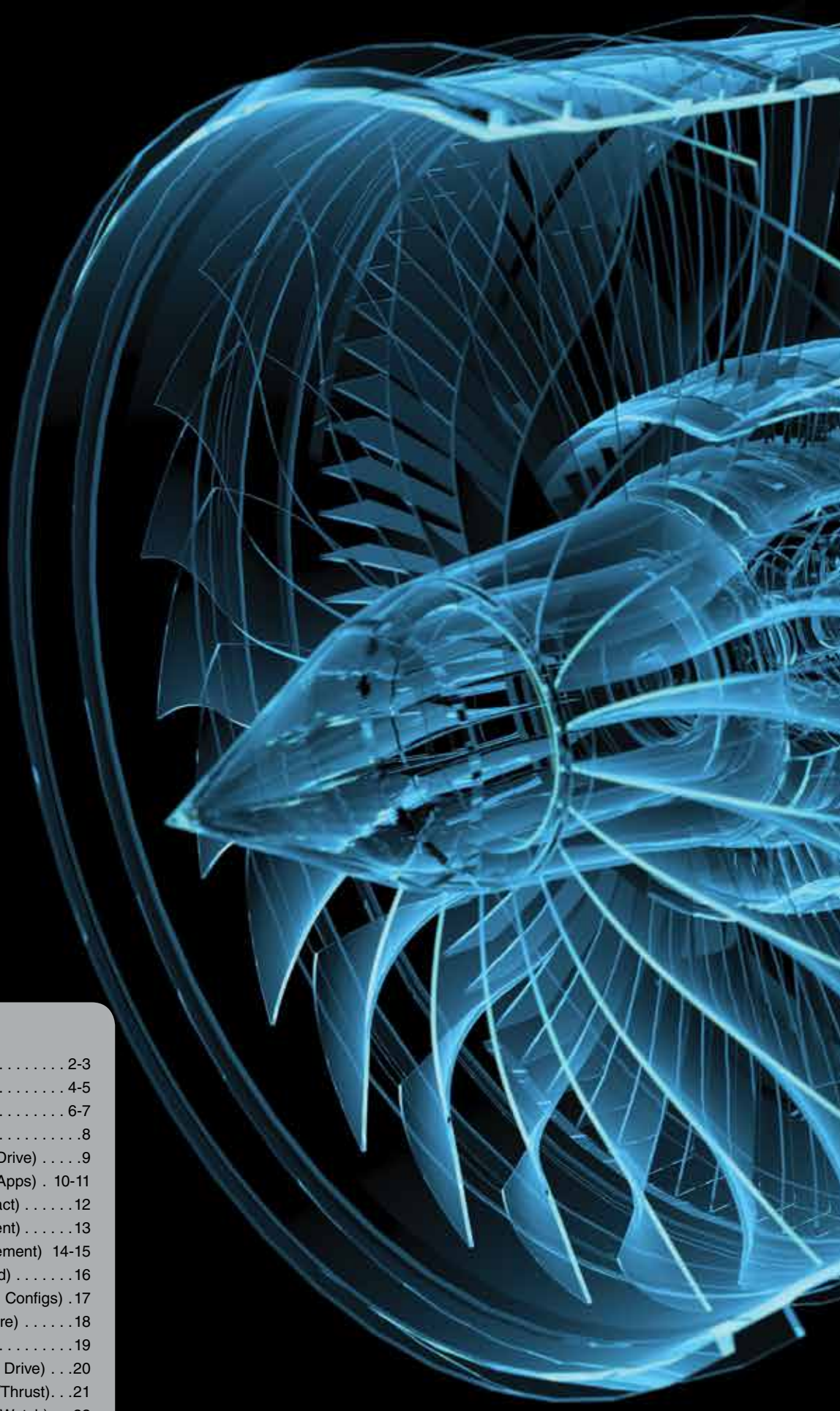
Torque Sensors

Honeywell

SENSING AND CONTROL

# Product Range Guide



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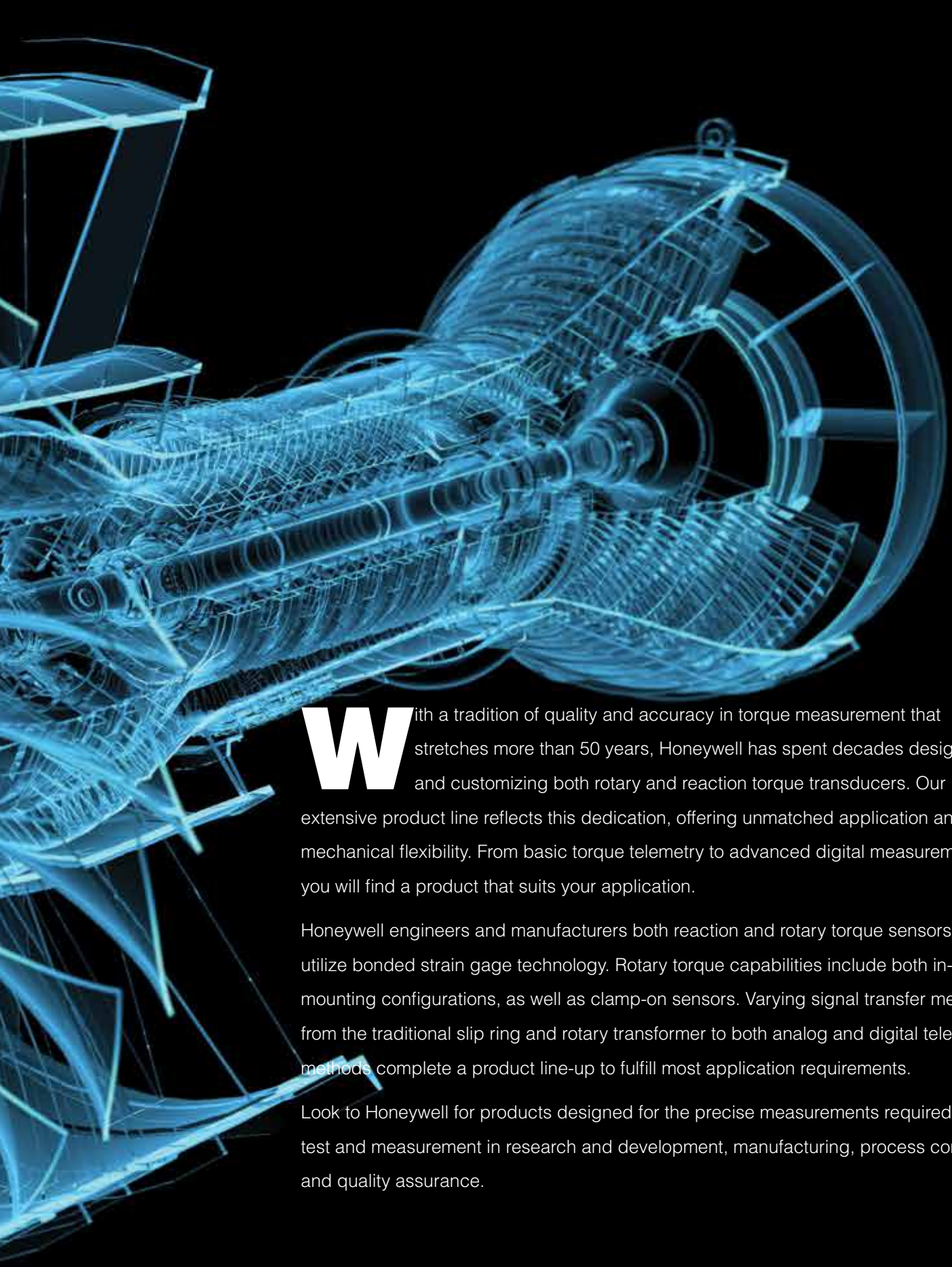


