



BHEL SPECIFICATION NO:

BHEL/BPL/AME/Torque Sensor/A (Rev. 00)

Date 10th June'19

TECHNICAL SPECIFICATION
FOR
TORQUE SENSOR

AC MACHINE ENGINEERING
BHARAT HEAVY ELECTRICALS LTD., BHOPAL

1.0 INTRODUCTION

BHEL manufactures various ratings of 3 phase AC motors for different applications of power plants & industries for Indian and overseas market.

These motors are tested as per latest IS/IEC standards. Temperature rise test of motors are carried out through direct loading facility subject to test plant limitation. Motor slip, power factor at rated as well as different loads can be measured with direct loading. Motors of various center heights and ratings are directly loaded through MG set.

Motor under test is connected directly with the gear box shaft (dia 140mm) of Motor Generator set as per figure 1.

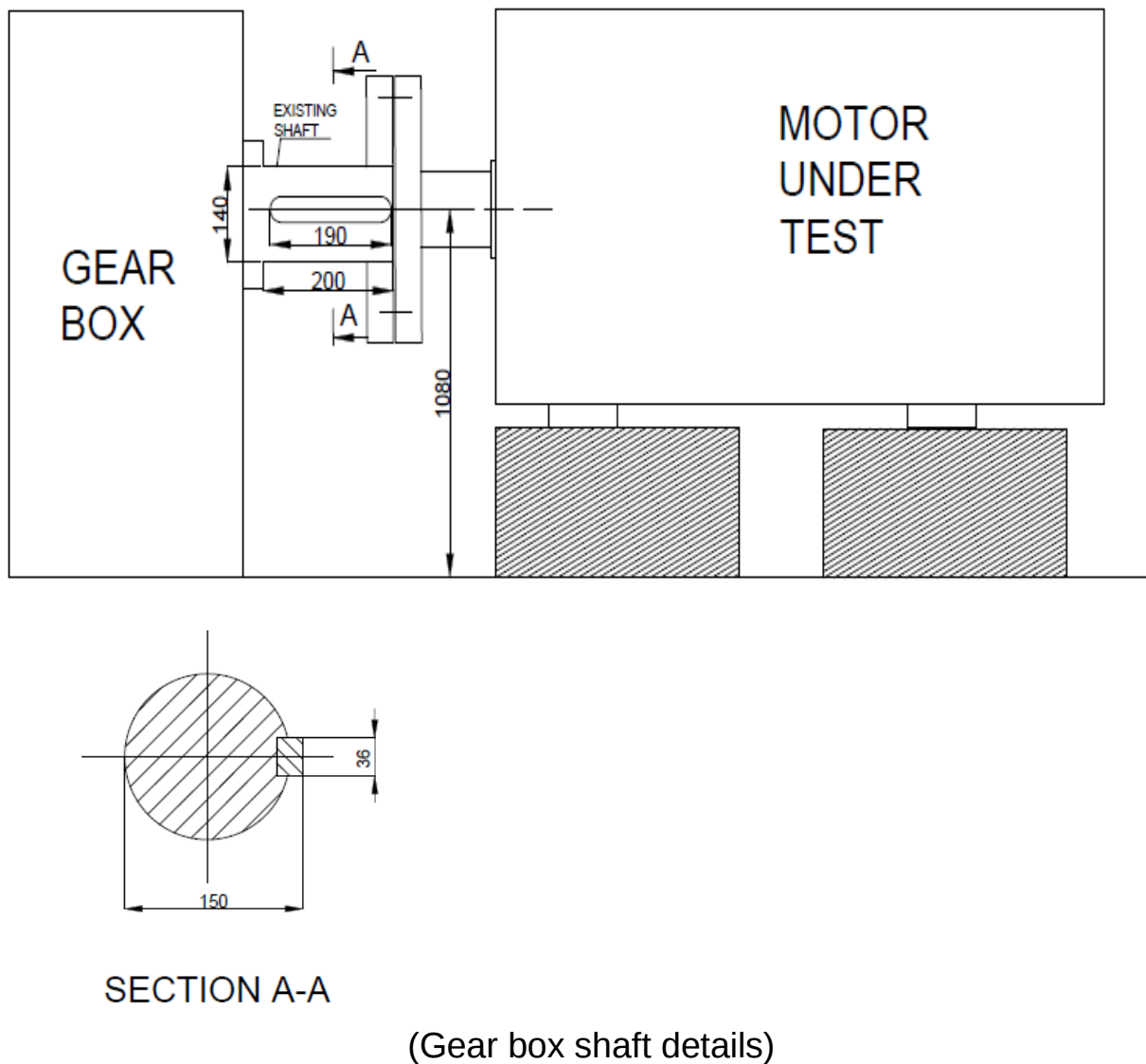


Fig 1



2.0 TORQUE SENSOR

2.1 Torque sensor of 10 kNm rating is required for obtaining torque, output kW and speed of motor at BHEL test plant.

2.2 This torque sensor shall be placed between gear box shaft (140mm dia) of motor generator set and motor under test.

2.3 Torque sensor shall be suitable for mounting on gear box shaft of motor generator set directly or by means of adaptor or rigid coupling. Torque sensor shall be suitable for rigid coupling at both ends for alignment within 50 microns.

