PCB PIEZOTRONICS
MTS SYSTEMS CORPORATION

SERIES **5300D**

TORKDISC®
IN-LINE ROTARY

- DC to 8500 Hz bandwidth
- AC coupled, 0 to ±10 volt analog output with 2-pole Butterworth high pass filter with user-selectable cutoff frequencies
- DC-coupled, 0 to ±10 volt analog output with 8-pole elliptical low pass filter with user-selectable cutoff frequencies
- Digital system alleviates noise and data corruption
- Full-scale capacities from 250 to 225k lbf-in (28 to 25.4k Nm)e

TYPICAL APPLICATIONS

- Automotive engine, powertrain, chassis dynamometer testing for:
  - Performance
  - Emissions
  - Fuel economy
- Development of:
  - Transfer cases
  - Axles
  - Differentials
- Production line validation of powertrain components including:
  - Gear mesh
  - Cold engine signature analysis
  - Chassis dynamometer
- Rotational dynamics testing
- Torque studies on pumps, fans, electric motors
- Gearbox efficiency testing

TORQUE SENSOR SYSTEM FOR POWERTRAIN DEVELOPMENT

Robust and Competitively Priced

PCB Load & Torque Division Series 5300D TORKDISC® In-line Rotary Torque Sensor System is a cost-effective solution for testing that requires a robust rotary torque transducer, and when axial space is at a premium. The TORKDISC® System consists of a short-coupled, flange-mounted rotating sensor, a stator assembly and a digital conditioning module. Onboard, the field-proven transmitter converts the torque signals into a high-speed digital representation. Once in digital form, this data is transmitted to a non-contacting pick-up loop, eliminating the risk of noise or data corruption. A remote receiver unit seamlessly converts the digital data to a high-level analog output voltage. The robust construction, high stiffness, and low rotating inertia of the TORKDISC® make it ideal for applications such as chassis and engine dynamometers.

Static and Dynamic Measurements

Series 5300D incorporates dual high-level analog outputs, AC and DC coupled, providing both static and dynamic torque measurement capability that can be recorded separately and independently scaled — which is particularly beneficial when high DC levels are present and low levels of AC content is of particular interest.

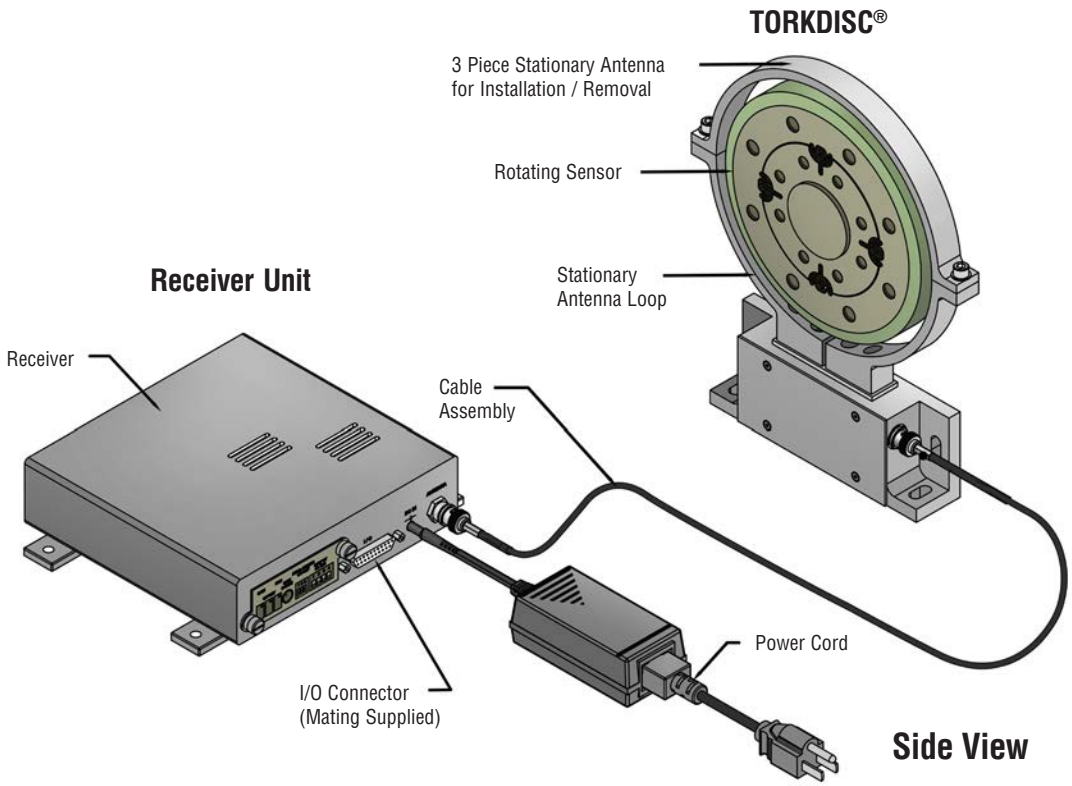
Series 5300D TORKDISC® also features industry-leading DC bandwidth to 8500 Hz, increasing the system's dynamic response characteristics. The DC-coupled output features an eight-pole low pass elliptical filter with user-selectable frequencies for minimal roll-off at each filter selection. Included with the AC coupled output is a two-pole Butterworth high-pass filter with a wide range of user-selectable cutoff frequencies.