With a tradition of quality and accuracy in torque measurement that stretches more than 50 years, Honeywell has spent decades designing and customizing both rotary and reaction torque transducers. Our extensive product line reflects this dedication, offering unmatched application and mechanical flexibility. From basic torque telemetry to advanced digital measurement, you will find a product that suits your application.

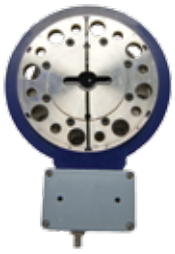
Honeywell engineers and manufacturers both reaction and rotary torque sensors that utilize bonded strain gage technology. Rotary torque capabilities include both in-line mounting configurations, as well as clamp-on sensors. Varying signal transfer methods from the traditional slip ring and rotary transformer to both analog and digital telemetry methods complete a product line-up to fulfill most application requirements.

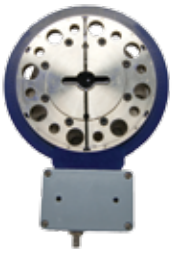
Look to Honeywell for products designed for the precise measurements required for test and measurement in research and development, manufacturing, process control, and quality assurance.

# Digital Telemetry
## TMS 9250

Honeywell's TMS 9250 digital telemetry torque measurement system offers a wireless, non-contact method to measure torque on rotating parts. The wireless design enables higher integrity of the torque data captured through higher resolution, higher sensitivity, faster response, and no mechanical interferences. The result is a more accurate indication of the actual torque being experienced, plus an increase in overall system reliability.

Fully software driven, the TMS 9250 features quick and easy setup, and selectable outputs which can be easily adjusted as needed. With no slip rings or bearings to replace, less routine maintenance is required. The flexible, compact modular design also allows the system to be easily adapted or customized to fit into many types of torque test and measurement applications such as those found in automotive / transportation, aerospace, and industrial manufacturing.





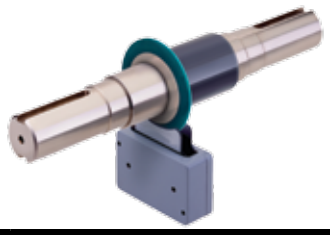
| Series | DIN Series | SAE Series |
|---|---|---|
| **Description** | wireless telemetry | |
| **Range** | 100 Nm to 10K Nm [50 lb-ft to 8K lb-ft]* | |
| **Accuracy** | ±0.05 % rated output (±0.1 % for ranges larger than 10K Nm [8K ft-lb]) | |
| **Non-linearity** | ±0.05 % rated output (±0.1 % for ranges larger than 10K Nm [8K ft-lb]) | |
| **Hysteresis** | ±0.05 % rated output (±0.1 % for ranges larger than 10K Nm [8K ft-lb]) | |
| **Output** | ±10 V; 4-20 mA; 10 KHz ±5 KHz; 60 KHz ±20 KHz | |
| **Temperature, operating** | Sensor and CCM: -40 °C to 85 °C [-40 °F to 185 °F]<br>SPM and Power Supply: 0 °C to 40 °C [32 °F to 104 °F] | |
| **Temperature, compensated** | Sensor and CCM: -10 °C to 50 °C [14 °F to 122 °F] | |
| **RPM rating** | up to 20000 rpm | |

* consult factory for capacity above 10K Nm

### Features

- 0.05 % full scale, total system accuracy
- DIN, SAE, shaft to shaft, integral or custom couplings available
- High torsional stiffness with low rotating inertia
- Multiple, field selectable analog outputs, scalable "on the fly"
- Compact, modular design to fit into tight spaces
- Quick and easy installation with full software set-up
- FCC and CE certified, meeting all EMC emission and susceptibility requirements

*For more information, specifications, or to place an order, please visit us online at* ***http://measurementsensors.honeywell.com or contact us at 800-848-6564 or +1 614-850-5000.***



