
TF Series

Torque Flange Sensor

FEATURES

- Complete Torque Measuring System consisting of:
 - Measuring Flange with Signal Amplifier
 - Antenna (Pickup)
 - Receiver
- Contactless Signal Transmission: via telemetry
- Torque Range: 50 N·m to 150,000 N·m
- High Accuracy: 0.1% to 0.25%
- Overload Capacity: 200%
- Overload Limit: 400%
- Compact, Easy-to-Mount Design
- High Torsional Stiffness
- Bearingless: maintenance and wear-free
- Excellent Noise Immunity and Shock Resistance
- Protection Class: IP 42 (IP 54 optional)
- 24 VDC Standard Power Supply
- Integrated Speed Pickup (option): for rotational speed measurement
- High Temperature Capability: up to 125 °C (optional)

DESCRIPTION

With its compact, bearingless, maintenance-free design, the new TF Torque Flange Sensor from Magtrol brings many appealing advantages to torque measurement applications. The TF's 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 of the test bench and reduces costs.

Based on strain-gauge technology, the TF Sensor's precise telemetry system enables highly accurate signal transmission. A signal amplifier mounted in the measuring flange amplifies the measuring signal, modulates it to high frequency and transmits it inductively (via the stationary antenna) to the receiver. In the receiver, the digitized torque signal is transformed into an analog output signal of ± 10 VDC or 4–20 mA (option). Rotational speed can be measured and converted to a TTL output signal with the optional speed pickup.



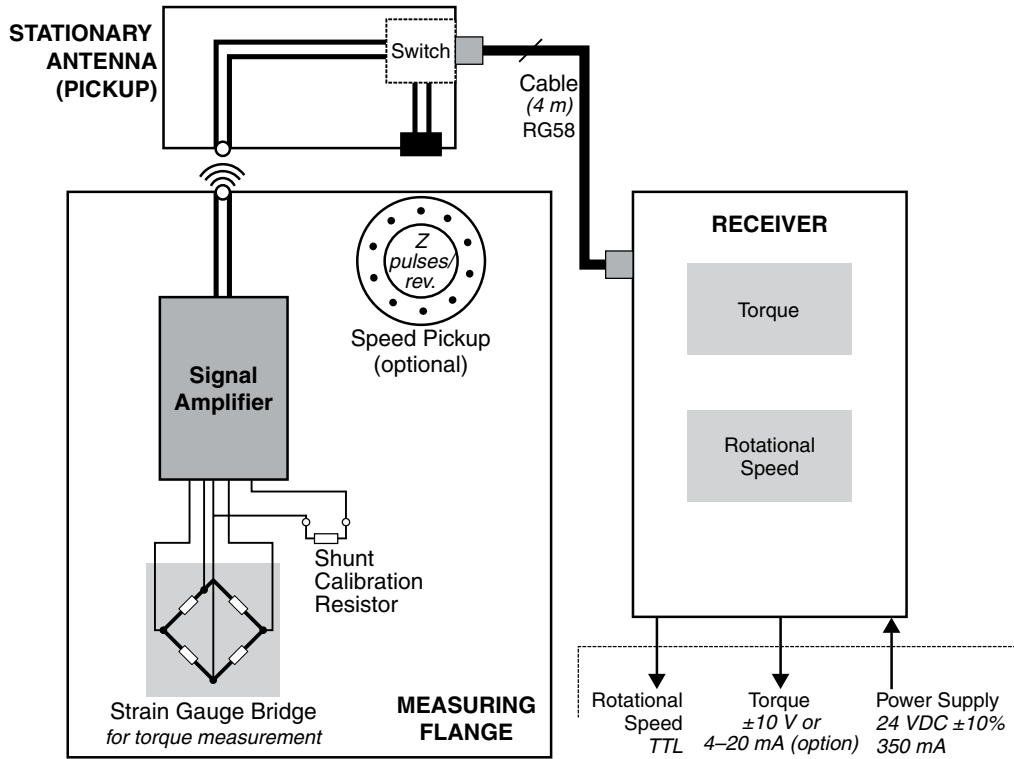
*Model TF Torque
Flange Sensor with
Measuring Flange,
Stationary Antenna
and Receiver*

The contactless design of the Torque Flange Sensor permits a gap of up to 5 mm (typically 1 to 3 mm) between the rotor antenna and stator antenna, which makes the signal acquisition insensitive to any axial or radial misalignment. Another advantage of this torque measurement 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. Additionally, a protective cover can be mounted close to the sensor with no effect on the signal.

