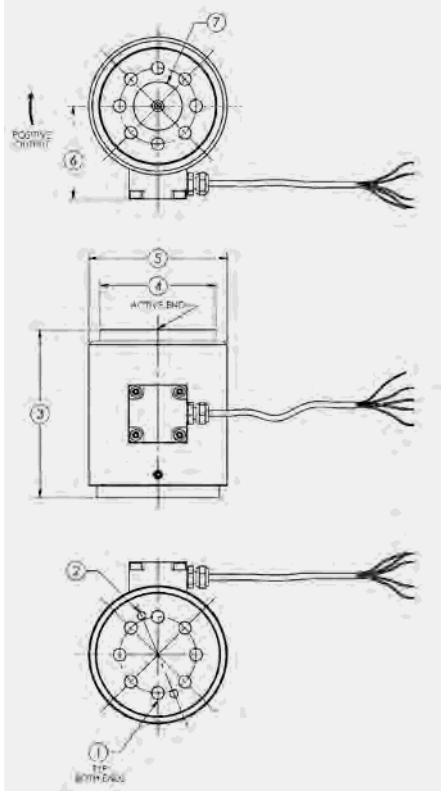
Model MRT2P Miniature Overload Protected Torque Transducer

- Capacities from 0.2 to 2 Nm (1.77 to 17.7 lb-in)
- 3x overload protection
- Proprietary Interface temperature compensated strain gages
- Small size – 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity and repeatability
- Low deflection – high torsional stiffness



DIMENSIONS

| See Drawing | CAPACITY (Nm) |
|-------------|--|
| | Inch (mm) |
| (1) | M5 x 0.8 – 6H x 0.32 Deep 8 PL EQ SP on 1.240 B.C. |
| (2) | .125 + .0005/- .0000 2 PL EQ SP on 1.375 B.C. |
| (3) | 2.75 |
| (4) | 1.875 |
| (5) | 2.25 |
| (6) | 1.50 |
| (7) | .7874 + .0008/- .0000 |



SPECIFICATIONS

| | | |
|------------------------------|-------------------|-------|
| Standard Capacities (Nm) | 0.2 2 | |
| Equivalent (lb-in) | 1.77 17.7 | |
| ACCURACY- (MAX ERROR) | | |
| Nonlinearity-% FS | ±0.10 | |
| Hysteresis-% FS | ±0.10 | |
| Nonrepeatability-% RO | ±0.05 | |
| TEMPERATURE | | |
| Effect on Zero- % /100°F | ±0.20 | |
| Effect on Output- %RO/100°F | ±0.10 | |
| Operating Range-°F | -65 to 200 | |
| Compensated Range-°F | 15 to 115 | |
| ELECTRICAL | | |
| Output-mV/V | 2.00 ±0.30 | |
| Excitation – VDC MAX | 20 | |
| Bridge Resistance – Ohms | 700 ±7 | |
| Electrical Connection | 5' integral cable | |
| MECHANICAL | | |
| Safe Torsion – % RO | 300 | 300 |
| Deflection at Capacity – rad | 0.01 | 0.007 |
| Overhung Moment – %CAP MAX | 100 | 100 |
| Shear – N MAX | 13 | 110 |
| Material | Aluminum | |

* Patent Pending

TSQ High Capacity Square Drive Torque Transducer

- 300K to 3,000K lb-in capacities (34K Nm to 340K Nm)
- Male square on each end
- High stiffness
- 2X safe overload
- Fully calibrated, CW & CCW



PERFORMANCE PARAMETERS

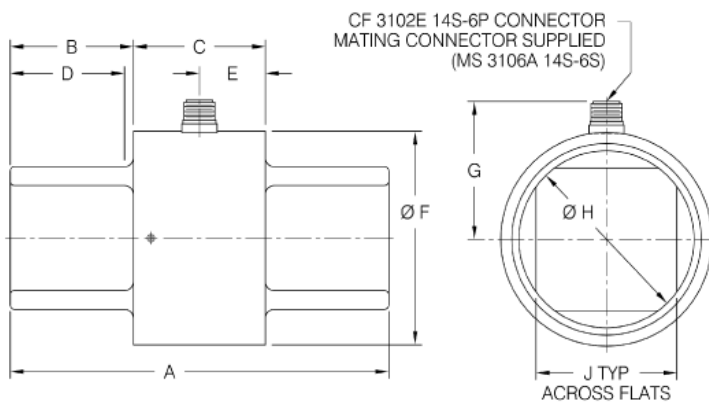
| Model | Capacity | | Torsional Stiffness | Weight | Max Thrust | Max Bending |
|-------|----------|-----|------------------------|--------|------------|-------------|
| | lb-in | kNm | lb-in/rad | lb | lbf | lb-in |
| TSQ1 | 300K | 34 | 52.2 x 10 ⁶ | 57 | 400K | 400K |
| TSQ1 | 600K | 68 | 56.6 x 10 ⁶ | 57 | 400K | 400K |
| TSQ1 | 1,200K | 137 | 57.2 x 10 ⁶ | 57 | 400K | 400K |
| TSQ2 | 750K | 85 | 17.1 x 10 ⁷ | 166 | 500K | 1,500K |
| TSQ2 | 1,500K | 170 | 20.7 x 10 ⁷ | 166 | 1,500K | 1,500K |
| TSQ2 | 3,000K | 339 | 2.2 x 10 ⁸ | 166 | 1,500K | 1,500K |

SPECIFICATIONS

| | |
|-------------------------------|----------------------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity –% FS | ±0.25 (TSQ1-1200K ±0.50) |
| Hysteresis –% FS | ±0.25 (TSQ1-1200K ±0.50) |
| Nonrepeatability - % RO | ±0.05 |
| TEMPERATURE | |
| Effect on Zero– % RO/°F | ±0.0002 |
| Effect on Output–%/°F | ±0.0002 |
| Compensated Range–°F | +75 to +175 |
| Operating Range–°F | -65 to +225 |
| ELECTRICAL | |
| Rated Output–mV/V (nominal) | 3 |
| Input Resistance - Ohms | 350 |
| Output Resistance - Ohms | 350 |
| Excitation, nominal –VDC | 10 |
| Excitation, MAX –VDC | 15 |
| MECHANICAL | |
| Safe Overload–% RO | 200 |
| Connector | CF 3102E-14S-6P |
| Calibration | CW & CCW to rated capacity |

DIMENSIONS

| Model | A | B | C | D | E | F | G | H | J |
|-------|-------|-----|------|------|-------|-----|-------|------|-----|
| TSQ1 | 10.75 | 3.5 | 3.75 | 3.25 | 1.875 | 6 | 3.875 | 4.97 | 4 |
| TSQ2 | 16 | 5.5 | 5 | 5 | 2.5 | 8.5 | 5.125 | 7.5 | 5.5 |



INSTRUMENTS

Wireless / Telemetry

Digital Indicators

PC Interface Modules

Signal Conditioners / Amplifiers

interface

ADVANCED FORCE MEASUREMENT

WTS – Wireless Load Cell Communication System

The WTS (Wireless Telemetry System) provides easy-to-use wireless data communication between a load sensor and a receiving indicator. The WTS-BS receiver is capable of receiving multiple inputs from various load cells or torque transducers.

The WTS-AM is fully compatible with all of Interface's force sensors, and comes direct from our factory setup, calibrated, and tested – ready-to-run.

Using AA batteries, the WTS-AM system can last for up to 3 months* without a battery change.



Transmitter Module (WTS-AM)

- mV/V, voltage, or current input with full 24 bit ADC and up to 18 bit effective resolution at 200 updates/sec.
- 2.4 GHz frequency with up to 200 meter range
- IP65 NEMA4 enclosure (80 x60 x30 mm)
- Battery operated (2@AA) with sleep mode
- Factory set-up to work properly with your selected sensors

Receiver Module (WTS-BS-1 Handheld)

- 8 digit display
- Fully functional tare capability
- Up to 200 meter range
- IP65 waterproof enclosure (90 x150 x35 mm)

* The WTS system functionality includes sleep/wake modes for extended battery life.

TRANSMITTER SPECIFICATIONS

| | |
|------------------------|------------------------|
| Excitation Voltage | 5VDC |
| Input | ±4.5mV/V (max) |
| Radio Type / Frequency | 2.4GHz; FCC conforming |
| Transmit Rate | 3/sec typical |
| Available Channels | 16 |
| Operating Temperature | -40 to 65 °C |
| IP rating | IP65 |

SYSTEM COMPONENT OPTIONS

Transmitters:

- WTS-AM-1 - mV/V input
- WTS-AM-2 - voltage input (0-10V)
- WTS-AM-3 - current input (0-20 or 4-20 mA)

Receivers:

- WTS-BS-1 - handheld display with multiple channel capability
- WTS-BS-3 - USB base station receiver for use with PC for data logging and/or WTS module configuration
- WTS-BS-4 - Ruggedized USB base station receiver for use with PC for data logging and/or WTS module configuration. Provides extended range usage to 200 meters
- WTS-BS-5 - Industrial analog output module for voltage or mA output

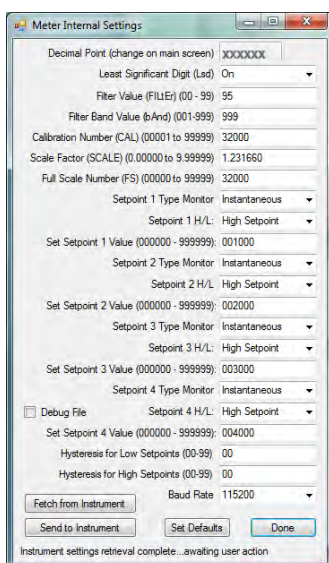
9860 TEDS High Speed Self-Configuring Digital Indicator

- Bright 6 digit bipolar LED display ($\pm 32,768$ counts)
- 0.01% Accuracy
- Fast, direct, scaleable analog output with 1000 Hz bandwidth
- 230 readings per second
- Peak and valley monitoring
- 4 calibration modes: mV/V, applied load, shunt and TEDS plug & play
- Excitation sense
- 4 limit setpoints with solid state relays
- Front panel shunt and tare
- Remote tare



OPTIONS & ACCESSORIES

- Bench top enclosure
- Plexiglass bench top tilt stand
- Remote peak/valley reset
- Software kit for display, setup & logging



Optional setup software available

SPECIFICATIONS

EXCITATION

Excitation Voltage 5, 10 VDC
switch selectable (internal)
Current 60, 120 mA respectively

PERFORMANCE

Maximum Display Range $\pm 999,999$
Display Update 5/sec
Internal Resolution $\pm 32,768$ counts
Signal Input Range ± 25 mV, ± 50 mV (switch selectable)
Sensitivity $0.8 \mu\text{V}/\text{count}$
Readings Per Second 230
Maximum Error 0.01% of reading

CMR

Scalable Analog Output ± 10 VDC and 4–20 mA (self-calibrating)

RS232 Output

ENVIRONMENTAL

Operating Temperature 14 to 122°F
–10 to 50°C
Relative Humidity – MAX 90% at 104°F, non-condensing

POWER

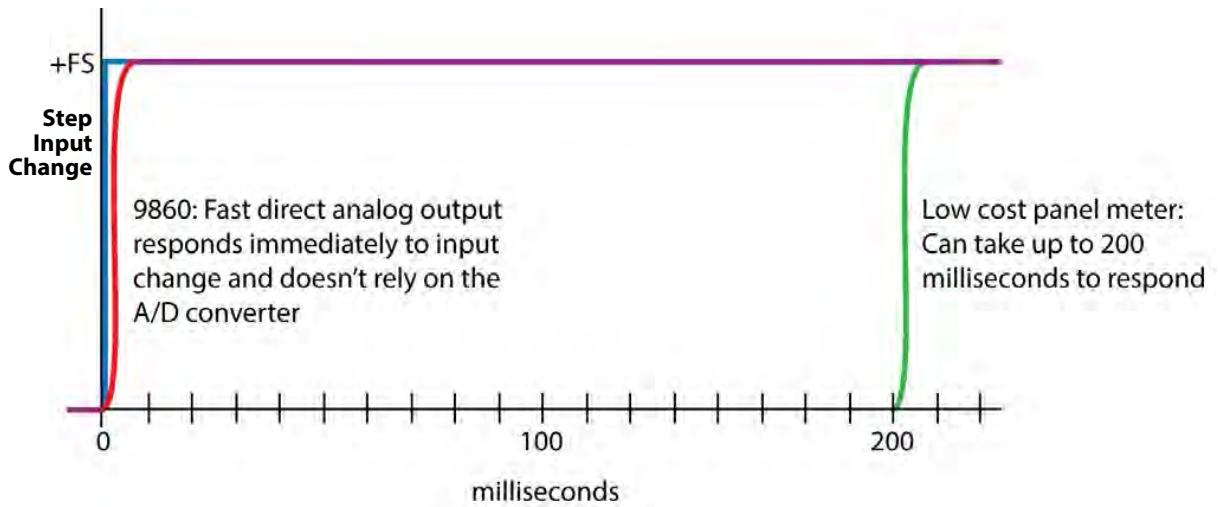
AC 100 to 250 VAC
50–60 Hz
Power Consumption 6 watt

MECHANICAL

Size 3.78" W \times 1.89" H \times 5.1" D
(96mm \times 48mm \times 130mm)
Weight 1.3 lb (575g)
Display LED 14 segment, 0.4" H
Panel Cutout 3.62" W \times 1.77" H
(92mm \times 45mm)

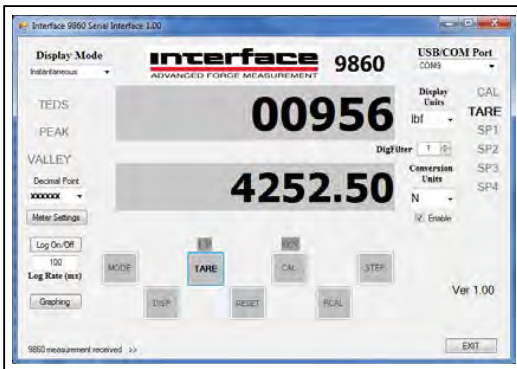
KEY FEATURE:

High Speed Direct Analog Output - Allows accurate capture of quickly changing events

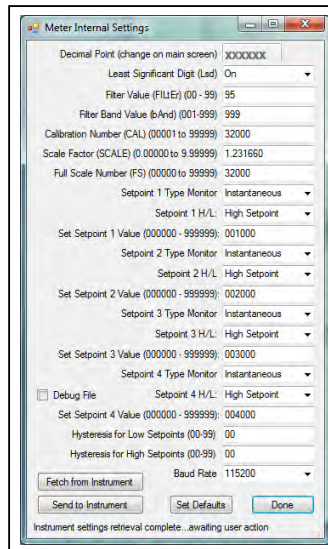


OPTIONS:

Software



Display



Set Up

Logging

| | A | B | C |
|----|-----------|---------------------|---------|
| 1 | Date | Time | Reading |
| 2 | 4/14/2014 | 16:16:57.7161-07:00 | 956 |
| 3 | 4/14/2014 | 16:16:57.8781-07:00 | 956 |
| 4 | 4/14/2014 | 16:16:57.9711-07:00 | 956 |
| 5 | 4/14/2014 | 16:16:58.0771-07:00 | 956 |
| 6 | 4/14/2014 | 16:16:58.1891-07:00 | 956 |
| 7 | 4/14/2014 | 16:16:58.3001-07:00 | 956 |
| 8 | 4/14/2014 | 16:16:58.3941-07:00 | 956 |
| 9 | 4/14/2014 | 16:16:58.5041-07:00 | 956 |
| 10 | 4/14/2014 | 16:16:58.6201-07:00 | 956 |
| 11 | 4/14/2014 | 16:16:58.7241-07:00 | 956 |
| 12 | 4/14/2014 | 16:16:58.8211-07:00 | 956 |
| 13 | 4/14/2014 | 16:16:58.9322-07:00 | 956 |
| 14 | 4/14/2014 | 16:16:59.0372-07:00 | 956 |
| 15 | 4/14/2014 | 16:16:59.1492-07:00 | 956 |
| 16 | 4/14/2014 | 16:16:59.2512-07:00 | 956 |
| 17 | 4/14/2014 | 16:16:59.3492-07:00 | 956 |

Mounting Options



Benchtop Enclosure



Plexiglass Tilt Stand



Model 9850 Multi-Channel Indicator

- High speed - 2000 samples/sec/channel
- Torque, speed, HP, load, angle, position display
- Works with torque sensors, load cells, encoders, LVDTs and speed pickups
- 7-pole 200 Hz anti-alias filter plus 4-pole digital filters
- Includes graphical logging software
- RS232, RS422, RS485
- Max/Min capture
- Two-line backlit LCD display
- Math channel for calculated values
- User definable units
- Scalable analog outputs



AVAILABLE CHANNELS

- AC mV/V
- DC mV/V
- ±5 or ±10 VDC
- 4-20 mA current
- Frequency (speed)
- Encoder/totalizer (angle or position)
- LVDT (position)

OPTIONS

- Second transducer channel
- Input type
- DC power
- Panel mount kit

SPECIFICATIONS

TRANSDUCER EXCITATION/SUPPLY

| | |
|-----------------------------------|------------------------------|
| Channel Type: | |
| AC mV/V | 3 Vrms, 3030 Hz ±0.01% |
| DC mV/V | 5 or 10 VDC |
| ±5 or ±10 VDC | 12V, 220mA |
| 4-20 mA | 15V, 30mA |
| Frequency/Encoder/Totalizer | 5V, 250mA and/or 12V, 125mA |
| LVDT | 2V rms, selectable frequency |

OUTPUTS

| | |
|-------------------------------|--------------------------------|
| Serial Interface | RS232/RS422/RS485 |
| Output – Analog, 12 bit | 2 Scalable, ±5 VDC, or ±10 VDC |
| Limits | HI/LO, per channel |

PERFORMANCE

| | |
|------------------------------|-----------|
| Maximum Display Counts | 10,000 |
| Display Update | 4/sec. |
| Internal Resolution | ±14 bits |
| Conversion Rate | 2000/sec. |
| Maximum Error | 0.02% FS |

ENVIRONMENTAL

| | |
|-------------------------------|------------------------------|
| Operating Temperature | +41°F to 122°F |
| Relative Humidity - MAX | 95% at 104°F, non-condensing |

POWER

| | |
|----------------|---------------------------|
| AC Power | 90 VAC to 250 VAC |
| | 50/60 Hz @ 25VA max |
| DC Power | 10-15 VDC at 15 watts max |

MECHANICAL

| | |
|---------------|------------------------|
| Size | 6.5" W, 2.5" H, 8.7" D |
| Weight | 3 lb |
| Display | Backlit LCD |

Model 9840 Intelligent Indicator

- TEDS Plug & Play Ready!
IEE1451.4 compliant
- 1 or 2 channel
- Remote sense excitation
- 5 & 6 point linearization
- Bipolar
- $\pm 999,999$ display counts
- Nonlinearity $< \pm 0.005\%$
- Auto setup for multiple load cells
- Fast, direct analog output
- ± 10 VDC scalable analog output – 16 bit
- Full duplex RS232C communication
- Peak/valley hold with front panel reset
- Front panel and remote tare
- 8 selectable digital filters
- Auto zero
- Front panel shunt calibration with two selectable resistors
- Display units conversion: Lb, Kg, N, Psi, Mpa, Klb, KN, t, mV/V, lb-in, oz-in, Nm
- Two-line vacuum fluorescent display
- Quadrature encoder channel available
- mV/V calibration
- USB port



SPECIFICATIONS

| | |
|-------------------------|---|
| EXCITATION | |
| Voltage | 5 or 10 VDC |
| Current – MAX | 180 mA |
| OUTPUTS | |
| Serial Interface | RS232 duplex |
| Output – Analog, 16 bit | Scalable, ± 10 VDC |
| Output – Analog, Direct | 1.5 kHz BW |
| Output – Analog | 4–20 mA (optional) |
| Limits | Quad-programmable |
| PERFORMANCE | |
| Maximum Display Counts | $\pm 999,999$ |
| Display Update | 4 / sec. |
| Internal Resolution | 24 bits |
| Signal Input Range | ± 4.5 mV/V |
| Programmable Count - by | 1, 2, 5, 10, and 20 |
| Conversion Rate | 60 / sec. |
| Maximum Error | 0.01% FS ± 1 count |
| CMRR | 115 dB |
| ENVIRONMENTAL | |
| Operating Temperature | 32 to 122°F 0 to 50°C |
| Storage Temperature | 14 to 140°F -10 to 60°C |
| Relative Humidity – MAX | 95% at 104°F non-condensing |
| POWER | |
| AC Power | 115 or 230 VAC 50–60 Hz |
| DC Power (option) | Available as a special |
| Power Consumption | 12 watts |
| MECHANICAL | |
| Size | 7.5" W, 2.5" H, 9.5" D |
| Weight | 5 lb |
| Display | Vacuum Fluorescent |
| Unit Annunciator | Lb, Kg, Klb, KN, N, mV/V, lb-in, oz-in, Nm |

STANDARD CONFIGURATION

9840-100-1 110V single channel

OPTIONS

TEDS
2nd channel
2nd 16-bit scalable analog output
Display Freeze/Remote Display Freeze
4-20 mA analog output
Quad Limits
RS485
Multi-drop RS232
Print Button
7-pin circular load cell connector
Encoder Channel
Second Line Enable on 1-channel unit
Keylock

Model 9834 High Level Input Digital Indicator

- Works with ± 5 VDC, ± 10 VDC, 0-20 mA and 4-20 mA inputs
- Sample rate 120 readings per second
- Programmable analog output, ± 10 VDC and 4-20 mA, 2000 Hz bandwidth
- 5 digit bipolar LED display
- Nonlinearity $< \pm 0.01\%$
- Front panel calibration
- Peak and valley monitoring
- Remote and front panel tare
- 4 limit setpoints
- Designed for CE compliance
- Bidirectional RS232



STANDARD CONFIGURATION

- 9834-V-1 Voltage input with ± 10 V analog output and 4-20 mA
- 9834-C-1 Current input with ± 10 V analog output and 4-20 mA

OPTIONS

- Bench top enclosure
- 230 VAC power

SPECIFICATIONS

EXCITATION

Excitation Voltage 15 VDC
Current 100 mA

PERFORMANCE

Maximum Display Range $\pm 99,999$
Display Update 10/sec
Internal Resolution $\pm 32,768$ counts
Signal Input Range 6 VDC max for 5 VDC
11 VDC max for 10 VDC
21 mA max for 4-20 & 0-20 mA
Readings Per Second 120
Maximum Error 0.01% of reading
 ± 1 count
CMR 120dB
Scalable Analog Output ± 10 VDC and 4-20 mA
RS232 Output

ENVIRONMENTAL

Operating Temperature 14 to 122°F
-10 to 50°C
Relative Humidity – MAX 90% at 104°F,
non-condensing

POWER

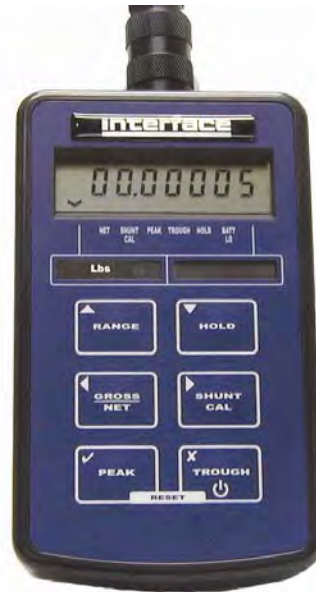
AC 115 OR 230 VAC
50–60 Hz
Power Consumption 6 watt

MECHANICAL

Size 3.78" W, 1.89" H, 5.5" D
(96mm x 48mm x 140mm)
Weight 1.3 lb (575g)
Display LED 14 segment, 0.4" H
Panel Cutout 3.62" W X 1.77" H
(92mm X 45mm)

Model 9320 Hand Held Battery Powered Indicator

- TEDS Plug & Play Ready
- 7 1/2 digital bipolar LCD display
- Dual range with unit labels
- Environmentally sealed
- Peak/valley hold
- Display hold
- Gross/net
- 25 Hz selectable update rate
- Shunt cal
- Power save mode
- mV/V Calibration



OPTIONS

Provides streaming ASCII for print, remote display and logging.
Order part # CAL-9320 RS232 Output

SPECIFICATIONS

| | |
|------------------------|--|
| ELECTRICAL | |
| Excitation Voltage | 5 VDC |
| Current | 59 mA |
| PERFORMANCE | |
| Maximum Display Counts | +9999999 |
| Internal Resolution | 24 bit |
| Signal Input Range | 5 mV/V |
| Readings Per Second | to 25 selectable |
| Nonlinearity | 0.005% FS |
| ENVIRONMENTAL | |
| Operating Temperature | 14 to 122°F -10 to 50°C |
| Enclosure | Sealed IP65/NEMA 4X (when mating plug fitted) |
| POWER | |
| Power | 2 x AA alkaline batteries |
| Battery Life | 45 hrs (450 hrs in low power mode) |
| MECHANICAL | |
| Size | 3.5" W x 6.0" H x 1.3" D 90mm x 152mm x 34mm |
| Weight | 0.5 lb (250 g) |
| Display | 7 1/2 digit LCD display, 8.8 mm digits |



Model 9390 Battery Powered Weight Indicator

- Large 1" high contrast LCD display
- 6-digits
- 100,000 graduations
- Powers up to 4 load cells
- Battery powered
- 15 updates/second typical
- Configurable standby mode for extended battery life
- Full front-panel digital calibration & configuration
- Three-stage digital filtering
- Full Duplex RS-232



SPECIFICATIONS

ELECTRICAL

Excitation Voltage 5 ±0.5VDC,
4 x 350Ω load cells or
8 x 700Ω load cells

PERFORMANCE

Maximum Display Counts 100,000
Analog Signal Input Range 4.5 mV/V
Sensitivity 0.3 μV/graduation min.
Measurement Rate 30, 15, 7.5, 3.75/second

ENVIRONMENTAL

Operating Temperature 14 to 104°F
-10 to 40°C

POWER

Power 9 VDC provided by 6 "C"
cells or included AC adaptor

MECHANICAL

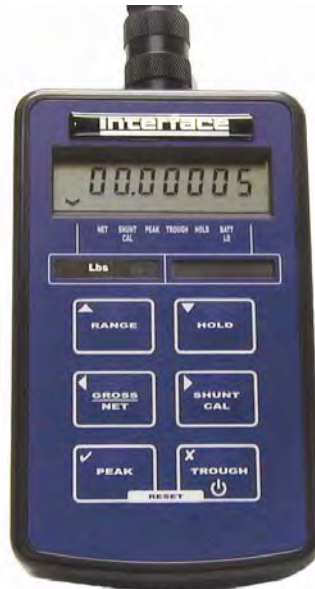
Weight 4.6 lb with batteries
Enclosure NEMA 4X/IP66
stainless steel
Enclosure Size 9.0 in x 3 in x 5.52 in
Display 6 digit LCD, 1" high

OPTIONS

Carrying case for portable use
Please specify if CE mark is required

Model 9320 Hand Held Battery Powered Indicator

- TEDS Plug & Play Ready
- 7 1/2 digital bipolar LCD display
- Dual range with unit labels
- Environmentally sealed
- Peak/valley hold
- Display hold
- Gross/net
- 25 Hz selectable update rate
- Shunt cal
- Power save mode
- mV/V Calibration



OPTIONS

Provides streaming ASCII for print, remote display and logging.
Order part # CAL-9320 RS232 Output

SPECIFICATIONS

| | |
|------------------------|--|
| ELECTRICAL | |
| Excitation Voltage | 5 VDC |
| Current | 59 mA |
| PERFORMANCE | |
| Maximum Display Counts | +9999999 |
| Internal Resolution | 24 bit |
| Signal Input Range | 5 mV/V |
| Readings Per Second | to 25 selectable |
| Nonlinearity | 0.005% FS |
| ENVIRONMENTAL | |
| Operating Temperature | 14 to 122°F -10 to 50°C |
| Enclosure | Sealed IP65/NEMA 4X (when mating plug fitted) |
| POWER | |
| Power | 2 x AA alkaline batteries |
| Battery Life | 45 hrs (450 hrs in low power mode) |
| MECHANICAL | |
| Size | 3.5" W x 6.0" H x 1.3" D 90mm x 152mm x 34mm |
| Weight | 0.5 lb (250 g) |
| Display | 7 1/2 digit LCD display, 8.8 mm digits |

Model 480 Bipolar Digital Weight Indicator



- Large 0.8 in LED 6-digit Display
- 100,000 displayed graduations
- $\pm 523,000$ internal counts
- Powers up to 10 Load Cells
- Tension/Compression operation
- NEMA 4X stainless steel enclosure
- Measurement Rate up to 40/sec
- Selectable filter settings
- 0.1uV/graduation signal sensitivity



OPTIONS

- Analog output – 16-bit, 0-10V, 0-20mA, 4-20mA
- I/O Board – 4 digital outputs (dry contact, 2A)
– 2 digital inputs (up to 24 VDC)
- Setpoints – 8 with batching (I/O Board option required)

SPECIFICATIONS

| | |
|----------------------------|--|
| ELECTRICAL | |
| Excitation Voltage | 5VDC, 10 x 350 Ω load cells or 20 x 700 Ω load cells |
| Current | 70mA @115VAC 35mA @ 230VAC |
| PERFORMANCE | |
| Maximum Display Counts | +99999 |
| Internal Resolution Counts | $\pm 523,000$ |
| Analog Input Range | $\pm 5mV/V$ |
| Readings Per Second | to 40 selectable |
| Nonlinearity | 0.01% FS |
| Sensitivity | to 0.1uV/graduation min |
| ENVIRONMENTAL | |
| Operating Temperature | 14°F to 122°F -10°C to 50°C |
| Enclosure | NEMA 4X/IP66 stainless steel washdown |
| POWER | |
| AC Power | 115 – 230VAC 50 or 60 Hz |
| MECHANICAL | |
| Size | 9.5 in x 6 in x 2.75 in |
| Weight | 6.4 lb (2.9 kg) |
| Display | 6 digit LED |

INF-USB2 Single Channel & SI-USB Dual Channel PC Interface Module

- Easy USB connection to Load and Torque Transducers
- Up to 5000 Sample/Second
- Graphing and Logging software included
- 16-bit resolution
- Data logged into MS Excel compatible CSV file format
- Shunt Cal trigger via software
- Works with mV/V, $\pm 5V$ DC and 4-20mA output transducers
- Environmentally sealed to IP67 (SI-USB IP40)



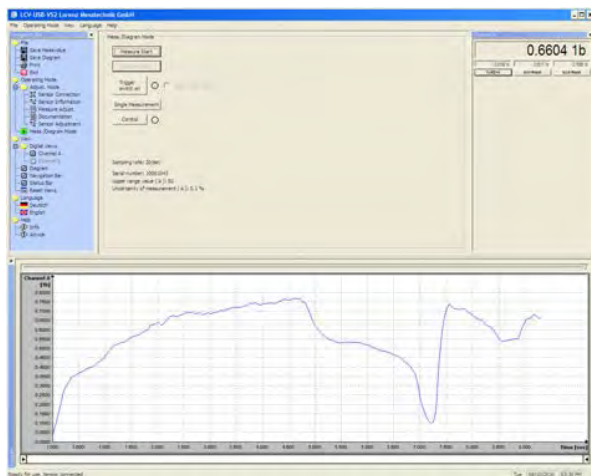
INPUT

| Range | AVAILABLE INPUT RANGES | | Excitation to Sensor | Input Resistance | AVAILABLE CONFIGURATIONS | |
|-------|------------------------|--------------|----------------------|------------------|--------------------------|---------------|
| | Input | Counts | | | Single Channel | Dual Channel* |
| A | ± 5 V | $\pm 25,000$ | 12V, 80 mA | 1.3 M Ω | INF-USB2-A | SI-USB-AA |
| B | 4-20 mA | 20,000 | 12V, 80 mA | 62 Ω | INF-USB2-B | SI-USB-BB |
| C | ± 4.5 mV/V | $\pm 30,000$ | 4V, 20 mA | 200 G Ω | INF-USB2-C | SI-USB-CC |
| D | ± 3 mV/V | $\pm 30,000$ | 4V, 20 mA | 200 G Ω | INF-USB2-D | SI-USB-DD |

*Mixed ranges also available. Example: SI-USB-AD.