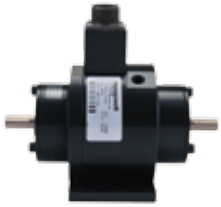
| Shaft | Integral Coupling | Special |
|---|---|---|
| wireless telemetry | wireless telemetry | wireless telemetry |
| 0.35 Nm [50 oz-in] to 7 Nm [1K oz-in]<br>5 Nm [50 in-lbs] and up | 300 Nm [250 lb-ft] and up | 50 Nm [50 lb-ft] and up |
| ±0.05 % rated output | ±0.05 % rated output | ±0.05 % rated output |
| ±0.05 % rated output | ±0.05 % rated output | ±0.05 % rated output |
| ±0.05 % rated output | ±0.05 % rated output | ±0.05 % rated output |
| ±10 V; 4-20 mA; 10 KHz ±5 KHz; 60 KHz ±20 KHz | ±10 V; 4-20 mA; 10 KHz ±5 KHz; 60 KHz ±20 KHz | ±10 V; 4-20 mA; 10 KHz ±5 KHz; 60 KHz ±20 KHz |
| Sensor and CCM: -40 °C to 85 °C [-40 °F to 185 °F]<br>SPM and Power Supply: 0 °C to 40 °C [32 °F to 104 °F] | Sensor and CCM: -40 °C to 85 °C [-40 °F to 185 °F]<br>SPM and Power Supply: 0 °C to 40 °C [32 °F to 104 °F] | Sensor and CCM: -40 °C to 85 °C [-40 °F to 185 °F]<br>SPM and Power Supply: 0 °C to 40 °C [32 °F to 104 °F] |
| Sensor and CCM: -10 °C to 50 °C [14 °F to 122 °F] | Sensor and CCM: -10 °C to 50 °C [14 °F to 122 °F] | Sensor and CCM: -10 °C to 50 °C [14 °F to 122 °F] |
| up to 20000 rpm | up to 20000 rpm | – |

## Typical Applications

- Powertrain testing:  engine, engine diagnostics, cold engine, transmission driveshaft and rear axle differential
- Dynamometer
- Brakes and wheel hub
- Drive wheels
- Continuous track, heavy equipment
- Oil and water pump testing
- Jet engine / turbine testing
- Wind power gearbox and torsion blade testing / propeller testing
- Turn up / turn down gear box testing
- Industrial motor / generator testing
- Auxiliary component efficiency testing

# Torque Transducers
## Rotary • Non-Contact, Unamplified, Shaft

Honeywell offers non-contact, rotary transformer, shaft torque sensors for installations running long-term durability testing. The non-contact nature of the signal transfer virtually eliminates the need for maintenance. High overload protection with high signal output helps prevent potential damage to the sensor. The carrier frequency excitation provides increased signal/noise immunity. Models offered include low capacity (50 in-oz [0,35 Nm] to 1,000 in-oz [7 Nm]) and standard (50 in-lb [5 Nm] to 100,000 in-lb [11300 Nm]) capacity ranges, both with 0.1 % non-linearity and hysteresis. Models with enhanced accuracy (up to 0.05 % non-linearity and hysteresis) are also available.



| Series | 1602 | 1604-1607 | 1800 Series |
|---|---|---|---|
| **Description** | shaft | shaft | shaft |
| **ac carrier excitation requirement** | Excitation voltage, 10 Vac max. rms: 3.28 kHz optimum | Excitation voltage, 10 Vac max. rms: 3.28 kHz optimum | Excitation voltage, 10 Vac max. rms: 3.28 kHz optimum |
| **Range** | 0,35 Nm to 7,06 Nm [50 oz-in to 1,000 oz-in] | 5,6 Nm to 11298,5 Nm [50 lb-in to 100,000 lb-in] | 11,3 Nm to 11298,5 Nm [100 lb-in to 100,000 lb-in] |
| **Accuracy** | 0.15 % rated output | 0.15 % rated output | 0.07 % rated output |
| **Non-linearity** | ±0.1 % rated output | ±0.1 % rated output | ±0.05 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output | ±0.05 % rated output |
| **Output** | ±2 mV/V (nominal) | ±2 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | MS-3102E-14S-5P | MS-3102E-14S-5P | MS-3102E-14S-5P |
| **RPM rating** | 20,000 | • 50 lb-in to 2,000 lb-in = 10,000<br>• 2,000 lb-in, 5,000 lb-in, 10,000 lb-in = 10,000<br>• 20,000 lb-in, 30,000 lb-in = 6,700<br>• 50,000 lb-in, 100,000 lb-in = 6,000 | • 100 lb-in to 2,000 lb-in = 27,000<br>• 2,000 lb-in, 5,000 lb-in, 10000 lb-in = 22,000<br>• 20,000 lb-in = 12,000<br>• 50,000 lb-in, 100,000 lb-in = 10,000 |

### Features

- 0.1 % non-linearity and hysteresis; 0.05 % for enhanced accuracy models
- Speed sensor and foot mount options available
- High overload protection with high signal output (sensitivity)
- Extended speed range
- Minimal maintenance due to bearings only contact
- Carrier frequency excitation provides increased signal/noise immunity

### Typical Applications

- Motor testing and development
- Quality assurance testing
- Automated assembly process monitoring
- Gear boxes, pump, and drive line testing
- Torque test stands (startup, running, and stall torque level monitoring)
- Conveyers / belt drive monitoring
- Mixing and/or viscosity control

*see page 23 for additional models available.*

# Torque Transducers
## Rotary • Non-Contact, Unamplified, Special

Honeywell offers a range of non-contact rotary torque sensors adaptable for many special applications, including hydraulic pump testing, hydraulic motor testing, military aircraft test stands, aircraft starter testing, and cross-bleed starting.

| Series | 1815A, 1815K | 1388-124 |
|---|---|---|
| **Description** | special application | special application |
| **ac carrier excitation requirement** | Excitation voltage, 10 Vac max.<br>rms: 3.28 kHz optimum | Excitation voltage, 10 Vac max.<br>rms: 3.28 kHz optimum |
| **Range** | 5,65 Nm to 112,98 Nm<br>[50 lb-in to 1,000 lb-in] (“A” spline)<br>5,65 Nm to 1129,84 Nm<br>[50 lb-in to 10,000 lb-in] (“K” spline) | 56,5 Nm [500 lb-in]<br>112,98 Nm [1,000 lb-in] |
| **Accuracy** | 0.07 % rated output | 0.21 % rated output |
| **Non-linearity** | ±0.05 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.05 % rated output | ±0.1 % rated output |
| **Output** | ±2 mV/V (nominal) | 2 mV/V (nominal) |
| **Temperature, operating** | -29 °C to 93 °C<br>[-20 °F to 200 °F] | -29 °C to 93 °C<br>[-20 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C<br>[70 °F to 170 °F] | 22 °C to 77 °C<br>[70 °F to 170 °F] |
| **Electrical termination** | MS-3102E-14S-5P | MS-3102E-14S-5P speed rating |
| **RPM rating** | 25,000; 15,000 | 5,000 |