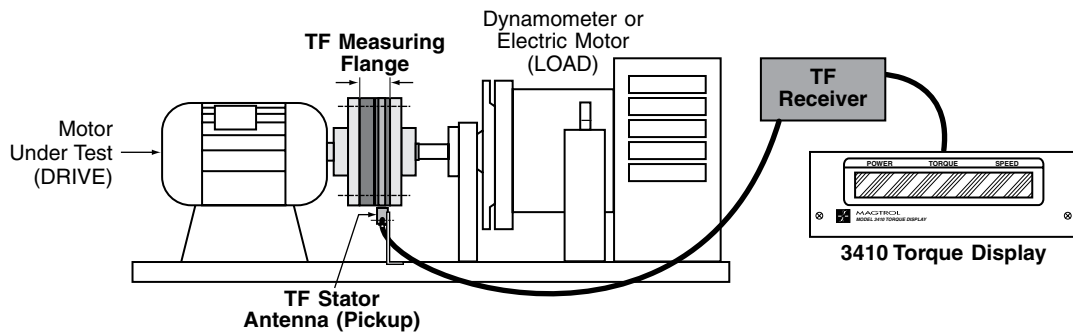
APPLICATIONS

TF Torque Flange Sensors measure both static and dynamic torque on rotating and stationary shafts. They are used in general combustion engine, electric motor and gearbox test benches; and can also be mounted inline for active torque monitoring of transmissions, powertrains, wind generators, gas turbines, boat engines, etc.

BLOCK DIAGRAM



SYSTEM CONFIGURATION



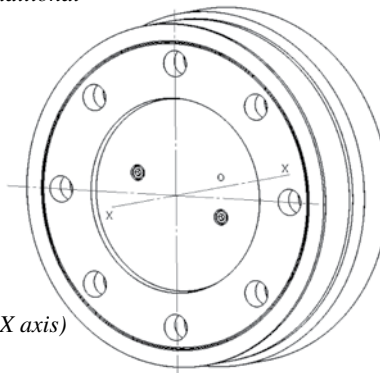
MODEL RATINGS

Model	Rated Torque	Accuracy Class *	Maximum Speed	Number of Teeth **	Torsional Stiffness	Deformation Angle	Sensor Weight ***
	N·m		rpm				
TF 210	50	0.1%	14,000	70	7.16×10^4	0.040	2.0
TF 211	100	0.1%	14,000	70	1.25×10^5	0.046	2.1
TF 212	200	0.1%	14,000	70	2.05×10^5	0.056	2.1
TF 213	500	0.1%	8,000	91	7.16×10^5	0.040	3.2
TF 214	1,000	0.1%	8,000	91	9.55×10^5	0.060	3.2
TF 215	2,000	0.1%	8,000	113	2.86×10^6	0.040	5.5
TF 216	5,000	0.1%	4,000	133	7.16×10^6	0.040	9.3
TF 217	10,000	0.1%	4,000	133	1.25×10^7	0.046	9.2
TF 218	20,000	0.2% to 0.25%	1,500	283	2.86×10^7	0.040	40.5
TF 219	50,000	0.2% to 0.25%	1,500	283	6.82×10^7	0.042	41.1

* 0.05% available on request.

** Inductive speed detection available on request.

*** Weight of electronic devices linked to the sensor (pickup, receiver, speed conditioner) is an additional 0.8 kg to 2.8 kg depending on configuration.