3.0 TECHNICAL REQUIREMENT

Nominal (rated) torque	kNm	10
Accuracy class	%	0.10 (2kNm – 10 kNm) 0.25 (≤ 2 kNm)
Nominal (rated) speed	rpm	3000 rpm (continuous) 3600rpm (for 2 minutes)
Overload	kNm	160% for 1 minute
Measuring frequency range	Hz	Upto 1KHz
Nominal output signal	V / mA	+/- 10 / 4-20
Permissible ambient humidity Relative humidity / no condensation	%	5 ... 95
Service temperature range	°C	0 to 60
Sensing		Bi-directional
Degree of protection		IP54
Input power		230V , 50Hz , single phase / 10-30 V DC



4.0 DISPLAY UNIT

- Display with indication of exact measured data for torque, speed, and kW for local indication.
- Torque sensor shall have connectivity with PC at control room. Torque, speed, and kW values shall also be displayed in PC.

5.0 SCOPE OF SUPPLY

S.No.	Description	Qty
(1)	Torque sensor with all associated sensors	1no.
(2)	Display device for measured Torque , Speed & kW readout	1 no.
(3)	Connectivity to PC / Laptop along with associated software for data acquisition.	1 set
(4)	Approximate cable length between Torque sensor and the Display unit (local indication)	20 m
(5)	Approximate cable length from test bed to control room PC	50 m
(6)	Recommended Spares (for 10 years operation) List of spares to be furnished	1Set
(7)	Special tools and instruments which shall be essentially required for maintenance List of Tools / instruments to be furnished	1 Set
(8)	Commissioning support for proper functioning of Torque sensor	To be quoted on man-days basis. (Maximum three man-days shall be considered for cost evaluation of tenders)

Note :- BHEL shall give requisition for supplier engineer for commissioning of torque sensor after ensuring complete readiness at BHEL works. Notice of at least one week shall be given for deputation of engineer. Supplier shall depute competent engineer for commissioning support of torque sensor. Supplier shall be responsible for demonstration of proper functioning of torque sensor at BHEL works.



6.0 COMPLIANCE WITH NATIONAL / INTERNATIONAL STANDARD

- 6.1 EMC Emission as per (EN 61326-1, section-7) RFI field strength
- 6.2 Interference immunity, as per EN 61326-1, EN 61326-2-3
- 6.3 Mechanical shock, as per EN 60068-2-72
- 6.4 Vibrational stress in 3 directions ,as per EN 60068-2-6
- 6.5 Degree of Protection - IP54

7.0 DOCUMENTS AND SERVICE

7.1 DOCUMENTS

Sl no.	Documents	Details
1	Assembly manual	Mounting & setup instructions of the Torque Sensor & functional tests to be done to ensure proper operation of the equipment.
2	Maintenance Manual & illustrated part catalogue	The maintenance manuals shall include details of the equipment for maintenance and fault rectification, with particulars of operating parameters, tools for dismantling and testing methods, repair techniques, software details and trouble shooting tools and all other information necessary.
3	Operating Manual	Vendor shall supply operation manual during supply of equipment . The operation manual shall be comprehensive, easy to read & understand and should include the menu based Trouble Shooting Directory, the equipment ratings and operation limits, control & safety features.
5	Drawings	Assembly, Mechanical drawings, wiring diagram
6	Test procedures & reports	Type test reports. Routine test procedures .
7	Troubleshooting manuals	List of all possible errors and corresponding troubleshooting methods.
8	Calibration Certificate	Vendor shall submit calibration certificate from an authorized testing agency.Vendor to inform calibration schedule of complete system.

7.2 SERVICES

Sl no.	Services	Details
1	Commissioning/ Installation	Support for commissioning of Torque Sensor for proper functioning. Providing electrical connections & ensuring power supply; I/O check via software, download of application software to the Laptop / PC & documentation of the related activities.
2	After sales services	The supplier should have appropriate man power in India to take care of after sales services.

8 SPARES

- 8.1 The vendor shall submit list of recommended spares for 10 years along with priced offer separately.
- 8.2 The vendor will also offer separately special tools and instruments which shall be essentially required for maintenance of electrical / electronics of the equipment.

9 Guarantee / warranty

- 9.1 The supplied equipment shall be subject to guarantee/warranty requirements as per BHEL standard terms and conditions.



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