### Features

- 0.05 % & 0.1 % non-linearity and hysteresis
- 1815: minimal maintenance due to “bearings only” contact
- 1388-124: Reduced sensitivity to belt/chain tension loads on torque readings not to exceed maximum overhung moment

### Typical Applications

- Feedback control loop on textile machinery
- Processing torque
- Belt-driven pulley torque monitoring
- Chain-driven sprocket torque monitoring
- Spindle control
- Roll or web-tension monitoring

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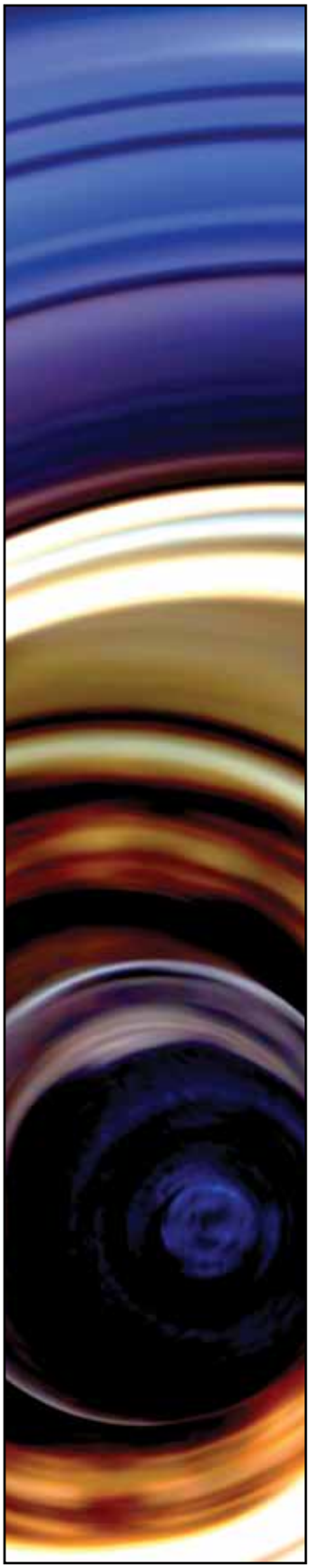
# Torque Transducers
## Slip Ring • Shaft



Honeywell's shaft, slip ring torque sensors are designed for fractional horsepower motor test applications and to monitor start up, running and stall torque levels. These rugged torque sensors are offered in capacities from 10 oz-in (0,07 Nm) up to 100000 in-lb (11300 Nm) for shaft-mounting configurations.

| Series | 1103 | 1102 | 1100 Series |
|---|---|---|---|
| **Description** | shaft | shaft | shaft |
| **Range** | 0,07 Nm [10 oz-in], 0,14 Nm [20 oz-in] | 0,35 Nm to 7,06 Nm [50 oz-in to 1,000 oz-in] | 11,3 Nm to 11298,5 Nm [100 lb-in to 100,000 lb-in ] |
| **Accuracy** | 0.09 % rated output | 0.15 % rated output | 0.15 % rated output |
| **Non-linearity** | ±0.05 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.05 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | ±0.95 mV/V (nominal) | ±2 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | PT02E-10-6P | PT02E-10-6P | MS-3102E-14S-5P |
| **RPM rating** | 20,000 | 20,000 | 100 lb-in to 2,000 lb-in = 9,000<br>5,000 lb-in , 10,000 lb-in = 8,500<br>20,000 lb-in = 4,500<br>50,000 lb-in, 100,000 lb-in = 4,000 |

### Features

- Capacity ranges from 10 oz-in (0,07 Nm) up to 100,000 in-lb [11300 Nm]
- 0.05 % or 0.1 % non-linearity and hysteresis
- Higher frequency response
- Can be used with almost all existing dc and ac signal conditioning equipment
- Cost-effective option for general in-line applications

### Typical Applications

- Motor testing and development
- Quality assurance testing
- Small pump testing
- Drive-line or gear box torque monitoring
- Conveyors / belt drive monitoring
- Paper mill drive motor monitoring
- Torque test stands
- Medical device monitoring

*see page 23 for additional models available.*

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# Torque Transducers
## Slip Ring • Square Drive

Honeywell's square drive, slip ring torque sensors measure the output torque of stall and clutch-type nut-runners in production fastening operations. Units equipped with incremental encoders are available for applications where the fastener's angle of rotation as well as torque data are required. These sensors are often used to monitor operation of systems using the following fastening strategies: turn of the nut, tension control and yield control.

| Series | 1254 |
|---|---|
| **Description** | square drive |
| **Range** | 5,6 Nm to 1355,8 Nm [50 lb-in to 1,000 lb-ft] |
| **Accuracy** | 0.23 % rated output |
| **Non-linearity** | ±0.15 % rated output |
| **Hysteresis** | ±0.15 % rated output |
| **Output** | ±2 mV/V ±0.25 % full scale |
| **Temperature, operating** | -29 °C to 93 °C [-20 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | PT02H-12-10P |
| **RPM rating** | 5000 |

### Features

- Capacity ranges from 50 in-lb to 1000 ft-lb
- 0.15 % non-linearity and hysteresis
- Hex (in-lb sizes) and square drive configurations
- Incremental encoder option
- Adaptable for portable usage
- No special adapter tools required
- Repeatable torque measurements

### Typical Applications

- Calibration reference for "hard usage" mechanical torque wrenches
- Fastening torque monitoring
- Torque to turn
- Nut running
- Tension and/or yield control

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# Torque Transducers
## Slip Ring • Special Application