FEATURES COMPARISON

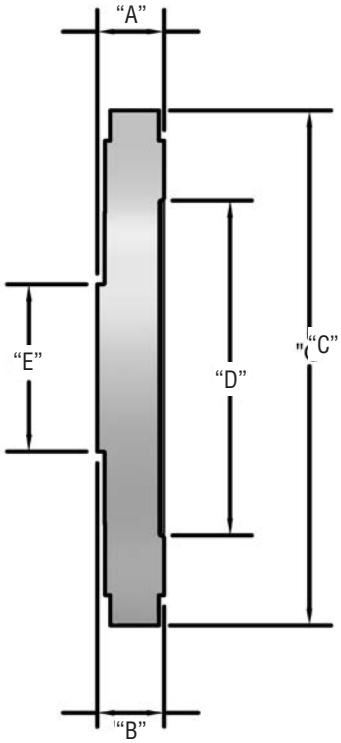
Performance	
Voltage Output A	AC Coupled, 0 to ± 10 volt w/ independent coarse gain control (16 increments)
Voltage Output B	DC Coupled, 0 to ± 10 volt w/ independent fine and coarse gain control
Digital Output:	QSPI
Performance	
Accuracy	Overall, 0.1% FS, combined effect of Non-Linearity, Hysteresis, & Repeatability
Voltage Output A Filter (AC)	2-pole Butterworth high pass w/ selectable cutoff frequencies of 5, 10, 20, 200, 500, & 735 Hz, & 8-pole low pass determined by the DC coupled output cutoff frequency selection
Voltage Output B Filter (DC)	8-pole elliptical low pass w/selectable cutoff frequencies of > 8500, 5000, 2500, 1250, 625, 313, 10, & 1 Hz
Bandwidth	DC to 8500 Hz anti-alias
Digital resolution	16-bit
Analog Resolution	0.31 mV (± 10 volts/32768, 16-bit resolution)
Digital Sample Rate	26,484 samples/sec
Group Delay	110 microseconds at 10 kHz
Noise	≤10 mV at 10 kHz
Noise Spectral Density	< 0.0005%FS per root Hz typical