SOFTWARE

System includes USB connection to computer and software. SI-USB additionally includes two mating connectors.



INF-USB2 Software

SPECIFICATIONS

| | |
|------------------------------|--------------------------|
| POWER | |
| INF-USB2 (from USB) | 5 VDC, 350mA |
| SI-USB (AC Adapter Supplied) | 24 VDC |
| PERFORMANCE | |
| Measuring Rate: | |
| - Internal Sample Rate | 5000/sec |
| - Software Selectable | 1/min to 2500/sec |
| Temperature Drift | 4 counts/10°C |
| Nonlinearity | 0.1% |
| Accuracy | 0.1% |
| Zero Point | 0 counts |
| Nominal temperature range | +10 to +40°C |
| Operating temperature range | 0 to +50°C |
| Storage temperature range | -10 to +70°C |
| Max cable length to sensor | 3m |
| Max USB cable length | 5m |
| SOFTWARE | Windows XP, Vista or 7 |
| INF-USB2 DIMENSIONS | 4" long x 1" diam |
| SI-USB DIMENSIONS | 4.9" L x 3.1" W x 2.2" H |

Model BSC4 4-Channel Bridge Amplifier

- $\pm 10V$ and 4-20mA or USB outputs
- 4 independent channels
- For use with model 3AXX series 3-axis load cells
- Can be used with up to any 4 standard load cells (with mV/V output)



STANDARD CONFIGURATION

| Model | Description |
|----------|--|
| BSC4-VMA | $\pm 10V$ and 4-20mA output, 2 mV/V input, 37-pin input connector. Includes power supply |
| BSC4-USB | USB output, 2 mV/V input, 37-pin input connector, USB powered. Includes graphing and logging software. |

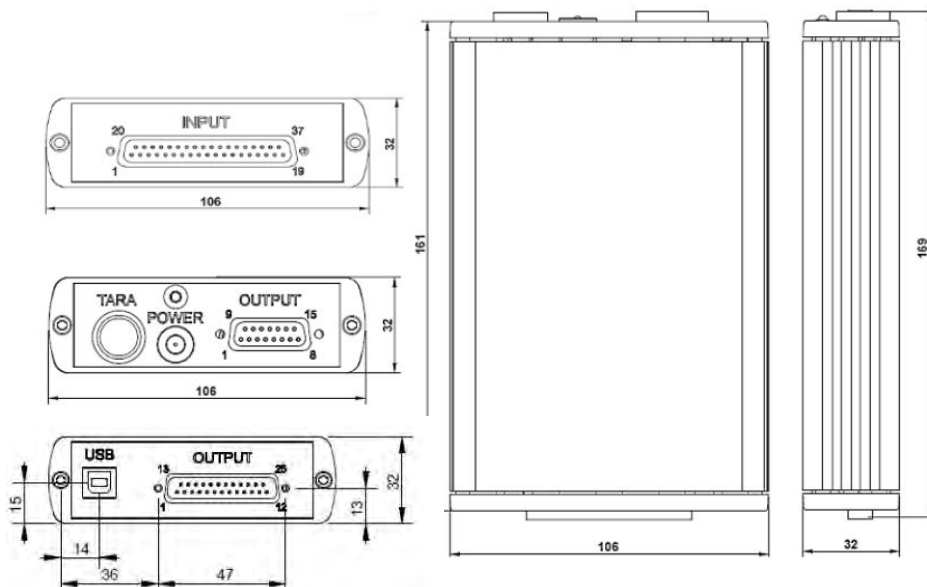
SPECIFICATIONS

| PERFORMANCE | BSC4-VMA | BSC4-USB |
|-----------------------------|---------------|---------------------|
| Signal Input Range | 2 mV/V | 2 mV/V |
| ACCURACY CLASS | 0.05% | 0.05% |
| CMR - dB @ 60 Hz | 95-110 | 95-110 |
| Data Rate - Hz | N/A | 0-125 |
| Sampling Frequency - MHz | N/A | 1.92 |
| Cut-off Frequency - Analog | 250 Hz | 1000 Hz |
| Cut-off Frequency - Digital | N/A | Notch Filler |
| Resolution | Analog | 16-bit |
| EXCITATION | | |
| Excitation Voltage | 5V | 2.5V |
| Excitation Current | 10 mA | 10 mA |
| Supply Voltage | 11 to 30 VDC | 4.5 - 5.5V from USB |
| Supply Current | <1000 mA | <200 mA |
| ENVIRONMENTAL | | |
| Operating Range | -10 to +65 °C | -10 to +65 °C |
| Storage Range | -40 to +85 °C | -40 to +85 °C |
| Zero Drift | 0.005%/°C | 0.005%/°C |
| Sensitivity Drift | 0.001%/°C | 0.001%/°C |

OPTIONS

- M12 load cell connectors (4x)
- 4 mV/V input range

DIMENSIONS



Model 500 In-Line Signal Conditioner

- DC powered
- ± 5 VDC or 4-20 mA
- Small size
- Ultra-stable electronics



| | 500 Analog Output Signal Conditioner |
|-----------------------|---|
| POWER | 12-24 VDC |
| EXCITATION | |
| Voltage | 5 or 10 VDC |
| Current | 30 mA |
| OUTPUT | ± 5 VDC Bipolar and 4-20 mA Unipolar |
| PERFORMANCE | |
| Input Range, Nominal | 10,20,30, or 40 mV |
| Dynamic Response | 1000 Hz |
| Span Adjustment Range | $\pm 10\%$ |
| Zero Adjustment Range | ± 1.4 mV |
| Operating Temperature | -32°F to 158°F -0°C to 70°C |
| ENVIRONMENTAL | |
| Size | 2.6 in X 1.7 in X 0.85 in |

ACCESSORIES

Terminal strip adaptors (to fan out connector wiring to a screw terminal strip)

TSA-101 (to load cell)

TSA-102 (to system wiring)

Model DMA DIN Rail Mount Signal Conditioner

- User selectable analog output
±10V, ±5V, 4-20mA
- 10-28 VDC power
- Selectable full scale input range 5 to 50 mV
- DIN Rail Mountable



Model DMA DIN Rail Mount Amplifier for strain gage transducer input

Terminal

- 1 Ground
- 2 Vsupply (10-28 VDC)
- 3 - Excitation
- 4 + Excitation
- 5 Iout (4-20 mA)
- 6 Vout (±5 or ±10V)
- 7 - Signal
- 8 + Signal

interface

ADVANCED FORCE & TORQUE MEASUREMENT

Scottsdale, AZ 85260 USA
480-948-5555 FAX 480-948-1924
www.interfaceforce.com

SPECIFICATIONS

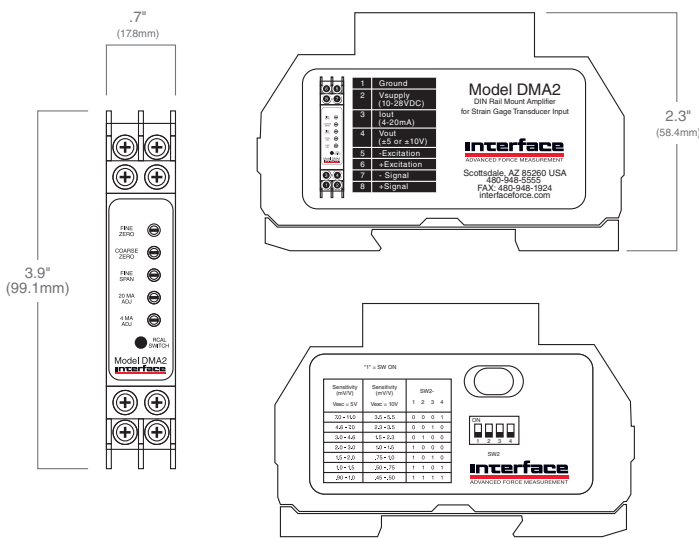
| | |
|------------------------|---|
| POWER | |
| DC | 10-28 VDC |
| EXCITATION | |
| Voltage | 5 or 10 VDC |
| Current | 30 mA Max |
| PERFORMANCE | |
| Output 1 | ±5 or ±10V Full Scale Bipolar, jumper selectable |
| Output 2 | 4-20 mA Full Scale Unipolar |
| Input Range | 5 to 50 mV FS coarse and fine adjust |
| Dynamic Response | DC to 1000 Hz |
| Zero Offset Range | ±50% FS Output coarse and fine adjust |
| Nonlinearity | 0.01% FS |
| Spam Temp. Coefficient | 0.004%/°F Max |
| Zero Temp. Coefficient | 0.5 μV/°F Max |
| ENVIRONMENTAL | |
| Operating Temp. | +32°F to +158°F |
| Nominal Dimensions | 0.70 in x 3.90 in x 2.30 in |
| Mounting | 35mm DIN Rail |



Model DMA2 DIN Rail Mount Signal Conditioner

- User Selectable Analog Output $\pm 10V$, $\pm 5V$, 4-20mA
- 10–28VDC Power
- Selectable Full Scale Input Range 5–50mV
- DIN Rail Mountable

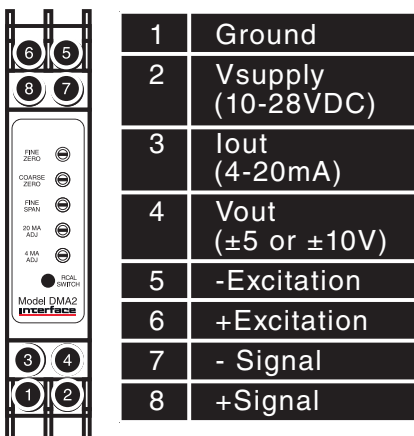
Dimensions



Specifications

| Model | DMA2 |
|------------------------------|--|
| Power | |
| DC | 10–28VDC |
| Excitation | |
| Voltage | 5–10VDC |
| Current | 30mA Max |
| Performance | |
| Output 1 | ± 5 or $\pm 10V$ Full Scale Bipolar, Jumper Selectable |
| Output 2 | 4–20mA Full Scale Unipolar |
| Input Range | 5–50mV FS Coarse and Fine Adjust |
| Dynamic Response | DC to 1000Hz |
| Zero Offset Range | $\pm 50\%$ FS Output Coarse and Fine Adjust |
| Nonlinearity | 0.01% FS |
| Span Temperature Coefficient | 0.004% / °F Max |
| Zero Temperature Coefficient | 0.5 μ V / °F Max |
| Environmental | |
| Operating Temperature | 32°F to 158°F (0°C to 70°C) |
| Nominal Dimensions | 0.7" x 3.9" x 2.3" (17.8mm x 99.1mm x 58.4mm) |
| Mounting | 35mm DIN Rail |

Wiring Diagram



| | |
|---|-------------------------------|
| 1 | Ground |
| 2 | Vsupply (10-28VDC) |
| 3 | Iout (4-20mA) |
| 4 | Vout (± 5 or $\pm 10V$) |
| 5 | -Excitation |
| 6 | +Excitation |
| 7 | - Signal |
| 8 | +Signal |

Default Settings

Model SGA AC/DC Powered Signal Conditioner



- User selectable analog output $\pm 10V$, $\pm 5V$, 0-10V, 0-5V, 0-20 mA, 4-20 mA
- 110 VAC, 220 VAC OR 18-24 VDC power
- Switch selectable filtering 1 Hz to 5 kHz
- Single channel powers up to 4 transducers
- Selectable full scale input range 0.06 to 30 mV/V
- Switch selectable offset $\pm 70\%$ FS
- Sealed ABS enclosure



SPECIFICATIONS

POWER

AC110 VAC 60 Hz
or 220 VAC 50 Hz
DC18-24 VDC

EXCITATION

Voltage10 VDC $\pm 5\%$
Current118 mA

PERFORMANCE

Output $\pm 10V$, $\pm 5V$ Bipolar
0-5V, 0-10V Unipolar
0-20 mA, 4-20 mA Unipolar
Input Range ± 0.06 to ± 30 mV/V
Switch selectable
Max Bandwidth6 kHz
Filter1 Hz to 5 kHz
Switch selectable
Offset $\pm 70\%$ FS
Course and fine adjust
Nonlinearity0.03% FS
Span Temp. Coefficient0.004%/°F Max
Zero Temp. Coefficient0.5 μV /°F Max

ENVIRONMENTAL

Operating Temp.+32°F to +122°F
Dimensions6.3 in X 3.1 in X 2.2 in
EnclosureSealed ABS case,
Compression cable seals

ACCESSORIES

AC Power Cord (PWRCRD-SGA-110)

Model CSC Cable Integral Inline Signal Conditioner

- IP67 stainless steel enclosure
- CE approved
- Zero and span adjustments
- 1 kHz bandwidth



OUTPUT

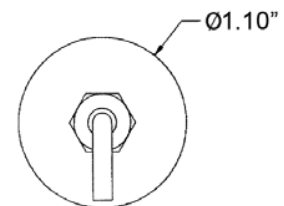
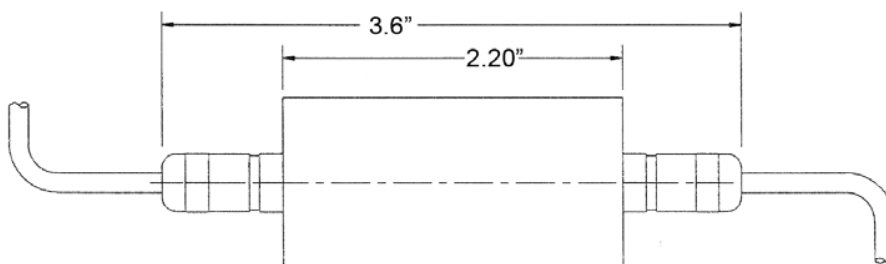
| Model | Output | Power Supply | |
|----------|--------------------------|--------------|--------|
| | | (DCV) | mA nom |
| CSC-1 | ±10 V Bipolar | 14 to 18 | 30 |
| CSC-2 | 0.1-10 V Unipolar Ten + | 13 to 30 | 23 |
| CSC-3 | 0.1-10 V Unipolar Comp + | 13 to 30 | 23 |
| CSC-4 | ±10 V Bipolar | ±13 to ±15 | 23 |
| CSC-5 | ± 5 V Bipolar | 14 to 18 | 30 |
| CSC-6 | 0.1-5 V Unipolar Ten + | 8.5 to 28 | 23 |
| CSC-7 | 0.1-5 V Unipolar Comp + | 8.5 to 28 | 23 |
| CSC-8 | 4-20 mA Bipolar Ten + | 10 to 30 | 24 |
| CSC-9 | 4-20 mA Unipolar Ten + | 10 to 30 | 24 |
| CSC-0 | 4-20 mA Unipolar Comp + | 10 to 30 | 24 |
| **CSD-4 | RS-485 | 6-18 | 45 |
| **CSD-4C | CAN Open | 6-18 | 45 |

Application Note: The Model CSC signal conditioner comes installed and calibrated to your choice of load cell and cabling. Call our design engineers for consultation to ensure the configuration meets your application needs.

| ** Additional Specifications for CSD-4 & CSD-4C | |
|---|-------------------|
| Internal Resolution - 24 bit | |
| - Resolution@1Hz | 200,000 counts |
| - Resolution@10Hz | 120,000 counts |
| - Resolution@100Hz | 50,000 counts |
| - Resolution@500Hz | 18,000 counts |
| RS485 Data Rate | 2,400 - 230K Baud |
| CAN 2.0B | 20K - 1M bps |

OPTIONS

- User-specified cable lengths
- User-specified conditioner placement in data path



SPECIFICATIONS

EXCITATION

Voltage 5 VDC
Current 15 mA MAX

PERFORMANCE

Bandwidth 1000 Hz
Span Adjustment Range ±8 % FRO
Zero Adjustment Range ±2 % FRO
Nonlinearity 0.02% FS
Span Temperature Coefficient ±0.0036 % /°F
Zero Temperature Coefficient ±0.0014% FRO/°F

ENVIRONMENTAL

Size 2.2" 1.1" Diameter
Operating Temperature -40 to 185°F
Enclosure Stainless Steel Case
Compression Cable Seals
Reverse Polarity Protection -30V

SYSTEM COMPONENTS

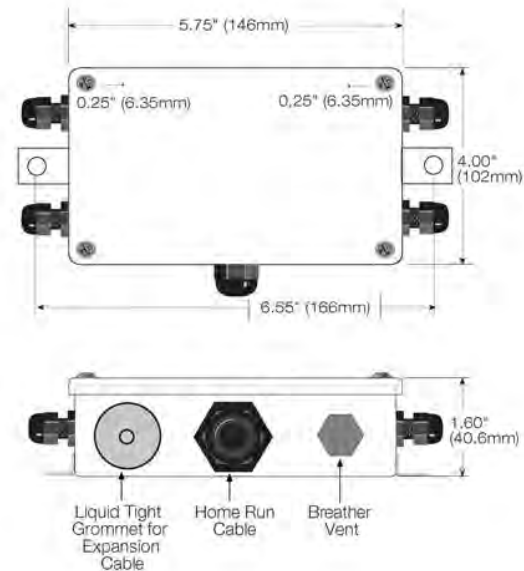
- One CSC Conditioner
- Load Sensor (not included)
- Connection Cables (not included)

Junction Boxes

In its most basic form a junction box provides a convenient method for wiring multiple load cells to a single indicator. Junction boxes are commonly used in weighing applications where a tank or scale is supported by more than one load cell. The individual load cell cables are wired into the junction box and then a single cable connects the junction box to the instrumentation.

The JB104SS is a small 4x6.5x1.75 inch stainless steel NEMA 4 rated box suitable for installations where space is limited. Standard configuration is for up to 4 load cells and provides three trim ranges; no trim, 10% and 30%. Spring clips are used for the load cell connections.

DIMENSIONS



JB104SS

MULTI-AXIS SENSORS

2-Axis

3-Axis

6-Axis

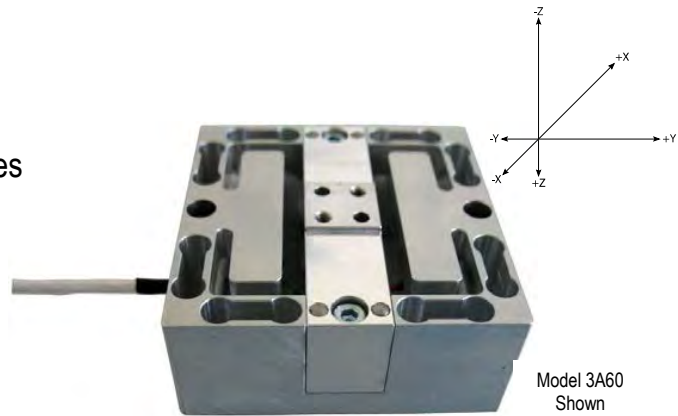
Specialty

interface

ADVANCED FORCE MEASUREMENT

Model 3A Series 3-Axis Load Cell (F_x F_y F_z)

- 3-Axis – F_x F_y F_z; independent bridges
- 10N to 50 kN force range
- Compact size
- Low crosstalk
- 1 mV/V output
- Temperature compensated



Interface's 3-axis load cell measures forces simultaneously in 3 mutually perpendicular axes: X, Y, and Z - tension and compression. Each axis provides an output of 1mV/V and requires no mathematical manipulation. The 3-axis load cell is built to minimize eccentric loading effects and crosstalk between channels.

Interface's 3-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

The load cell is provided in various capacity ranges and sizes with each of the three axes providing the same capacity.

We are happy to work with your design needs – providing a custom design if warranted for varying capacities (between X-Y and Z), higher temperature capability, or OEM/private labeling if needed.

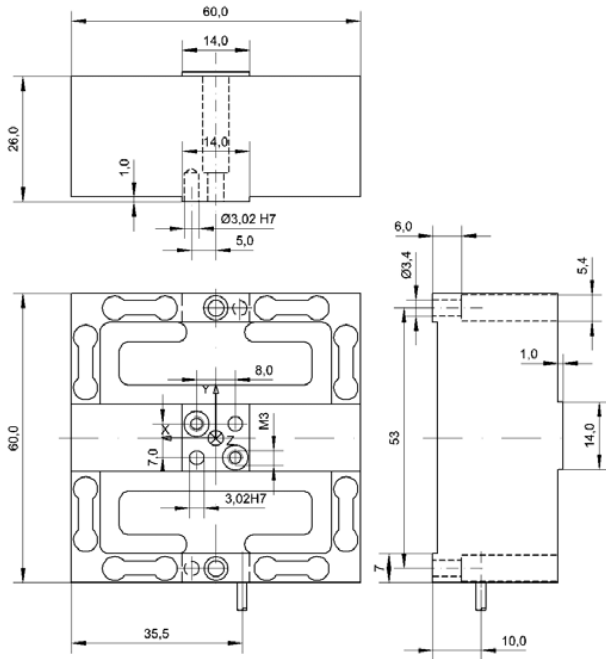
MODEL COMPARISON (3A60, 3A120, 3A160)

| | MODEL 3A60 | | | MODEL 3A120 | | | | | | MODEL 3A160 | | |
|--|------------|-----|-----|-------------|------|------|-------|-------|-------|-------------|------|------|
| F _x - Capacity | 10N | 20N | 50N | 50N | 200N | 500N | 1000N | 2000N | 5000N | 10kN | 20kN | 50kN |
| F _y - Capacity | 10N | 20N | 50N | 50N | 200N | 500N | 1000N | 2000N | 5000N | 10kN | 20kN | 50kN |
| F _z - Capacity | 10N | 20N | 50N | 50N | 200N | 500N | 1000N | 2000N | 5000N | 10kN | 20kN | 50kN |
| Length (mm) | 60 | | | 120 | | | | | | 160 | | |
| Width (mm) | 60 | | | 120 | | | | | | 160 | | |
| Height (mm) | 26 | | | 28 | | | | | | 66 | | |
| Output – mV/V | 1 | | | 1 | | | | | | 1 | | |
| Allowable Force Eccentricity (mm) | ±40 | | | ±100 | | | | | | ±100 | | |
| Crosstalk from Z to XY @50% full load –% | <2% | | | <1% | | | | | | <1% | | |
| Crosstalk from X to Y @50% full load –% | <2% | | | <1% | | | | | | <1% | | |
| Crosstalk from Y to X @50% full load –% | <2% | | | <1% | | | | | | <1% | | |
| Maximum Overload % | 300% | | | 300% | | | | | | 300% | | |
| Weight (kg) | 0.11 | | | 0.70 | | | 1.6 | | | 8.2 | | |

WIRING

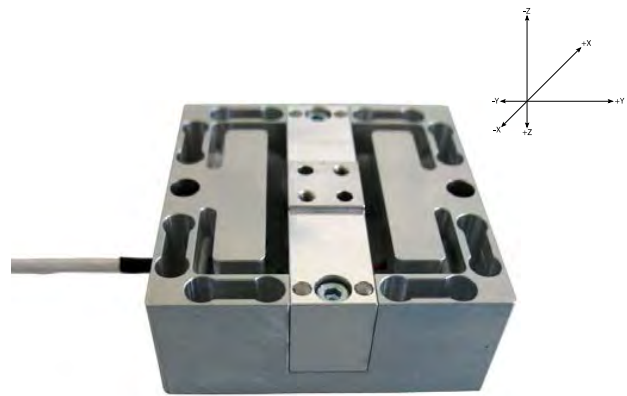
| | | | | | | | | | | | |
|----------|--------------|--------|----|----------|--------------|------|---|----------|--------------|-----------|----|
| X - Axis | + Excitation | Brown | 20 | Y - Axis | + Excitation | Pink | 2 | Z - Axis | + Excitation | Purple | 11 |
| | - Excitation | White | 27 | | - Excitation | Gray | 9 | | - Excitation | Black | 18 |
| | + Output | Green | 22 | | + Output | Blue | 4 | | + Output | Gray/Pink | 13 |
| | - Output | Yellow | 25 | | - Output | Red | 7 | | - Output | Red/Blue | 16 |
| | Shield | | 1 | | | | | | | | |

Model 3A60 3-Axis Load Cell



Dimensions in mm

Mechanical views are 1st-angle projection



SPECIFICATIONS

| MODEL 3A60 | | | | |
|---------------------------------|-------------------|-----------------------|-----|-----|
| ACCURACY (Max. Error) | | | | |
| Nonlinearity | %FS | ±0.5 | | |
| Hysteresis | %FS | ±0.3 | | |
| Non-repeatability | %RO | ±0.3 | | |
| Creep (30 min) | % | 0.5 | | |
| MECHANICAL DATA | | | | |
| Rated Capacity (FS) | N | 10 | 20 | 50 |
| Material | Aluminum | | | |
| Length x width x height | mm | 60 x 60 x 26 | | |
| Mounting Hardware | 2x M3; 2x M3 SHCS | | | |
| Total Weight | gm | 110 | | |
| Maximum Overload | %FS | 300 | | |
| ELECTRICAL DATA | | | | |
| Rated Output: x-axis (Nom.) | mV/V | 1.0 | | |
| Rated Output: y-axis (Nom.) | mV/V | 1.0 | | |
| Rated Output: z-axis (Nom.) | mV/V | 1.0 | | |
| Max. Excitation Voltage | V | 10 | | |
| Input resistance x, y-axis | Ohm | 700 ± 5 | | |
| Output resistance x, y-axis | Ohm | 700 ± 5 | | |
| Input resistance z-axis | Ohm | 350 ± 5 | | |
| Output resistance z-axis | Ohm | 350 ± 5 | | |
| Zero Balance | ±% RO | ±1.0 | | |
| Insulation Resistance | Ohm | > 5 × 10 ⁹ | | |
| TEMPERATURE | | | | |
| Operating Temp. Range | °C | -20 to 70 | | |
| Compensated Temp. Range | °C | -10 to 45 | | |
| Temperature effect on zero | %RO / °C | ± 0.05 | | |
| Temperature effect on output | % / °C | ± 0.05 | | |
| ECCENTRICITY AND MOMENT | | | | |
| Allow'd moment of ecc't load | Nm | 0.1 | 0.2 | 0.5 |
| Crosstalk: x to y at rated load | % | ±2 | | |
| Crosstalk: x to y at rated load | % | ±2 | | |
| Crosstalk: z to x/y rated load | % | ±2 | | |

STANDARD CONFIGURATION

- 3 meter integral cable with 37-pin connector and mate

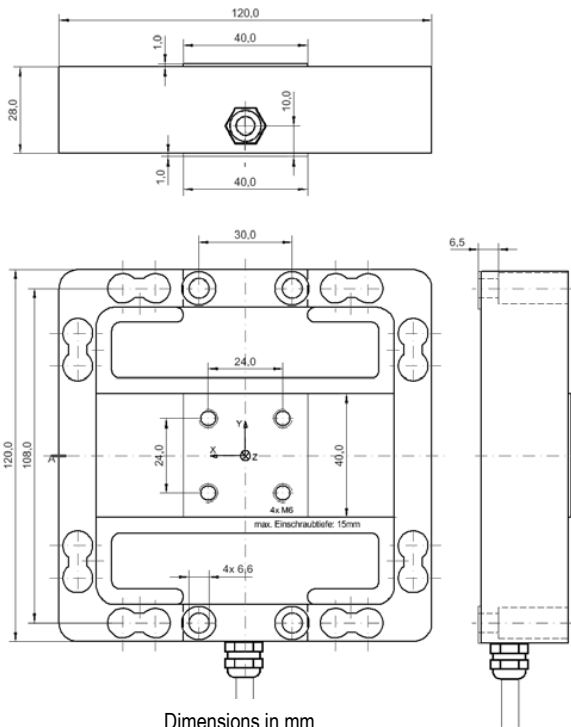
OPTIONS

- 3 meter integral cable – pigtail end

ACCESSORIES

- 4-channel instrumentation-amplifier with USB output to PC/laptop (BSC4-USB)
- 4-channel instrumentation-amplifier with ±10V and 4-20mV output (BSC4-VMA)