Honeywell offers a range of slip ring torque sensors adaptable for many special industrial applications, including measuring steering torque feedback for automobiles, trucks, buses, and material handling equipment, wheel cornering testing, and precision feedback control on textile machinery.

| Series | 1246 | 1388-102 |
|---|---|---|
| **Description** | special application | special application |
| **Range** | 2259,7 Nm to 22597 Nm [20K lb-in to 200K lb-in] | 56,5 Nm [500 lb-in] 112,98 Nm [1,000 lb-in] |
| **Accuracy** | 0.37 % rated output | 0.21 % rated output |
| **Non-linearity** | ±0.25 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.25 % rated output | ±0.1 % rated output |
| **Output** | ±1.5 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | PT02H-10-6P | PT02H-10-6P |
| **RPM rating** | 5,000 | 5,000 |

### Features

- Slip ring torque sensors for special applications
- Large selection of capacities and sizes
- Custom options available

### Typical Applications

- Automotive brake testing
- Automotive wheel torque design
- Car, truck or bus steering effort measurement
- Marine steering effort measurement
- Belt-driven pulley, chain-driven sprocket monitoring
- Spindle control
- Roll or web-tension monitoring
- Feedback control loop

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| 1369 | 1115A, 1115K | 1242, 1239 and 1308 |
|---|---|---|
| special application | special application | special application |
| 67,8 Nm [50 lb-ft],<br>135,6 Nm [100 lb-ft], 271,1 Nm [200 lb-ft] | 56,5 Nm to 112,98 Nm [50 lb-in to 1,000 lb-in]<br>(“A” spline ),<br>56,5 Nm to 1129,85 Nm [50 lb-in to 10,000 lb-in]<br>(“K” spline ) | 3389,5 Nm to 6779,1 Nm [30,000 lb-in to 60,000 lb-in] (1242),<br>564,9 Nm to 2259,7 Nm [5,000 lb-in to 20,000 lb-in] (1239),<br>1129,8 Nm to 2259,7 Nm [10,000 lb-in to 20,000 lb-in] (1308) |
| 0.79 % rated output | 0.15 % rated output | 0.36 % rated output |
| < 0.50 % rated output | ±0.1 % rated output | ±0.25 % rated output |
| < 0.50 % rated output | ±0.1 % rated output | ±0.25 % rated output |
| ±2 mV/V (nominal) | ±2 mV/V (nominal) | ±1 mV/V (nominal) , ±1.5 mV/V (nominal) |
| -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] | -29 °C to 93 °C [-20 °F to 200 °F] |
| 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] |
| PT02E-12-8P | MS-3102E-14S-5P | MS-3102E-14S-5P |
| 100 | – | – |

# Torque Transducers
## Rotary • Non-Contact, Amplified, Shaft/Square

With their compact size and multiple mounting options, Honeywell's non-contact amplified rotary torque sensors are suitable for laboratory applications as well as industrial environments, and are offered in either shaft or square drive styles. The contactless transmission of supply voltage and measuring signal enables continuous operation with low maintenance.

| Series | 1700 Series | 1754 |
|---|---|---|
| **Description** | shaft | square drive |
| **Range** | 0,02 Nm to 1500 Nm [0.18 lb-in to 13276.1 lb-in] | 500 Nm to 2,000 Nm [4425.3 lb-in to 17701.5 lb-in] |
| **Accuracy** | < 0.25 % rated output | < 0.25 % rated output |
| **Non-linearity** | ±0.1 % rated output | ±0.15 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | ±10 volts | ±5 volts |
| **Temperature, operating** | 0 °C to 60 °C [32 °F to 140 °F] | 0 °C to 60 °C [32 °F to 140 °F] |
| **Temperature, compensated** | 5 °C to 45 °C [41 °F to 113 °F] | 5 °C to 45 °C [41 °F to 113 °F] |
| **Electrical termination** | 12-pin binder | 12-pin binder |
| **RPM rating** | up to 37,000 | 12,000 |

### Features

- Non-contact amplified rotary torque sensor
- 0,02 Nm to 1500 Nm capacity range or 500 Nm to 2000 Nm capacity range
- 0.25 % accuracy
- Built-in instrumentation amplifier (high level voltage output
- Speed sensor or angle encoder option
- Compact size
- Custom options available

### Typical Applications

- Motor and transmission testing
- Gear boxes, pump, and drive line testing
- Automated assembly process monitoring
- Conveyors/belt drive monitoring
- Paper mill drive motor monitoring
- Torque test stands
- Mixing and/or viscosity control

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# Wireless Telemetry
## Rotary Measurement Systems

Where other measurement methods are affected by vibration, dust, moisture, high RPMs, and large axial/radial shaft movements, Honeywell's Model 2100 series (2101 - 2106) and 1202B series wireless telemetry rotary torque measurement systems are designed for both short and long term testing and monitoring of torque or strain on these rotating applications. A combination of up to six transmitters and receivers operating on different frequencies provide up to six points of measurement on the same shaft. A scaleable analog output and numeric display readout on the receiver provides electrical and visual indication of the measurement.

These products are highly customizable to meet individual measurement and monitoring needs; contact Honeywell to discuss your particular application and environment.

| Series | 2101-2106 Rotary Measurement System | |
|---|---|---|
| **Description** | Rotary Measurement System<br>Model 2101<br>Model 2102<br>Model 2103<br>Model 2104<br>Model 2105<br>Model 2106 | <br>One-channel system<br>Two-channel system<br>Three-channel system<br>Four-channel system<br>Five-channel system<br>Six-channel system |
| **Accuracy** | <0.25 % rated output | |
| **Output** | analog voltage 0 to 5, 0 to 10 | |
| **Temperature, Operating** | Transmitter is -40 C to 85 C<br>IPS and Receiver are -15 C to 65 C | |
| **Temperature, Transmitter** | 0 °C to 85 °C [32 °F to 185 °F] | |
| **Fits Shaft Sizes** | 50,8 mm to 1066,8 mm [2 in to 42 in] | |

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# Wireless Telemetry
## Clamp-on Measurement Systems

Honeywell's WDC series of clamp-on analog telemetry torque transducers measure torque on rotating machinery or propulsion systems where up-time is critical. These systems monitor very large motors (350 HP or above).