Performance	
Rotor Temp. Range Compensated	+70 to +170 °F (+21 to +77 °C)
System Temp. Effect on Output[1]	± 0.002% FS/°F (± 0.0036% FS/°C)
System Temp. Effect on Zero[1]	± 0.002% FS/°F (± 0.0036% FS/°C)
Rotor/Stator Temp. Range Usable	+32 to +185 °F (0 to +85 °C)
Rotor/Stator Optional Temp. Range Usable	+32 to +250 °F (0 to +121 °C)
Receiver Temp. Range Usable	0 to +122 °F (-17 to +50 °C)
Performance	
Permissible Radial Float, Rotor to Stator	± 0.25 in (± 6.35 mm)
Permissible Axial Float, Rotor to Stator	± 0.25 in (± 6.35 mm)
Dynamic Balance	ISO G 2.5
Sensor Positional Sensitivity	0.1% FS (180° rotation)
Performance	
Power Requirements	9 to 18 VDC, 15 watts (90 to 240VAC 50-60 Hz, adaptor is supplied)
Performance	
Symmetry Adjustment	Factory and user adjustable ± 0.5% FS
Supplied Cable, Stator to Receiver	24 ft. (7.3 m), RG 58/U (BNC plug /stator side, TNC plug/receiver side)
Optional Cable, Stator to Receiver	80 ft. (24.4 m), RG 58/U (contact factory for longer lengths)
Output Interface	DB-25 female connector (mating supplied w/backshell)
Calibration	Unipolar shunt calibration, invoked from the receiver front panel
Stator Assembly	Top half of loop is removable for easy installation over rotor

The TORKDISC® and receiver make up a complete system. No additional signal conditioning is required. The receiver box provides voltage and digital output via a 25-pin I/O connector. A standard 24-foot cable is supplied, but an 80-foot, 112-foot or 176-foot cable can be used as well.



TORKDISC® IN-LINE ROTARY TORQUE SENSOR SYSTEM DIMENSIONS						
	A	B	C	D	E	F
Series	O.D. - Outside Diameter /(including telemetry/collar)	Overall Thickness	Pilot	Pilot	Driven (inner) Bolt Circle	Load (outer) Bolt Circle
5302D	7.0 in 177.8 mm	1.1 in 27.9 mm	2.0 in 50.8 mm	4.4 in 111.1 mm	(8) 3/8-24 threaded holes, equally spaced on a 3.00 in (76.20 mm) B.C.	(8) 0.406 in (10.31 mm) dia. through holes equally spaced on a 5.00 in (127.0 mm) B.C.
5308D	8.5 in 215.5 mm	1.1 in 27.9 mm	2.7 in 69.9 mm	5.5 in 140.0 mm	(8) 5/8-11 threaded holes, spaced on a 3.75 in (95.25 mm) B.C.	(8) 0.531 in (13.49 mm) dia. through holes equally spaced on a 6.5 in (165.0 mm) B.C.
5309D	10.5 in 241.0 mm	1.6 in 41.7 mm	4.0 in 101.5 mm	7.5 in 190.5 mm	(12) 5/8-11 threaded holes, spaced on a 6.0 in (152.4 mm) B.C.	(16) 0.531 in (13.49 mm) dia. through holes equally spaced on a 8.5 in (215.9 mm) B.C
5310D	18.0 in 456.7 mm	2.1 in 53.0 mm	5.5 in 139.7 mm	11.0 in 279.4 mm	(12) 7/8-14 threaded holes, spaced on a 9.0 in (228.6 mm) B.C.	(16) 0.780 in (19.8 mm) dia. through holes equally spaced on a 13.0 in (330.2 mm) B.C.



See TORKDISC® In-Line Rotary Sensor System Dimensions Table (page 3) for measurement values.

Superior Customer Service

As with all PCB® instrumentation, the TORKDISC® is complemented with toll-free applications assistance, 24-hour technical service, and backed by a no-risk policy that guarantees total customer satisfaction or your money refunded. We can also calibrate and repair your TORKDISC®.

