

BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
TRANSFORMER ENGINEERING DEPARTMENT

Sht 1 of 3 sheets

ANNEXURE TO INDENT-CUM-ENQUIRY - 240604030

DESCRIPTION OF EQUIPMENT	: ONLINE CAPACITANCE AND TAN DELTA MEASUREMENT EQUIPMENT OF BUSHINGS
--------------------------	--

WORK ORDER NO. : 69160T53001

CUSTOMER : M/s TANTRANSCO ARIYALUR

SPECIFICATION FOR ONLINE CAPACITANCE AND TAN DELTA MEASUREMENT
EQUIPMENT OF BUSHINGS.

1) GENERAL

The specification governs the design, manufacturing, testing, supply, installation & commissioning of On-Line Capacitance and Tan Delta monitoring System of Bushings. It shall be used to continuously monitor the HV (800KV) bushing of 1-Ph 765 KV (Each Shunt Reactor having one HV bushing) with expert system capable of detecting abnormalities in the Bushing insulation and issuing alerts locally and remotely.

2) ESSENTIAL FEATURES

- a) The system shall monitor 3 nos. of 800KV HV Bushings associated with 3 nos. working Shunt Reactors forming 3 Phase Bank. For this, 3 nos. sensors for 3 nos. HV bushing required. Devices are to be fitted physically at the Bushings for display for the Capacitance and Tan Delta values locally and at control room.
- b) The following minimum parameters pertaining to individual Bushing should be monitored and should be accessible through the P.C.
 - i. Power Factor/ Dissipation Factor
 - ii. Capacitance.
 - iii. Rate of change of the above value
 - iv. Leakage current through the test tap
- c) The calculation and display should be automatic and integral part of the instrument and should be able to indicate the measuring status (LED/Buzzer/Display).
- d) The instrument should be able to identify the problems and issue alerts/warnings on the following conditions.
 - a) Absolute change in Power/Dissipation factor.
 - b) Rate of change in Power/ Dissipation factor.
 - c) Absolute change in capacitance.
 - d) Rate of change in capacitance.

REV	DATE	ALT Ckd & Appd	REV-	DATE	ALT Ckd & Appd	REV 00	NAME	SIGN	DATE
						Prep	S. Dutta	<i>S. Dutta</i>	30.5.20
						Ckd & Appd.	A. Dave	<i>AD</i>	30.5.20
DWI/TCB/TRE/016									

30

BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
TRANSFORMER ENGINEERING DEPARTMENT

FORM NO: TRE-2003A

Sht 2 of 3 sheets

- e) The system should be protected against over voltage, surges and all other likely abnormal conditions.
- f) The materials should be corrosion proof and complying with required IP class.
- g) The instrument should give necessary alert messages, which should contain historical and detailed information.
- h) The System / Instrumentation should be easy to configure.
- i) Local Access: Serial port for connection to a PC for the purpose of configuration and data retrieval.
- j) The system should possess a control panel for user interface that could display alerts. Also access to P.C. through RS232 port/ RS 485/ Ethernet TCP/IP/ Supervisory Input/ Output for SCADA interface should be made available. The necessary data / parameter should be displayed at the device and means must be provided for displaying these parameters at the control room which may be at a distance of 500m from the Transformer by suitable cables/ fiber optics cables.
- k) The system shall be complete with all necessary items i.e. sensors, suitable cables/Fiber Optic cables (as required), Conduits, fittings, operating software etc. to complete the equipment in all respect for the purpose described in this specification.
- l) The local control unit shall be installed independently near the M. Box of the GT on the frame and suitable with environmental protected enclosure. The complete structure frame and enclosure shall be included in the scope of supply. Supplier should furnish the detail of foundation of structure required along with the offer.
- m) Ambient temperature: 5⁰C to 50⁰C; Humidity: upto 95%.
- n) 3 phase Auxiliary power supply and 220V DC supply shall be provided.

3) **OTHER DETAILS**

- a) ***Scheme and electrical connection:*** Complete schematic showing the connections of power supply to the display/ control unit, terminal marking and wiring termination contacts shall be furnished alongwith offer. Further, type and size of terminals used in display/ control unit shall also be furnished to select suitable cable lugs.
- b) ***Mounting details*** – Outline and fixing detail drawings for sensors, display/ control unit etc. to be furnished alongwith offer.
- c) Necessary spares (if any) shall also to be offered separately.
- d) The Offer should include a Bill of Material of all the items considered in the scope of supply.
- e) Input/Interfacing points/Items required from reactor side for mounting and proper functioning of the system to be clearly specified in the offer.

30

BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
TRANSFORMER ENGINEERING DEPARTMENT

FORM NO: TRE-2003A

Sht 3 of 3 sheets

- f) Compliance checklist as per enclosed Annexure-I must to be filled up, signed and submitted along with technical offer and if there is any deviation that should be clearly brought out.

4) **INSPECTION & DESPATCH**

- a) Three sets of inspection, routine, acceptance and calibration test reports, operation and maintenance manual, descriptive catalogue/ leaflets shall be sent along with dispatch document. One set shall be supplied along with the equipment.
- b) The supplier shall furnish a list of all fittings and components in the dispatch details giving description and quantity of each item (Quantity of each item shall be mentioned). All items shall be properly packed in wooden boxes so as to avoid scratches/damage in transit along with considering storage at site for long duration of time.

5) **INSTALLATION, COMMISSIONING & TRAINING**

Installation & commissioning of the system is also in the scope of supply. The supplier shall install & commission the equipment and provide training for operation and maintenance to our ultimate customer at site on intimation of BHEL and obtain certificate from the customer for the same. Complete cable connection etc. up to plant control room PC, making Measurement Equipment data display available in the control room & interface with plant SCADA are in the scope of commissioning of Online C & Tan δ Measurement Equipment of Bushing by the vendor. Supplier should quote the charges for the same, if any, in the offer separately.

Annexure -I
Compliance Check List

	Requirement	Yes/ No	Deviation, if any
1.	GENERAL		
2.	ESSENTIAL FEATURES		
3.	OTHERS DETAILS		
4.	INSPECTION & DISPATCH		
5.	INSTALLATION, COMMISSIONING & TRAINING		