Model 3A120 3-Axis Load Cell



Dimensions in mm

Mechanical views are 1st-angle projection



SPECIFICATIONS

| MODEL 3A120 | | | | | | |
|---------------------------------|----------|-----------------------|-----|-----|----------|---------|
| ACCURACY (Max. Error) | | | | | | |
| Nonlinearity | %FS | ±0.2 | | | | |
| Hysteresis | %FS | ±0.1 | | | | |
| Non-repeatability | %RO | ±0.1 | | | | |
| Creep (30 min) | % | 0.5 | | | | |
| MECHANICAL DATA | | | | | | |
| Rated Capacity (FS) | KN | 50 | 200 | 500 | 1KN | 2KN 5KN |
| Material | | Aluminum | | | Chr/moly | |
| Total Weight | kg | 0.7 | | | 1.6 | |
| Length x width x height | mm | 120 x 120 x 28 | | | | |
| Mounting Hardware | | 4x M6; 4x M6 SHCS | | | | |
| Total Weight | kg | 8.2 | | | | |
| Maximum Overload | %FS | ≤300 | | | | |
| ELECTRICAL DATA | | | | | | |
| Rated Output: x-axis (Nom.) | mV/V | 1.0 | | | | |
| Rated Output: y-axis (Nom.) | mV/V | 1.0 | | | | |
| Rated Output: z-axis (Nom.) | mV/V | 1.0 | | | | |
| Max. Excitation Voltage | V | 10 | | | | |
| Input resistance x, y-axis | Ohm | 700 ± 5 | | | | |
| Output resistance x, y-axis | Ohm | 700 ± 5 | | | | |
| Input resistance z-axis | Ohm | 700 ± 5 | | | | |
| Output resistance z-axis | Ohm | 700 ± 5 | | | | |
| Zero Balance | ±% RO | ±1.0 | | | | |
| Insulation Resistance | Ohm | > 5 × 10 ⁹ | | | | |
| TEMPERATURE | | | | | | |
| Operating Temp. Range | °C | -20 to 70 | | | | |
| Compensated Temp. Range | °C | -10 to 45 | | | | |
| Temperature effect on zero | %RO / °C | ± 0.05 | | | | |
| Temperature effect on output | % / °C | ± 0.05 | | | | |
| ECCENTRICITY AND MOMENT | | | | | | |
| Allow'd moment of ecc't load | Nm | 50 | 50 | 100 | 100 | 100 200 |
| Crosstalk: x to y at rated load | % | ±1 | | | | |
| Crosstalk: x to y at rated load | % | ±1 | | | | |
| Crosstalk: z to x/y rated load | % | ±1 | | | | |

STANDARD CONFIGURATION

- 3 meter integral cable with 37-pin connector and mate

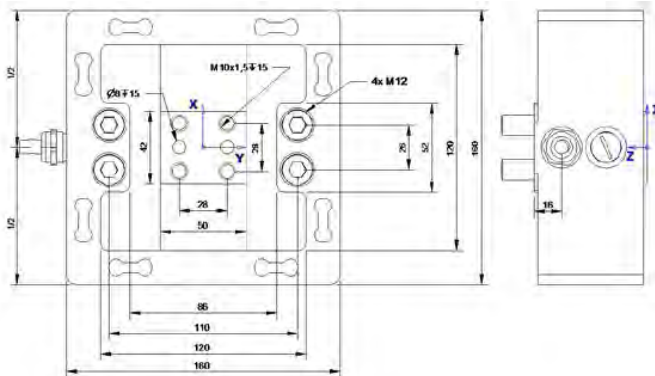
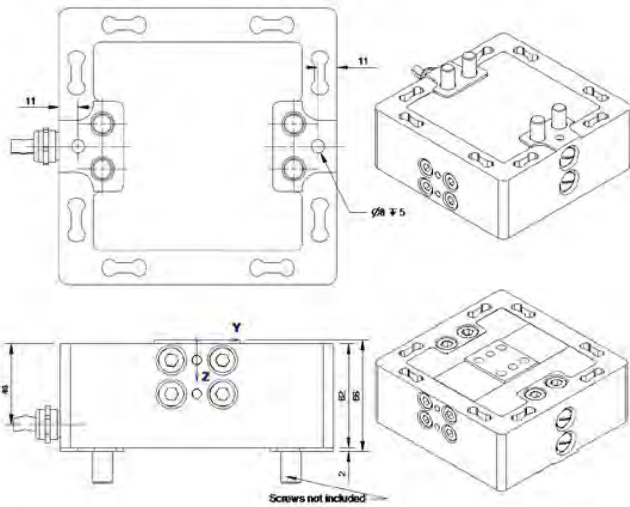
OPTIONS

- 3 meter integral cable – pigtail end

ACCESSORIES

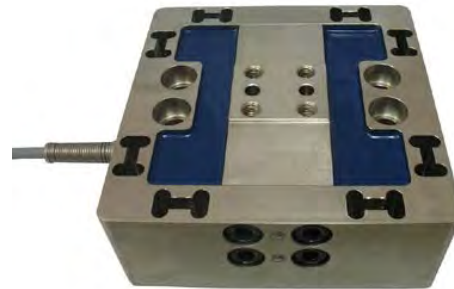
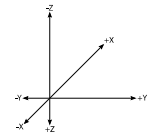
- 4-channel instrumentation-amplifier with USB output to PC/laptop (BSC4-USB)
- 4-channel instrumentation-amplifier with ±10V and 4-20mV output (BSC4-VMA)

Model 3A160 3-Axis Load Cell



Dimensions in mm

Mechanical views are 1st-angle projection



SPECIFICATIONS

| MODEL 3A160 | | | | |
|---------------------------------|---------------------|-----------------------|------|------|
| ACCURACY (Max. Error) | | | | |
| Nonlinearity | %FS | ±0.2 | | |
| Hysteresis | %FS | ±0.1 | | |
| Non-repeatability | %RO | ±0.1 | | |
| Creep (30 min) | % | 0.5 | | |
| MECHANICAL DATA | | | | |
| Rated Capacity (FS) | KN | 10 | 20 | 50 |
| Material | Chrome-moly | | | |
| Length x width x height | mm | 160 x 160 x 66 | | |
| Size / thread | 4x M10; 4x M12 SHCS | | | |
| Total Weight | kg | 8.2 | | |
| Maximum Overload | %FS | 300 | | |
| ELECTRICAL DATA | | | | |
| Rated Output: x-axis (Nom.) | mV/V | ±1.0 | | |
| Rated Output: y-axis (Nom.) | mV/V | ±1.0 | | |
| Rated Output: z-axis (Nom.) | mV/V | ±1.0 | | |
| Max. Excitation Voltage | V | 10 | | |
| Input resistance x, y-axis | Ohm | 700 ± 5 | | |
| Output resistance x, y-axis | Ohm | 700 ± 5 | | |
| Input resistance z-axis | Ohm | 350 ± 5 | | |
| Output resistance z-axis | Ohm | 350 ± 5 | | |
| Zero Balance | ±% RO | ±1.0 | | |
| Insulation Resistance | Ohm | > 5 × 10 ⁹ | | |
| TEMPERATURE | | | | |
| Operating Temp. Range | °C | -20 to 70 | | |
| Compensated Temp. Range | °C | -10 to 45 | | |
| Temperature effect on zero | %RO / °C | ± 0.05 | | |
| Temperature effect on output | %/°C | ± 0.05 | | |
| ECCENTRICITY AND MOMENT | | | | |
| Allow'd moment of ecc't load | Nm | 500 | 1000 | 2000 |
| Crosstalk: x to y at rated load | % | ±1 | | |
| Crosstalk: x to y at rated load | % | ±1 | | |
| Crosstalk: z to x/y rated load | % | ±1 | | |

STANDARD CONFIGURATION

- 3 meter integral cable with 37-pin connector and mate

OPTIONS

- 3 meter integral cable – pigtail end

ACCESSORIES

- 4-channel instrumentation-amplifier with USB output to PC/laptop (BSC4-USB)
- 4-channel instrumentation-amplifier with ±10V and 4-20mV output (BSC4-VMA)

Model 1216 Axial Torsion Load Cell

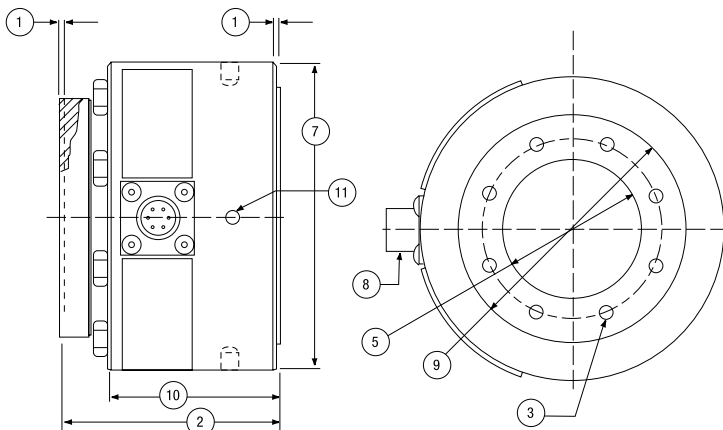
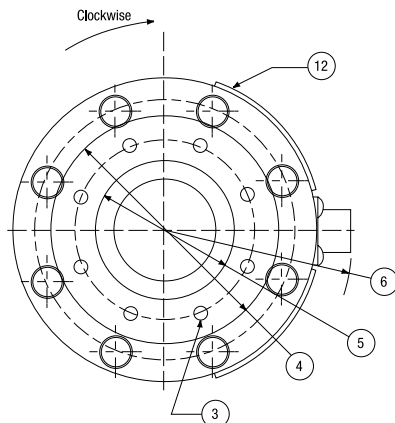
Why the Interface model 1216 Axial Torsion Load Cell is the best in class:

- Measures load and torque
- Minimal crosstalk
- Extraneous load resistance
- Fatigue rated



OPTIONS

- Integral Cable
- Compression Overload Protection
- Connector Protector



SPECIFICATIONS

| ACCURACY – (MAX ERROR) | Axial Bridge A | Torsion Bridge B |
|------------------------|----------------|------------------|
| Nonlinearity-% FS | ±0.04 | ±0.07 |
| Hysteresis-% FS | ±0.04 | ±0.05 |
| Nonrepeatability-% RO | ±0.02 | ±0.05 |
| Creep, in 20 min-% | ±0.025 | ±0.025 |

| TEMPERATURE | Axial | Torsion |
|---------------------------------|------------|------------|
| Compensated Range-°F | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 |
| Effect on Output-%/100°F – MAX | ±0.08 | ±0.08 |
| Effect on Zero-% RO/100°F – MAX | ±0.08 | ±0.08 |

| ELECTRICAL | Axial | Torsion |
|-----------------------------|--------|---------|
| Rated Output-mV/V (Nominal) | 1.50 | 1.80 |
| Zero Balance-% RO | ±2.0 | ±2.0 |
| Input Resistance-Ohms | 700±7 | 700±7 |
| Output Resistance-Ohms | 700±7 | 700±7 |
| Excitation Voltage – MAX | 20 VDC | 20 VDC |

| MECHANICAL | Axial | Torsion |
|-------------------------|-------|----------|
| Calibration | T&C | CW & CCW |
| Safe Overload-% CAP | ±200 | ±200 |
| Ultimate Overload-% CAP | ±400 | ±400 |

DIMENSIONS

| See Drawing | MODEL 1216 | |
|-------------|--------------------------------------|----------|
| | CAPACITY (lbf)/(inch-lb) | |
| | 250/125, 500/250, 1K/500, 2K/1000 | |
| | inch | mm |
| ① | 0.070 | 1.78 |
| ② | 3.00 | 76.2 |
| ③ | 0.250-28 x 0.43 deep on a 2.600 B.C. | |
| ④ | 3.20 | 81.3 |
| ⑤ | 2.000 + 0.002 / -0.000 | |
| ⑥ | 2.77 | 70.3 |
| ⑦ | 4.13 | 104.3 |
| ⑧ | PT02E-12-8P | |
| ⑨ | 3.200 | 81.28 |
| ⑩ | 2.33 | 59.2 |
| ⑪ | 0.25 | 6.4 |
| | 0.25 deep | 6.4 deep |
| ⑫ | Label | |

INTERFACE • 7401 E. Butherus Drive, Scottsdale, AZ 85260 • PHONE: (480) 948-5555 • FAX: (480) 948-1924

1216A-01-00



Model 6A Series 6-Axis Load Cells (Fx Fy Fz Mx My Mz)

- 6-Axis – Force and Torque in All Six Axes
- 50N / 1Nm to 100KN/10KNm
- Compact Size
- Force and Moment Values MUST be Calculated Using Supplied 36-Term Coefficient Matrix
- Low Crosstalk
- Temperature Compensated
- Optional BSC8 Amplifier and Software can be Used for Force & Moment Value Calculation

Interface's 6-axis load cell measures forces simultaneously in three mutually perpendicular axes and three simultaneous torques about those same axes. Six full bridges provide mV/V output on six independent channels.

Interface's 6-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical)

A 36-term coefficient matrix is included for calculating the load and torque values in each axis.

An 8-channel amplifier with USB PC interface is also available which simplifies data analysis.

Specifications

Accuracy - (Max Error)

| | |
|-----------------------|-------|
| Nonlinearity-% FS | ±0.1 |
| Hysteresis-% FS | ±0.1 |
| Nonrepeatability-% RO | ±0.10 |
| Creep, in 20 min-% | ±0.1 |

Mechanical

| | |
|--------------------------|-----|
| Safe Overload-% of CAP | 150 |
| Ultimate Overload - % RO | 300 |

Temperature

| | |
|------------------------------|-----------|
| Compensated Range-°F | 14 to 158 |
| Compensated Range-°C | -10 to 70 |
| Operating Range-°F | 14 to 185 |
| Operating Range-°C | -10 to 85 |
| Effect On Zero- % RO/°C -Max | ±0.1 |
| Effect on Output- %/°C -Max | ±0.05 |

Electrical

| | |
|-----------------------------|----------|
| Rated Output-mV/V (Nominal) | ±0.4 |
| Max. Excitation Voltage | 5V |
| Crosstalk | ±1% |
| Zero Balance - mV/V | <2 |
| Input Resistance (6A27) | 1KΩ ±10 |
| Output Resistance (6A27) | 1KΩ ±10 |
| Input Resistance | 350Ω ±10 |
| Output Resistance | 350Ω ±10 |

| Model | 6A27 | | | 6A40 | | | 6A68 | | | | | 6A154 | | | | 6A175 | | |
|------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|--|--|
| | A | A | B | A | B | C | D | E | A | B | C | D | A | B | C | | | |
| Fx (N) | 50 | 200 | 500 | 1K | 2K | 5K | 10K | 10K | 50 | 100 | 200 | 500 | 10K | 20K | 50K | | | |
| Fy (N) | 50 | 200 | 500 | 1K | 2K | 5K | 10K | 10K | 50 | 100 | 200 | 500 | 10K | 20K | 50K | | | |
| Fz (N) | 200 | 500 | 2K | 2K | 4K | 10K | 20K | 20K | 100 | 200 | 500 | 1K | 20K | 50K | 100K | | | |
| Mx (Nm) | 1 | 5 | 20 | 20 | 50 | 50 | 100 | 500 | 5 | 10 | 20 | 50 | 1K | 2K | 5K | | | |
| My (Nm) | 1 | 5 | 20 | 20 | 50 | 50 | 100 | 500 | 5 | 10 | 20 | 50 | 1K | 2K | 5K | | | |
| Mz (Nm) | 1 | 10 | 40 | 20 | 50 | 50 | 100 | 500 | 5 | 10 | 20 | 50 | 2K | 5K | 10K | | | |
| Diameter (mm) | 27 | 60 | 60 | 83 | 83 | 83 | 83 | 83 | 154 | 154 | 154 | 154 | 175 | 175 | 175 | | | |
| Height (mm) | 25 | 40 | 40 | 64 | 64 | 64 | 64 | 64 | 100 | 100 | 100 | 100 | 116 | 116 | 116 | | | |
| Weight (g) | 25 | 250 | 400 | 830 | 830 | 1050 | 1050 | 1050 | 800 | 800 | 800 | 800 | 11,000 | 11,000 | 11,000 | | | |
| Material | SS | AL | SS | AL | AL | SS | SS | SS | AL | AL | AL | AL | SS | SS | SS | | | |
| Deflection (mm) | 0.01 | 0.1 | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 | 0.08 | 0.08 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| Deflection (rad) | 0.001 | 0.01 | 0.003 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.01 | 0.01 | 0.01 | | | |
| Protection (IP) | 54 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | | | |

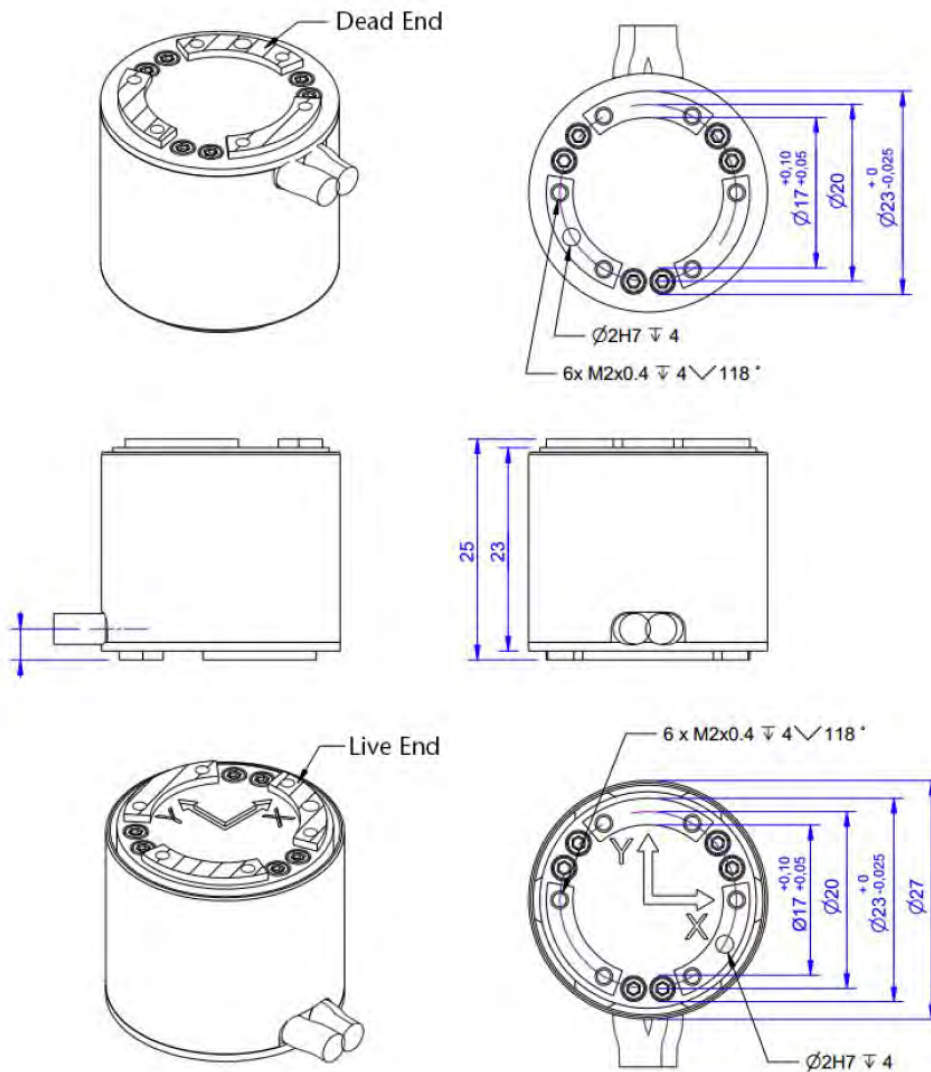


Model 6A27 6-Axis Load Cell

- Integration into Wind Tunnel Models
- Integration into Handles of Medical Tools
- Sports Medicine
- Biomechanics
- Control o Assembly & Handling Processes in Micromechanics

Standard Configuration

3 Meter Dual Cable with M16 24-Pin Connector & Mate



Dimensions in mm
Mechanical views are 1st-angle projection

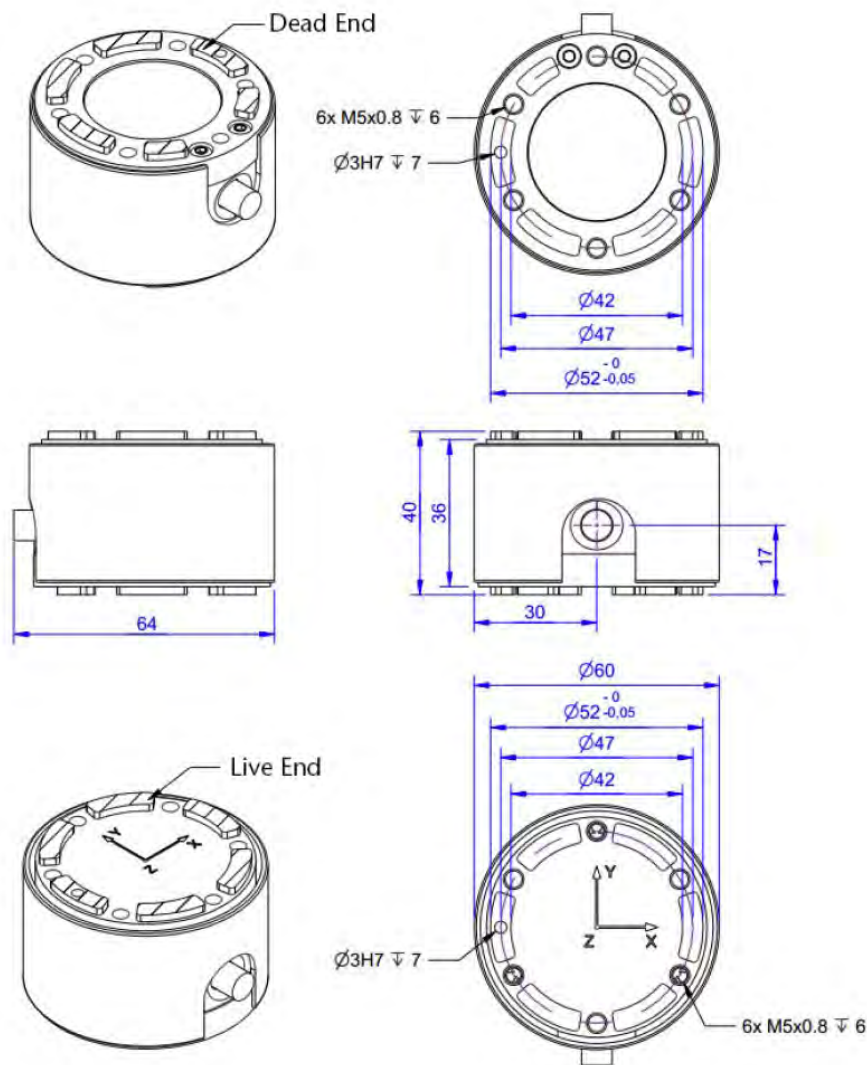


Model 6A40 6-Axis Load Cell

- Collision Detection
- "Teach-In"
- Presence or Error Detection
- Medical / Prosthetics / Orthopedics
- Gait Analysis
- Sports Medicine
- Comfort / Ergonomics

Standard Configuration

5 Meter Dual Cable with M16 24-Pin Connector & Mate



Dimensions in mm
Mechanical views are 1st-angle projection

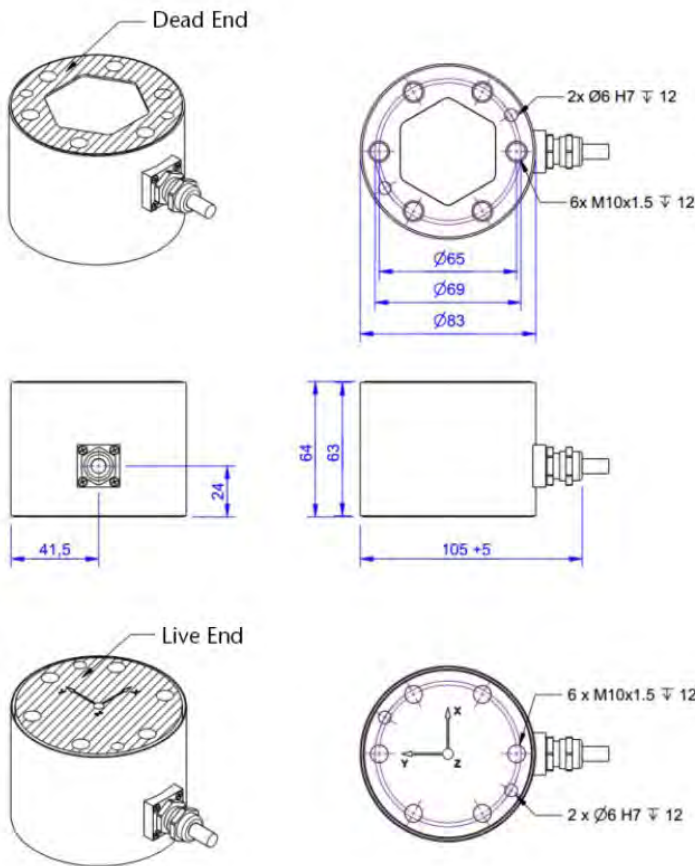


Model 6A68 6-Axis Load Cell

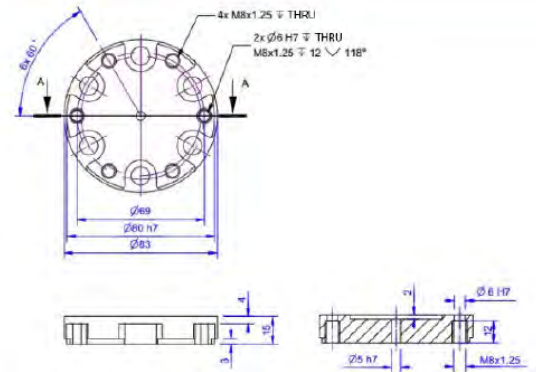
- Collision Detection
- "Teach-In"
- Presence or Error Detection
- Medical / Prosthetics / Orthopedics
- Gait Analysis
- Sports Medicine
- Comfort / Ergonomics

Standard Configuration

5 Meter Dual Cable with M16 24-Pin Connector & Mate



Adapter Plates



- Two Required Per Sensor
- Aluminum or Stainless Steel Depending on Capacity
- 6A68 Only

Dimensions in mm
Mechanical views are 1st-angle

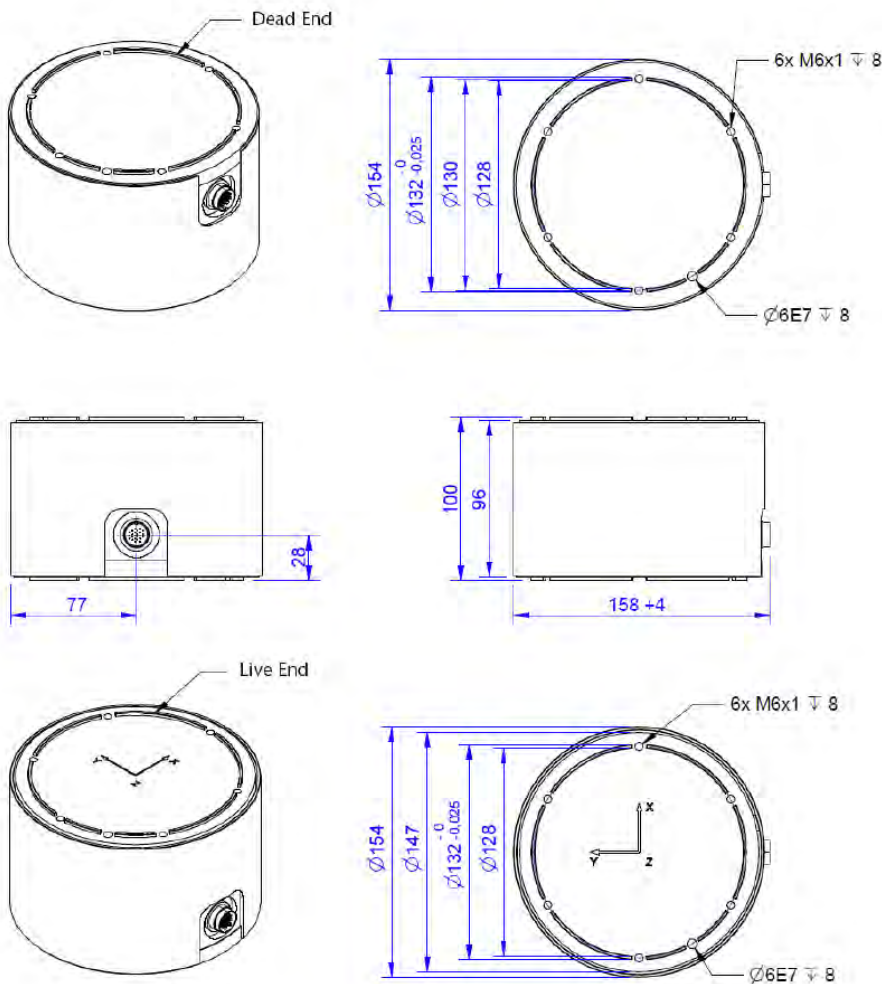


Model 6A154 6-Axis Load Cell

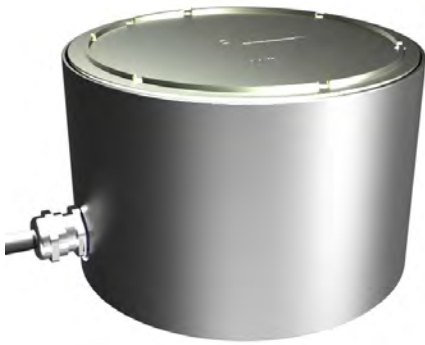
- Wind Tunnel Balances
- Combines Low Force with High Moment Capacity