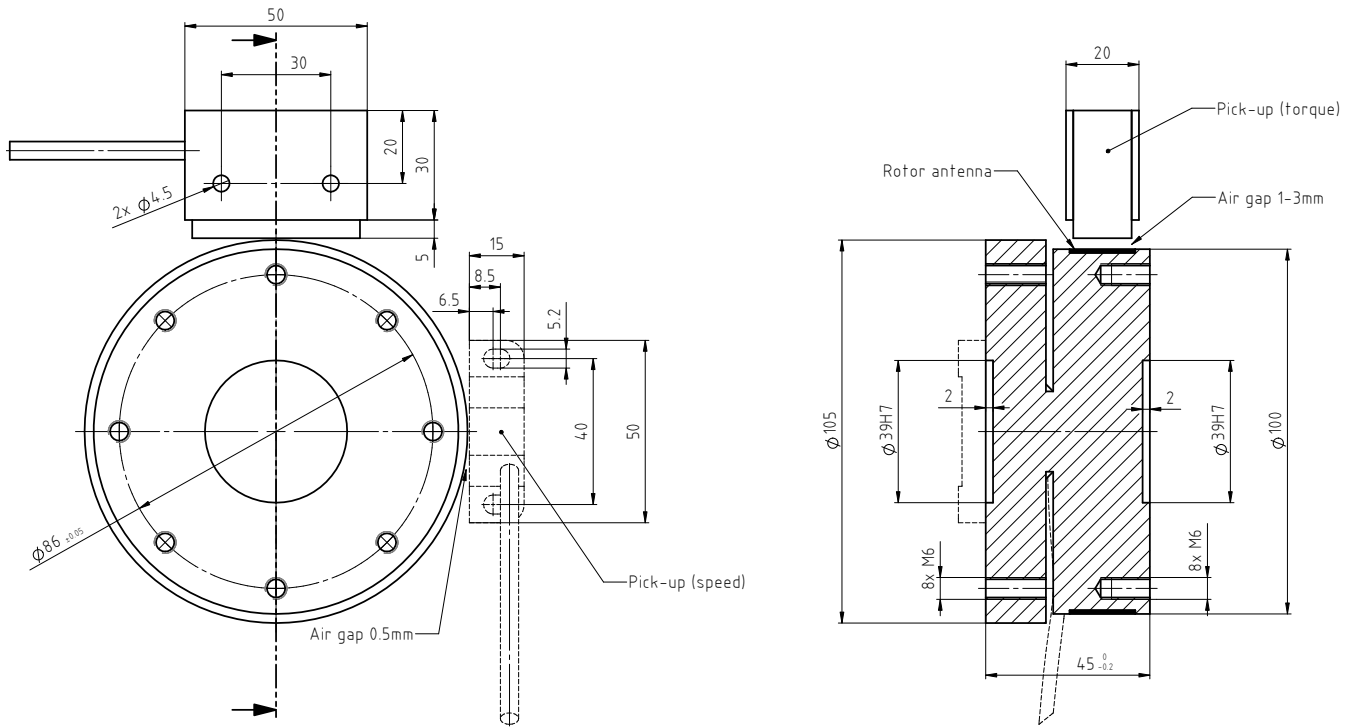
Moment of Inertia (X axis)

Model	Moment of Inertia	
	kg·m ²	lb·ft·s ²
TF 210	1.846×10^{-3}	1.362×10^{-3}
TF 211	1.923×10^{-3}	1.419×10^{-3}
TF 212	1.923×10^{-3}	1.419×10^{-3}
TF 213	4.918×10^{-3}	3.630×10^{-3}
TF 214	4.918×10^{-3}	3.630×10^{-3}
TF 215	1.026×10^{-2}	7.569×10^{-3}
TF 216	2.503×10^{-2}	1.847×10^{-2}
TF 217	2.503×10^{-2}	1.847×10^{-2}
TF 218	4.672×10^{-1}	3.448×10^{-1}
TF 219	4.672×10^{-1}	3.448×10^{-1}