Clamp-on collars surround the shaft and provide digital readouts to display torque, RPM, and computed horsepower. A programmable alarm can be set so that the system can be shut down or scheduled for maintenance. Units can be sealed to work in harsh environments and areas of high vibration. Waterproof systems for marine environments are also available.

Honeywell's WDC series systems are highly customized to meet each unique application and operating environment. Please contact Honeywell for more information on the appropriate system to fit your particular situation.

| Series | 9300 |
|---|---|
| **Description** | Model 9300 Clamp-on Rotary Torque Transducer System |
| **Accuracy** | <1 % rated output |
| **Non-Linearity** | ±0.25 % rated output |
| **Hysteresis** | ±0.10 % rated output |
| **Repeatability** | ±0.05 % rated output |
| **Output** | analog voltage 0-5; 0-10 |
| **Temperature, Operating** | 0 °C to 85 °C [32 °F to 185 °F] |
| **Temperature, Compensated** | 0 °C to 85 °C [32 °F to 185 °F] |
| **Torsional Stiffness** | 0.125 in max. |
| **Fits Shaft Sizes** | From 63,5 mm to 392,17 mm [2.5 in to 15.4 in diameter] |

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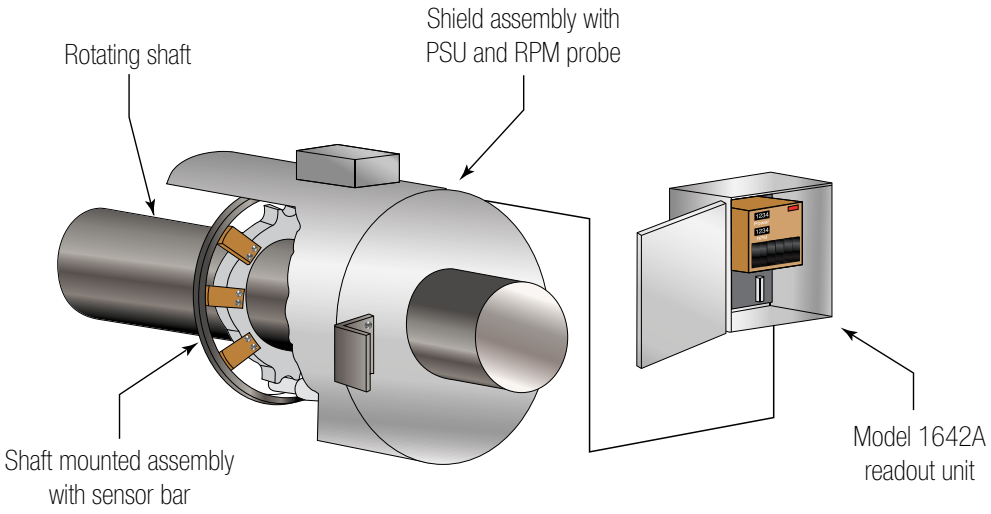


**Model 1602 system drawing**

| 1602A/1602A-01 |
|---|
| 1602A: Clamp-On Propulsion Monitoring System<br>1602A-01: Clamp-On Propulsion Monitoring System (torque measurement only)<br>1603A: Clamp-On Propulsion Monitoring System (without cover)<br>1603A-01: Clamp-On Propulsion Monitoring System (without cover) (torque measurement only)<br>1605: Clamp-On Horsepower Monitoring System |
| <1 % rated output |
| ±0.25 % rated output |
| ±0.10 % rated output |
| ±0.05 % rated output |
| analog voltage 0 V to 5 V; 0 V to 10 V or current 4 mA to 20 mA |
| 0 °C to 85 °C [32 °F to 185 °F] |
| 21°C to 85 °C [70 °F to 185 °F] |
| 0.125 in max. |
| 1602 & 1605: From 381 mm to 762 mm [15 in to 30 in] in diameter<br>1603: From 63,5 mm to 391 mm [2.5 in to 15.4 in] in diameter |

## Features

- Measures torque, horsepower, and RPM
- Non-contact wireless telemetry technology transmits thermocouple data to a receiver
- RF modulation types include FSK and PWM - typical RF operating frequencies range up to 16 MHz
- Clamp-on torsionmeter
- Can be optimized to work in high vibration areas and tight paces
- Custom options available

## Typical Applications

- Marine:  Propulsion system monitoring, hull and propeller fouling, load and balancing on twin screw vessels, fuel conservation programs
- Power plant equipment monitoring (turbines, etc.)
- Large industrial dryers and incinerators for waste disposal

# Torque Transducers
## Reaction - Flanged

Honeywell's flanged, reaction torque sensors are designed for installation between test pieces such as motors, switches, axles or shafts and their mounting plates. Each model utilizes four bonded strain gauges on a special-machined portion of the transducer to achieve a minimal non-linearity over a large dynamic range.

These models operate and are calibrated in both directions and are made of either stainless or nickel-plated alloy steel with no moving parts for enhanced durability in harsh, industrial environments.

| Series | 2102 | 2110 | QFFH-9 |
|---|---|---|---|
| **Description** | flange | flange | flange |
| **Range** | 5,65 Nm to 112,98 Nm [50 lb-in to 1,000 lb-in] | 225,97 Nm to 271163,59 Nm [2,000 lb-in to 2,400,000 lb-in] | 338,95 Nm to 2711,64 Nm [3,000 in-lb to 24,000 in-lb] |
| **Non-linearity** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | 2.5 mV/V (nominal) | ±2 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -54 °C to 93 °C [-65 °F to 200 °F] | -54 °C to 93 °C [-65 °F to 200 °F] | -54 °C to 107 °C [-65 °F to 225 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] | 16 °C to 71 °C [60 °F to 160 °F] |
| **Electrical termination** | MS-3102E-14S-5P | MS-3102E-14S-5P | Bendix PTIH-10-6P or equivalent |

### Features

- 50 in-lb [5 Nm] up to 2,400,000 in-lb [271,000 Nm] capacities
- 0.1 % non-linearity and hysteresis
- Low-end-sensitivity due to absence of moving parts
- Wide dynamic range