Standard Configuration

5 Meter Dual Cable with M16 24-Pin Connector & Mate



Dimensions in mm
Mechanical views are 1st-angle projection

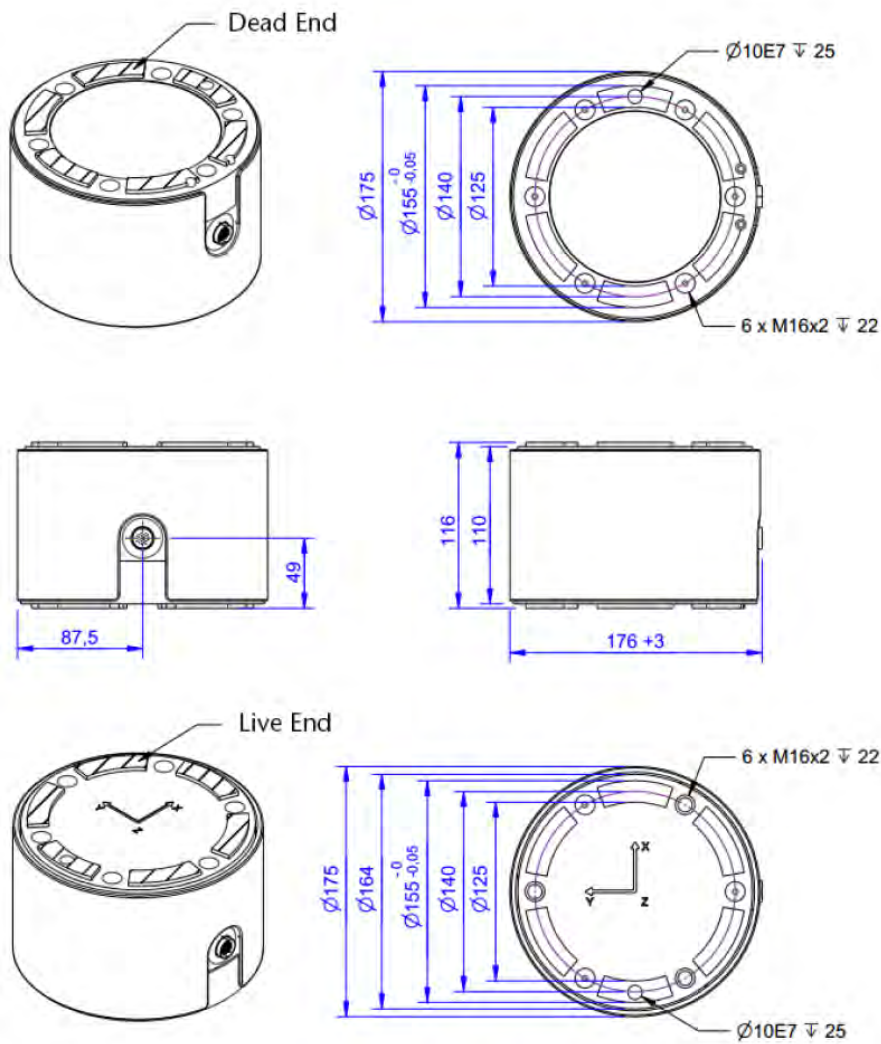


Model 6A175 6-Axis Load Cell

- Automation & Robotics
- Press Force
- Seismic Studies

Standard Configuration

3 Meter Dual Cable with M16 24-Pin Connector & Mate



Dimensions in mm
Mechanical views are 1st-angle projection

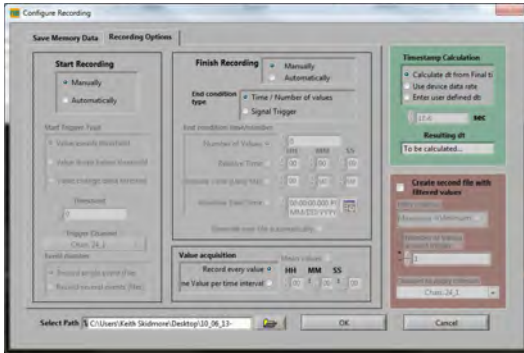
BSC8 Multi-Channel Amplifier



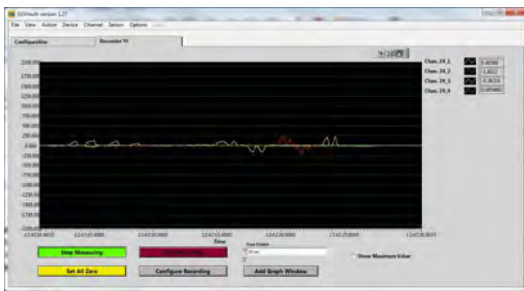
- 8-Channel
- 200K Samples/Sec
- 16-Bit Resolution
- USB Connection to PC
- Includes Graphic & Logging Software
- NI LabView Compatible
- Tare via Button or Software
- $\pm 5V$ Analog Outputs of Raw Data Only
- Software Calculates Force & Moment Values

Specifications

| | |
|--|----------------------------------|
| Input Range -mV/V | 2 (Optional 3.5) |
| Resolution | 16-Bit |
| Sample Rate | 200kHz |
| Analog Filter | 2.5kHz (250Hz or 10kHz Optional) |
| Excitation Voltage | 5V |
| Supply Voltage | 11VDC - 25VDC |
| Supply Current | 300mA |
| Operating Temperature- $^{\circ}C$ | -10 to 65 |
| Storage Temperature - $^{\circ}C$ | -20 to 65 |
| Temperature Effect On Zero- % / $10^{\circ}C$ | ± 0.0008 |
| Temperature Effect on Sensitivity- % / $10^{\circ}C$ | ± 0.0008 |
| Length | 75mm |
| Width | 38mm |
| Height | 45mm |
| Protection | 40IP |



Software Screen Shots



16-Channel System

Wiring Information for 6A Series 6-Axis Sensors.

| | Function | Single Cable | Dual Cable | Pin |
|------------|--------------|--------------|-------------|-----|
| CH1 | + Excitation | Red | Red | 1 |
| | - Excitation | Black | Black | 2 |
| | + Output | Green | Green | 3 |
| | - Output | White | White | 4 |
| | Function | Single Cable | Dual Cable | Pin |
| CH2 | + Excitation | Blue | Blue | 5 |
| | - Excitation | Yellow | Yellow | 6 |
| | + Output | Violet | Violet | 7 |
| | - Output | Gray | Gray | 8 |
| | Function | Single Cable | Dual Cable | Pin |
| CH3 | + Excitation | Orange | Orange | 9 |
| | - Excitation | Brown | Brown | 10 |
| | + Output | Pink | Pink | 11 |
| | - Output | Transparent | Transparent | 12 |

| | Function | Single Cable | Dual Cable | Pin |
|------------|--------------|---------------------|-------------|-----|
| CH4 | + Excitation | Green - Black | Green | 13 |
| | - Excitation | Black - White | Black | 14 |
| | + Output | Red - Black | Red | 15 |
| | - Output | White - Black | White | 16 |
| | Function | Single Cable | Dual Cable | Pin |
| CH5 | + Excitation | Purple - Black | Purple | 17 |
| | - Excitation | Yellow - Black | Yellow | 18 |
| | + Output | Blue - Black | Blue | 19 |
| | - Output | Gray - Black | Gray | 20 |
| | Function | Single Cable | Dual Cable | Pin |
| CH6 | + Excitation | Pink - Black | Pink | 21 |
| | - Excitation | Brown - Black | Brown | 22 |
| | + Output | Orange - Black | Orange | 23 |
| | - Output | Transparent - Black | Transparent | 24 |

Model 1516 Axial Torsion Load Cell

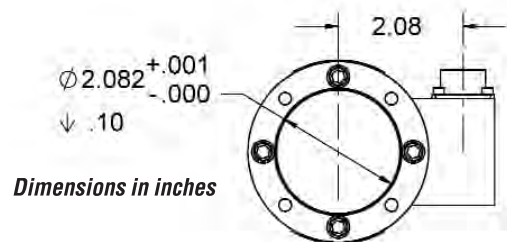
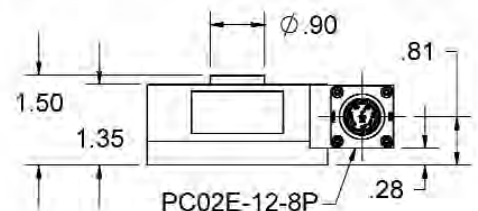
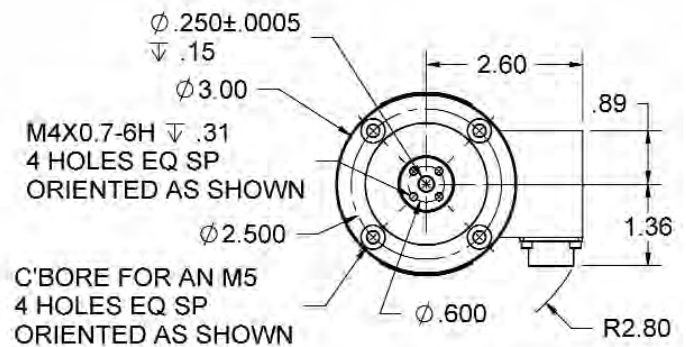
Why the Interface model 1516 Axial Torsion Load Cell is the best in class:

- Capacities 100 lb 50 lbf-in (Axial/Torsion)
- Axial force torque
- Minimal crosstalk
- Fatigue rated



SPECIFICATIONS

| ACCURACY | Axial Bridge A | Torsion Bridge B |
|---------------------------------|-------------------|---------------------|
| Nonlinearity-% FS | ±0.04 | ±0.05 |
| Hysteresis-% FS | ±0.04 | ±0.05 |
| Nonrepeatability-% RO | ±0.02 | ±0.05 |
| Creep, in 20 min-% | ±0.025 | ±0.025 |
| TEMPERATURE | | |
| Compensated Range-°F | 15 to 115 | 15 to 115 |
| Compensated Range-°C | -10 to 45 | -10 to 45 |
| Operating Range-°F | -65 to 200 | -65 to 200 |
| Operating Range-°C | -55 to 90 | -55 to 90 |
| Effect on Output-%/100°F - MAX | ±0.08 | ±0.08 |
| Effect on Zero-% RO/100°F - MAX | ±0.15 | ±0.15 |
| ELECTRICAL | | |
| Rated Output-mV/V (T & C) | +1.50 ±0.15 | -1.50 ±0.15 |
| Zero Balance-% RO - MAX | ±2.0 | ±2.0 |
| Input Resistance-Ohms | 700±7 | 700±7 |
| Output Resistance-Ohms | 700±7 | 700±7 |
| Excitation Voltage - VDC MAX | 20 | 20 |
| MECHANICAL | | |
| Calibration | T&C | CW & CCW |
| Safe Overload-% CAP - MAX | ±200 | ±200 |
| Ultimate Overload-% CAP - MAX | ±400 | ±400 |



Dimensions in inches

Model 2816 Axial Torsion Load Cell

- Measures load and torque simultaneously
- Minimal crosstalk
- Extraneous load resistance
- Fatigue rated

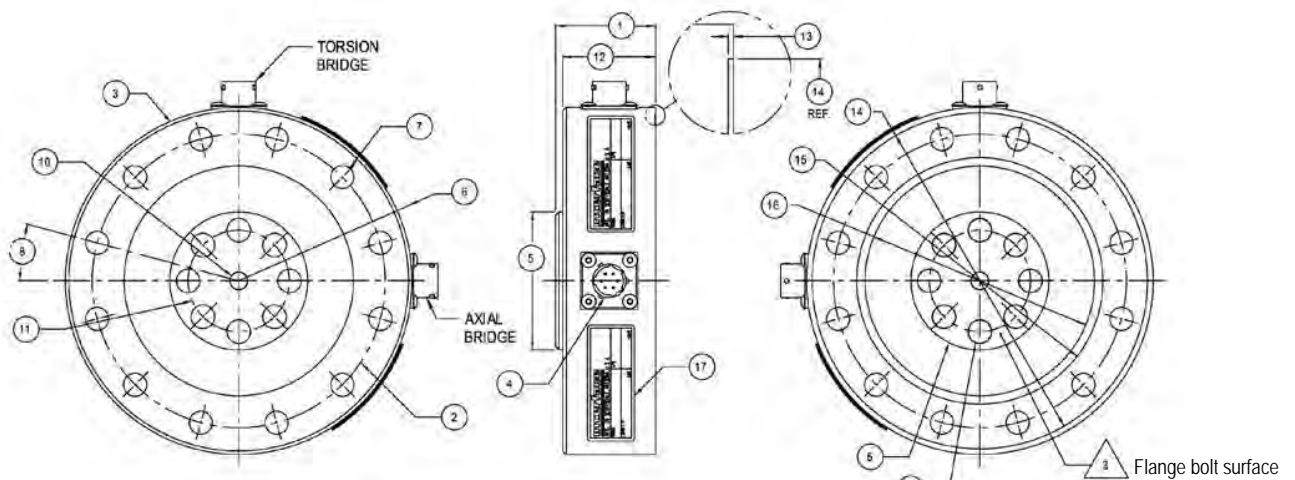


DIMENSIONS

| See Drawing | CAPACITY | |
|-------------|---|--------------------------------------|
| | (lbf) / (inch-lb) | (N) / (Nm) |
| | 3.3K/2K, 5K/3K 10K/6K, 15K/7.5K | 16K/220, 25K/340 45K/680, 63K/900 |
| | inch | mm |
| (1) | 1.75 | 44.4 |
| (2) | 5.12 | 130.18 |
| (3) | 6.06 | 153.9 |
| (4) | PT02E-10-6P | |
| (5) | 2.41 | 61.2 |
| (6) | 3.55 | 90.2 |
| (7) | 0.41 | 10.3 |
| (8) | 15° | |
| (9) | 0.41 (10.5) thru. C Sink Ø 0.46 (11.7) | |
| (10) | Ø 0.31 (7.8) thru. C Bore Ø 0.3155-3166 (8.014-8.042) ▽ 0.39 (10.0) This side only | |
| (11) | 1.772 | 45.00 |
| (12) | 1.62 | 41.3 |
| (13) | 0.015 | 0.38 |
| (14) | Ø 5.86 | 148.8 |
| (15) | Ø 4.30 | 109.2 |
| (16) | Ø 4.01 | 101.9 |
| (17) | Label | |

SPECIFICATIONS

| ACCURACY - (MAX ERROR) | Axial Bridge A | Axial Bridge B |
|--------------------------------|-----------------------|----------------|
| Nonlinearity - %FS | ±0.05 | ±0.07 |
| Hysteresis - %FS | ±0.05 | ±0.05 |
| Non-Repeatability - %RO | ±0.02 | ±0.05 |
| Creep, in 20 min - % | ±0.025 | ±0.025 |
| TEMPERATURE | | |
| Compensated Range - °F | 15 to 115 | 15 to 115 |
| Compensated Range - °C | -10 to 45 | -10 to 45 |
| Operating Range - °F | -65 to 200 | -65 to 200 |
| Operating Range - °C | -55 to 90 | -55 to 90 |
| Effect on Zero - % RO/°F - MAX | ±0.0015 | ±0.0015 |
| Effect on Zero - % RO/°C - MAX | ±0.0027 | ±0.0027 |
| Effect on Output - %/°F - MAX | ±0.0008 | ±0.0008 |
| Effect on Output - %/°C - MAX | ±0.0015 | ±0.0015 |
| ELECTRICAL | | |
| Rated Output-mV/V | +2.0 ±0.3 / -2.0 ±0.3 | |
| Zero Balance - % RO- MAX | ±2.0 | ±2.0 |
| Input Resistance-Ohms | 350±3.5 | 700±7 |
| Output Resistance-Ohms | 350±3.5 | 700±7 |
| Excitation Voltage-VDC MAX | 20 | 20 |
| MECHANICAL | | |
| Calibration | T&C | CW & CCW |
| Safe Overload - % CAP - MAX | ±200 | ±200 |
| Ultimate Overload - % CAP- MAX | ±400 | ±400 |





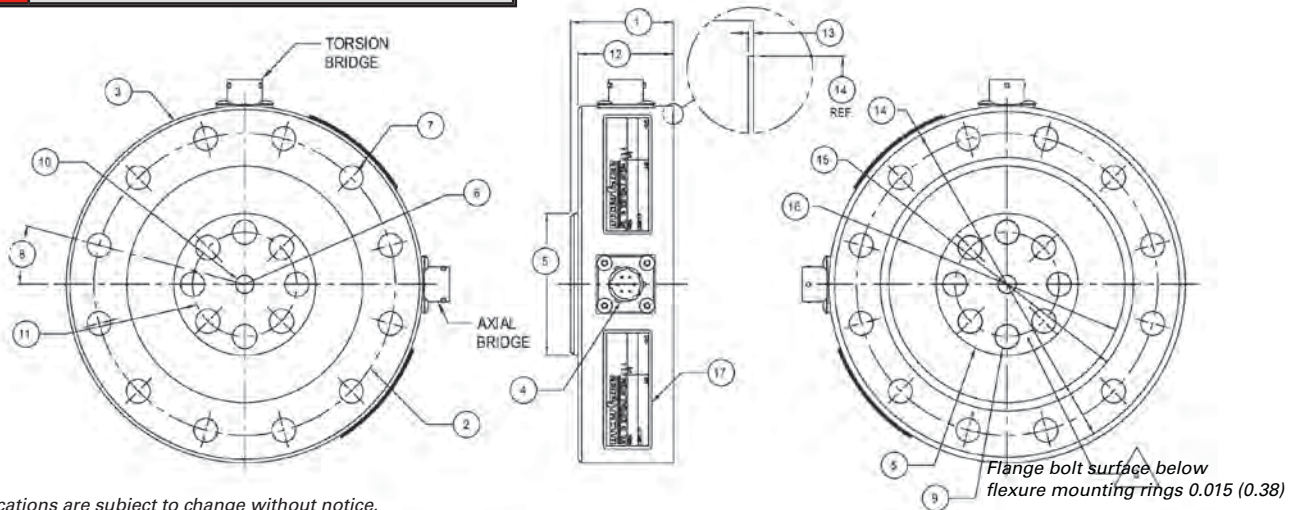
Model 2816 Axial Torsion Load Cell

- Measures load and torque simultaneously
- Minimal crosstalk
- Extraneous load resistance
- Fatigue rated

Specifications

| Model | 2816 | |
|------------|--|--|
| Capacity | U.S. (lbf) / (lb-in) | Metric (N) / (Nm) |
| | 3.3K / 2K, 5K / 3K, 10K/6K, & 15K/7.5K | 16K / 220, 25K / 340, 45K / 680, & 63K / 900 |
| Dimensions | U.S. (Inch) | Metric (mm) |
| | 1 | 44.5 |
| 2 | 130.18 | |
| 3 | 153.9 | |
| 4 | PT02E-10-6P | |
| 5 | 61.2 | |
| 6 | 90.2 | |
| 7 | 10.31 | |
| 8 | 15° | |
| 9 | 0.41 (10.5) thru, C'Sink Ø0.46 (11.7) | |
| 10 | Ø0.31 (7.8) thru, C'Bore Ø0.3155-0.3166 (8.014-8.042) IØ0.39 (10.0) This side only | |
| 11 | 45.00 | |
| 12 | 41.3 | |
| 13 | 0.38 | |
| 14 | Ø148.8 | |
| 15 | Ø109.2 | |
| 16 | Ø101.9 | |
| 17 | Label | |

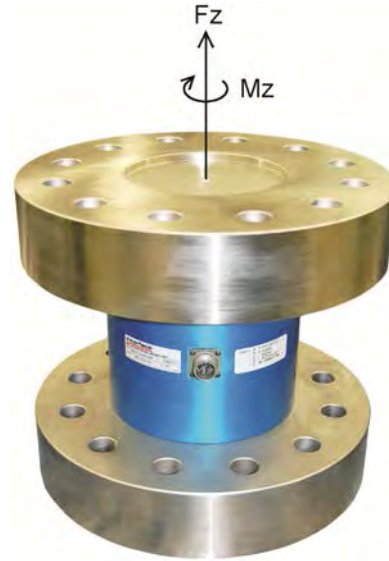
| Model | 2816 | |
|---|------------------------|----------|
| Axial Bridge | A | B |
| Accuracy - (Max Error) | | |
| Nonlinearity - %FS - Max | ±0.05 | ±0.07 |
| Hysteresis - %FS - Max | ±0.05 | ±0.05 |
| Nonrepeatability - %RO - Max | ±0.02 | ±0.05 |
| Creep, 20 Minutes - % - Max | ±0.025 | ±0.025 |
| Temperature | | |
| Compensated Range - °F (°C) | 15 to 115 (-10 to 45) | |
| Operating Range - °F (°C) | -65 to 200 (-55 to 90) | |
| Effect on Zero - %RO / 100°F (°C) - Max | ±0.0015 (±0.0027) | |
| Effect on Output - % / 100°F (°C) - Max | ±0.0008 (±0.0015) | |
| Electrical | | |
| Rated Output -mV/V (Nominal) | ±2.00 ±0.03 | |
| Zero Balance - %RO - Max | ±2.0 | |
| Input Resistance -Ω | 350 ±3.5 | 700 ±7 |
| Output Resistance -Ω | 350 ±3.5 | 700 ±7 |
| Excitation - VDC - Max | 20 | |
| Mechanical | | |
| Calibration | T&C | CW & CCW |
| Safe overload - %CAP - Max | ±200 | |
| Ultimate Overload - %CAP - Max | ±400 | |



Specifications are subject to change without notice.

Model 5600 Axial Torsion Force Transducer

- Capacities from 6K lbf / 5K lb-in to 180K lbf / 300K lb-in
- Measures force and torque
- Low cross talk
- High stiffness
- Extraneous load resistance



SPECIFICATIONS

| PARAMETERS | MODEL | | | | | | | | | |
|-----------------------------------|----------------|---------------|----------------|----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| | 5610 - 5K | | 5611 - 20K | | 5612 - 100K | | 5613 - 200K | | 5614 - 300K | |
| | Fz | Mz | Fz | Mz | Fz | Mz | Fz | Mz | Fz | Mz |
| CAPACITY | 6K (lbf) | 5K (lb-in) | 30K (lbf) | 20K (lb-in) | 100K (lbf) | 100K (lb-in) | 150K (lbf) | 200K (lb-in) | 180K (lbf) | 300K (lb-in) |
| | 27 (kN) | 560 (Nm) | 130 (kN) | 2200 (Nm) | 450 (kN) | 11000 (Nm) | 670 (kN) | 22000 (Nm) | 800 (kN) | 33000 (Nm) |
| ACCURACY - (MAX ERROR) | | | | | | | | | | |
| Nonlinearity-% FS | ±0.1 | | ±0.1 | | ±0.1 | | ±0.1 | | ±0.1 | |
| Hysteresis-% FS | ±0.1 | | ±0.1 | | ±0.1 | | ±0.1 | | ±0.1 | |
| Nonrepeatability-% RO | ±0.02 | | ±0.02 | | ±0.02 | | ±0.02 | | ±0.02 | |
| TEMPERATURE | | | | | | | | | | |
| Compensated Range-°F | +70 to +170 | | +70 to +170 | | +70 to +170 | | +70 to +170 | | +70 to +170 | |
| Compensated Range-°C | +21 to +77 | | +21 to +77 | | +21 to +77 | | +21 to +77 | | +21 to +77 | |
| Operating Range-°F | -65 to +200 | | -65 to +200 | | -65 to +200 | | -65 to +200 | | -65 to +200 | |
| Operating Range-°C | -54 to +93 | | -54 to +93 | | -54 to +93 | | -54 to +93 | | -54 to +93 | |
| Effect on Zero-%RO/°F-MAX | ±0.004 | ±0.002 | ±0.004 | ±0.002 | ±0.004 | ±0.002 | ±0.004 | ±0.002 | ±0.004 | ±0.002 |
| Effect on Zero-%RO/°C-MAX | ±0.007 | ±0.004 | ±0.007 | ±0.004 | ±0.007 | ±0.004 | ±0.007 | ±0.004 | ±0.007 | ±0.004 |
| Effect on Output-%/°F-MAX | ±0.002 | | ±0.002 | | ±0.002 | | ±0.002 | | ±0.002 | |
| Effect on Output-%/°C-MAX | ±0.004 | | ±0.004 | | ±0.004 | | ±0.004 | | ±0.004 | |
| ELECTRICAL | | | | | | | | | | |
| Rated Output-mV/V (Nominal) | .25 | 2.0 | .50 | 2.0 | .50 | 2.0 | .50 | 2.0 | .50 | 2.0 |
| Excitation Voltage-VDC MAX | 20 | | 20 | | 20 | | 20 | | 20 | |
| Bridge Resistance-Ohm (Nominal) | 350 | | 350 | | 350 | | 350 | | 350 | |
| Electrical Connection | MS3102E-14S-5P | | MS3102E-14S-5P | | MS3102E-14S-5P | | MS3102E-14S-5P | | MS3102E-14S-5P | |
| MECHANICAL | | | | | | | | | | |
| Safe Overload-% CAP | ±150 | | ±150 | | ±150 | | ±150 | | ±150 | |
| Deflection at Capacity-(inch/rad) | 0.001 | 0.005 | 0.001 | 0.004 | 0.002 | 0.005 | 0.002 | 0.006 | 0.002 | 0.005 |
| Overhung Moment-lb-in MAX | 2 | | 10 | | 50 | | 90 | | 200 | |
| Side load-lbf MAX | 2K | | 7K | | 20K | | 30K | | 55K | |



Model TXY

Model TXY Multi-axis Load Cell

- Measures X & Y Forces
- Linearity 0.1%
- Low Cross Talk - <1.0%
- 3-Axis Version Available

Specifications

| Model | TXY |
|-------------------------------------|---------------|
| Performance | |
| Side Force Capacity - lbf | 500 |
| Radial Force Capacity - lbf | 1K, 1.5K, 2K |
| Rated Output - mV/V | 2 ±0.25% |
| Nonlinearity - %FS | ±0.1 |
| Hysteresis - %FS | ±0.1 |
| Nonrepeatability - %RO (Max) | ±0.05% |
| Temperature Effect on Zero - %RO/°F | ±0.002 |
| Temperature Effect on Output - %/°F | ±0.002 |
| Excitation Voltage, MAX - VDC | 20VDC |
| Zero Balance - %RO | ±1 |
| Input Resistance | 350 Ω |
| Output Resistance - Nominal | 350 Ω (±3%) |
| Insulation Resistance (50VDC) | 5000 MΩ |
| Compensated Temperature Range | 70°F – 170°F |
| Operating Temperature Range | -65°F – 200°F |
| Safe Overload - %CAP | 150% |
| Load Cell Material | Alloy Steel |

Accessories

CT-139-10

- Interconnect Cable (1600 Type)

CT-142-10

- Interconnect Cable (1000 Type)

CT-154-10

- Interconnect Cable (Pigtails)

DA-101

- Digital-Analog Board, Used with Automated Systems (Consult Factory)

Model AT101 Axial Torsion Force & Torque Transducer

- Capacities: Force (kN) / Torque (Nm) - 0.5/5, 1/10, 1/30; 20/20, 0.5/50, 2/50
- Measures force & torque in one package
- 8 mm thru-hole



OPTIONS

Internal Shunt Resistor – 100% output

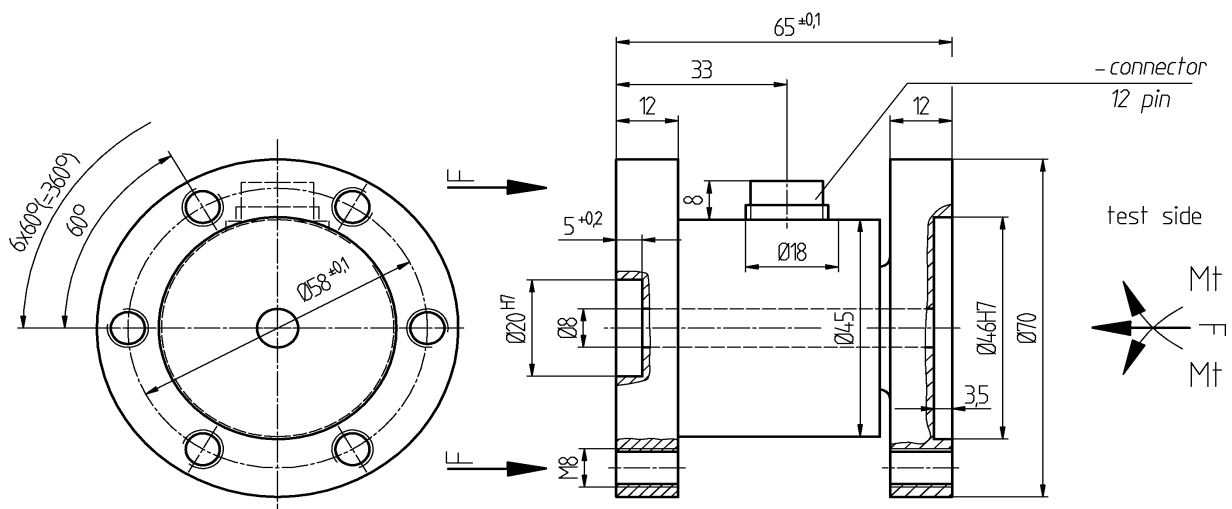
CAPACITIES

| MODEL | FORCE | TORQUE |
|----------------|--------|--------|
| AT101 - 0.5/5 | 0.5 kN | 5 Nm |
| AT101 - 1/10 | 1 kN | 10 Nm |
| AT101 - 1/30 | 1 kN | 30 Nm |
| AT101 - 20/20 | 20 kN | 20 Nm |
| AT101 - 0.5/50 | 0.5 kN | 50 Nm |
| AT101 - 2/50 | 2 kN | 50 Nm |

