Series 420 Specification Rotor / Stator
Non-contact Rotary Torque Transducers

DESCRIPTION
Datum Electronics has further extended its standard range of torque transducers to cater for higher rotary speeds and an increased number of torque ranges.

The 420 Series torque transducers operate with no direct contact from the rotor to the stator, they are available either as complete transducers or as separate rotor/stator assemblies for test rig and OEM applications. They provide a system accuracy of 0.1% of full scale either into a rack-mounted indicator, a PC or a control system.

The standard range of housings cater for torque ranges from 10Nm up to 10kNm, the same modular elements have been applied to bespoke transducers for use down as low as 1Nm and up to 200kNm. The 420 Series is compatible with Datum’s full range of torque indicators (Type 300 torque indicator, Type 310 portable torque and speed indicator, Type 370 torque, speed and power indicator) and a range of data-logging software including TorqueLog.

Torque measurement applications often benefit from an engineering input at an early stage in terms of the application of standard transducers or the design of a bespoke unit. We at Datum Electronics have an experienced design team with a wealth of experience and we are confident that we can engineer a design solution which will more than meet your requirements.

Among the enhanced features are the additional options for:

- Direct Serial Outputs
- Analogue Output (via Type 686 Analogue Output Module)
- Increased Sampling Rates
- Advanced Analysis Tools

The new range is complemented by Datum’s ability to engineer special torque solutions with Transducers, Indicators and Software tailor made to meet customer requirements.

FEATURES

Series 420 Non-Contact Rotary Torque Transducer

- Non-contact Transmission
- High Accuracy
- High Tolerance to Misalignment
- 250 - 100,000Nm High Speed Non-contact Torque Transducers

Types of Specification

- Rotor / Stator Non-Contact Torque Transducers (Type RS420)
- Imperial Replacement Non-Contact Torque Transducers (Type RS420)
## TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>TRANSDUCER SIZE</th>
<th>TORQUE RANGE</th>
<th>SPEED</th>
<th>COMBINED ERROR</th>
<th>SAMPLE RATE</th>
<th>SIGNAL RESOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS420 - Size 1</td>
<td>0-5 Nm to 0-100Nm</td>
<td>0 - 12,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
<tr>
<td>RS420 - Size 2</td>
<td>0-100Nm to 0-750Nm</td>
<td>0 - 12,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
<tr>
<td>RS420 - Size 3</td>
<td>0-750Nm to 0-3,500Nm</td>
<td>0 - 12,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
<tr>
<td>RS420 - Size 4</td>
<td>0-3,500Nm to 0-15,000Nm</td>
<td>0 - 8,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
<tr>
<td>RS420 - Size 5</td>
<td>0-18,000Nm to 0-60,000Nm</td>
<td>0 - 8,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
<tr>
<td>RS420 - Size 6</td>
<td>0-60,000Nm to 0-100,000Nm</td>
<td>0 - 8,000rpm</td>
<td>0.1% FSD (standard)</td>
<td>100sps</td>
<td>12 bit resolution</td>
</tr>
</tbody>
</table>

These are our standardised range of torque transducers. If your requirements dictate anything above our standard transducer range of 100,000Nm we can and have engineered torque measurement solutions up to 250,000Nm.

- Torque Output: Digital RS232
- Speed Output: Digital RS232
- Analogue Output Options: 4-20mA / +/-10Vdc for torque and speed
- Serial Data Options: Digital RS485 / CAN Bus
- Signal Transmission: Non-Contact Inductive
- Combined Error (Accuracy): 0.1% FSD (standard) 0.05% of full scale to order (including non-linearity, hysteresis, signal transmission)
- Output Sample Rate: 10 - 100sps (Samples Per Second) - see notes for higher data rates to 5KHz
- Operating Temperature Range: - 10 to + 70C
- Service Temperature Range: - 20 to 85C (-20 to +125C Series 430*)
- Storage Temperature Range: - 40 to + 85C
- * If you require a greater temperature range than the ones quoted, the Series 430 torque transducer can be adapted to meet your needs. Contact Datum Electronics for further information (T: +44 (0) 1983 810310  E: sales@datum-electronics.co.uk.)
- Temperature Effect on Span: 0.001% per degree C
- Temperature Effect on Zero: 0.002% per degree C
- Calibration (normal temp): 22 degree C
- Environmental Protection: IP54 (IP65 to order if required)
- Cable Length: 4 metres (standard) longer if required
- Connection: Connector (TRIAD01 4-Way Plug) transducer
- Mechanical Overload: 150% of rated load (standard) up to 400% if required
- Signal Convention: + ve clockwise
  - ve anti-clockwise
- Power Supply: 11 - 15 Vdc, (24Vdc and 110 / 240Vac)
- Speed Measurement (not effected by oil / dust etc…): Integral Magnetic pick off
- Other Options available (Non-standard): Fast data in burst mode for transient analysis to 30000Hz
  - AC Coupled signal output
  - Signal Filtering
  - Shaft Torque, Bending and Thrust Outputs
  - Built into customer shaft
- Compatible Instrumentation: Type 370 / Type 310 / Type 300 and Datum Torque-Log Software
### DIMENSIONS

