



# Force Washer Transducers

For Use in Threaded Fastener Torque-Angle-Tension Testing

## Highlights

- High stiffness in a small package
- Pair of hardened ground washers to minimize effect of "spot" loading
- Furnished with a 5 ft. cable with pigtail leads
- Available in a variety of English and Metric sizes

## Applications

- Measure and Record Tension Characteristics of Threaded Fasteners
- Verify Threaded Fastener Tension Calculations
- Test Fasteners in a Laboratory or Assembly Environment
- Measure Threaded Fastener Clamp Load



Model 054216-01144



PCB Load & Torque Division's RS Technologies Series FT4000 Force Washer Transducers are miniature load cells designed specifically for measuring fastener clamping forces. The design provides high stiffness in a small package, making these load cells ideal for static and dynamic measurements on fasteners, or structural test applications where space limitations exist. Force washer transducers come in a variety of English and Metric sizes.

All transducers are carefully sealed and thoroughly tested prior to shipment. Two hardened steel washers are provided with each unit and should be mounted on both sides of the transducer to minimize any transmitted rotational effects or spot loading.

Series FT4000 Force Washer Transducers can be used along with rotary torque or torque-angle torque sensors and a data acquisition instrument to acquire fastener testing data; Model 962 Portable Data Recorder is recommended. If fastener clamp load alone is required, Model 920 Portable Digital Transducer Instrument can quickly capture and record the data.

RS Technologies provides calibration services for this and their other torque and force products at its A2LA Accredited Calibration Laboratory in Farmington Hills, Michigan.

As with all PCB® instrumentation, these products are complemented with toll-free applications assistance, 24-hour technical service, and are backed by a no-risk policy that guarantees total customer satisfaction or your money refunded.



# Series FT4000 Force Washer Transducers

## English Sizes

| Model No.    | Size      | Inner Diameter     | Outer Diameter     | Height             | Capacity           |
|--------------|-----------|--------------------|--------------------|--------------------|--------------------|
| 054103-01252 | #10       | 0.196 in (5.0 mm)  | 0.682 in (17.3 mm) | 0.255 in (6.5 mm)  | 2500 lbf (11.1 kN) |
| 054104-01502 | 1/4 inch  | 0.256 in (6.5 mm)  | 0.674 in (17.1 mm) | 0.255 in (6.5 mm)  | 5000 lbf (22.2 kN) |
| 054105-01802 | 5/16 inch | 0.319 in (8.1 mm)  | 0.809 in (20.5 mm) | 0.317 in (8.1 mm)  | 8000 lbf (35.6 kN) |
| 054106-01103 | 3/8 inch  | 0.381 in (9.7 mm)  | 0.842 in (21.3 mm) | 0.380 in (9.7 mm)  | 10 klbf (44.5 kN)  |
| 054107-01153 | 7/16 inch | 0.443 in (11.2 mm) | 0.943 in (23.9 mm) | 0.420 in (10.7 mm) | 15 klbf (66.7 kN)  |
| 054108-01203 | 1/2 inch  | 0.506 in (12.8 mm) | 1.111 in (28.2 mm) | 0.455 in (11.6 mm) | 20 klbf (89.0 kN)  |
| 054109-01253 | 9/16 inch | 0.569 in (14.5 mm) | 1.213 in (30.8 mm) | 0.495 in (12.6 mm) | 25 klbf (111.2 kN) |
| 054110-01303 | 5/8 inch  | 0.631 in (16.0 mm) | 1.348 in (34.2 mm) | 0.525 in (13.3 mm) | 30 klbf (133.4 kN) |
| 054112-01403 | 3/4 inch  | 0.756 in (19.2 mm) | 1.618 in (41.1 mm) | 0.595 in (15.1 mm) | 40 klbf (177.9 kN) |
| 054114-01603 | 7/8 inch  | 0.881 in (22.4 mm) | 1.888 in (48.0 mm) | 0.665 in (16.9 mm) | 60 klbf (266.9 kN) |
| 054116-01803 | 1 inch    | 1.006 in (25.5 mm) | 2.158 in (54.8 mm) | 0.735 in (18.7 mm) | 80 klbf (355.6 kN) |

## Metric Sizes

|              |     |                     |                     |                     |                  |
|--------------|-----|---------------------|---------------------|---------------------|------------------|
| 054206-01203 | M6  | 6.16 mm (0.243 in)  | 17.12 mm (0.674 in) | 6.48 mm (0.255 in)  | 20 kN (4496 lbf) |
| 054208-01353 | M8  | 8.16 mm (0.321 in)  | 20.52 mm (0.808 in) | 9.65 mm (0.380 in)  | 35 kN (7869 lbf) |
| 054210-01543 | M10 | 10.16 mm (0.400 in) | 23.95 mm (0.943 in) | 10.67 mm (0.420 in) | 54 kN (12 klbf)  |
| 054212-01084 | M12 | 12.16 mm (0.479 in) | 28.22 mm (1.111 in) | 11.56 mm (0.455 in) | 80 kN (18 klbf)  |
| 054214-01114 | M14 | 14.16 mm (0.557 in) | 30.81 mm (1.213 in) | 12.57 mm (0.495 in) | 110 kN (25 klbf) |
| 054216-01144 | M16 | 16.16 mm (0.636 in) | 34.24 mm (1.348 in) | 13.34 mm (0.525 in) | 140 kN (31 klbf) |
| 054218-01184 | M18 | 18.16 mm (0.715 in) | 41.14 mm (1.620 in) | 15.11 mm (0.595 in) | 180 kN (40 klbf) |
| 054220-01224 | M20 | 20.16 mm (0.794 in) | 41.14 mm (1.620 in) | 15.11 mm (0.595 in) | 220 kN (49 klbf) |
| 054222-01274 | M22 | 22.16 mm (0.872 in) | 47.95 mm (1.888 in) | 16.89 mm (0.665 in) | 270 kN (61 klbf) |
| 054224-01324 | M24 | 24.16 mm (0.951 in) | 54.86 mm (2.160 in) | 18.67 mm (0.735 in) | 320 kN (72 klbf) |
| 054230-01404 | M30 | 30.18 mm (1.188 in) | 71.45 mm (2.813 in) | 25.40 mm (1.000 in) | 400 kN (90 klbf) |

**NOTE:** Fastener Force Washers are not designed for use as high-accuracy clamp force measurement devices.



## Common Specifications

|                             |                               |
|-----------------------------|-------------------------------|
| Construction                | Steel Flexure, Aluminum Cover |
| Output at Rated Capacity    | 1.5 mV/V Nominal              |
| Overload Capacity           | 150% FS                       |
| Non-linearity               | ±5.0% FS                      |
| Hysteresis                  | ±5.0% FS                      |
| Zero Offset                 | ±5.0% FS                      |
| Excitation Voltage          | 10 VDC, Maximum               |
| Bridge Resistance           | 350 Ohms                      |
| Operating Temperature Range | 0 to +200 °F<br>-18 to +93 °C |

## Supplied Accessories

One Pair Hardened Grounded Washers, Shunt Calibration Resistor, & A2LA Accredited Calibration Certificate

## Recommended Accessories

|  |              |
|--|--------------|
| Connector, DB15 Male                             | 42220-001250 |
| Strain Relief                                    | 42230-003200 |
| Model 920 Portable Digital Transducer Instrument | 080920-01000 |
| Model 962 Portable Data Recorder                 | 080962-01000 |



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