### Typical Applications

- Tire braking
- Motor dynamometers
- Friction-skid testing
- Twist measurement
- Structural endurance
- Component or product testing

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# Torque Transducers
## Reaction - Special Configurations

Honeywell offers a series of hollow, reaction torque sensors designed for reaction force measurement in mixing, hydraulic pump and motor test applications. These models operate and are calibrated in both directions, utilizing four bonded strain gauges on a special-machined portion of the transducer to achieve a maximum non-linearity of 0.1 % over a wide dynamic range. The nickel-plated alloy steel construction, with no moving parts, enhances durability in harsh industrial environments.

| Series | 2404 | 2320 |
|---|---|---|
| **Description** | hollow reaction | flanged reaction |
| **Range** | 5,6 Nm to 564,9 Nm [50 lb-in to 5000 lb-in] | 1355,8 Nm [12,000 lb-in], 4067 Nm [36,000 lb-in] |
| **Non-linearity** | ±0.1 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | 1.5 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -54 °C to 93 °C [-65 °F to 200 °F] | -54 °C to 93 °C [-65 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | MS-3102E-14S-5P | MS-3102E-14S-5P |

### Features

- 50 in-lb [5,6 Nm] up to 36,000 in-lb [4067 Nm] capacities
- 0.1 % non-linearity and hysteresis
- High torsional stiffness
- High resistance to bending moments
- Low-end sensitivity due to absence of moving parts

### Typical Applications

- Mixing applications
- Viscosity measurement
- Hydraulic pump and motor testing
- Dynamometer testing

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# Torque Transducers
## Reaction - Miniature

Honeywell's miniature, low capacity, reaction torque sensors are designed and engineered to fit into small spaces with tight clearances, yet still provide highly accurate torque measurements. These sensors are made of modular stainless steel, aluminum, or nickel-plated alloy steel with no moving parts for excellent durability under harsh industrial conditions.

Each sensor has four bonded strain gauges positioned on a special-machined portion of the transducer to effectively measure even slight torque loads to achieve a minimal non-linearity over a large dynamic range.

| Series | 2105 | QWFK-8M | QWLC-8M |
|---|---|---|---|
| **Description** | miniature | miniature | miniature |
| **Range** | 0,35 Nm to 7,06 Nm<br>[50 oz-in to 1,000 oz-in] | 0,18 Nm to 1,77 Nm<br>[25 in-oz to 250 in-oz]<br>5,6 Nm to 33,9 Nm<br>[50 in-lb to 300 in-lb] | 0,18 Nm to 1,77 Nm<br>[25 in-oz to 250 in-oz]<br>5,6 Nm to 33,9 Nm<br>[50 in-lb to 300 in-lb] |
| **Non-linearity** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | ±2 mV/V (nominal) | ±2 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -54 °C to 93 °C<br>[-65 °F to 200 °F] | -54 °C to 107 °C<br>[-65 °F to 225 °F] | -54 °C to 107 °C<br>[-65 °F to 225 °F] |
| **Temperature, compensated** | 21 °C to 77 °C<br>[70 °F to 170 °F] | 16 °C to 71 °C<br>[60 °F to 160 °F] | 16 °C to 71 °C<br>[60 °F to 160 °F] |
| **Electrical termination** | PT02H-10-6P | Teflon cable (1.5 m [5 ft]) | Teflon cable (1.5 m [5 ft]) |

### Features

- 25 in-oz [0,18 Nm] up to 300 in-lb [34 Nm] capacities
- 0.1 % non-linearity and hysteresis
- Compact size
- High frequency response
- Stainless steel construction
- No maintenance of slip rings, bearings or brushes

### Typical Applications

- Twist measurement
- Small component and product testing
- Switch testing

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# Torque Transducers
## Reaction - Shaft

Honeywell's shaft reaction torque sensors are designed for installation between test pieces, such as motors, switches, axles or shafts and their mounting plates. These models operate and are calibrated in both directions. They are constructed of either stainless or nickel-plated alloy steel with no moving parts for enhanced durability in harsh industrial environments.

| Series | 2120 Low | 2120 | QSFK-9 |
|---|---|---|---|
| **Description** | shaft | shaft | shaft |
| **Range** | 0,35 Nm to 7,06 Nm<br>[50 oz-in to 1,000 oz-in] | 11,3 Nm to 56492,4 Nm]<br>[100 lb-in to 500,000 lb-in] | [11,3 Nm to 2711,6 Nm]<br>100 in-lb to 24,000 in-lb |
| **Accuracy** | 0.15 % rated output | 0.15 % rated output | ±0.15 % rated output |
| **Non-linearity** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Hysteresis** | ±0.1 % rated output | ±0.1 % rated output | ±0.1 % rated output |
| **Output** | ±2 mV/V (nominal) | ±2 mV/V (nominal) | ±2 mV/V (nominal) |
| **Temperature, operating** | -54 °C to 93 °C<br>[-65 °F to 200 °F] | -54 °C to 93 °C<br>[-65 °F to 200 °F] | -54 °C to 107 °C<br>[-65 °F to 225 °F] |
| **Temperature, compensated** | 21 °C to 77 °C<br>[70 °F to 170 °F] | 21 °C to 77 °C<br>[70 °F to 170 °F] | 16 °C to 71 °C<br>[60 °F to 160 °F] |
| **Electrical termination** | PT02H-10-6P | MS-3102E-14S-5P | MS3102A-14S-6P or equivalent |

### Features

- 50 in-oz [0,35 Nm] to 1,000 in-oz [7 Nm] or 100 in-lb [10 Nm] to 500,000 in-lb [56500 Nm] capacities
- 0.1 % non-linearity and hysteresis
- Wide dynamic range
- Stainless steel or nickel-plated alloy construction
- No maintenance of slip rings, bearings or brushes
- High frequency response
- Low-end sensitivity

### Typical Applications

- Tire braking
- Motor dynamometers
- Friction-skid testing
- Twist measurement
- Stall torque
- Component and product testing

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# Torque Transducers
## Reaction - Square Drive