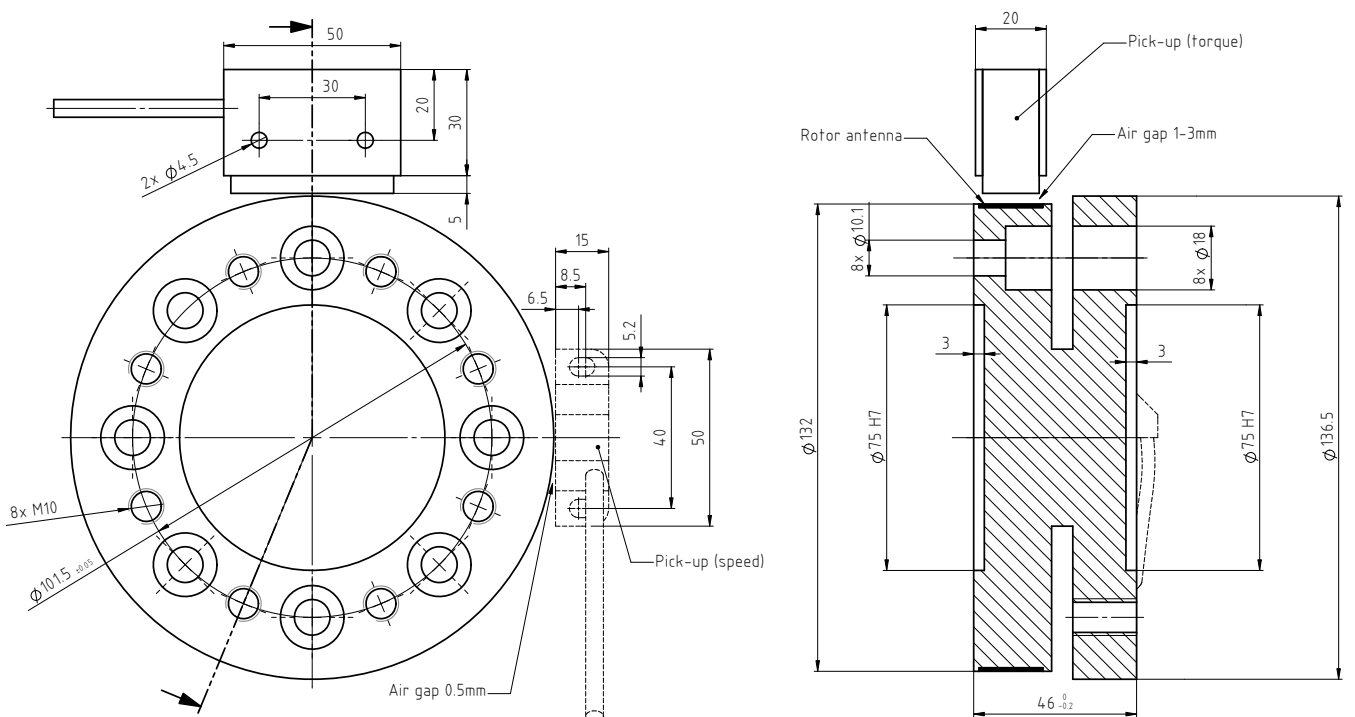
RATINGS COMMON TO ALL TF SENSORS

TORQUE MEASUREMENT	
Maximum Dynamic Torque Peak Value (Overload Capacity)	200% of Rated Torque
Maximum Dynamic Torque Without Damage (Overload Limit)	400% of Rated Torque
SPEED MEASUREMENT	
Resolution	14-bit
ENVIRONMENT	
Rated Temperature Range	+10 °C to +85 °C
Storage Temperature Range	-25 °C to +85 °C
Extended Temperature Range (option)	-30 °C to +125 °C
Temperature Influence on Zero	0.005% / °C
Protection Class	IP 42 (optional IP 54)
INPUT AND OUTPUT SIGNALS	
Power Supply	24 VDC ±10%, max 350 mA
Torque Output Signal (rated / max)	±5 VDC / ±10 VDC (option: 4–20 mA)
Speed Output (option)	TTL (pulses per revolution corresponds with number of teeth)
Passband Frequency	0 to 1 kHz (-3 dB)

