

# MODEL 3411

## TORQUE DISPLAY

### FEATURES

- For use with all Magtrol TS / TM / TMHS / TMB In-Line Torque Transducers and TF Torque Flange Sensors
- High Quality, Easy-to-Read Vacuum Fluorescent Readout: Displays torque, speed and power
- Addition of high resolution quadrature encoder enables low RPM applications or position measurements
- Selectable English, Metric and SI Torque Units
- Isolated USB Interface
- Ethernet connectivity
- Torque: Analog, raw sensor output
- Speed output; analog or digital, user selectable
- B.I.T.E. (Built-In Test Equipment)
- Overload Indication
- TARE Function
- Includes Magtrol TORQUE Software
- High Speed Data Acquisition: Up to 500 torque and speed points per second with time stamp
- Rack mount or handle versions available



Fig. 1: MODEL 3411 | Torque Display

### TORQUE SOFTWARE

Magtrol's TORQUE Software is a user-friendly LabView™ executable program, used to automatically collect torque, speed and mechanical power data. The data can be printed, displayed graphically or quickly saved as a Microsoft® Excel spreadsheet. Standard features of TORQUE include:

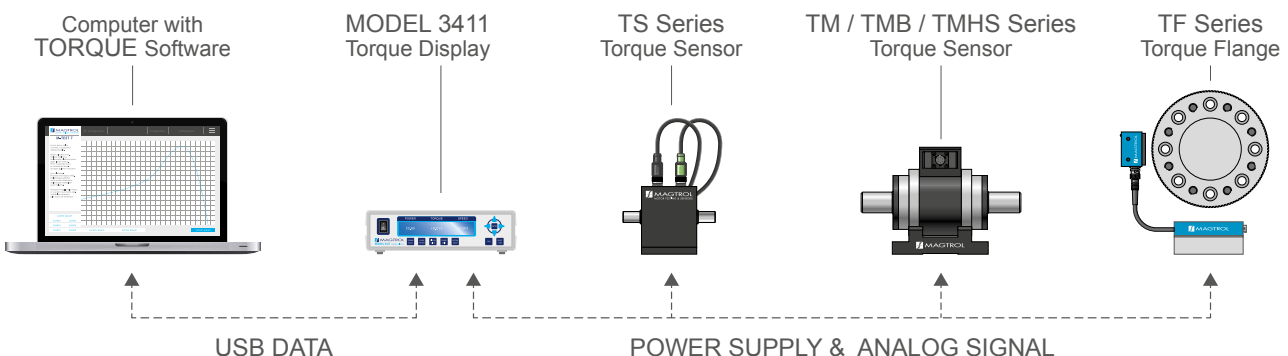
- Measured Parameter vs. Time
- Adjustable Sampling Rates
- Polynomial Curve Fitting
- Peak Torque Capture
- Direction of Rotation
- Multi-Axes Graphing
- Optional USB Interface: for reading up to 4 thermocouples

### DESCRIPTION

Magtrol's MODEL 3411 - Torque Display is designed for use with all Magtrol TS, TM, TMHS, TMB and TF Torque Transducers. This easy-to-use device powers the transducer and utilizes high speed processing to display torque, speed and mechanical power. It includes a tare function to help offset

any slight residuals caused by couplings or suspended loads. The MODEL 3411 may also be used with any torque sensors requiring 24 VDC power (500 mA max.) with  $\pm 5$  VDC torque output ( $\pm 10$  VDC max.) and open collector, TTL or CMOS output for the speed signal.

### SYSTEM CONFIGURATIONS



**SPECIFICATIONS**
**MEASUREMENT CHARACTERISTICS**

|                         |   |
|-------------------------|---|
| Maximum Input Speed     | 199 999 rpm                             |
| Maximum Input Frequency | 199 999 Hz                              |
| Speed Accuracy          | 0.01 % of reading from 5 to 199 999 rpm |
| Torque Accuracy         | 0.02 % of range ( $\pm 10$ V)           |

**ELECTRICAL CHARACTERISTICS**

|   |  |
|---|--|
| Voltage Requirements                                  | 120/240 VAC / 60/50 Hz <sup>a)</sup>   |
| Power Requirements                                    | 36 VA  |
| Sensor Power Available (through the 14-pin Connector) | 5 VDC 200 mA, fused internally at 500 mA<br>24 VDC 500 mA, short circuit protected |
| Fuses (5 x 20 mm)                                     | IEC / 500 mA / 250 VAC / T   |

**INPUTS AND OUTPUTS**

|                                |   |
|--------------------------------|---|
| Transducer Input Speed / Angle | Open Collector, 5VHC, TTL, CMOS                               |
| Transducer Input Torque        | $\pm 10$ VDC max  |
| Torque Output BNC              | $\pm 10$ VDC (direct from transducer)                         |
| Speed Output BNC               | 5 VHC pulse (buffered from transducer) or $\pm 10$ VDC analog |

**ENVIRONMENT**

|                         |                                  |
|-------------------------|----------------------------------|
| Operating Temperature   | 5 °C to 50 °C                    |
| Relative Humidity       | < 80 %                           |
| Temperature Coefficient | 0.001 % (5 °C to 50 °C) of FS/°C |
| Weight                  | 5.11 lb (2.32 kg)                |

a) The MODEL 3411 has built-in Over Voltage protection on the AC power entry in order to comply to CE requirements. Do not perform insulation tests at a voltage higher than 250VDC.