SPECIFICATIONS

| ACCURACY – (MAX ERROR) | |
|----------------------------------|---------------|
| Nonlinearity – Torque - %FS | +/-0.2 |
| Hysteresis – Torque - %FS | +/-0.2 |
| Nonlinearity – Torque - %FS | +/-0.3 |
| Hysteresis – Torque - %FS | +/-0.3 |
| Hysteresis - %FS | +/-0.2 |
| Nonrepeatability - % RO | +/-0.1 |
| Cross talk - % | <1% |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.02 |
| Compensated Range - °C | -5 to +45 |
| Operating Range - °C | -15 to +55 |
| ELECTRICAL | |
| Output – mV/V | 1 |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Torque - Ohm | 350 |
| Bridge Resistance – Force - Ohm | 700 |
| Electrical Connection | 12-pin Binder |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| IP Rating | 50 |

DIMENSIONS



Model AT102 Axial Torsion Force & Torque Transducer

- Capacity 10 kN (force) / 10 Nm (torque)
- Compact design
- Side cable exit



OPTIONS

Internal Shunt Resistor – 100% output

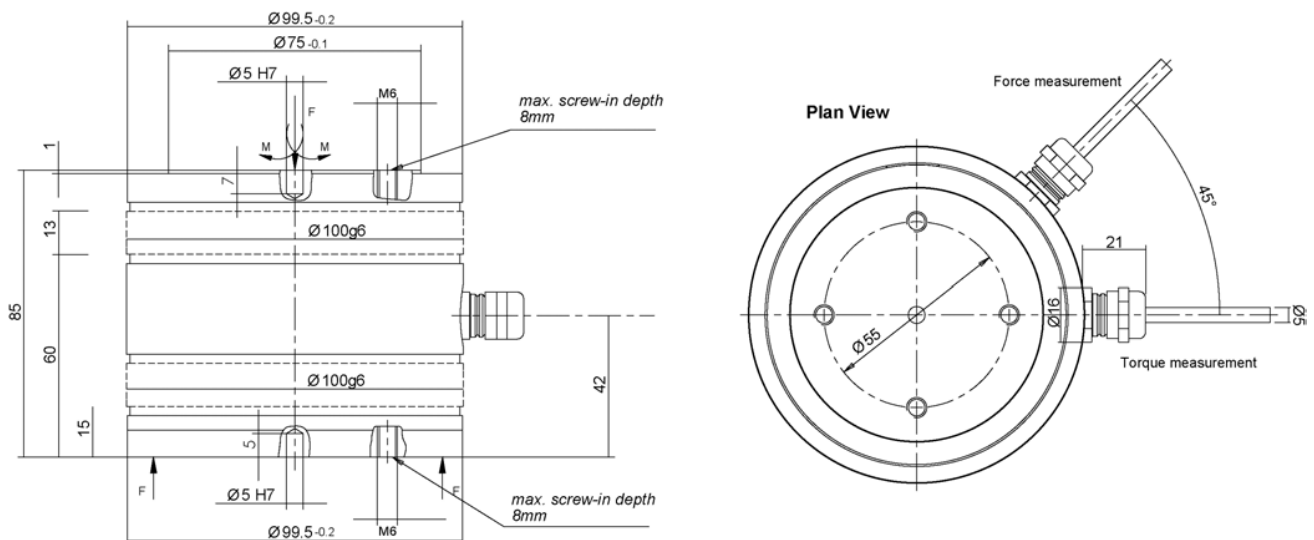
CAPACITIES

| MODEL | FORCE | TORQUE |
|------------|-------|--------|
| AT102-10kN | 10 kN | 10 Nm |

SPECIFICATIONS

| | |
|-------------------------------|--------------------------|
| ACCURACY – (MAX ERROR) | |
| Nonlinearity – Torque - %FS | +/-0.2 |
| Hysteresis – Torque - %FS | +/-0.2 |
| Nonrepeatability - % RO | +/-0.08 |
| Creep, in 30 min - % | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.02 |
| Compensated Range - °C | -10 to +50 |
| Operating Range - °C | -30 to +80 |
| ELECTRICAL | |
| Output – mV/V | 1+/-15% |
| Excitation Voltage – VDC | 2-12 |
| Bridge Resistance – Ohm | 350 |
| Electrical Connection | 2 cables (3 meters each) |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| IP Rating | 40 |

DIMENSIONS



Model AT103 Axial Torsion Force & Torque Transducer

- Capacities: Force (kN) / Torque (Nm) - 10/10, 20/20
- Compact design
- Bottom cable exit



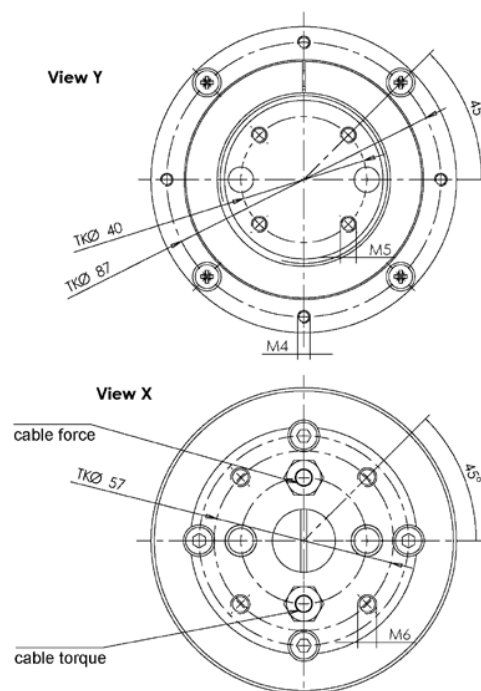
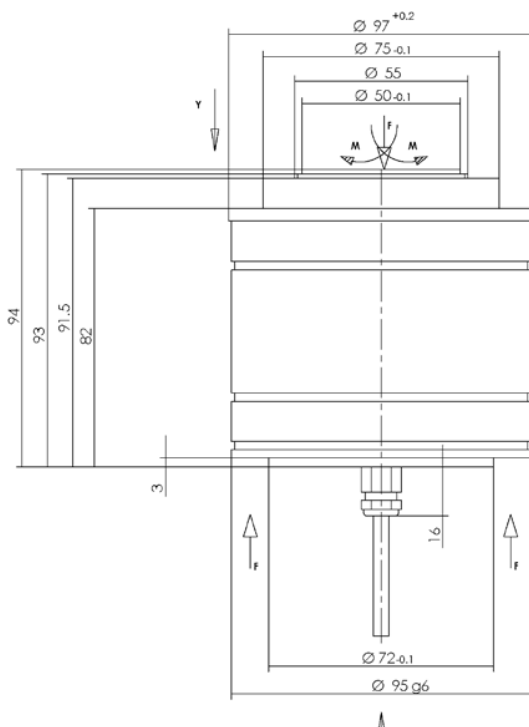
CAPACITIES

| MODEL | FORCE | TORQUE |
|------------|-------|--------|
| AT103-10kN | 10 kN | 10 Nm |
| AT103-20kN | 20 kN | 20 Nm |

SPECIFICATIONS

| | |
|-------------------------------|--------------------------|
| ACCURACY - (MAX ERROR) | |
| Nonlinearity - Torque - %FS | +/-0.2 |
| Hysteresis - Torque - %FS | +/-0.2 |
| Nonrepeatability - % RO | +/-0.08 |
| Creep, in 30 min - % | +/-0.1 |
| TEMPERATURE | |
| Effect on Zero - % RO/°C | +/-0.02 |
| Effect on Output - %/°C | +/-0.02 |
| Compensated Range - °C | 0 to +100 |
| Operating Range - °C | -30 to +120 |
| ELECTRICAL | |
| Output - mV/V | 1+/-0.5% |
| Excitation Voltage - VDC | 2-12 |
| Bridge Resistance - Ohm | 350 |
| Electrical Connection | 2 cables (3 meters each) |
| MECHANICAL | |
| Safe Overload - % RO | 150 |
| IP Rating | 40 |

DIMENSIONS





OPTIONS & ACCESSORIES

interface

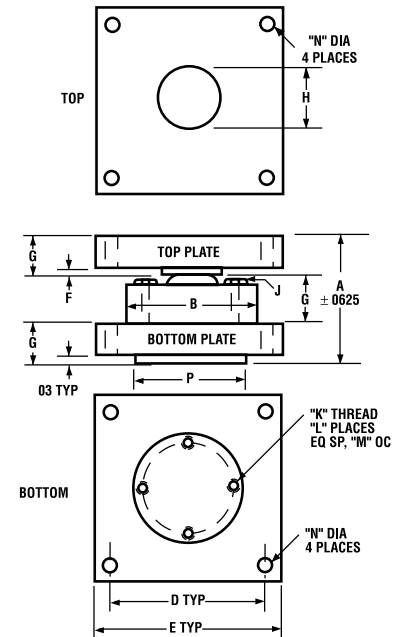
ADVANCED FORCE MEASUREMENT

Accessories

Mounting Plates for Low Profile™ Load Cells

The installation of a compression load cell under a weigh bridge, tank, or other structure normally requires that mounting plates be used. The bottom plate, ground flat to 0.0002 T.I.R. to mate with the load cell and fabricated of mild steel, distributes the load over the foundation or supporting structure and provides a prepared surface for the load cell.

The top plate distributes the load to the weighing structure and provides a hard (R_c45) surface for the load button. The top plate will move on the button due to thermal expansion, load shifting, wind loading, and other side loads. The high side load capacity of the INTERFACE load cell eliminates the requirement for expansion assemblies in most installations. Mounting plates are suitable for compression loads only; they will not properly support a universal load cell used in tension.



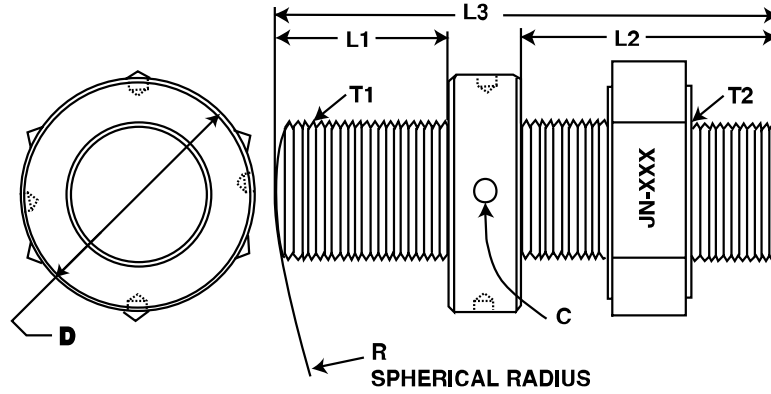
| P/N | L/C RANGE | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
|-----------------|-----------|------|------|------|-----|----|-----|------|------|------------------|---------|----|------|-----|------|
| TP-101, BP-101 | 1K, 2K | 3.62 | 4.12 | 1.37 | 5.0 | 6 | .25 | 1.12 | 2.00 | 1/4-20 X 1-1/2 | 1/4-20 | 8 | 3.50 | .56 | 3.00 |
| TP-101, BP-108 | 5K, 10K | 3.62 | 4.12 | 1.37 | 5.0 | 6 | .25 | 1.12 | 2.00 | 1/4-20 X 1-1/2 | 1/4-20 | 8 | 3.50 | .56 | 3.00 |
| TP-102, BP-102 | 25K, 50K | 4.25 | 4.75 | 4.75 | 5.5 | 7 | .25 | 1.25 | 2.25 | 5/16-18 X 2 | 5/16-18 | 4 | 4.00 | .69 | 3.50 |
| TP-103, BP-103 | 100K | 5.25 | 7.50 | 2.25 | 6.5 | 8 | .25 | 1.50 | 2.75 | 7/16-20 X 2 -1/2 | 7/16-20 | 12 | 6.25 | .69 | 4.00 |
| TP-104, BP-104 | 200K | 8.25 | 8.25 | 3.25 | 8.0 | 10 | .37 | 2.50 | 4.00 | 5/8-11 X 3 3/4 | 5/8-11 | 12 | 6.75 | .69 | 8.25 |
| *TP-301, BP-308 | 5K, 10K | 3.49 | 4.12 | 1.37 | 5.0 | 6 | .12 | 1.12 | 1.9 | 1/4-20 X 1-1/2 | 1/4-20 | 8 | 3.50 | .56 | 3.00 |
| *TP-302, BP-302 | 25K, 50K | 4.25 | 4.75 | 1.75 | 5.5 | 7 | .25 | 1.25 | 1.9 | 5/16-18 X 2 | 5/16-18 | 4 | 4.00 | .69 | 3.50 |
| *TP-303, BP-303 | 100K | 5.25 | 7.50 | 2.25 | 6.5 | 8 | .25 | 1.50 | 1.9 | 7/16-20 X 2-1/2 | 7/16-20 | 12 | 6.25 | .69 | 4.0 |

*STAINLESS STEEL

Add the dash number after the basic part number of bottom plate to specify exact configuration of the plate and type of mounting screws supplied in the kit.

| DASH # | DESCRIPTION | PAD | USAGE |
|--------|---|-----|-------------------------------|
| -3 | Single threaded stud in center | No | Load cell with base installed |
| -11 | Tapped holes and hex head cap screws | Yes | Uncounterbored load cell |
| -12 | Tapped holes and socket head cap screws | Yes | Counterbored load cell |
| -21 | Tapped holes and hex head cap screws | No | Uncounterbored load cell |
| -22 | Tapped holes and socket head cap screws | No | Counterbored load cell |

Calibration Adapters



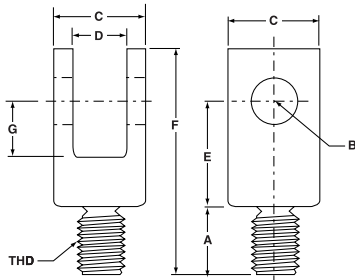
CALIBRATION ADAPTERS

| Model | Jam Nut Included | Size T1 to T2 | Application | Dimensions in Inches | | | | | |
|----------------|------------------|----------------------|---------------|----------------------|---------|---------|--------|---------|----|
| | | | | C | D | L1 | L2 | L3 | R |
| CA-101 | JN-103 | 5/8-18 to 5/8-18 | 1X10 to 10K | 1/4 | 1 1/4 | 3/4 | 1 9/16 | 2 13/16 | 6 |
| CA-102 | JN-105 | 1 1/4-12 to 1 1/4-12 | 1X20 to 50K | 1/4 | 2 | 1 1/2 | 2 7/16 | 4 3/16 | 6 |
| CA-103 | JN-106 | 1 3/4-12 to 1 3/4-12 | 1X32 to 100K | 1/4 | 3 | 2 | 3 1/8 | 6 | 12 |
| CA-105 | JN-106 | 1 3/4-12 to 2 3/4-8 | 1X32 to 100K | 1/4 | 3 1/2 | 2 | 4 7/8 | 7 3/8 | 12 |
| CA-104 | JN-107 | 2 3/4-8 to 2 3/4-8 | 1X40 to 200K | 5/16 | 3 1/2 | 2 1/2 | 4 7/8 | 8 1/8 | 12 |
| Metrics | | | | | | | | | |
| CA-201 | JN-203 | M16 x 2 to M16 x 2 | 1X10 to 50kN | 1/4 | 1 1/4 | 3/4 | 1 9/16 | 2 13/16 | 6 |
| CA-202 | JN-205 | M33 x 2 to M33 x 2 | 1X20 to 250kN | 1/4 | 2 | 1 1/2 | 2 7/16 | 4 3/16 | 6 |
| CA-203 | JN-206 | M42 x 2 to M42 x 2 | 1X32 to 450kN | 5/16 | 2 15/16 | 1 13/16 | 3 3/16 | 5 3/4 | 12 |
| CA-204 | JN-207 | M72 x 2 to M72 x 2 | 1X40 to 900kN | 5/16 | 4 1/4 | 2 3/4 | 4 3/4 | 8 1/4 | 12 |

Material: Heat treated steel.

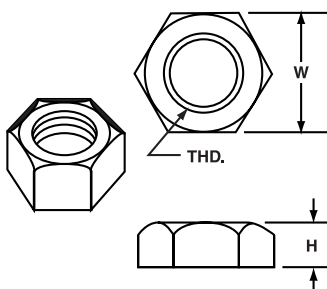
Note: X refers to Low Profile™ Load Cell model numbers. For example, 1X10 could be 1010, 1110 or 1210.

Clevises



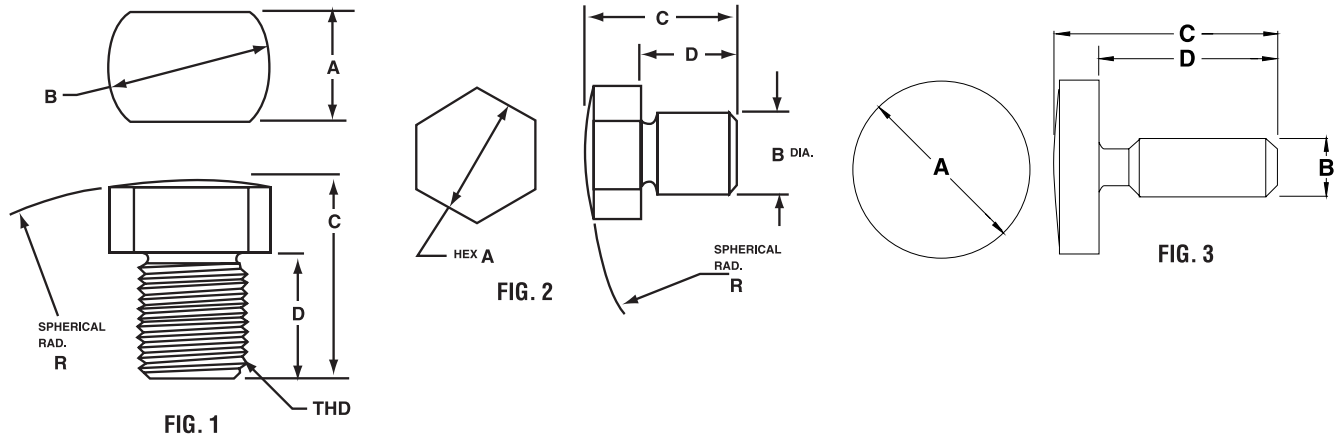
| CLEVISES | | | | | | | | | | |
|----------|------------|----------|------------------------------------|----------------------|-------------|-------|-------------|-------|--------|-------|
| MODEL | MATERIAL | THD | APPLICATION | DIMENSIONS IN INCHES | | | | | | |
| | | | | A | B | C | D | E | F | G |
| CLV-104 | ALUMINUM | 1/4-28 | SM-10 THRU 250 SSM-50 THRU 250 | 5/16 | .251 ±.001 | 3/4 | .377 ±.001 | 3/4 | 1 7/16 | 7/16 |
| CLV-105 | ALUMINUM | 1/2-20 | SM-500,1000 SSM-500 THRU 1000 | 1/2 | .501 ±.001 | 1 1/2 | .627 ±.001 | 1 1/2 | 2 3/4 | 3/4 |
| CLV-106 | H.T. STEEL | 1/2-20 | SSM-2000,3000 | 9/16 | .501 ±.001 | 1 | .627 ±.001 | 1 1/2 | 2 7/16 | 3/4 |
| CLV-101 | H.T. STEEL | 5/8-18 | 1110 & 1210-300 THRU 10K,SSM-5K | 7/8 | .626 ±.001 | 1 1/4 | .752 ±.002 | 1 1/2 | 3 1/8 | 7/8 |
| CLV-102 | H.T. STEEL | 1 1/4-12 | 1120 & 1220-25K, 50K | 1 3/8 | 1.001 ±.001 | 2 1/2 | 1.380 ±.002 | 2 7/8 | 5 3/4 | 1 5/8 |

Jam Nuts



| JAM NUTS (Heat treated Steel Grade 8) | | | |
|---------------------------------------|----------|----------------------|-------|
| MODEL | THD | DIMENSIONS IN INCHES | |
| | | H | W |
| JN-101 | 1/4-28 | 5/32 | 7/16 |
| JN-102 | 1/2-20 | 5/16 | 3/4 |
| JN-103 | 5/8-18 | 3/8 | 15/16 |
| JN-104 | 3/4-16 | 27/64 | 1 1/8 |
| JN-105 | 1 1/4-12 | 23/32 | 1 7/8 |
| JN-106 | 1 3/4-12 | 1 | 2 3/4 |
| JN-107 | 2 3/4-8 | 1 1/2 | 4 1/4 |
| DIMENSIONS IN MILLIMETERS | | | |
| JN-201 | M6X1 | 3 | 10 |
| JN-202 | M12X1.75 | 6 | 19 |
| JN-203 | M16X2 | 8 | 24 |
| JN-204 | M27x2 | 14 | 48 |
| JN-205 | M33X2 | 16 | 48 |
| JN-206 | M42X2 | 20 | 70 |
| JN-207 | M72X2 | 35 | 110 |

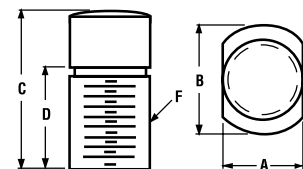
Load Buttons



| LOAD BUTTONS | | | | | | | | | |
|--------------|------------|----------|------------------------------------|----------------------|--------|--------|-------|----|-----|
| MODEL | MATERIAL | THD/DIA | APPLICATION | DIMENSIONS IN INCHES | | | | | |
| | | | | A | B | C | D | R | FIG |
| LB-106 | H.T. STEEL | 1/4-28 | SM-10 THRU 250, SSM-50 THRU 250 | 7/16 | 1/2 | 5/8 | 1/2 | 2 | 1 |
| LB-109 | H.T. STEEL | 1/2-20 | SM-500, 1000 SSM-500 THRU 3000 | 15/16 | 1 1/16 | 1 5/16 | 1 | 4 | 1 |
| LB-110 | H.T. STEEL | 5/8-18 | SSM-5000 | 15/16 | 1 1/16 | 1 5/16 | 1 | 4 | 1 |
| LB-101 | H.T. STEEL | 5/8-18 | 1110 & 1210-300 THRU 10K | 15/16 | 1 1/16 | 1 9/32 | 1 | 4 | 1 |
| LB-102 | H.T. STEEL | 1 1/4-12 | 1120 & 1220-25K, 50K | 1 1/2 | 1 3/4 | 1 9/16 | 11/16 | 6 | 1 |
| LB-103 | H.T. STEEL | 1 3/4-12 | 1132 & 1232-100K | 2 1/8 | 2 1/2 | 3 3/4 | 2 1/8 | 12 | 1 |
| LB-104 | H.T. STEEL | 2 3/4-8 | 1140 & 1240-200K | 3 1/2 | 4 | 5 | 3 1/8 | 12 | 1 |
| LB-111 | H.T. STEEL | .395 | SSB-500, 1000 | 3/4 | .395 | 3/4 | 1/2 | 4 | 2 |
| LB-114 | H.T. STEEL | 0.169 | MB-All, SSB-50 thru 250 | 0.50 | 0.169 | 0.63 | 0.50 | 2 | 3 |
| METRIC SIZES | | | | | | | | | |
| LB-101M | H.T. STEEL | M16x2 | 1110 & 1210-5kN TO 50kN | 15/16 | 1 1/16 | 1 9/32 | 1 | 4 | 1 |
| LB-102M | H.T. STEEL | M33x2 | 1120 & 1220-100kN, 250kN | 1 1/2 | 1 3/4 | 1 9/16 | 11/16 | 6 | 1 |
| LB-103M | H.T. STEEL | M42x2 | 1132 & 1232-450kN | 2 1/8 | 2 1/2 | 3 3/4 | 2 1/8 | 12 | 1 |
| LB-104M | H.T. STEEL | M72x2 | 1140 & 1240-900kN | 3 1/2 | 4 | 5 | 3 1/8 | 12 | 1 |

A load button may be installed in an INTERFACE universal load cell if it is used as a compression cell with the load applied by a plate or other flat surface.

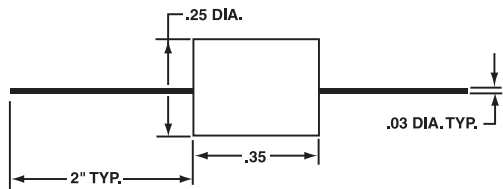
For compression applications only, an INTERFACE compression load cell should usually be specified. Compression load cells are usually smaller, less expensive and have an integral load button.



| P/N | A | B | C | D | F |
|------------|------|------|------|------|-------------------------|
| LB-101 (M) | 0.94 | 1.06 | 1.25 | 1.00 | 5/8-18 UNF-3A (M16x2) |
| LB-102 (M) | 1.25 | 1.75 | 1.56 | 0.69 | 1 1/4-12 UNF-3A (M32x2) |
| LB-103 (M) | 1.75 | 2.50 | 3.75 | 2.12 | 1 3/4-12 UNF-3A (M42x2) |
| LB-104 (M) | 2.75 | 4.00 | 5.00 | 3.12 | 2 3/4-8 UNF-3A (M72x2) |

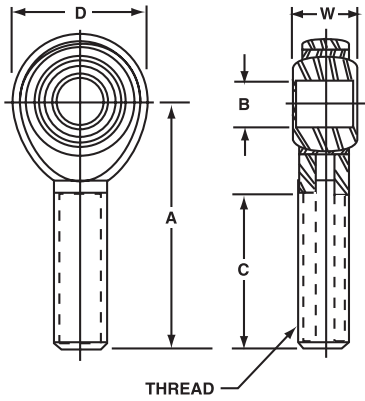
(M) suffix for metric threads

RCAL Resistors



| RCAL RESISTORS | | |
|----------------|-------------------|------------------|
| MODEL | RESISTANCE (Kohm) | APPLICATION |
| RS-100-30K | 30 ±0.01% | 4mV/V Load Cells |
| RS-100-40K | 40 ±0.01% | 3mV/V Load Cells |
| RS-100-60K | 60 ±0.01% | 2mV/V Load Cells |
| RS-100-120K | 120 ±0.01% | 1mV/V Load Cells |

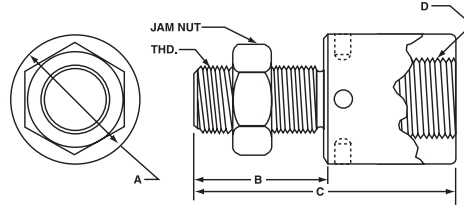
Rod End Bearings



| ROD END BEARINGS | | | | | | | | |
|------------------|----------|---|------------------|----------------------|-------|---------|--------|--------|
| MODEL | THD | APPLICATION | JAM NUT INCLUDED | DIMENSIONS IN INCHES | | | | |
| | | | | B | W | C | D | A |
| REB-104 | 1/4-28 | SM-10 THRU 250, SSM-50 THRU 250 | JN-101 | 1/4 | 3/8 | 1 | 3/4 | 1 9/16 |
| REB-106 | 1/2-20 | SM-500, 1000, SSM-500, 1000 SSM-2000, & 3000 | JN-102 | 1/2 | 5/8 | 1 1/2 | 1 5/16 | 2 7/16 |
| REB-101 | 5/8-18 | 1110 & 1210-300 THRU 10K, SSM-5K | JN-103 | 5/8 | 3/4 | 1 5/8 | 1 1/2 | 2 5/8 |
| REB-102 | 1 1/4-12 | 1120 & 1220-25K, 50K | JN-105 | 1 | 1 3/8 | 2 11/32 | 2 3/4 | 4 1/8 |

NOTE: When connecting a ROD END BEARING directly to a LOAD CELL, use of the JAM NUT is recommended.

Thread Adaptors



| THREAD ADAPTORS | | | | | | | |
|-----------------|------------------|----------------------|-------------------------|----------------------|------|------|---------------|
| MODEL | JAM NUT INCLUDED | SIZE MALE to FEMALE | APPLICATION | DIMENSIONS IN INCHES | | | |
| | | | | A | B | C | D |
| TA-102 | N/A | 1/4-28 to 1/2-20 | SM & SSM TO 250 | 0.75 | 0.38 | 1.50 | 1/2-20x.63 |
| TA-103 | N/A | 1/4-28 to 3/8-24 | SM & SSM TO 250 | 0.75 | 0.38 | 1.50 | 3/8-24x.50 |
| TA-106 | N/A | 1/4-28 to 5/8-18 | SM & SSM TO 250 | 1.19 | 0.44 | 1.56 | 5/8-18x.63 |
| THD-101 | JN-103 | 5/8-18 to 1/2-20 | LOW PROFILES TO 10K | 1.25 | 1.75 | 3.19 | 1/2-20x.50 |
| THD-112 | JN-103 | 5/8-18 to 1-14 | LOW PROFILES TO 10K | 1.62 | 1.75 | 4.56 | 1-14x1.25 |
| THD-153 | JN-105 | 1 1/4-12 to 1-14 | LOW PROFILES 25K TO 50K | 2.00 | 2.50 | 4.50 | 1-14x1.0 |
| THD-103 | JN-105 | 1 1/4-12 to 1 1/2-12 | LOW PROFILES 25K TO 50K | 2.50 | 2.34 | 4.42 | 1 1/2-12x1.40 |
| THD-163 | N/A | 1 1/4-12 to 1 1/2-12 | LOW PROFILES 25K TO 50K | 2.50 | 1.50 | 3.58 | 1 1/2-12x1.40 |
| THD-143 | JN-105 | 1 1/4-12 to 2-12 | LOW PROFILES 25K TO 50K | 3.38 | 2.34 | 5.89 | 2-12x2.62 |
| THD-144 | N/A | 1 1/4-12 to 2-12 | LOW PROFILES 25K TO 50K | 3.38 | 1.50 | 5.05 | 2-12x2.62 |
| THD-114 | JN-106 | 1 3/4-12 to 3-8 | LOW PROFILES TO 100K | 4.00 | 3.75 | 9.62 | 3-8x4.50 |
| THD-115 | N/A | 1 3/4-12 to 3-8 | LOW PROFILES TO 100K | 4.00 | 1.75 | 7.62 | 3-8x4.50 |
| THD-105 | JN-107 | 2 3/4-8 to 4-8 | LOW PROFILES TO 200K | 5.50 | 5.25 | 13.0 | 4-8x6.00 |
| THD-106 | N/A | 2 3/4-8 to 4-8 | LOW PROFILES TO 200K | 5.50 | 2.75 | 10.5 | 4-8x6.00 |



CALIBRATION SYSTEMS

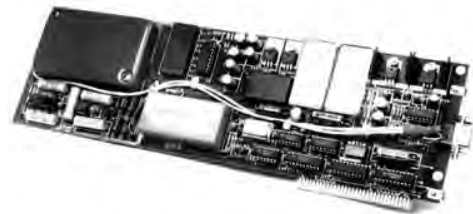
interface

ADVANCED FORCE MEASUREMENT

Model HRBSC High Resolution Signal Conditioning Board

- **Nonlinearity <0.001% full scale**
- **22-bit resolution**
- **High thermal stability**
- **Shunt calibration, software selectable**
- **Auto ID with Gold Standard load cells**
- **ISA slot plug-in board**
- **Bipolar**

The model HRBSC is a single-channel high resolution signal conditioning board. This board offers many additional features over the SCB1 for users requiring the highest levels of accuracy and precision.