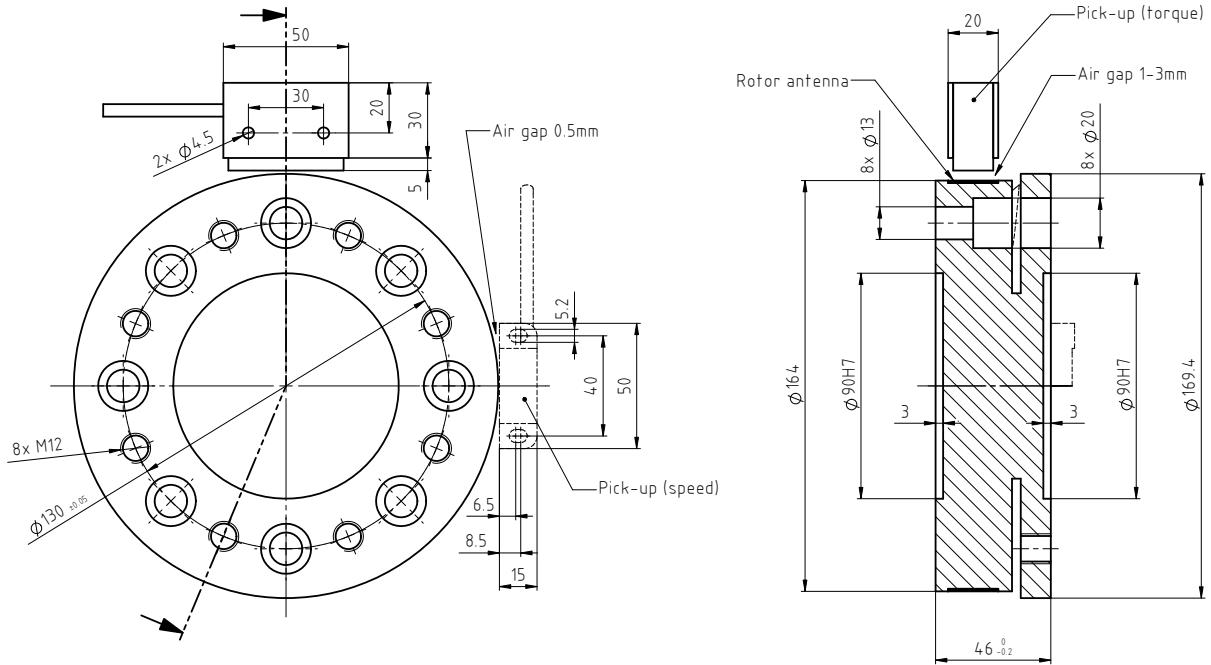
TF 210 (50 N-m), TF 211 (100 N-m) and TF 212 (200 N-m)



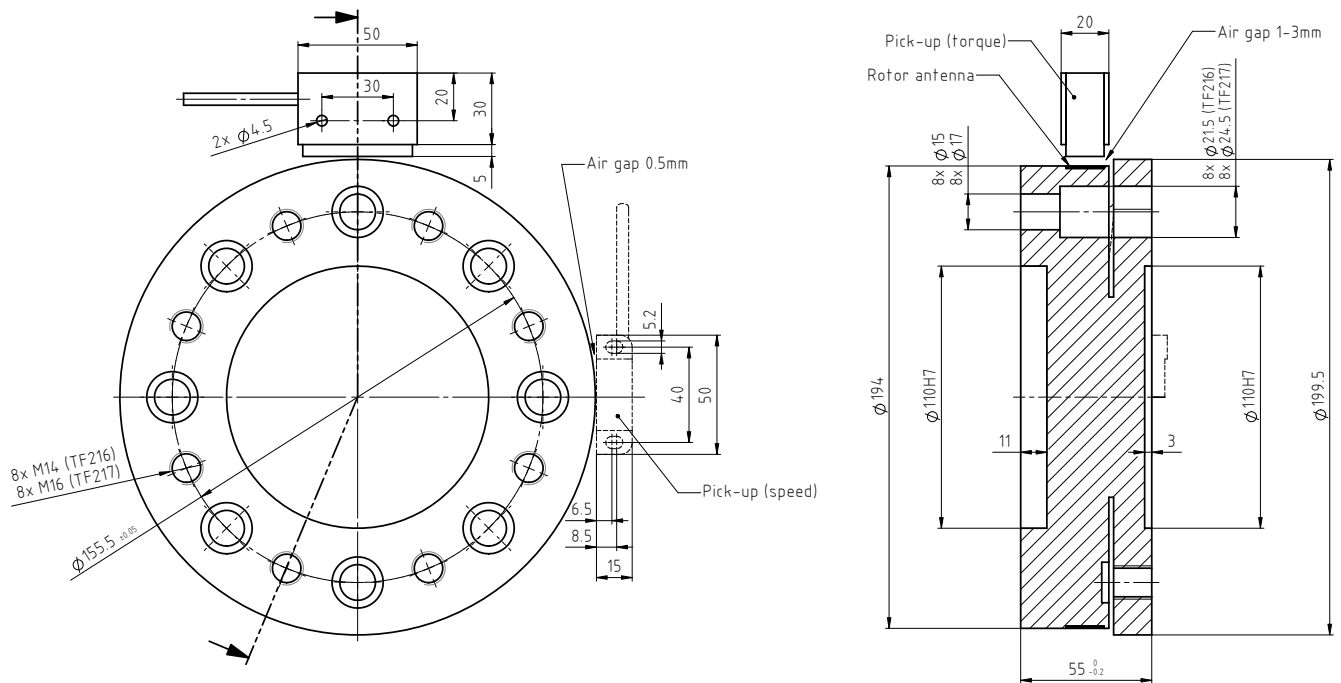
TF 213 (500 N-m) and TF 214 (1000 N-m)