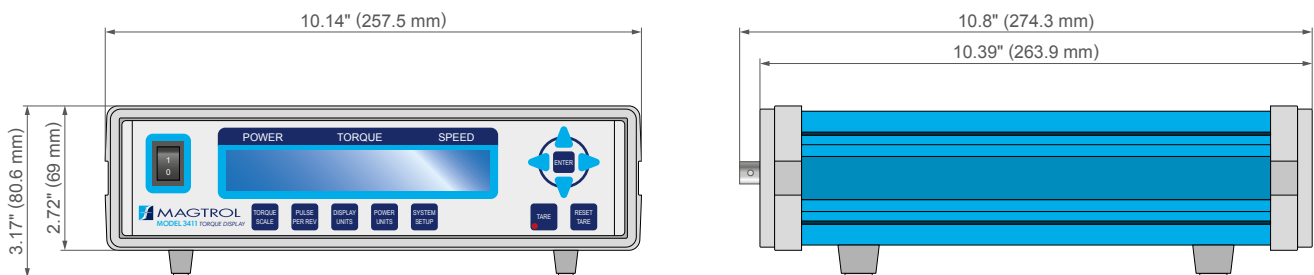
**DIMENSIONS**


Fig. 2: MODEL 3411 HDL (handel) version

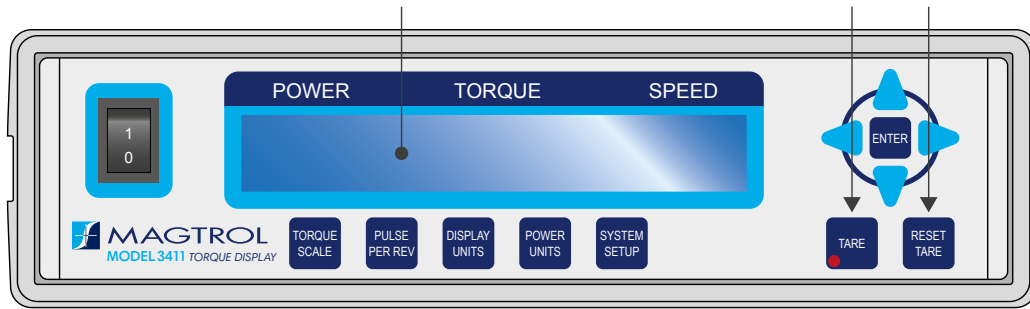
The MODEL 3411 torque display is also available in a Rack Mountable version (RMK) as well as in a portable version (HDL) with adjustable handle.

For more information, please contact our sales engineers or visit our website [www.magtrol.com](http://www.magtrol.com).

**NOTE:** 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.

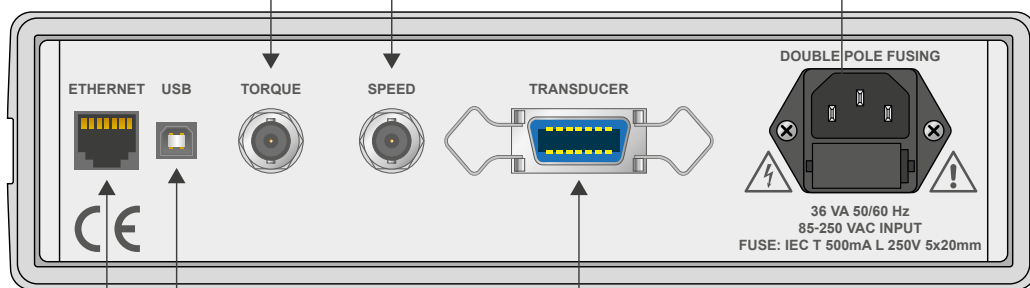
PRODUCT INTERFACE

Displays Torque, Speed and Mechanical Power Values TARE Reset TARE



Torque Scale (xx.xx N·m / 5V)  
 Pulse Per Revolution (1 to 99 999 PPR)  
 Display Units (Oz·in, Oz·ft, Lb·in, Lb·ft, g·cm, kg·cm, mN·m, cN·m, N·m, daN·m)  
 System Setup  
 Power Units (W, kW, HP)

Torque Output BNC Speed Output BNC Power socket



ETHERNET connection USB connection Transducer connection 14-pin  
 For use with Magtrol TS, TM, TMHS, TMB or TF Torque Transducer (or other brand torque sensor)

SYSTEM OPTIONS AND ACCESSORIES

CABLE ASSEMBLIES - TS SERIES

|                       |            |   |
|-----------------------|------------|---|
| ORDERING NUMBER       | ER 121 / 0 | 1 |
| 1 : Cable length 5 m  |            |   |
| 2 : Cable length 10 m |            |   |
| 3 : Cable length 20 m |            |   |
| 4 : Cable length 3 m  |            |   |

