INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
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Technical Specifications of Digital Torque Measurement System

RFx No. 6100000993 (Reference No. 1000022394)

1. Torque Sensor Specification	
Measurement Methodology	Strain gauge based Torsionally Rigid Digital Torque Measuring Flange
Nominal Torque	**100 Nm**
Quantity	1 No
Nominal sensitivity Frequency output	60 KHz
Nominal Torque Output (5 V Symmetrical)	60±30 KHz
Linearity deviation including hysteresis 60 to 100% range 20 to 60% range 0 to 20% range	 <± 0.03 % FSO <± 0.02 % FSO <± 0.01 % FSO
Temperature influence on the Zero & output signal	± 0.005 % /ºC
Repeatability	<± 0.03%
Shunt signal	50% of 100 Nm
Dynamic torque measurement bandwidth	≥ 3 KHz
Oscillation bandwidth (peak-to-peak)	200 Nm
Speed Measurement Methodology	AMR Sensor
Nominal Speed	0- 20,000 RPM
Pulses per rotation (5 V Symmetrical)	1024
Mechanical Specification	
Limit Torque	200 Nm
Breaking Torque	400 Nm
Axial Limit force	> 4 kN
Lateral Limit force	> 1KN
Bending Limit Moment	>45 Nm
Torsional stiffness	180 kNm/rad
Mass moment of inertia of the rotor	≤ 0.001 kgm^2
Maximum permissible eccentricity radically & Axially	≥ ± 1mm
Weight & Dimension of rotor with mg speed	< 1kg & diameter < 110mm
Signal transmission Between rotor & Stator	Inductive Telemetry
Impact Resistance(n= 1000, duration = 3ms)	65g
Vibration resistance(10-2000Hz, duration 2 hrs)	20g
Working Temperature Range	0 to 80˚C

EMC/EME/ RF field class B	EN61326-1, Sec 7
Supply Voltage	18 to 30V
Cable length to electronics	10 meters
Degree of Protection EN 60529	IP54

2. 4-Channel Modular Torque, Speed Controller - 1 No	
Accuracy Class	0.01
Inputs	Frequency, Torque Measurement Communication, Counter, encoder, SSI, PWM, Magnetic sensor, Pulse
Data rate	> 36,000 samples/sec/channel
Measurement frequency range (-3dB)	6 KHz
Input frequency range	1.1 to 2,000 000 Hz
Frequency measurement resolution	1 mHz
Counter	+/- 8,000 000 pulses
Filter	Bessel & Butterworth, selectable from 0.1 Hz to 6KHz
Zero Shift	0.001% /ºC
Full Scale Drift	0.001% /ºC of the measured value
Shunt	Remote shunt activation from electronics is required.
Cable length	Max 100m between sensor & electronics with TEDS support
Transducer excitation	10 to 30 V, 3 A safety fuse, continuous current ≤ 2 A
Real Time Calculations	Peak values, limit values, mean values, root mean square values (RMS), tolerance bands, mathematic calculation channels, logic functions, signal characteristics, signal generators, 2-point scaling, 2-point controllers, PID controllers, filters, multiplexers, sample-hold, time calculation, counters, triggers etc
Analogue Outputs	5 Nos of ± 10V with 0.1% accuracy Real measurement signals and calculated signals at >15 KHz Crosstalk attenuation >90db Zero drift & Full Scale drift < 10mV/10ºC
Digital Inputs	8 signals capable of Zero balance, tare, reset limit value, digital output, parameter set selection, calculation channel flags. Having Input signal range of 0 to 30V & 7.5 KΩ resistance
Digital Outputs	8 signals capable of Measured value/system status, digital input, limit value switch, current parameter set number, calculation channels flags. Having 10-30V range and 200mA current
Transducer connection	Plug terminals
Supply voltage range (DC)	24 V DC & 230V with AC/DC adapter
Electrical isolation from mains	60 V DC voltage between plug-in card and supply
Operating temperature	0 to +60
Degree of protection	IP20 per EN60529
Vibration 30 min, 5 to 65 Hz	2.5g
Shock	20g
EMC/EME/ RF field class B	EN61326 and EN55011
Interface	Ethernet. Ready to accept Profinet / EtherCAT with add-on card
User Rights	Worker and Admin

Software	The software should include: Hardware setup, simplified Data Viewing of Torque, Speed & Power Display on a PC, Data conversion to ASCII/Excel. LabView Driver.

Note: The supplier needs to confirm each point with documentary evidence in datasheet

Warranty : 12 months

LIST OF DELIVERABLES

Sl. No.	Description	Qty.
1.	100Nm Digital Torque Transducer	1No.
2.	6 meter Speed cable with end connectors to connect Transducer & electronics	2 Nos.
3.	Torque & Speed electronics with voltage output	1 No.