TORKDISC® ROTARY TORQUE SENSOR SYSTEM					
Model Number	**Unit**	**5302D-05A**	**5302D-01A**	**5302D-02A**	**5308D-01A**
Continuous Rated Capacity	lbf-in (Nm)	250 (28)	2000 (226)	5000 (565)	10k (1130)
Bolt Joint Slip Torque	lbf-in (Nm)	3300 (373)	3300 (373)	10k (1130)	35k (4000)
Safe Overload	lbf-in (Nm)	750 (85)	6000 (678)	15k (1695)	30k (3400)
Failure Overload	lbf-in (Nm)	1000 (113)	8000 (904)	20k (2260)	40k (4500)
Torsional Stiffness	lbf-in/rad (Nm/rad)	300k (34k)	5800k (655k)	15M (1600k)	34M (3800k)
Torsional Angle @ Capacity	degrees	0.125	0.020	0.020	0.017
Rotating Inertia	lbf-in sec2 (Nm sec2)	0.030 (0.003)	0.056 (0.006)	0.117 (0.013)	0.240 (0.027)
Axial Load Limit [1]	lbf (N)	62.5 (278)	500 (2224)	1000 (4448)	1350 (6000)
Lateral Load Limit [1]	lbf (N)	62.5 (278)	500 (2224)	1000 (4448)	1650 (7300)
Bending Moment Limit [1]	lbf-in (Nm)	125 (14)	1500 (169)	3000 (339)	5000 (565)
Maximum Speed	RPM	15k	15k	15k	10k
Rotor Weight	lbf (kg)	2 (0.9)	3.5 (1.6)	9 (4.1)	10 (4.5)
Rotor Material	–	Aluminum	Aluminum	Steel	Steel

TORKDISC® ROTARY TORQUE SENSOR SYSTEM						
Model Number	**Unit**	**5308D-03A**	**5309D-01A**	**5309D-02A**	**5310D-02A**	**5310D-04A**
Continuous Rated Capacity	lbf-in (Nm)	30k (3400)	50k (5650)	100k (11k)	200k (23k)	225k (25k)
Bolt Joint Slip Torque	lbf-in (Nm)	35k (4000)	85k (9600)	110k (12k)	268k (30k)	268k (30k)
Safe Overload	lbf-in (Nm)	75k (8475)	100k (11k)	200k (23k)	600k (68k)	675k (76k)
Failure Overload	lbf-in (Nm)	100k (11k)	125k (14k)	250k (28k)	800k (90k)	900k (102k)
Torsional Stiffness	lbf-in/rad (Nm/rad)	100M (11.3M)	115M (13M)	230M (26M)	1200M (138M)	1350M (152.5M)
Torsional Angle @ Capacity	degrees	0.017	0.017	0.017	0.01	0.01
Rotating Inertia	lbf-in sec2 (Nm sec2)	0.240 (0.027)	0.874 (0.099)	0.874 (0.099)	7.514 (0.849)	7.514 (0.849)
Axial Load Limit [1]	lbf (N)	4000 (17.8k)	5000 (22.2k)	10k (44.5k)	14k (62k)	15k (66.7k)
Lateral Load Limit [1]	lbf (N)	5000 (22.2k)	5000 (22.2k)	10k (44.5k)	14k (62k)	15k (66.7k)
Bending Moment Limit [1]	lbf-in (Nm)	10k (1130)	25k (2825)	50k (5650)	95k (10.7k)	100k (11.3k)
Maximum Speed	RPM	10k	10k	10k	4500	4500
Rotor Weight	lbf (kg)	10 (5)	30 (14)	30 (14)	100 (45)	100 (45)
Rotor Material	–	Steel	Steel	Steel	Steel	Steel

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PCB Piezotronics, Inc. is a designer and manufacturer of microphones, vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology used by design engineers and predictive maintenance professionals worldwide for test, measurement, monitoring, and control requirements in automotive, aerospace, industrial, R&D, military, educational, commercial, OEM applications, and more. With a worldwide customer support team, 24-hour SensorLine℠, and a global distribution network, PCB® is committed to Total Customer Satisfaction. Visit www.pcb.com for more information. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corporation. Additional information on MTS can be found at www.mts.com.

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MTS SENSORS

MTS Sensors, a division of MTS Systems Corporation (NASDAQ: MTSC), vastly expanded its range of products and solutions after MTS acquired PCB Piezotronics, Inc. in July, 2016. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corp.; IMI Sensors and Larson Davis are divisions of PCB Piezotronics, Inc.; Accumetrics, Inc. and The Modal Shop, Inc. are subsidiaries of PCB Piezotronics, Inc.