CABLE ASSEMBLIES - TM/TMB/TMHS SERIES

|                       |            |   |
|-----------------------|------------|---|
| ORDERING NUMBER       | ER 113 / 0 | 1 |
| 1 : Cable length 5 m  |            |   |
| 2 : Cable length 10 m |            |   |
| 3 : Cable length 20 m |            |   |

CABLE ASSEMBLIES - TF SERIES

|                       |            |   |
|-----------------------|------------|---|
| ORDERING NUMBER       | ER 116 / 0 | 1 |
| 1 : Cable length 5 m  |            |   |
| 2 : Cable length 10 m |            |   |
| 3 : Cable length 20 m |            |   |

SBB 14 - SIGNAL BREAKOUT BOX



Fig. 3: SBB-14 Signal Breakout Box

Magtrol's SBB 14 Signal Breakout Box is designed to assist in the monitoring of speed, torque and index signals obtained from either a Magtrol dynamometer or torque transducer. The easy-to-use SBB 14 is simply inserted in series between a Magtrol controller and any Magtrol dynamometer or torque transducer.

Speed, torque and index signals are then outputted through BNC connectors to an oscilloscope or other DAQ instrumentation device. A toggle switch is now provided to allow switching between a torque transducer and an external encoder wired to the encoder input.

|                 |        |
|-----------------|--------|
| ORDERING NUMBER | SBB-14 |
|-----------------|--------|

**RELATED PRODUCTS**

**TF SERIES - TORQUE FLANGE SENSOR**



Fig. 4: Torque Flange Sensors TF 313 & TF 318 with HF transmitter & signal amplifier

TF Series are the compact, bearingless and maintenance-free Torque Flange Sensor from Magtrol. Its high torsional rigidity supports direct mounting on the machine shaft or flange, avoiding the use of couplings on one side. This allows easy integration into a test system, shortens the overall length and reduces costs.

Based on strain-gauge technology, the TF Sensor use HF technology to transmit its highly accurate signal. An external HF receiver transforms the signal into an analog output signal  $\pm 10\text{VDC}$ . Rotational speed can be measured and converted to a TTL output signal with the optional speed pickup.

The contactless design of the Sensor permits a gap up to 5 mm between the sensor and the HF transmitter, which makes the signal acquisition insensitive to any axial or radial misalignment. Another advantage of this system is its insusceptibility to signal interference - due to the fact that, unlike other designs, the antenna does not need to be looped around the sensor.

**DSP 7000 - HIGH-SPEED PROGRAMMABLE DYNAMOMETER CONTROLLERS**



Fig. 5: DSP 7001 | Programmable Dynamometer Controllers

Magtrol's Model DSP 7000 High Speed Programmable Dynamometer Controller employs state-of-the-art Digital Signal Processing Technology to provide superior motor testing capabilities. Designed for use with any Magtrol Hysteresis, Eddy-Current or Powder Dynamometer, Magtrol In-Line Torque Transducer or auxiliary instrumentation, the DSP 7000 can provide complete PC control via the USB or optional IEEE-488 or RS-232 interface. With up to 500 readings per second, the DSP7000 is ideally suited for both the test lab and the production line.

**TS & TM SERIES - IN-LINE TORQUE SENSOR**



Fig. 6: TM313 & TS106 In-line Torque Sensor

Magtrol's In-Line Torque Transducers deliver precise torque and speed measurement over a very broad range. Each model has an integrated conditioning electronic module providing 0 to  $\pm 10\text{VDC}$  torque output and an open collector speed output or TTL

**TM Series** Torque Transducers are very reliable, providing high overload protection, excellent long term stability and high noise immunity. All transducer models employ our unique non-contact differential transformer torque measuring technology. This measuring technology offers many benefits, most notably that no electronic components rotate during operation. To provide customers with several price/performance options, Magtrol offers three torque transducer models: basic model (TMB Series), high accuracy (TM Series) and high speed with high accuracy (TMHS). The integrated electronic circuit, supplied by single DC voltage, provides torque and speed signals without any additional amplifier. The transducer is a stand-alone measuring chain.

**TS Series** In-Line Torque Sensors provide extremely accurate torque and speed measurement. Each model has an integrated conditioning electronic module providing 0VDC to  $\pm 5\text{VDC}$  ( $\pm 10\text{VDC}$ ), as well as a USB interface which can be directly connected to a computer. The sensor is delivered with software allowing easy connection and data acquisition. A speed encoder provides 360 PPR (Pulse Per Revolution) in Tach A, Tach B and Index reference Z (1 PPR). TS Series sensor models are strain gauge-based measuring systems with imbedded telemetry signal transmission. Available torque ranges from 0.05N·m to 100N·m. Higher torque ranges will be available soon.

**ORDERING INFORMATION**

|                 |                    |
|-----------------|--------------------|
| ORDERING NUMBER | MODEL 3411 - _ _ _ |
|-----------------|--------------------|

- blank : Standard version
- HDL : Handel version
- RMK : Rack-Mount version

Example: MODEL 3411 Torque display with handel would be ordered as : **MODEL 3411 -HDL**