SPECIFICATIONS

EXCITATION

Excitation voltage10VDC $\pm 1\%$, mV ripple max
80-5000 ohm load

PERFORMANCE

Internal Resolution22 bits
Signal Input Range-4.5 to +4.5 mV/V
Integration TimeSoftware selectable from
1, 10, 16.7, 20, 100, 166.7
and 300 msec
Nonlinearity<0.001% full scale
Span Temperature Coefficient.....<5ppm/ $^{\circ}$ C
Zero Temperature Coefficient<0.1 microvolt/ $^{\circ}$ C
Span Stability—after 60 min warmup..... $\pm 0.001\%$, 24 hrs.
 $\pm 0.003\%$, 1 yr.
Zero Stability— after 60 min warmup..... ± 5 microvolts, one year
Response<0.5 sec to within 0.01% basic
analog response. Response
rate equals 3 seconds for 100
msec conversion time and
standard digital filter
Input Resistance.....>100 megohm
Common Mode Rejection>120dB @ 60Hz,
>110 dB @ DC
Common Mode Voltage ± 8 V without damage
 ± 5 V for specified common
mode reject
Noise<0.25 μ volt typical, 0.6 μ volt
max peak with 350 ohm load,
@ 100 msec integration time
and 10 sample average

ENVIRONMENTAL

Operating Temperature.....35 to 105 $^{\circ}$ F
Relative Humidity-MAX80%
Power
DCPC BUS +5 V supply
Power Consumption10 watts max
Mechanical
Outline3.75 x 14 x .75 in
(95 x 356 x 19 mm)
Full size card
Connector.....DE-9 socket

OPTIONS*

5 VDC excitation
Special shunt calibration resistors

ACCESSORIES

CT-134-10 Interconnect cable
(1600 type)
CT-141-10 Interconnect cable
(1000 type)
DA-101 Digital-Analog board,
used with automated systems
(consult factory)
GS-USB Chassis to house Signal
Conditioning Board(s)

Consult factory for more technical information



Model LBMU

The model HRBSC is a single-channel high resolution signal conditioning board. This board offers many additional features over the SCB1 for users requiring the highest levels of accuracy and precision.

Model HRBSC High Resolution Signal Conditioning Board

- Nonlinearity <0.001% Full Scale
- 22-bit Resolution
- High Thermal Stability
- Shunt Calibration
- Auto ID with Gold Standard Load Cells
- ISA Slot Plug-In Board
- Bipolar

Specifications

| Model | LBMU |
|--|--|
| Excitation | |
| Excitation Voltage | 10VDC \pm 1%, mV Ripple Max 80-5K Ω Load |
| Performance | |
| Internal Resolution | 22 bits |
| Signal Input Range | -4.5 – +4.5 mV/V |
| Integration Time | Software Selectable from 1, 10, 16.7, 20, 100, 166.7, & 300 milliseconds |
| Nonlinearity | <0.001% Full Scale |
| Span Temperature Coefficient | <5ppm / $^{\circ}$ C |
| Zero Temperature Coefficient | <0.1 microvolts / $^{\circ}$ C |
| Span Stability After 60 Minute Warmup | \pm 0.001%, 24 Hours |
| Zero Stability After 60 Minute Warmup | \pm 5 microvolts, One Year |
| Response | <0.5 seconds to Within 0.01% Basic Analog Response. Response Rate Equals 3 Seconds for 100 msec Conversion Time and Standard Digital Filter. |
| Input Resistance | 100 M Ω |
| Common Mode Rejection | >120dB @ 60Hz, >110dB @ DC |
| Common Mode Voltage | \pm 8V Without Damage, \pm 5V for Specified Common Mode Reject |
| Noise | <0.25 μ volt Typical, 0.6 μ volt Max Peak with 350 Ω Load, @ 100 msec Integration Time and 10 Sample Average |
| Environmental | |
| Operating Temperature | 35 $^{\circ}$ F – 105 $^{\circ}$ F |
| Relative Humidity-MAX | 80% |
| Power | |
| DC | PC BUS +5V Supply |
| Power Consumption | 10 Watts Max |
| Mechanical | |
| Outline | 3.75" x 14" x .75" (95mm x 356mm x 19mm) |
| Connector | DE-9 Socket |

Options

5VDC Excitation

-Special shunt calibration resistors

Accessories

CT-134-10

- Interconnect Cable (1600 Type)

CT-141-10

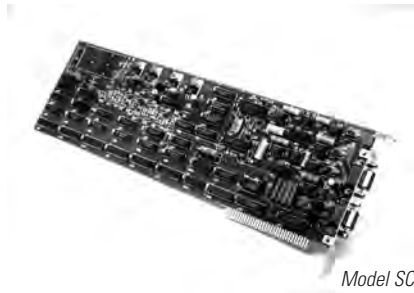
- Interconnect Cable (1000 Type)

DA-101

- Digital-Analog Board, Used with Automated
Systems (Consult Factory)

Specifications are subject to change without notice.

Custom Sizes and Capacities Available.



Model SCB1

The SCB1 signal conditioning board comes in a one or two-channel configuration. The single-channel unit is used with a dead weight system and/or for test machine verification, while the two-channel unit is used for calibrations where a reference (Standard) load cell is being used. One channel is connected to the reference standard and one channel is connected to the cell being calibrated.

Accessories

CT-139-10

- Interconnect Cable (1600 Type)

CT-142-10

- Interconnect Cable (1000 Type)

CT-154-10

- Interconnect Cable (Pigtails)

DA-101

- Digital-Analog Board, Used with Automated Systems (Consult Factory)

Model SCB1

Signal Conditioning Board 1 or 2 Channel

- Nonlinearity <0.003% Full Scale
- 20-bit Resolution
- High Thermal Stability
- Shunt Calibration, Software Selectable
- Single or Dual Channel Versions
- Bipolar
- Isolated Output

Specifications

| Model | LBMU |
|---------------------------------------|---|
| Excitation | |
| Excitation Voltage | 10VDC |
| Current | 120 mA Max |
| Performance | |
| Resolution | 20 bits |
| Signal Input Range | ±2.5, ±5.0, or ±7.5 mV/V |
| Conversion Rate | 8 Readings/Second |
| Nonlinearity | <0.003% Full Scale |
| Span Temperature Coefficient | <10ppm / °C |
| Zero Temperature Coefficient | <0.2 microvolts / °C |
| Span Stability After Warmup | ±0.003% per 24 Hours, ±0.01% per Year |
| Zero Stability After 60 Minute Warmup | ±10 microvolts, One Year |
| Settling Time | <0.25 sec to Within .01% |
| Frequency Response | 5Hz (-3dB Points) |
| Input Resistance | >100 MΩ |
| Common Mode Rejection | >90 dB |
| Common Mode Voltage re:Signal | ±8V Without Damage |
| Common Mode Voltage re:Ground | ±500V Peak without damage (Isolated Version Only) |
| Isolation Resistance | >100 MΩ to Ground |
| Noise | <0.3 μvolt typical, 0.6 μvolt Max (Digital Filter ON) <0.7 μvolt typical, 1.5 μvolt Max (Digital Filter OFF) |
| Environmental | |
| Operating Temperature | 35°F – 105°F |
| Relative Humidity-MAX | 80% |
| Power | |
| DC | PC BUS +5V Supply |
| Power Consumption | 10 Watts Max |
| Mechanical | |
| Outline | 3.75" x 14" x .75" (95mm x 356mm x 19mm) |
| Connector | DE-9 Socket (1 Per Channel) |

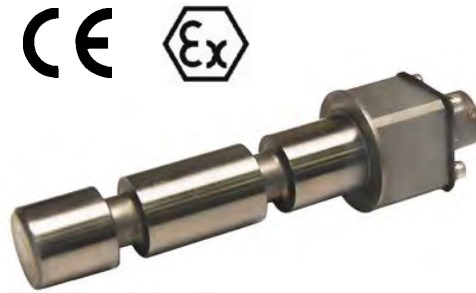
Specifications are subject to change without notice.

Custom Sizes and Capacities Available.

Model LP Loadpin

– Force Sensing

- Designed to replace pins or bolts that carry a load
- Stainless steel construction
- Capable of 100% humidity, 30G mechanical shock and 5G vibration
- Used with Clevises, or pulley shafts to monitor loads



Interface loadpins are unique in that the strain gages are installed inside the inner diameter as opposed to outer diameter, where they are protected from harsh environments.

Model LP loadpins are designed to be installed where pins or bolts are carrying a load. Applications which involve the use of shackle pins, load pins and pulley shafts are prime examples of where force sensing load pins can provide accurate, real time monitoring of load forces. Some typical applications are mooring lines, tension pulleys, winches, sheaves, sprockets, tongue & yoke shackles, clevises. and are ideal for use in web tension applications.

ACCURACY SPECIFICATIONS

| Characteristic | Specification |
|------------------------------|---|
| Load Ranges - 200, 500, 1000 | 2K, 3K, 5K, 6K, 10K, 12.5K, 20K, 30K, 50K, 75K, 100K, 125K, 150K, 200K, 200K lb |
| Linearity (max) | from $\pm 0.05\%$ full scale (consult factory) |
| Hysteresis | from $\pm 0.05\%$ full scale (consult factory) |
| Nonrepeatability | $\pm 0.15\%$ full scale |
| Tolerance on output | 1 mV/V nominal |

TEMPERATURE SPECIFICATIONS

| Characteristic | Specification |
|---------------------------|--------------------------------|
| Temperature - Operating | -54°C to 93°C (-65°F to 250°F) |
| Temperature - Compensated | 15°C to 54°C (60°F to 160°F) |
| Temperature Effect, Zero | 0.003% full scale/°F |
| Temperature Effect, Span | 0.003% of load/°F |

ELECTRICAL SPECIFICATIONS

| Characteristic | Specification |
|------------------------------|-----------------------------------|
| Strain gage type | Foil |
| Excitation (calibration) | 10 Vdc |
| Bridge resistance | 500 ohm |
| Electrical termination (std) | PTIH-10-6P |
| Mating connector (not incl.) | PT06A-10-6S or equivalent (AA111) |

MECHANICAL SPECIFICATIONS

| Characteristic | Specification |
|------------------------|--------------------------------------|
| Maximum allowable load | 200% FS |
| Case material | 17-4 PH stainless steel - all welded |

ATEX INTERNAL AMPLIFIERS

| Amplifier Specifications | Current Two-Wire Amp |
|----------------------------|----------------------|
| Output signal | 4 mA to 20 mA |
| Input power (voltage) | 15 Vdc to 40 Vdc |
| Input power (current) | 4 mA to 28 mA |
| Freq. response (amp) | 300 Hz |
| Power supply | 60 db |
| Operating temperature | 0°F to 185°F |
| Reverse voltage protection | Yes |
| Short circuit protection | Yes |

MOUNTING DIMENSIONS

| Capacity | Typical Diameter mm (in) | Typical Length mm (in) |
|------------|--------------------------|------------------------|
| 200 | 17 (0.69) | 95 (3.98) |
| 500 | 17 (0.69) | 95 (3.98) |
| 1K | 20 (0.78) | 95 (3.98) |
| 2K, 3K | 12.7 (0.50) | 101.09 (3.98) |
| 5K, 6K | 19.05 (0.75) | 113.79 (4.48) |
| 10K, 12.5K | 25.4 (1.0) | 120.4 (4.74) |
| 15K, 20K | 31.75 (1.25) | 144.53 (5.69) |
| 30K | 38.1 (1.50) | 157.48 (6.20) |
| 50K | 50.8 (2.0) | 167.89 (6.61) |
| 75K | 63.5 (2.5) | 193.29 (7.61) |
| 100K | 69.85 (2.75) | 219.20 (8.63) |
| 125K | 76.2 (3.0) | 225.55 (8.88) |
| 150K | 88.9 (3.5) | 263.65 (10.38) |
| 200K | 101.6 (4.0) | 301.75 (11.88) |

WARNING!

PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
- Failure to comply with these instructions could result in death or serious injury.

WARNING!

MISUSE OF DOCUMENTATION

- The information presented in this spec sheet is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.
- Failure to comply with these instructions could result in death or serious injury.

**Transducer Electronic Data Sheet (TEDS)
SELF-ID Load Cell**



TEDS

- Load Cell with Electronic Identification Inside
- Meets IEEE 1451.4 Standard for Smart Transducer Interface
- Available On New or Existing Load Cells
- Plug & Play Ready
- Cuts Instrument Setup Time
- Eliminates Data Entry Error
- Sensor Information and Calibration Data

Interface has offered sensors with various types of SELF-ID for many years. The SELF-ID features eliminates the need to enter data via a keyboard or key panel from a paper calibration sheet into the instrument used with the load cell. This feature offers the following benefits:

- Eliminates potential for data entry error
- Cuts time in half to set up instrument
- Makes swapping of load cells easy
- Increases safety by making certain that system has the correct capacity of the load cell
- Can be used to identify location of load cell
- No need to store calibration sheets, no more paper, no more concern about lost sheets
- Makes inventory control of your load cells easy
- Load cells can be changed out without jeopardizing integrity of system

Now TEDS provides additional advantages over proprietary SELF-ID because it is an industry standard (IEEE 1451.4) which has the potential to permit mix and matching of load cells and instruments from different manufacturers.

IEEE1451.4 specifies a table of identifying parameters that are stored in the load cell in the form of a TEDS (Transducer Electronic Data Sheet). TEDS is a table of parameters that identify the transducer and is held in the transducer on a EEPROM for interrogation by external electronics.



We Build Customer Requirements...and support many industry applications:

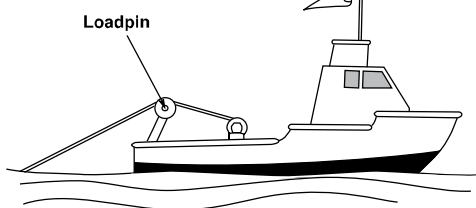
- Tension / Compression Measurements
- Clevis Pin / Shackle Loading
- Sprockets & Pulley Axle
- Crane, Lifting & Winch System
- Mooring Line Tension Measurements
- Hydraulic Systems

Interface Load Pins are made with a dual-shear design; which provides for center-loading with support from both ends. Strain gage based, the strain gages are installed in the inside-center, neutral axis of the load pin where they are protected from both physical damage and the environment. A full Wheatstone Bridge ensures the best specifications, while the physical design ensures proper alignment and the anti-rotation in application.

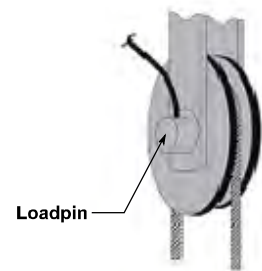
Fork Lift Load Measurement



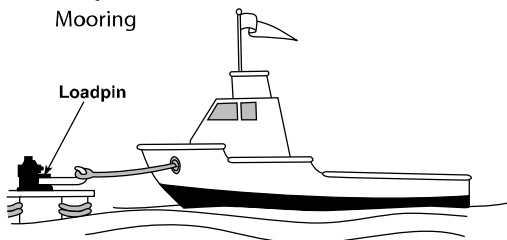
Tow Line Tension



Sheave or Pulley

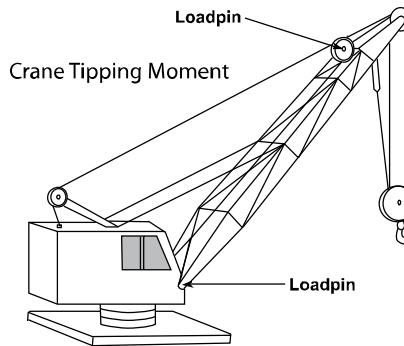


Tension on Quick Release Mooring



Loadpin

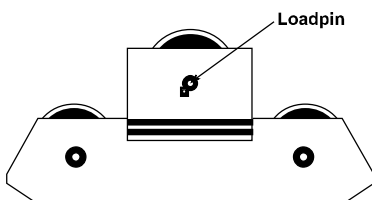
Crane Tipping Moment



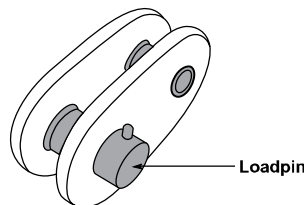
Shackle



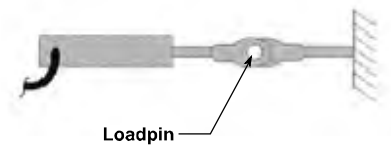
Line Tensiometer



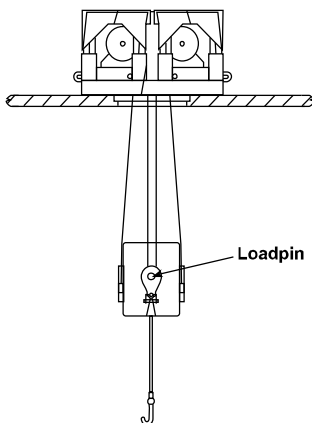
Tension & Mooring Linkage



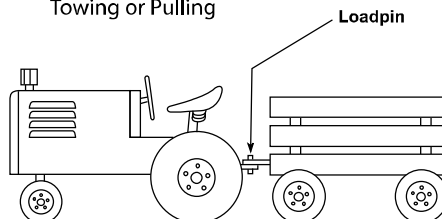
Hydraulic Cylinders



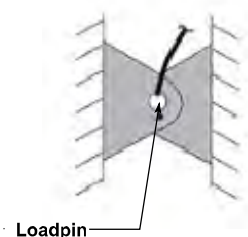
Lifting Systems



Towing or Pulling

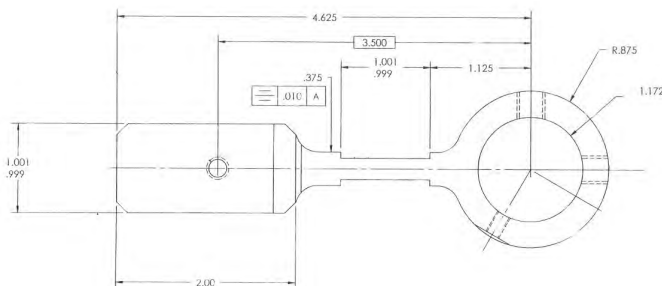
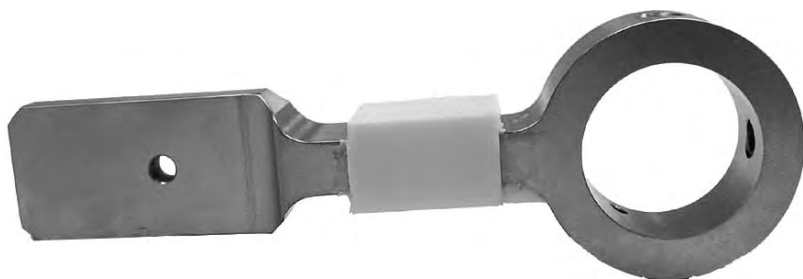


Structural



INTERFACE CUSTOM DESIGNS

Interface Model RTA—Torque Arm

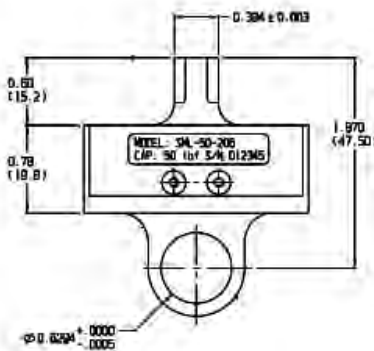


- Test machine application
- Semi-conductor strain gages
- High output of 270 mV
- Used to measure the torque applied on test specimens
- Capacity 60 lb-in

SPECIFICATIONS

| | |
|----------------------|------------------------------------|
| Rated Output | 270 mV at 10mA DC Constant Current |
| Nonlinearity %FS | ±0.25 |
| Hysteresis %FS | ±0.25 |
| Nonrepeatability %FS | ±0.05 |

Interface Model SML—Custom



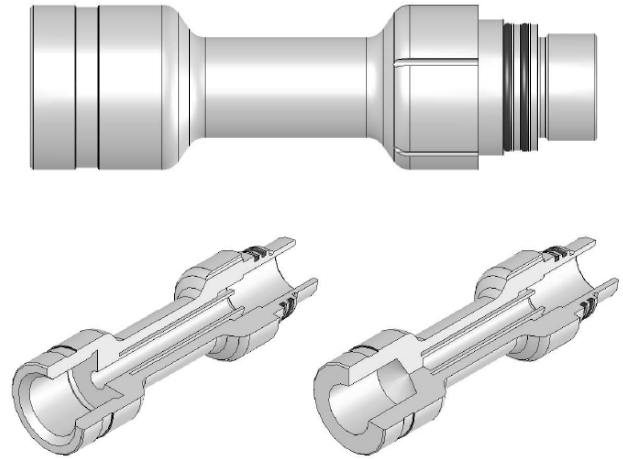
- Industrial automation application
- Custom SML series load cell
- Used for force measurement on robotic positioning and welding assembly
- Modified for ease of installation and connectivity to fixturing
- Small package size
- Capacity 50 lbf

SPECIFICATIONS

| | |
|----------------------|----------|
| Rated Output | 1.9 mV/V |
| Nonlinearity %FS | ±0.10 |
| Hysteresis %FS | ±0.10 |
| Nonrepeatability %FS | ±0.05 |

Model DTD Downhole Tension Device Load Cell

- Compensated to negate the effects of pressure and temperature in the harsh environment downhole
- Pressure compensated as high as 35KSI and temperature compensated up to 500F
- Internal pressure compensation eliminates the need for a pressure vessel
- Accuracy as high as 0.5% F.S.
- Through hole or dead ended design
- Eliminates the delay associated with load cells used above ground
- Replaces a wet load cell which has a short life expectancy and high cost of ownership
- User defined specifics regarding size, shape, mating connections and sealing techniques
- NACE compliant material available



SPECIFICATIONS

| Parameter | Units | | | Comb |
|--|------------------------|-----|---|------|
| Force Capacity | Klbf | | 2.5 to 30 | |
| Rated Output (RO) | mV/V | | 1.00 ±0.15 | |
| Operating Pressure Range | psig | | 0 to 30,000 | |
| Nonlinearity | % FS | Max | ±0.25 at any constant compensated temperature | X |
| Hysteresis | % FS | Max | ±0.25 at any constant compensated temperature | X |
| Temperature Range | | | | |
| Operating | °F (°C) | | -65 to 400 (-54 to 204) | |
| Compensated | °F (°C) | | -65 to 400 (-54 to 204) | |
| Zero Balance (offset) | mV/V | | 0 ±0.065 | |
| Temperature Effect on Zero* | % RO/°F (%RO/°C) | Max | 0 ±0.006 (0 ±0.011) | X |
| Temperature Effect on Output* | %/°F (%/°C) | | 0 ±0.003 (0 ±0.0055) | X |
| Pressure Effect on Zero* | %RO / 20,000 psig | Max | 1.5 | X |
| Creep due to pressure @ 20,000 psig, 30 minutes | %RO | Max | 0 ±1.5, over compensated temperature range | |
| Combination of parameters checked in Comb column over compensated temperature range and 0 to 20,000 psig | %RO | Max | 3 | |
| Input Resistance | ohm | | 350 ±10 | |
| Output Resistance | ohm | | 350 ±5 | |
| Insulation Resistance | Megohm | Min | 1000 @ 50 VDC | |
| Overload Ratings (with 30,000 psig pressure): | | | | |
| Safe, axial load | Klbf, with 30,000 psig | Max | | |
| Ultimate, axial load | Klbf | Max | | |
| Deflection at capacity | inch | Nom | 0.002 | |
| Natural Frequency | Hz | Nom | | |
| Excitation, nominal | VDC or VAC | Nom | 10 | |
| Excitation, maximum | VDC or VAC | Max | 15 | |
| Weight (without cable) | lb | Nom | | |
| Flexure Material | | | High Strength Heat Treated Stainless Steel | |

*As measured by the chord slope method.



APPENDIX

interface

ADVANCED FORCE MEASUREMENT

Electrical Information

| Load Cell Series | Cell Type | Upscale (4) Mode | Integral Cable Wiring | Std. Cable Type | Cable Length, Feet (5) | Connector Wiring | Mating Connector (2) |
|------------------|-----------|------------------|-----------------------|-----------------|------------------------|------------------|----------------------|
| 1000 | Univ. | Tension | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| 1100 | Univ. | Tension | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| 1100 | Comp. | Tension | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| 1200 | Univ. | Tension | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| 1200 | Comp. | Comp. | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| 1500 | Univ. | Tension | — | — | — | Fig. C1 | PT06A-10-6S(SR) |
| 1600 | Univ. | Tension | — | — | — | Fig. C2 | PT06A-12-8S(SR) |
| 1600 | Comp. | Tension | — | — | — | Fig. C2 | PT06A-12-8S(SR) |
| 1700 | Univ. | Tension | — | — | — | Fig. C6 | PT06A-10-6S(SR) |
| 1800 | Univ. | Tension | — | — | — | Fig. C2 | PT06A-12-8S(SR) |
| 3200 | Univ. | Tension | Fig. W2 | B | 20 | — | — |
| 3200 | Comp. | Tension | Fig. W2 | B | 20 | — | — |
| 4200 | Comp. | Tension | Fig. W2 | B | 20 | — | — |
| 4600 | Comp. | Tension | Fig. W2 | B | 20 | — | — |
| 5200 | Univ. | Tension (1) | Fig. W1 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| SSB | Comp. | Comp. | Fig. W2 | C | 5 | — | — |
| MB, MBP | Comp. | Comp. | Fig. W2 | C | 5 | — | — |
| SM | Univ. | Tension | Fig. W2 | C | 5 | — | — |
| SSM | Univ. | Tension | Fig. W2 | A | 10 | Fig. C1 | PC06W-10-6S(SR) |
| SMT | Univ. | Tension | Fig. W2 | D | 5 | — | — |
| SPI | Univ. | Comp. | Fig. W2 | C | 5 | — | — |
| SML | Univ. | Tension | Fig. W2 | D | 5 | — | — |
| LBM | Comp. | Tension | Fig. W2 | G | 5 | — | — |
| LBS | Comp. | Tension | Fig. W2 | G | 5 | — | — |
| LoadCheck | Comp. | Tension | Fig. W1 | A | 10 | — | — |
| LoadTrol | Comp. | Comp. | — | Note (3) | Note (3) | Note (3) | Note (3) |
| LW | Comp. | Comp. | Fig. W2 | — | 5 | — | — |
| WeighCheck | Comp. | Tension | Fig. W2 | B | 30 | — | — |
| WMC | Univ. | Tension | Fig. W3 | G | — | — | — |
| WMC ≥15K | Univ. | Tension | — | — | — | Fig. C3 | PT06A-10-6S(SR) |
| 2410-2430 | Univ. | Tension | — | — | — | Fig. C3 | PT06A-10-6S(SR) |
| 2440-2450 | Univ. | Tension | — | — | — | Fig. C3 | MS3106A-145-6S |
| 2100 | Univ. | Tension | — | — | — | Fig. C4 | MS3106A-145-5S |
| 2100 | Comp. | Tension | — | — | — | Fig. C4 | MS3106A-145-5S |
| MRT | Torque | CW | W2 | D | 5 | — | — |
| ULC | Univ. | Tension | W2 | D | 5 | — | — |
| MCC | Comp. | Comp. | W2 | E | 5 | — | — |
| CX | — | — | — | — | — | Fig. C5 | PT06A-12-8S(SR) |

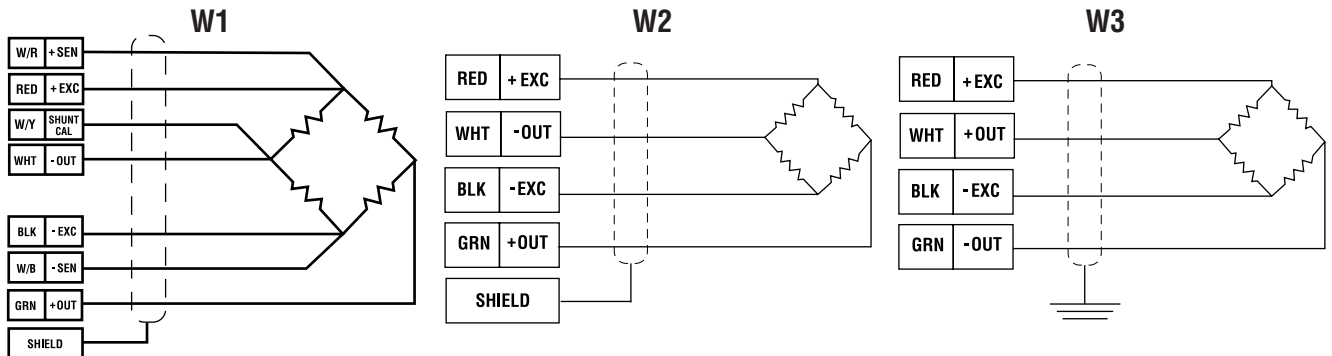
- Notes: (1) Thrust axis only.
 (2) Mating connector for the stock version of cell. Consult factory for alternate connectors and specials.
 (3) Consult factory. Several connectors and mating cable types are available.
 (4) Indicates the loading direction which causes a positive output.
 (5) Stock length; other lengths available on special order.