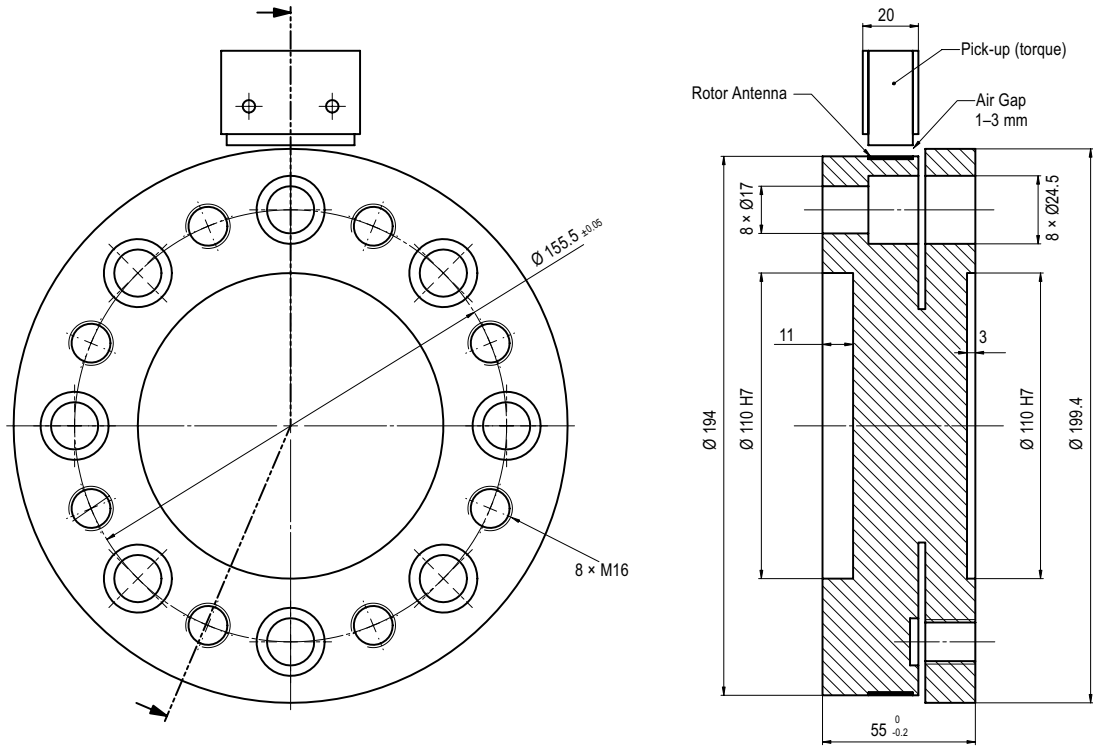
TF 215 (2 kN-m)