<table>
<thead>
<tr>
<th></th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Total length</td>
<td>184 mm</td>
<td>240 mm</td>
<td>315 mm</td>
<td>425 mm</td>
</tr>
<tr>
<td>B Stator body length</td>
<td>128 mm</td>
<td>128 mm</td>
<td>119 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>C End of stator body - to end of shaft</td>
<td>28 mm</td>
<td>56 mm</td>
<td>98 mm</td>
<td>112.5 mm</td>
</tr>
<tr>
<td>D Shaft diameter</td>
<td>15 mm</td>
<td>30 mm</td>
<td>50 mm</td>
<td>75 mm</td>
</tr>
<tr>
<td>E Stator body diameter</td>
<td>60 mm</td>
<td>85 mm</td>
<td>105 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>F Keyway width</td>
<td>5 mm</td>
<td>8 mm</td>
<td>12 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>G Keyway depth</td>
<td>3 mm</td>
<td>6.6 mm</td>
<td>6.6 mm</td>
<td>12 mm</td>
</tr>
<tr>
<td>H Keyway length</td>
<td>25 mm</td>
<td>44 mm</td>
<td>78 mm</td>
<td>75 mm</td>
</tr>
</tbody>
</table>

### STATOR DIMENSIONS

<table>
<thead>
<tr>
<th>Size</th>
<th>Max Rating</th>
<th>Width</th>
<th>Depth</th>
<th>Height</th>
<th>Fixing Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,3</td>
<td>3500Nm</td>
<td>45 mm</td>
<td>150 mm</td>
<td>134 mm</td>
<td>220 x 45 mm</td>
</tr>
<tr>
<td>4,5</td>
<td>60,000Nm</td>
<td>45 mm</td>
<td>200 mm</td>
<td>205 mm*</td>
<td>270 x 45 mm</td>
</tr>
<tr>
<td>6</td>
<td>100,000Nm</td>
<td>45 mm</td>
<td>250 mm</td>
<td>260 mm*</td>
<td>320 x 45 mm</td>
</tr>
</tbody>
</table>

*Height will increase with shaft diameter

Rotor / Stator Torque Transducer without bearings

This type of torque transducer has no bearings, and there is no secondary load on the test shaft and allows for multiple shaft sizes. This type of transducer is very similar to the FF420 but has a keyway shaft as opposed to flanges.
Datum Electronics offers a choice of Torque Indicators, which compliment the Series 420 Non-contact Rotary Torque Transducers. These indicators output data in various forms including Torque, Speed, Power, Strain and Load. Datum Electronics have also developed a compatible software package called TorqueLog, which allows data measurements to be recorded direct to your PC or laptop. See page 5 for full details.

**type300 wall mounted or free standing torque cell indicator**

- Torque, Load or Strain Indication
- Large 5-Digit Displays
- Control Outputs 4-20mA, 0-10Vdc
- 2x relay
- Serial Output for PC or Printer
- Peak Hold
- Simple to Calibrate

Designed for use with all conventional load cells, torque transducers and strain gauges. Available in wall mounted or free standing enclosures.

**type310 hand-held torque cell indicator**

- Torque, Load or Strain Indication
- Simple to Calibrate
- Outputs 4-20mA, 0-5V
- Peak Hold
- Load Cell Supply

Compatible with Load Cells 0-3.2mV/V
- PC Interface Software
- Tare
- 10 Load Cell Calibration Memory
- Rechargeable NiMH Batteries

Designed for use with all conventional load cells, torque transducers and strain gauges. The indicator provides a 2x 20 Character LCD readout of the load, its units and status.

**type370 rack or desktop torque cell indicator**

- Torque, Speed and Power Indication
- Large 5-Digit Displays
- Control Outputs 4-20mA, 0-10Vdc
- Serial Output for PC or Printer
- Simple to Calibrate

For use with Datum’s digital and slip ring torque transducers Supplied as a 19” rack or instrument case

**type686 torque transducer analogue output module**

- Converts digital output from Torque Transducer and converts to either 4 - 20mA or 0 - 10 V Analogue Output. LED’s indicate level of torque from 0 - 100% rating
- (- ve torque)
- Very low or 0 torque being recieved
- Mid range level of torque being received
- Very high or 100% torque being received.

- Serial port for connection to PC or Laptop
- Compatible with TorqueLog software
- Zero reset allows operator to reset zero at current applied Torque Level.
- For use with Datum’s Torque Transducer Range
Datum Electronics TorqueLog software is an easy and convenient way of collecting data. Compatible with Windows 2000 and XP, the TorqueLog software provides a direct readout of Torque, Speed and Power on a PC with additional facilities to read peak torque, log data to Excel and provide data for other applications.

Using a Serial Port or USB Port (adapter required) from either a Laptop or desktop PC connected through to the Series 420 Torque Transducer, you can have the data that you require at your fingertips, allowing you to process the information which can be printed, displayed graphically or quickly saved as a Microsoft Excel spreadsheet.

The TorqueLog software is easy to use and easy to install, and provides the user with data access at the touch of a button.

DATA LOGGING

TorqueLog software can log data to the disk drive of your PC in a comma separated value (CSV) format. This format is directly compatible with Microsoft Excel.

Data can be logged, at a selectable interval from the transducer data rate (normally about 15 per second) to once every 30 minutes.

Data is logged as Torque only, or Torque, Speed & Power depending on the display mode selected.

FEATURES

Datum Electronics TorqueLog software is designed work on a Laptop or Desktop WindowsTM PC to provide display of Torque, (or Torque Speed and Power) and Data logging facilities for Datum Electronics Range of Digital contact less Torque Transducers.

SYSTEM REQUIREMENTS

The software is compatible with any WindowsTM PC but a basic minimum specification is as listed below.

PentiumTM Desktop or Laptop PC with one spare Com Port (Com1 — Com 4)

Minimum 640 x 480 Screen resolution (Min 256 colour, preferably 16 bit)

Min 5Mb free HDD space

WindowsTM 98, 2000 or XP