Honeywell's reaction, square drive sensors are primarily used in torque wrench calibration applications, such as socket-wrench torque monitoring, where repeatable torque measurements are needed. They are cost-effective and adaptable for portable usage, with no special adapter tools required. These sensors may also be used in a production line, assembly line, stall nut-runner setup and calibration.

| Series | 2133-300 |
|---|---|
| Description | square drive |
| Range | 0,42 Nm [10 lb-ft], 0,84 Nm [20 lb-ft], 2,11 Nm [50 lb-ft], 4,21 Nm [100 lb-ft], 10,5 Nm [250 lb-ft], 25,3 Nm [600 lb-ft], 42,1 Nm [1,000 lb-ft] |
| Accuracy | 0.37 % rated output |
| Non-linearity | ±0.25 % rated output |
| Hysteresis | ±0.25 % rated output |
| Output | ±2 mV/V (nominal) |
| Temperature, operating | -54 °C to 93 °C [-65 °F to 200 °F] |
| Temperature, compensated | 21 °C to 77 °C [70 °F to 170 °F] |

### Features

- 10 ft-lb to 1,000 ft-lb capacities
- 0.25 % non-linearity and hysteresis
- Adaptable for portable usage
- No special adapter tools required
- Repeatable torque measurements

### Typical Applications

- Production line/assembly line stall nutrunner set-up, calibration, and verification
- Socket wrench torque monitoring
- Calibration reference for "hard usage" mechanical torque wrenches

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# Torque Transducers
## Reaction - Torque Thrust

Honeywell's Model 6400 series reaction torque-thrust transducers are used to sense both torque and thrust parameters simultaneously. These torque sensors are constructed of one-piece, nickel-plated alloy steel and are designed specifically to provide the strength and rigidity required to withstand extraneous loads and bending moments. The unique construction also provides both maximum structure life and minimum thrust/torque crosstalk.

| Series | 6400 |
|---|---|
| **Description** | thrust |
| **Range** | 101,7 Nm/ 1,500 lb to 11 298,5 Nm/ 200,000 lb<br>[900 lb-in/1,500 lb to 100,000 lb-in/200,000 lb] |
| **Accuracy** | 0.23 % rated output |
| **Non-linearity** | ±0.15 % rated output |
| **Hysteresis** | ±0.15 % rated output |
| **Output** | 1.5 mV/V (nominal) |
| **Temperature, operating** | -54 °C to 93 °C [-65 °F to 200 °F] |
| **Temperature, compensated** | 21 °C to 77 °C [70 °F to 170 °F] |
| **Electrical termination** | MS-3102E-14S-5P |

### Features

- 900 in-lb/1,500 lb to 100,000 in-lb/200,000 lb (standard)
- 0.15 % non-linearity and hysteresis
- Reduced crosstalk
- Extraneous load resistance
- Single piece construction
- Fatigue rated

### Typical Applications

- Material testing
- Geological drilling or boring applications
- Component endurance testing
- Structural integrity testing

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# Torque Transducers
## Reaction - Torque Watch

Honeywell offers a series of torque watch gauges for measurement of very low, low static, and high range torque. Each model features internal stainless steel rotation stops which help prevent damage from over-torque up to two times the normal range (three times the normal range for the low range series). All models are simple to use and can measure torque in either a clockwise or counter-clockwise direction.

| Series | 366 | 651 | 940 |
|---|---|---|---|
| **Description** | low range | mid range | high range |
| **Range** | 0.003 oz-in to 0.6 oz-in<br>0.2 g-cm to 42 g-cm | 0.5 oz-in to 10 oz-in<br>2.8 gm-cm to 600 gm-cm | 15 oz-in to 200 oz-in<br>1 Kgm-cm to 14 Kgm-cm<br>0.1 Nm to 1.4 Nm |
| **Accuracy** | ±5 %, ±10 % rated output | ±2 % rated output | ±2 % rated output |

### Features

- Accurate measurement of high range, low static, or very low torque
- Accuracy ranges from 2 %, 5 % and 10 % depending on model
- Measures torque in either a clockwise or counter-clockwise direction
- Keyed chuck or square socket driver adapter
- Dial indication
- Overload protection

### Typical Applications

- Production assembly line
- Quality assurance

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# Torque Transducers
## Accessories and Special Order Products

Honeywell provides a wide range of accessories for our test and measurement sensor products, which are designed to meet additional requirements for most customer applications.

**TEST & MEASUREMENT ACCESSORIES**

- Optional speed sensing available
- Passive magnetic pickups
- Zero velocity pickups
- Footmounts
- Cables
- Signal conditioning/readout devices
- Calibration arms

### Additional Torque Models Available

| Series | Description | Capacity | Features |
|---|---|---|---|
| 1641 | Rotary Torque: Non-contact, unamplified, flange mount | 2250 Nm to 11300 Nm [20000 lb-in to 100000 lb-in] | • Shortened drive length<br>• Extended speed range<br>• Minimal maintenance due to “bearings only” contact<br>• High performance accuracy |
| 1648 | Rotary Torque: Non-contact, unamplified, flange mount | 225 Nm to 1130 Nm [2000 lb-in to 10000 lb-in] | • Shortened drive length<br>• Extended speed range<br>• Minimal maintenance due to “bearings only” contact<br>• High performance accuracy |
| 1615K | Rotary Torque: Slip ring, special application | 5,6 Nm to 1130 Nm [50 lb-in to 10000 lb-in] | • Conforms to Army/Navy mounting standards |
| 1228 | Rotary Torque: Slip ring, flange mount | 225 Nm to 1130 Nm [2000 lb-in to 10000 lb-in] | • Special application flanges<br>• Short drive length<br>• An industry military standard for pump and driveline testing |
| 1248 | Rotary Torque: Slip ring, flange mount | 2250 Nm [20000 lb-in] | • Special application flanges<br>• Short drive length<br>• An industry military standard for pump and driveline testing |

**Warranty/Remedy**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.
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Sensing and Control
**Honeywell**
1985 Douglas Drive North
Golden Valley, MN 55422
**honeywell.com**

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LifeElectronics
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*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

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