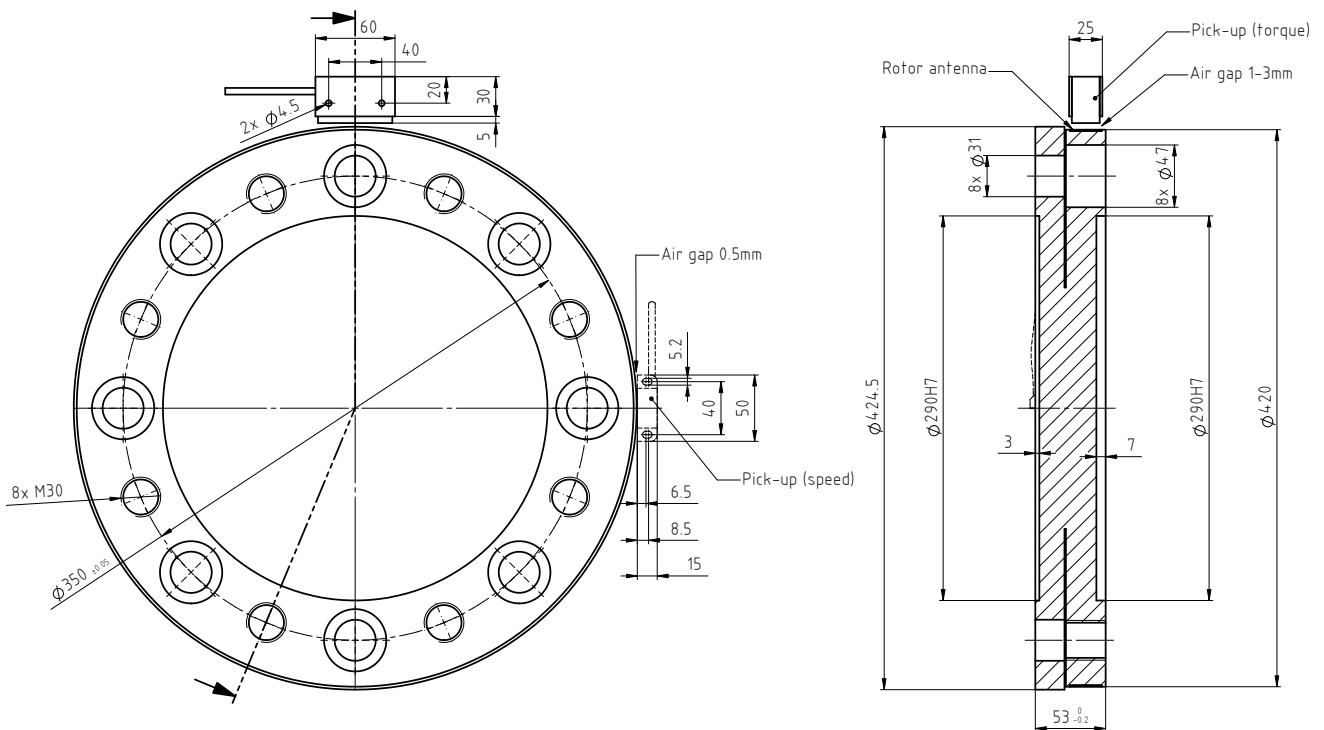
TF 216 (5 kN-m)



TF 217 (10 kN-m)



TF 218 (20 kN-m) and TF 219 (50 kN-m)



OPTIONS AND ORDERING INFORMATION

MODEL NUMBER:	TF 2 <input type="checkbox"/> <input type="checkbox"/> / 0 <input type="checkbox"/> 1
MODEL TF 2 <input type="checkbox"/> 0 - 2 <input type="checkbox"/> 9	
SPEED PICKUP / OUTPUT	
• without (standard)	1
• with (option)	2

SYSTEM OPTIONS

Model 3410 Torque Transducer Display

Magtrol offers the new Model 3410 Display which supplies power to any TF Sensor and displays torque, speed and mechanical power. Features include:

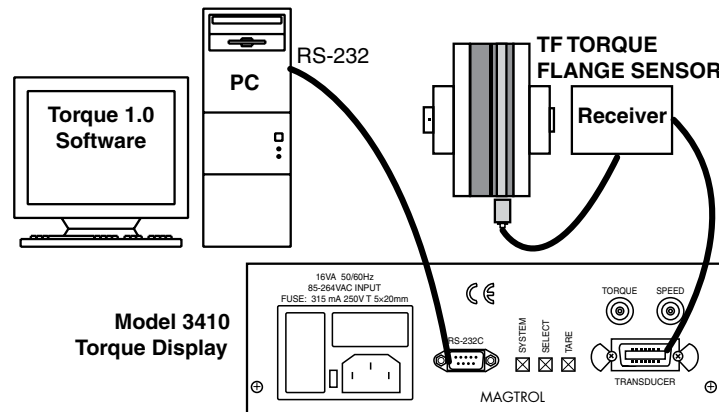
- Adjustable English, metric and SI torque units
- Large, easy-to-read vacuum fluorescent display
- Built-in self-diagnostic tests
- Overload indication
- Tare function
- RS-232 interface
- Torque and speed outputs
- Closed-box calibration
- Includes Magtrol TM Software

Torque 1.0 Software

Magtrol's Torque 1.0 Software is an easy-to-use Windows® 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 Magtrol's Torque 1.0 Software include: peak torque capture, direction of rotation, multi-axes graphing, measured parameter vs. time, adjustable sampling rates and polynomial curve fitting.

Parts	Model #
Torque Transducer Connector Cable (5/10/20 m)	ER 116

PC-Based System Configuration



Due to the continual development of our products, we reserve the right to modify specifications without forewarning.



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