LOAD CELL INTEGRAL CABLES

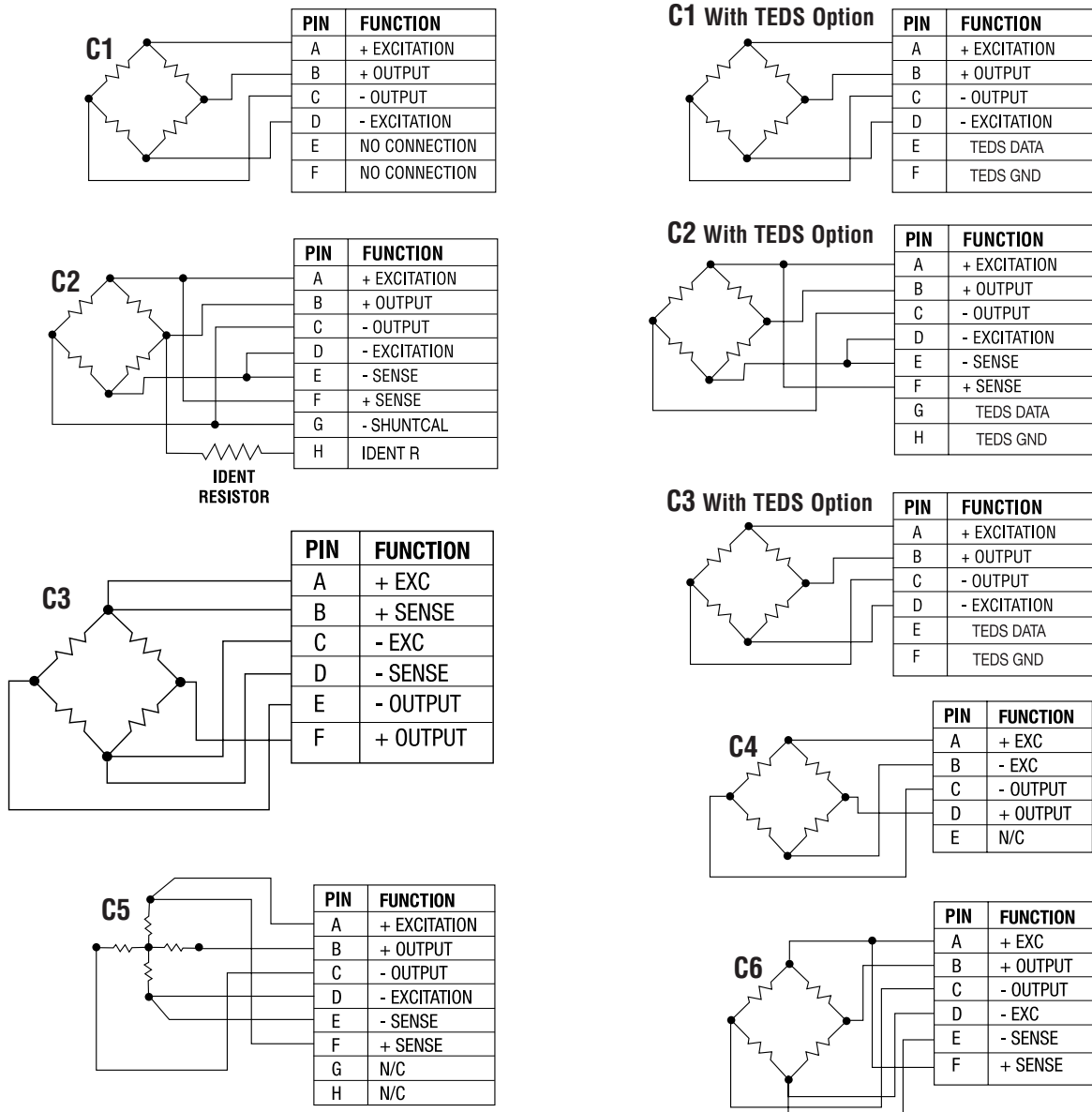
| Cable Type | Wire Size | No. of Wires | Shield | Description |
|------------|-----------|--------------|--------|----------------------------------|
| A | 22 AWG | 7 | Braid | Heavy-duty, PVC jacket |
| B | 22 AWG | 4 | Braid | Heavy-duty, polyurethane jacket |
| C | 28 AWG | 4 | Braid | Tough, clear PVC jacket |
| D | 28 AWG | 4 | Spiral | Ultra-flexible, black PVC jacket |
| E | 30 AWG | 4 | Braid | Ultra-flexible, gray PVC jacket |
| F | 20 AWG | 4 | Braid | Teflon jacket |
| G | 30 AWG | 4 | Braid | Teflon jacket |

Wiring Diagrams

LOAD CELL CABLE WIRING



LOAD CELL CONNECTOR WIRING



Load Cell Terms & Definitions

This document defines the terminology and performance parameters pertaining to engineering specifications of load cell products. The objective of this terminology standard is to promote effective communication of specifications and to constitute a reference for uniformity. The definitions herein are generally compatible with common understanding in the load cell community and are an expansion of those found in "Load Cell Terminology and Test Procedure Recommendations," Third Edition, 1985, Scale Manufacturers Association, and in OIML International Recommendation R60, 1991 Edition. This document includes modifications to the definitions in the above referenced standards to correct some of their inconsistencies and inadequacies.

For convenience, terms which are defined in this standard are printed in upper case when used in the definition of another term.

AMBIENT TEMPERATURE

The temperature of the medium surrounding the LOAD CELL.

AXIAL LOAD

A load applied along the PRIMARY AXIS.

BAROMETRIC SENSITIVITY

The change in ZERO BALANCE due to a change in ambient barometric pressure. Normally expressed in units of %RO/atm.

CALIBRATION

The comparison of LOAD CELL OUTPUT against standard test loads.

CAPACITY

The maximum AXIAL LOAD a LOAD CELL is designed to measure within its specifications.

COMBINED ERROR

The maximum deviation of the CALIBRATION curve from the straight line drawn between MINIMUM LOAD OUTPUT and MAXIMUM LOAD OUTPUT, normally expressed in units of %FS. Both ascending and descending curves are considered.

CREEP

The change in LOAD CELL SIGNAL occurring with

time while under load and with all environmental conditions and other variables remaining constant. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RECOVERY

The change in LOAD CELL SIGNAL occurring with time immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded and unloaded intervals. Normally expressed in units of % of applied load over a specified time interval. Normally the applied interval and the recovery interval are equal. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RETURN

The difference between LOAD CELL SIGNAL immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded interval, and the SIGNAL before application of the load. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

DEFLECTION

The displacement of the point of AXIAL LOAD application in the PRIMARY AXIS between the MDL and MDL+CAPACITY load conditions.

ECCENTRIC LOAD

Any load applied parallel to but not concentric with the PRIMARY AXIS.

FULL SCALE or FS

The OUTPUT corresponding to MAXIMUM LOAD in any specific test or application.

HYSTERESIS

The algebraic difference between OUTPUT at a given load descending from MAXIMUM LOAD and OUTPUT at the same load ascending from MINIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60% FS.

INPUT RESISTANCE

The resistance of the LOAD CELL circuit measured at the excitation terminals with no load applied and with the output terminals open-circuited.

INSULATION RESISTANCE

The DC resistance measured between the bridge circuit and the case. Normally measured at 50 VDC.

LOAD CELL

A device which produces an OUTPUT proportional to an applied force load.

MAXIMUM AXIAL LOAD, SAFE

The maximum AXIAL LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified. Normally expressed in units of % CAPACITY.

MAXIMUM LOAD

The highest load in a specific test or application, which may be any load up to and including CAPACITY + MINIMUM LOAD, but may not exceed CAPACITY significantly.

MAXIMUM AXIAL LOAD, ULTIMATE

The maximum AXIAL LOAD which can be applied without producing a structural failure. Normally expressed in units of % CAPACITY.

MAXIMUM LOAD AXIS MOMENT, SAFE

The maximum moment with respect to the PRIMARY AXIS which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM MOUNTING TORQUE, SAFE

The maximum torque which can be applied concentric with the primary axis without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM SIDE LOAD, SAFE

The maximum SIDE LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MEASURING RANGE

The difference between MAXIMUM LOAD and MINIMUM LOAD in a specific test or application. It may not exceed CAPACITY.

MINIMUM DEAD LOAD or MDL

The smallest load for which specified performance will be met. It is normally equal to or near NO LOAD in single mode applications and is of necessity equal to NO LOAD in double mode applications.

MINIMUM LOAD

The lowest load in a specific test or application, differing from NO LOAD by the weight of fixtures and load receptors which are attached plus any intentional pre-load which is applied.

MODE

The direction of load. tension & compression are each one mode.

NATURAL FREQUENCY

The frequency of free oscillations under conditions of NO LOAD.

NO LOAD

The condition of the LOAD CELL when in its normal physical orientation, with no force input applied, and with no fixtures or load receptors attached.

NONLINEARITY

The algebraic difference between OUTPUT at a specific load and the corresponding point on the straight line drawn between MINIMUM LOAD and MAXIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60 %FS.

NONREPEATABILITY

The maximum difference between OUTPUT readings for repeated loadings under identical loading and environmental conditions. Normally expressed in units of %RO.

OUTPUT

The algebraic difference between the SIGNAL at applied load and the SIGNAL at MINIMUM LOAD.

OUTPUT RESISTANCE

The resistance of the LOAD CELL circuit measured at the SIGNAL terminals with no load applied and with the excitation terminals open-circuited.

PRIMARY AXIS

The axis along which the LOAD CELL is designed to be loaded.

Load Cell Terms & Definitions, Continued

RATED OUTPUT or RO

The OUTPUT corresponding to CAPACITY, equal to the algebraic difference between the SIGNAL at (MINIMUM LOAD + CAPACITY) and the SIGNAL at MINIMUM LOAD.

RESOLUTION ☑

The smallest change in load which produces a detectable change in the SIGNAL.

SHUNT CALIBRATION ☑

Electrical simulation of OUTPUT by connection of shunt resistors of known values at appropriate points in the circuitry.

SIDE LOAD

Any load at the point of AXIAL LOAD application acting at 90° to the PRIMARY AXIS.

SIGNAL

The absolute level of the measurable quantity into which a force input is converted.

SPAN

Another name for RATED OUTPUT.

STATIC ERROR BAND or SEB

The band of maximum deviations of the ascending and descending calibration points from a best fit line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and non-return to MINIMUM LOAD. Normally expressed in units of %FS.

SEB OUTPUT

A computed value for OUTPUT at CAPACITY derived from a line best fit to the actual ascending and descending calibration points and through zero OUTPUT.

SYMMETRY ERROR

The algebraic difference between the RATED OUTPUT in tension and the average of the absolute values of RATED OUTPUT in tension and RATED OUTPUT in compression. Normally expressed in units of %RO.

TEMPERATURE EFFECT ON OUTPUT

The change in OUTPUT due to a change in AMBIENT TEMPERATURE. Normally expressed as the slope of a chord spanning the COMPENSATED TEMPERATURE RANGE and in units of %/°F or %/100°F.

TEMPERATURE EFFECT ON ZERO

The change in ZERO BALANCE due to a change in AMBIENT TEMPERATURE. Normally expressed as the slope of a chord spanning the COMPENSATED TEMPERATURE RANGE and in units of %RO/°F or %RO/100°F.

TEMPERATURE RANGE, COMPENSATED ☑

The range of temperature over which the LOAD CELL is compensated to maintain OUTPUT and ZERO BALANCE within specified limits.

TEMPERATURE RANGE, OPERATING

The extremes of AMBIENT TEMPERATURE within which the LOAD CELL will operate without permanent adverse change to any of its performance characteristics.

TOGGLE

Another name for ZERO FLOAT.

ZERO BALANCE

The SIGNAL of the LOAD CELL in the NO LOAD condition.

ZERO DEAD BAND

Another name for ZERO FLOAT.

ZERO FLOAT

The shift in ZERO BALANCE resulting from a complete cycle of equal tension & compression loads. Normally expressed in units of %FS and usually characterized at FS = CAPACITY.

ZERO STABILITY

The degree to which ZERO BALANCE is maintained over a specified period of time with all environmental conditions, loading history, and other variables remaining constant.

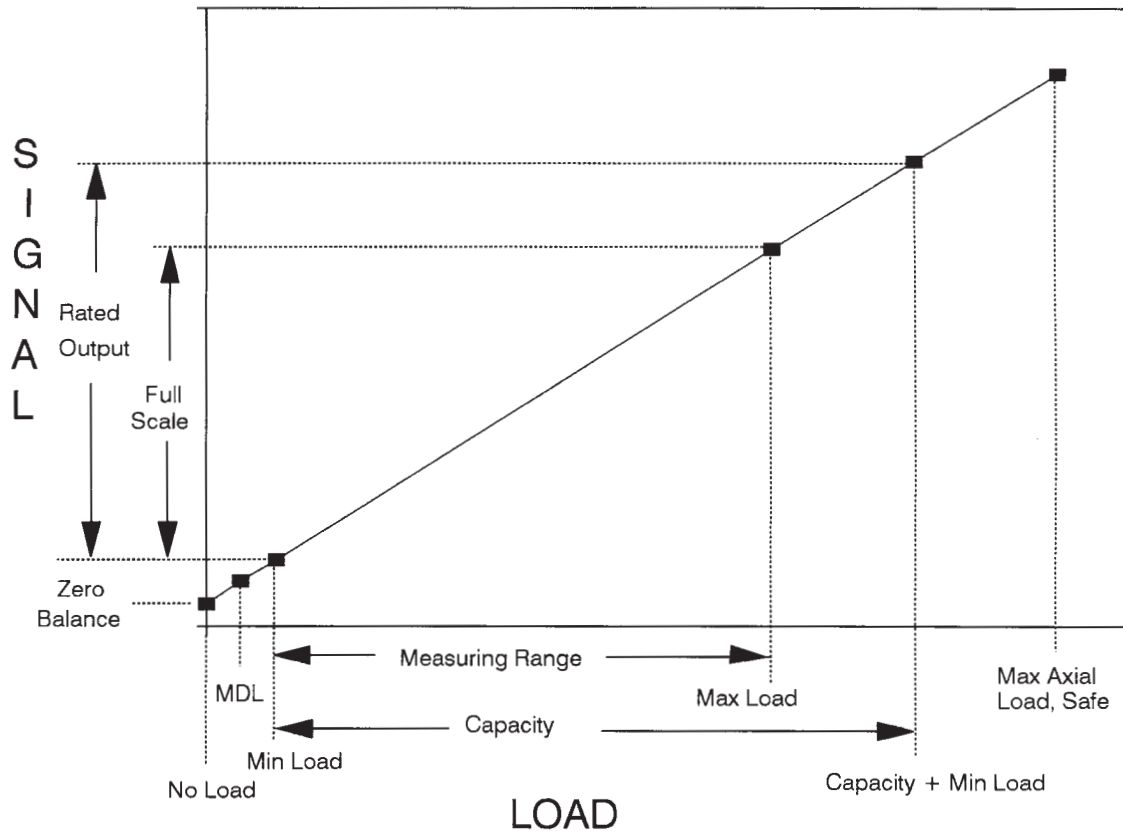


FIGURE 1. ILLUSTRATION OF TERMS

ABBREVIATIONS

(All abbreviations are case-specific, are not to be pluralized, and do not use trailing periods.)

| | | | | | |
|-------------------|-------|-------------------|-------|--------------------------|-------|
| ampere | A | kilogram force | kgf | pound | lb |
| combined error | CE | kilonewton | kN | pound-inch | lb-in |
| degree Celsius | °C | kilopound (kip) | K | pound-foot | lb-ft |
| degree Fahrenheit | °F | kilopound force | K lbf | pound force | lbf |
| degree Kelvin | °K | meganewton | MN | pound per square inch | psi |
| foot | ft | meter | m | rated output | RO |
| foot-pound | ft-lb | milliampere | mA | static error band | SEB |
| full scale | FS | millimeter | mm | ton, metric | t |
| gram | g | millivolt | mV | volt | V |
| hertz | Hz | millivolt/volt | mV/V | volt direct current | VDC |
| inch | in | minimum dead load | MDL | volt alternating current | VAC |
| inch-pound | in-lb | newton | N | watt | W |
| kilogram | kg | newton-meter | Nm | | |

Troubleshooting Guide for Interface Load Cells

1. INTRODUCTION

Performance of a load cell force (or weigh) measurement system is dependent upon the integrity of the physical installation, correct interconnection of the components, proper performance of the basic components which make up the system, and calibration of the system. Presuming that the installation was originally operating and was calibrated, troubleshooting can begin by checking the components individually to determine if they have been damaged or have failed. The basic components are:

- Load cells
- Mechanical supports and load connections
- Interconnecting cables
- Junction boxes
- Signal conditioning electronics

1.1 Mechanical Installation

Load Cells which are not mounted in accordance with the manufacturer's recommendations may not perform to manufacturer's specifications. It is always worthwhile to check:

- Mounting surfaces for cleanliness, flatness, and alignment
- Torque of all mounting hardware
- Load cell orientation: "Dead" end on mechanical reference or load forcing source, "live" end connected to the load to be measured. (Dead end is the end closest mechanically to the cable exit or connector.)
- Proper hardware (thread sizes, jam nuts, swivels, etc) as required to connect the load to the load cell.

A fundamental requirement is that there be one, and only one load path! This load path must be through the load axis of the load cell. This may sound elementary, however it is a commonly overlooked problem.

1.2 Electrical Installation:

Proper load cell performance is also dependent upon the electrical "system." The following items are common problem areas:

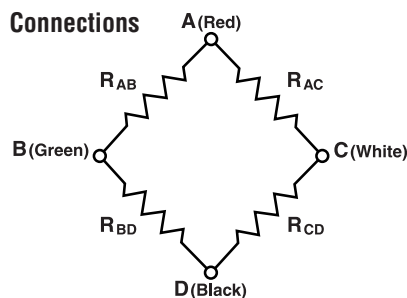
- Loose or dirty electrical connections, or incorrect connection of color coded wires.
- Failure to make use of remote sensing of excitation voltage on long cables.
- Incorrect setting of excitation voltage. (The best setting is 10 VDC, because that voltage is used to calibrate the load cell in the factory. The maximum voltage allowed is 15 or 20 volts, depending on the model. Some battery-operated signal conditioners use smaller voltages, down to 1.25 volts, to conserve battery power.)
- Loading of the bridge circuit. (Highly accurate load cell systems require highly accurate read-out instruments. Such instruments typically have very high input impedances to avoid circuit loading errors.)

2. LOAD CELL EVALUATIONS

It is quite easy to make a quick diagnostic check of a load cell. The procedure is quite simple and a minimum of equipment is required. Should it be determined that the load cell is at fault, the unit should be returned to the factory for further evaluation and repair as may be required. Many of the checks may be performed with an ohmmeter.

2.1 Check Bridge Circuitry and Zero Balance. (Numbers apply to standard 350 ohm bridges.)

Typical Connections



- Instrument required: Ohmmeter with 0.1 ohms resolution in the range of 250-400 ohms.
- Bridge Input Resistance: R_{AD} should be 350 ± 3.5 ohms (unless the cell has “standardized output,” in which case the resistance should be less than 390 ohms)
- Bridge Output Resistance: R_{BC} should be 350 ± 3.5 ohms
- Bridge Leg Resistances: Comparing the leg resistances at no load permits evaluation of the cause of any permanent damage in the load cell flexure. The “computed unbalance” of the bridge shows the general condition of the cell.
- The computed unbalance, in units of “mV/V,” is determined as follows:
$$\text{Unbalance} = 1.4 \cdot (R_{AC} - R_{AB} + R_{BD} - R_{CD})$$
- The Zero Offset, in units of “% of Rated Output”, is determined as follows:
$$\text{Zero Offset} = 100 \cdot \text{Unbalance} \div \text{Rated Output}$$

If the ohmmeter resolution is 0.1 ohm or better, then a computed Zero Offset of greater than 20 percent is a clear indication of overload. A computed zero balance of 10-20% is an indication of probable overload.

If the load cell has been overloaded, mechanical damage has been done that is not repairable, because overloading results in permanent deformation within the flexural element and gages, destroying the carefully balanced processing that results in performance to Interface specifications. While it is possible to electrically re-zero a load cell following overload, it is not recommended because this does nothing to restore the affected performance parameters or the degradation to structural integrity.

If the degree of overload is not severe the cell may in some cases be used at the user’s discretion, although some performance parameters may violate specifications and the cyclic life of the load cell may be reduced.

2.2 Insulation Resistance Tests

- Insulation resistance, shield to conductors: Connect all the conductors together, and measure the resistance between all those wires and the shield in the cable.
- Insulation resistance, load cell flexure to conductors: Connect all the conductors together, and measure the resistance between all those wires and the metal body of the load cell.

The tests described above can be performed using a standard ohm meter, although best results are obtained with a megohm meter. If resistance is beyond the standard ohmmeter range, about 10 megohms, the cell is probably OK. However, some kinds of electrical shorts show up only when using a megohm meter or with voltages higher than most ohmmeters can supply.

CAUTION

Never use a voltage higher than 50 VDC or 35 VRMS AC to measure insulation resistance, or breakdown of the insulation between the gages and the flexure may result.

Low resistance (below 5000 megohms) is often caused by moisture or pinched wires. The cause and extent of damage must be established at the factory to determine if the load cell may be salvaged.

3. FACTORY EVALUATION

If the load cell is defective for reasons other than overload, return to factory for detailed evaluation. Factory evaluation may show that the cell is repairable or non-repairable and if repair or replacement will be under warranty. If non-warranty, the customer will be contacted with the cost of repairs and recalibration, and a delivery date after receipt of authorization to proceed.

Load Cell Fatigue Theory

BACKGROUND

Interface has specialized in fatigue-rated load cells and their applications since its founding in 1968. Fatigue rating is a distinct specification which guarantees the customer a load cell which has a service life of 100 million fully reversed loading cycles at full rated capacity.

The very first products at Interface were fatigue-rated load cells, and over the years a history has been built up by thousands of cells in use all over the world. Many have been supplied to major manufacturers of materials test machines and to major aerospace manufacturers, for use in long term structural fatigue test programs on aircraft, space, and automotive equipment. **No fatigue failure of any fatigue-rated Interface load cell, used within its ratings, has ever been reported.**

FATIGUE FAILURE THEORY

It is well known that metals will fail in a statically loaded situation if the yield strength is exceeded. Inasmuch as load cells are structural members which are stressed in the course of their normal use, they are commonly given "ultimate overload" ratings in an effort to characterize the magnitude of static load they will withstand without failing structurally.

However, all metal structures, including load cells, are also subject to failure as a result of repetitive loadings which are much lower than the ultimate overload rating. This phenomenon is known as a fatigue failure, and it is due to the fact that the stress which a metal can withstand under cyclic loading usually becomes less and less as the number of cyclic loadings is increased.

The cause of this apparent anomaly can be explained by noting that metals are typically not perfectly homogeneous solids. They are composed of crystals, and at locations called grain boundaries, along slip planes or in a region of a microscopic

defect there can be minute strains under load which do not completely reverse during unload, leaving the material with a slight plastic deformation at the end of each complete cycle. This effect is highly dependent on the magnitude of the load and the number of cycles.

ANATOMY OF A FATIGUE FAILURE

It is generally acknowledged that a structural fatigue failure develops in three stages:

1. Repeated cycling builds up local plastic deformation, and a microscopic crack is initiated.
2. The crack propagates and a larger section becomes weakened.
3. Stress concentration in the section of cracking increases rapidly, and continued cycling enlarges the crack until sudden fracture occurs.

FATIGUE LIFE PREDICTION

Accurate prediction of fatigue life of any structure is not a reality. Well controlled tests on the most simple configurations of test specimens result in a wide scatter band of results. With complex structures typical of a load cell, analysis is even more complex. Theoretical analysis can produce approximations, however, which can be useful in estimating the margin of safety at which a particular load cell design is operating.

In materials science, the S-N curve is a well known tool. It is a graphical representation of the number of load cycles required to break a specimen, at a range of peak cyclic stress levels. S-N curves for the high quality materials used in Interface load cells have been experimentally determined, and are shown in Figure 1 for stainless steel and alloy steel, and in Figure 2 for aluminum alloy.

Thus, if the stress level is known, the fatigue life can be approximately known. However, there are factors which make fatigue life difficult to characterize.

Such factors include the shape of the loading curve, the frequency of the load cycling, residual stresses, stress concentrations due to material shape, state of stress, material condition, size, fabrication method, surface finish, corrosion, operating temperature, and operating atmosphere.

LOAD CELL FATIGUE FAILURE MODES

COMPONENTS SUBJECT TO FAILURE

There are two metal components in a load cell that must be considered in fatigue analysis, the flexure (spring element) and the strain gage (sensor).

1. The flexure bears the load; therefore failure of the flexure is structural.
2. Since the gages' function is electrical measurement of minute deflections, failure of the strain gages, on the other hand, is typically not structural; failure is noted by a shift in resistance or gage factor.

The relative propensity to first encounter flexure or strain gage fatigue failure depends upon the design of the transducer.

FLEXURES

There are several metals used for flexures in Interface load cells including aircraft quality alloy steel, stainless steel, and high strength fatigue-resistant aluminum alloy. S-N curves for these three materials are presented in Figure 1 and Figure 2.

Stress is normally expressed in units of psi (pounds per square inch), but for convenience we use units of KSI which are equal to 1000 psi. Shear stress is on the vertical axis, corresponding to the state of stress in Low Profile load cells. Readers with some materials science familiarity will recognize that classical fatigue strength for these materials is higher than indicated in the figures. This is because classical data is for bending or direct stress, whereas Interface fatigue-rated cells operate in shear mode. This analysis therefore appropriately uses the required factor for shear, avoiding a falsely optimistic result.

Note that the shear S-N curve for steel becomes essentially flat at about 55 KSI. This is a characteristic of steel. The stress level at the flat portion of the curve is called the **endurance limit**. If operated below this limit, theoretically the material will endure an infinite number of load cycles. Nonferrous metals do not generally exhibit an endurance limit, their curves continuing on with a small slope.

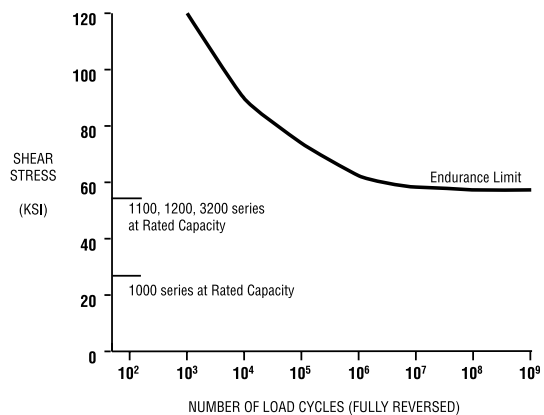


FIG. 1 S-N CURVE, INTERFACE ALLOY STEEL AND STAINLESS STEEL

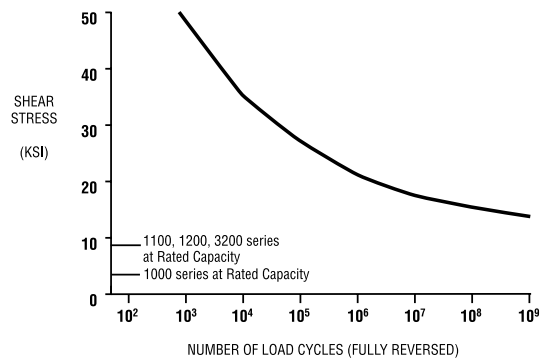


FIG. 2 S-N CURVE, INTERFACE ALUMINUM

Load Cell Fatigue, Continued

GAGES

Interface strain gages are specially made of fatigue-resistant nickel-chromium alloy. Strain gage fatigue characteristics are most conveniently viewed in terms of strain rather than stress. Figure 3 shows a Strain-N curve for Interface strain gage material. Strain is a dimensionless quantity of normally very small magnitude. The microstrain unit is simply 106 strain units and is used for convenience. Stress and strain for any particular material are related by a constant which is the modulus of elasticity (30X106 for steel and 10X106 for aluminum), allowing convenient comparison of S-N curves and Strain-N curves.

NOTE

The curves in Figures 1, 2 and 3 are for fully reversed load cycles, meaning that for 2000 microstrain as an example, a cycle starts at zero load and consists of one load to (+2000), one load to (-2000), with a return to zero.

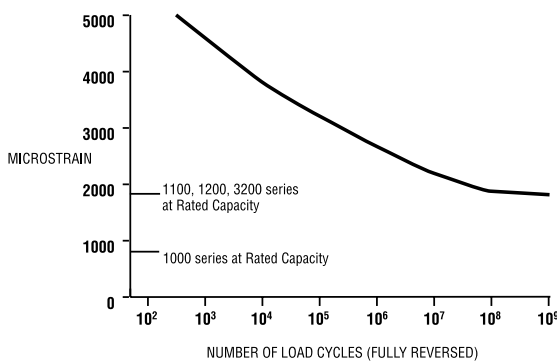


FIG. 3 STRAIN-N CURVE, INTERFACE STRAIN GAGES

COMPARISON OF LOADING LEVELS

Superimposed on the curves are operating levels of Interface Low Profile load cells by model series. This provides a convenient visualization of the fact that all of these load cells are designed to have very long, if not infinite, theoretical fatigue lives. Remember that in actual practice things are not necessarily so ideal. Therefore, in order to establish the correlation between theoretical and realizable fatigue life, actual test results are desirable.

DESIGN VERIFICATION TESTS

TEST PROTOCOL

Interface conducted Design Verification Tests to substantiate the theoretical life predictions by means of actual load tests of the product. Obviously, building up millions of load cycles on a high capacity load cell is not a trivial task. Many hours of costly machine time are required. Tests were conducted on three representative Interface Low Profile load cells: (1) an aluminum cell of 5,500 lbf capacity, (2) a steel cell of 11,000 lbf capacity, and (3) a steel cell of 22,000 lbf capacity.

Loading to 130% of rating was selected as an acceleration factor, to bring down the test time to a realizable length, since 100 million cycles at 1 hertz and 100% loading would consume 3 years and 2 months of testing, 24 hours per day. Based on the slopes of the S-N curves, a cycle acceleration factor of at least 10 can be achieved with 130% loading, thus ensuring that the more stringent test at 10⁷ cycles will prove a fatigue life of 10⁸ cycles at 100% loading.

TEST RESULTS

Analysis of the test data showed that there were no indications of fatigue failure nor degradation of load cell performance outside specified limits, for the critical load cell parameters of output, zero balance, nonlinearity, hysteresis, and creep, during or after completion of the Verification Test program.

BENEFITS OF REDUCED STRESS LEVELS

LOWER STRESS BY DESIGN

Interface load cells are designed for optimum fatigue life. Other load cells are not necessarily equivalent. Table 1 is a comparison of actual strain levels in Low Profile™ and typical competitive load cells. The safety factors are a means of visualizing the design merit of the various designs. The value of fatigue rated load cells for fatigue applications is evident from the safety factor data. It is also apparent that Interface load cells with 4 mV/V output have lower stress levels and, therefore, more fatigue resistance than competitors' cells, even though their output is only 3 mV/V or less.

LOWER STRESS, BY USER LIMITS

Note that the tests and S-N curves are based on fully reversed load cycles. This type of loading cycle is considerably more stringent than unidirectional loading, which is the more common application of load cells. If a fatigue load cell is repeatedly loaded in only one direction, the Goodman Law predicts that it can be loaded to about 133% of the bidirectional fatigue-rated capacity with no degradation of its fatigue rating. Conversely, unidirectional loading to a fatigue cell's rated capacity is much less stressful on the cell than bidirectional loading and can be expected to yield a fatigue life well beyond the number of cycles which could be reasonably and economically applied in a verification test program.

TABLE 1. Low Profile Load Cell Strain and Safety Factor Comparison

| Design Characteristic | Interface 1000 Series (Fatigue) | Interface 1000 Series (Fatigue) | Interface 1100 Series 1200 Series | Interface 1100 Series 1200 Series 3200 Series 4200 Series 4600 Series | Competition Generic Load Cell |
|---|---------------------------------|---------------------------------|-----------------------------------|---|-------------------------------|
| | Aluminum | Steel | Aluminum | Steel | Steel |
| Output, mV/V | 1 | 2 | 2 | 4 | 3 |
| Fatigue Life Rating (Cycles) | 10 ⁸ | 10 ⁸ | | | ? |
| Microstrain at Rated Capacity | 450 | 900 | 900 | 1800 | 1790 (1) |
| Max Microstrain on Flexure allowed for 10 ⁸ Cycle Life | 1400 | 1850 | 1400 | 1850 | 1850 |
| Max Microstrain on Gages allowed for 10 ⁸ Cycle Life | 2000 | 2000 | 2000 | 2000 | 1400 (2) |
| Safety Factor, Flexure (Ratio allowed/actual strain) | 3.1 | 2.1 | 1.6 | 1.0 | 1.0 |
| Safety Factor, Gages (Ratio allowed/actual strain) | 4.4 | 2.2 | 2.2 | 1.1 | 0.8 |

NOTES: (1) In typical competitors' load cells, the copper-nickel alloy gages have approximately 20% lower Gage Factor than interface gages and lose approximately 10% of their natural output to temperature compensation circuitry, a loss which is not present with Interface self-compensated gages. The result is that generic 3 mV/V load cells are stressed about equally with Interface 4 mV/V load cells.

(2) Typical copper-nickel alloy gages have approximately 70% of the fatigue resistance of Interface nickel-chromium alloy gages.

Load Cell Resolution

INTERFACE Load Cells are constructed using electric resistance metal foil strain gages bonded to an elastic flexure element. The load cell is a passive analog device with continuous resolution limited ultimately by noise, due to electron motion on the order of 10^{-9} volts (1 nanovolt). Therefore, practically speaking, resolution is limited by the type and quality of the electronic instrumentation used, rather than by the load cell itself. Many reasonably priced instruments can resolve 0.8 to 1.0 microvolt/count as a minimum signal level.

For example, consider a load cell with Rated Output of 3mV/V. Assume that 10VDC excitation is used. At Rated Output, the signal level produced would be:

$$3 \text{ mV/V} \times 10 \text{ V} = 30 \text{ mV}$$

If the indicating instrument can resolve 1 microvolt in the rightmost digit of the display, then:

$$\begin{aligned} \text{Resolution} &= \frac{1 \text{ } \mu\text{volt}}{30 \text{ mV}} \\ &= \frac{1 \text{ } \mu\text{volt}}{30,000 \text{ } \mu\text{volt}} \\ &= 0.000033, \text{ fraction of Rated Output} \\ &= 0.0033 \% \text{ of Rated Output} \end{aligned}$$

If, for example, an MB-5 (5 lbf Rated Capacity) load cell were being used, the resolution in pounds could be calculated as:

$$\begin{aligned} \text{Resolution} &= 5 \text{ lbf} \times 0.000033 \\ &= 0.00017 \text{ lbf} \end{aligned}$$

If an instrument capable of 0.5 microvolt resolution were used, the resolution would be approximately 1 part in 60,000 or 0.000083 pounds for the 5 pound capacity cell. Maximum resolution may be limited by the instrument to the total number of counts that can be displayed.

Another typical example would be the case where only a portion of the range of the load cell is to be used. If the maximum load on the MB-5 were to be 3 pounds, then the output would be:

$$\begin{aligned} 3 \text{ mV/V} \times 3 \text{ lbf} / 5 \text{ lbf} &= \\ 1.8 \text{ mV/V} & \end{aligned}$$

Using 10V excitation provides a signal of 18 mV output for 3 pounds input. If the instrument displays is to display 30,000 counts a signal strength of

$$\begin{aligned} 18 \text{ mV} / 30,000 \text{ counts} &= \\ 0.6 \text{ microvolt/count} & \end{aligned}$$

results in a display of 0.00015 pound/count resolution. Of course, the instrument must have a sensitivity of at least 0.6 μ volt/count for this example.

It can be seen from the above examples that the sensitivity and stability of the electronic instrumentation is critical, when high resolution is required. High electronic gain alone will not achieve good results if the zero stability or gain stability is poor because the readings will drift with time or temperature changes.

Also, keep in mind that excessive resolution can be detrimental in situations where the stability of the applied force is low, as in some hydraulic systems.

Generally, it is desired to read physical units instead of counts. Most instruments provide a count-by feature of 1, 2, 5 or 10 to facilitate this. For the above example, an instrument could be set up to read 30,000 counts by 2 for the 3 pound load, providing resolution of 0.0002 lbf Premium instruments are available that offer as good as 0.001 μ volt/count.

Grounding and Shielding in Load Cell Installations

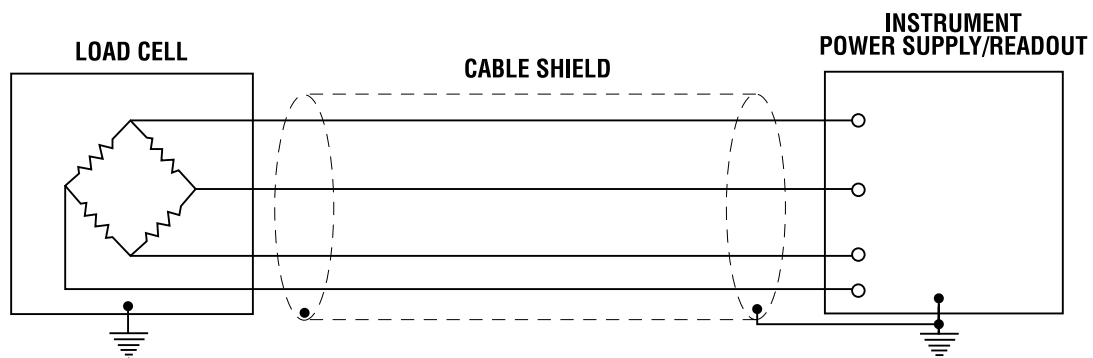
Proper grounding and shielding can be critical to the successful application of load cells generating low level signals. There is no “best way” to set up all systems and the specifics of the installation and associated instrumentation must be considered in arriving at a system configuration that is satisfactory.

The basic rule that should not be violated is that continuous ground loops should be avoided, i.e., a system should not be grounded at multiple points. This could occur, for example, if the shield of the load cell cable were grounded at both ends.

Interface load cell cables are supplied with a braided shield which provides protection from electrostatic interference when properly grounded. This shield is floating (not connected) at the load cell end so that a “ground loop” will not be inadvertently created.

A basic system layout that is easily achieved and usually is satisfactory is as follows:

The load cell case is grounded by mechanical attachment to the structure to which it is mounted. This structure should be properly grounded to the electrical circuits which drive the excitation for the load cell. The braided shield enclosing the load cell leads is grounded at the instrument and the instrument is grounded through the power cord.



Excitation Voltage

INTRODUCTION

Unless otherwise specified, all Interface load cells are calibrated with an excitation voltage of 10 VDC. Although Low Profile™ cells may be operated with excitation as high as 20 VDC, and Mini Series cells can be excited with up to 15 VDC, it is always best to operate a load cell at the same voltage used for the calibration, because certain parameters of the cell are affected by the applied voltage.

The basic construction of a load cell consists of strain gages bonded to a flexure inside the load cell with a very thin layer of an electrically insulating epoxy. Typically, four gages are connected together in a bridge circuit. When voltage is applied to the bridge, the current through the each gage generates heat, which is conducted through the epoxy into the larger mass of the flexure. Thus, the temperature of the bridge is always slightly higher than the flexure during normal operation.

GAGE HEATING

Each 350 ohm leg of a bridge will dissipate over 71 milliwatts at 10 VDC excitation. Since power is proportional to the square of the voltage, the leg would be dissipating over a quarter of a watt at 20 VDC, but only 18 milliwatts at 5 VDC.

ZERO BALANCE

Slight differences in the temperature coefficient of resistance in each leg of a bridge will cause the zero balance to shift slightly as the gage temperature changes. The effect is usually small. For example, a change of excitation from 10.00 VDC to 10.25 VDC will cause a zero shift of less than 0.0014% of rated output.

SENSITIVITY

The gage factor of each gage is adjusted so as to compensate for the temperature coefficient of the modulus of the flexure. This matching is exactly valid only at an excitation of 10 VDC. An increase of excitation voltage to 10.25 VDC would lower the bridge sensitivity by only 0.001%, but use of 20 VDC would cause the sensitivity of a Low Profile cell to decrease by 0.07%, which could be significant. 20 VDC applied to Mini Series cell would cause a more serious effect due to gage heating, and could possibly even shorten the life of the cell.

CREEP

Creep is influenced by temperature, but the magnitude and direction of the effect of large changes in applied voltage is not predictable.

At room temperature, changing the applied voltage from 10.00 VDC to 10.25 VDC causes a negligible effect. However, increasing the voltage on a Low Profile cell to 20 VDC could cause the creep to increase (or decrease) by less than 10% of the creep specification.

CONCLUSION

Because of the inherent temperature stability of the design of Interface load cells, reasonable shifts in excitation voltage will result in parametric shifts which would not be detectable in most normal applications.

However, in applications where the load cell is to be used as a transfer standard, or where the stability of the cell's characteristics is necessary, precautions should be used to assure the stability of the excitation voltage.

Moment Compensation

Do you know if you have an accurate force reading? In most applications it is difficult, if not impossible, to calculate or even estimate the effect of misalignments on the precision of a force measurement system. Moment sensitivity introduces errors into force measurements whenever forces cannot be applied precisely on-axis.

The Low Profile™ design by Interface has the intrinsic capability of canceling moment loads because of its radial design.

- The radial flexure beams are precision machined to balance the on-axis loading.
- The gages are precisely placed so that strains due to on-axis loads are additive and strains due to moment loads tend to cancel under actual moment loading.
- Interface uses eight gages, as opposed to the four used by many manufacturers, which helps to further minimize error from the loads not being perfectly aligned.
- Slight discrepancies between gage outputs are carefully measured and each load cell is adjusted to further reduce extraneous load sensitivity, to meet the specifications in the table below.

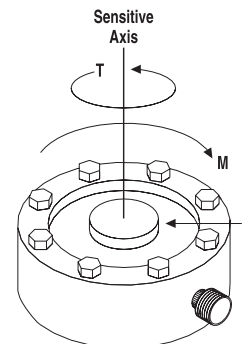
| SERIES | S | M | T | Max Error Due To S or M (% Rated Range) |
|--------|--------------------------------|-------------------------------------|-------------------------------------|---|
| | Max Side Force (% Rated Range) | Max Moment (% Rated Range x 1 inch) | Max Torque (% Rated Range x 1 inch) | |
| 1000 | 100% | 100% | 100% | 0.10% |
| 1100 | 40% | 40% | 40% | 0.04% |
| 1200 | 40% | 40% | 40% | 0.10% |
| 1500 | 40% | 40% | 60 in-lb | 0.10% |
| 1600 | 40% | 40% | 40% | 0.04% |
| 1800 | 100% | 100% | 100% | 0.05% |

RESISTANCE TO EXTRANEIOUS LOADS

The INTERFACE Low Profile™ design provides optimum resistance to extraneous loads to insure maximum operation life and minimize reading errors. The above chart tabulates maximum allowable extraneous loads that may be applied singularly without electrical or mechanical damage to the cell and the maximum error that can be expected from side forces or bending moments. Several loads can be tolerated simultaneously if the total combined load is not more than 100% of the allowable maximum extraneous load.

Only Interface guarantees maximum extraneous load error and physically adjusts every load cell.

The Interface 1200 Series cells have eccentric load sensitivity less than ±0.25% of reading per inch, and the 1000, 1100, and 1600 Series are further adjusted to come in at less than ±0.1% of reading per inch. Most competing load cells will have extraneous load error ten, or more, times higher than with a superior Interface load cell.



Temperature Compensation of Zero

THE ADVANTAGES OF FULL TEMPERATURE RANGE COMPENSATION

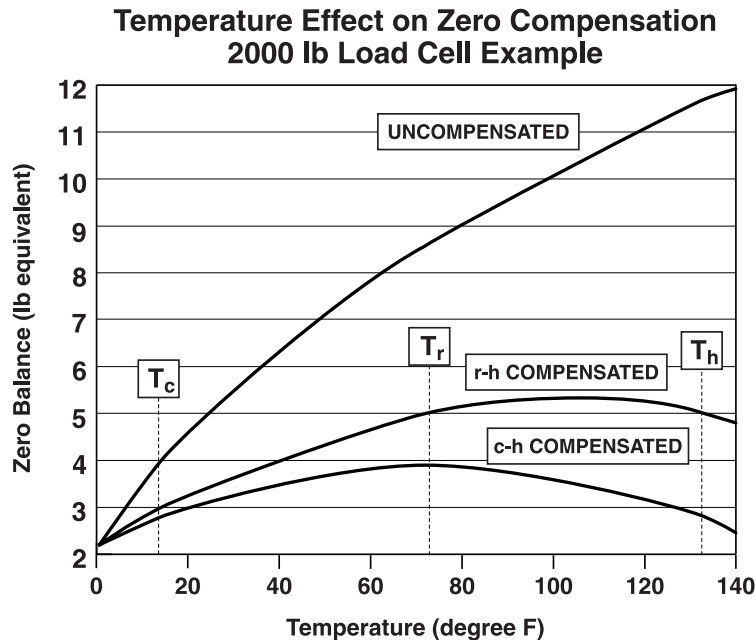
Temperature compensation of zero balance of load cells is conventionally performed using the chord-slope method. A partial-range implementation of this method, acting on a chord between room temperature and one extreme temperature is often used. A better implementation is full-range using three test temperatures and acts on a chord between the cold and hot extremes.

The top curve on the plot represents the zero temperature characteristics of an uncompensated load cell. This curve would ideally be a straight line but often has some nonlinearity such as shown here. The objective of the compensation process is to rotate the curve to a more level position. The middle curve represents a compensation based on room temperature (T_r) and hot temperature (T_h) and is consequently labeled “r-h compensated.” The process equalizes the zero balance values at T_r and T_h .

The lower curve represents a compensation based on cold temperature (T_c) and hot temperature (T_h) and is labeled “c-h compensated.” This process equalizes the zero balance values at T_c and T_h , producing a relatively full-range solution.

It is now apparent why the full range procedure (lower curve) is superior:

1. The slope of the characteristic near room temperature, the temperature at which most applications are of most interest, is near zero.
2. The total range of zero balance over the temperature range of the plot is minimal, approximately one-half that of the partial-range compensated curve in this example.



Instrument Calibration Using a Shunt Calibration Resistor

INTRODUCTION

Since a strain gage load cell is a passive electrical device, there exists a simple, yet effective, method for checking the calibration of a load cell system in the field or when a means of applying actual forces is unavailable. Inducing an electrical imbalance in the cell's bridge circuit will simulate the bridge imbalance caused by the application of actual forces to the load cell. Then the system gain may be adjusted so that the system output signal or display indicates a known force on the load cell.

NOTE

Be careful not to use Shunt Calibration as a substitute for actual force calibration of a system. Shunt Calibration merely supplies a known signal to the signal conditioning unit, in order to check its gain or span adjustment.

EQUIVALENT FORCE

On the Calibration Certificate for each Low Profile load cell, Interface routinely supplies the value of the equivalent force resulting from connecting a specified shunt calibration resistor across one leg of the bridge. For other types of cells, Interface will supply shunt calibration values on special request.

SHUNT CALIBRATION CONNECTIONS

The standard connections used by Interface for tension & compression shunt calibration are specified on the Calibration Certification for each load cell.

It is important that the standard connection be used, although a similar (but not equal) output would result from connecting to the opposite leg of the bridge. Shunt calibration is relatively insensitive to small changes in temperature, although the calibration is precisely correct only at the "Lab Standard" conditions noted on the load cell's Calibration Certificate.

RESISTOR VALUES

The following values of shunt resistors will cause an output of approximately 73% of Rated Output for the load cell types indicated when connected across the specified load cell terminals.

For 4 mV/V cells:

RS-100-30K (30,000 ohms, $\pm 0.01\%$)

For 3 mV/V cells:

RS-100-40K (40,000 ohms, $\pm 0.01\%$)

For 2 mV/V cells:

RS-100-60K (60,000 ohms, $\pm 0.01\%$)

For 1 mV/V cells:

RS-100-120K (120,000 ohms, $\pm 0.01\%$)

PROCEDURE

To perform a shunt calibration, use the following procedure:

1. Remove or stabilize all forces on the load cell.
2. Adjust the display or indicator ZERO to read exactly zero.
3. Connect the shunt calibration resistor to the terminals specified on the Calibration Certificate, and adjust the SPAN or GAIN until the display reads the force value stated on the Certificate.
4. Repeat the procedure to insure a valid calibration.

Load Cell Performance as Affected by Cable Length

INTRODUCTION

For high accuracy force measurement the effects of the cable on the measurement must be considered. For constant voltage excitation there are two effects of significance. These are:

1. An effect on the sensitivity due to voltage drops over the cable length.
2. An effect on the thermal span characteristics of the load cell due to the change of cable resistance with temperature.

CABLE LENGTH EFFECTS

If the load cell is sold with a cable of any length, the sensitivity is determined with the installed cable in calibration and this is not a problem. For load cells with connectors, or if the customer adds cable himself, there will be a loss of sensitivity of approximately 0.37% per 10 feet of 28 gage cable and .09% per 10 feet of 22 gage cable. This error can be eliminated if a six wire cable is run to the end of the load cell cable or connector and used in conjunction with an indicator that has sense lead capability.

TEMPERATURE EFFECTS

Since cable resistance is a function of temperature, the cable response to temperature change affects the thermal span characteristics of the load cell/cable system. For 6-wire systems this effect is eliminated. For 4-wire cables the effect is compensated for in the standard cable lengths offered with the load cells if the load cell and cable are at the same temperature at the same time. For non-standard cable lengths, there will be an effect on thermal span performance. The effect of adding 10 feet of 28 gage cable is to cause a decrease in sensitivity with temperature equal to 0.0008%/°F (an amount equal to the standard Interface specification). For an added 10 feet of 22 gage cable the effect is to decrease sensitivity by .0002%/°F (one-fourth Interface spec). In many cases a customer can tolerate the degraded performance since our standard specification is extremely tight. However, for long cable runs or high accuracy applications, this can be a significant factor. In such cases, the best approach to the problem is to run six wires to the end of the standard cable length and sense the excitation voltage at that point. This eliminates the problem.

Proprietary Interface Strain Gages

UNIQUE FORMULATION, MADE IN-HOUSE

Interface load cells are constructed with strain gages manufactured by Interface from a unique proprietary alloy which provides inherently temperature compensated output. They are manufactured in our facility, in order to provide the necessary strict control of the formulation and the forming process.

MATCHED TEMPERATURE CHARACTERISTICS

The temperature characteristic of the strain gages is adjusted by special processes to exactly match and counteract the temperature characteristic of the modulus of the load cell structural material, thereby providing output which is relatively temperature insensitive. The bridge circuit is simple, reliability is high, and changes in output sensitivity caused by temperature variations are automatically compensated.

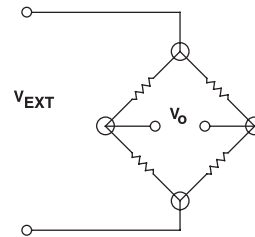
By contrast, competitive load cells use strain gage alloys which require the addition of temperature-sensitive resistors in the bridge circuit for compensation, thus reducing reliability. Since the resistors aren't in intimate thermal contact with the cell's flexure, the dynamic thermal performance, resistance to thermal gradients, and thermal response times are also severely affected.

LONGER FATIGUE LIFE

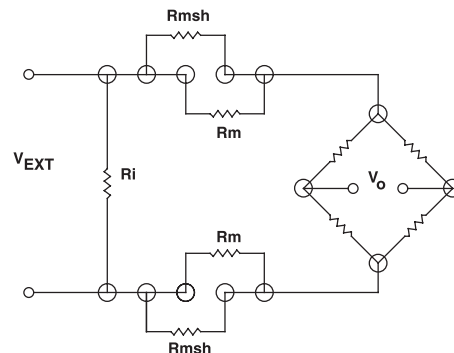
The Interface strain gage alloy provides significantly greater fatigue life than the widely-used constantan gages used by the competition.

HIGHER OUTPUT

A third advantage of the Interface strain gage is higher output, providing higher signal-to-noise ratio and opportunity for higher resolution in precision measurement applications.



INTERFACE LOAD CELL



TYPICAL COMPETITOR'S LOAD CELL

- Rm = Modulus compensating resistor
- Rmsh = Fine trim for Rm
- Ri = Bridge input resistance trim

ORDER TOLL-FREE **1-800-947-5598** www.interfaceforce.com

interface

Warranty & Repair Policy

WARRANTY

1. Interface warrants that its products shall be free from defects in material and workmanship for the full warranty period under normal and proper use when correctly installed. The warranty period for most load cells is two years and for other products is one year, from date of shipment by Interface.
2. Any Interface product, which proves defective in material or in workmanship within the warranty period, will be repaired or replaced free of charge provided that the buyer; (1) provides Interface with satisfactory proof of the defect and that the product was properly installed, maintained and operated within the limits of rated and normal usage; (2) buyer obtains from Interface authorization to return the product; and (3) products claimed to be defective must be returned with transportation charges prepaid, and will be returned to buyer with transportation charges collect unless the item is found to be defective, in which case, Interface will pay the return transportation charges.
3. The remedy set forth herein does not apply to damage to or defects in any product caused by the buyer's misuse or neglect, nor does it apply to any product which has been repaired or disassembled which in the sole judgement of Interface affects the performance of the product.
4. Interface makes no warranty concerning components not manufactured by it. However, in the event of the failure of any component or accessory not manufactured by Interface, reasonable assistance will be given to buyer in obtaining from the respective manufacturer whatever adjustment is reasonable based on the manufacturer's own warranty.
5. Interface expressly disclaims any liability to its customers, dealers, and representatives, and to users of its products, and to any other person for special or consequential damages of any kind and from any cause whatsoever arising out of or in any way connected with the manufacture, sale, handling, repair, maintenance, or replacement arising out of or in any way connected with the use of Interface products.
6. Representations and warranties made by any person, including dealers and representatives of Interface, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of Interface, as set forth above), shall not be binding upon Interface unless reduce to writing and approve by an officer of Interface, Inc.

THIS EXPRESS WARRANTY SUPERCEDES ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OBTAINING SERVICE UNDER WARRANTY

Advance authorization is required before any product is returned to Interface. Prior to the return of any product, write or call the Repair Department at Interface advising them of; (1) a part number; (2) a serial number of the defective product; (3) a technical description of the defect including specific test data, written observations on the failure and specific corrective action required; (4) a no-charge purchase order number (so the product can be returned to sender correctly); and (5) ship and bill addresses. Non-verified problems or defects may be subject to an evaluation charge. Please return the original calibration data with the unit.

REPAIR WARRANTY

All repairs of Interface products are warranted for a period of 90 days from date of shipment. This warranty applies only to those items which were found defective and repaired; it does not apply to products in which no defect was found and returned as is or merely recalibrated. Out of warranty products may not be capable of being returned to the exact original specifications.

Terms & Conditions

The following Terms and Conditions shall apply to any order between Interface Inc., (seller) and buyer, unless overridden by written agreement.

1. ACCEPTANCE

All orders and sales contracts are subject to acceptance or rejection by Interface and are not binding on Interface unless and until so accepted. Acceptance of an order by Interface constitutes a complete and binding contract governed by the terms and conditions of sale expressed herein and by the laws of the state of Arizona. Acceptance is at all time subject to availability for delivery of the goods covered by each order, and prices in effect at the time of shipment, unless otherwise agreed in a separate agreement signed by buyer and Interface.

2. CANCELLATION

In the event of cancellation, buyer will pay promptly upon receipt of invoice from Interface:

- (a) The full contract price for all products which have been completed prior to receipt of notice of cancellation.
- (b) All costs incurred by Interface in connection with the uncompleted portion of the order.
- (c) Cancellation charges incurred by Interface on account of its purchasing commitments made to its suppliers under the order.

3. PATENTS

No license or other rights under any patents, copyrights or trademarks owned or controlled by Interface or under which Interface is licensed are granted to buyer or implied by the sale of products or services hereunder. Buyer shall not identify as genuine products of Interface products purchased hereunder which buyer has modified, or altered in any way nor shall buyer use Interface's trademarks to identify such products; provided, however, that buyer may identify such products as utilizing, containing, or having been manufactured from genuine products of Interface as modified or altered by buyer or buyer's representative. If products or services sold hereunder are manufactured or performed according to buyer's specifications, buyer shall indemnify Interface against any liability for patent, copyright or trademark infringement on account of such manufacture or performance.

4. PRICES

Unless otherwise stated, prices are subject to change without notice. No cash discounts or other discounts for prompt payment are offered unless specifically stated on the face thereof. The prices quoted are based upon the manufacture of the quantity and type ordered and are subject to revision when interruptions, engineering changes, or changes in quantity are caused or required by buyer. Clerical errors made by Interface are subject to correction.

5. TAXES & OTHER CHARGES

To the extent legally permissible, all present and future excise levies, taxes, or any similar charges imposed by any federal, state, foreign or local authority which Interface may be required to pay or collect, upon or with reference to the sale, purchase, transportation, use or consumption of products or services, including taxes measured by the receipts therefrom (except net income and franchise taxes), shall be for the account of buyer.

6. DELIVERY

All sales are F.O.B. Interface's Plant. Delivery dates are approximate and estimated, and are based on prompt receipt of all necessary information from buyer. Interface may make partial shipments of any one or more items covered by the quotation or acknowledgment. Interface assumes no liability for loss, damage, or consequential damages due to delays.

7. TERMS OF PAYMENT

All invoices are payable only in U.S. funds. Payment terms are net 30 days. Credit and delivery of products shall be subject to the approval of Interface to whom all bills are payable and who reserves the right to alter the terms and set a limit of credit. Each shipment shall be treated as a separate and independent contract; but if the buyer fails to fulfill the terms of payment under this or any other contract, Interface at its option may defer further shipments, until payment have been made. Invoices that are not paid by the due date are subject to a late charge of 1.5% per month on the unpaid balance.

8. CONFIDENTIAL INFORMATION

Selected software and hardware, drawings, diagrams, manuals, specifications, and other materials furnished by Interface relating to the use and service of products furnished hereunder, including any information which may be identified as proprietary to Interface. Such software and hardware, diagrams, manuals, drawings, specifications and other materials, have been developed at great expense and are considered to be trade secrets to Interface and buyer may not reproduce them in any way without the express written permission of Interface except as needed to operate and maintain the equipment supplied by Interface.

9. DISPUTE RESOLUTION

This agreement and all transactions hereunder are governed by the laws of the state of Arizona.

**SIGN UP TODAY TO ACCESS
THE INTERFACE TECHNICAL LIBRARY
AT INTERFACEFORCE.COM**

**WITH TOPICS RANGING FROM
LOAD CELL BASICS TO
ADVANCED CALIBRATION
THERE IS SOMETHING
FOR EVERYONE.**



**NEED MORE HELP?
TALK TO ONE OF OUR APPLICATION ENGINEERS TODAY:
480.948.5555**

interface
ADVANCED FORCE MEASUREMENT