

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

CIRCUIT BREAKER TIMER

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1.0 SCOPE

This specification covers design manufacture, testing, supply & delivery of portable digital circuit breaker timer kit that shall measure timings of all the poles of Circuit Breakers upto 33 kV simultaneously to check operating mechanism.

2.0 CLIMATIC CONDITIONS

The Measuring Instrument should work in following climate.

- | | |
|-------------------------------------|---------------------------|
| i) Maximum Ambient Air Temperature | 55°C |
| ii) Minimum Ambient Air Temperature | 05°C. |
| iii) Maximum Relative Humidity | Upto 95% (non-condensing) |
| iv) Storage Temperature | -20°C to 70°C |
| v) Storage Humidity | Upto 95% (non condensing) |
| vi) Max. Altitude | 1000 meter |

3.0 APPLICABLE STANDARDS

- a) EN 61010-1:2001, 61010-031 CAT III 600V for Safety requirement for electrical equipment for measurement, control & laboratory use
- b) EN 61326-1:2006 for EMI & EMC requirement for electrical equipment for measurement, control & laboratory use.
- c) IEC 60529 for Ingress Protection (IP 54 Required).
- d) CISPR 16-1 and 16-2 for Radiated emission for enclosure
- e) IEC 61000-4-2 for Electrostatic Discharge (ESD)
- f) IEC 61000-4-3 RF Electromagnetic Field
- g) IEC 60068-2-2/IS 9000 Part 3/Sec3 for Dry Heat Test
- h) IEC 60068-2-78/IS 9000 Part 4 for for Steady State Damp Test
- i) IEC 60068-2-14/IS 9000 Part 14/Sec 1 for Change of temperature
- j) IEC 60068-2-6/IS 9000 Part 8 for Vibration test
- k) IEC 60068-2-29/IS 9000 Part 7/Sec 2 for Bump Test
- l) IEC 60068-2-27/IS 9000 Part 7/Sec 1 for Mechanical Shock test
- m) IS 9000 for Supply Voltage Variation test & Surge withstand test

4.0 GENERAL TECHNICAL REQUIREMENTS

The Circuit Breaker Time Interval Meter should measure and display the Open, Close & Close-Open timings of all types of HV circuit breakers in live HV switchyard conditions.

1. The instrument should be capable of measuring of Open, Close & Close-Open timings of three poles/phases simultaneously with end to end connections
2. The instrument should be useable to measure the operation timings of all types of circuit breakers namely SF6, Air Blast, Minimum Oil , Bulk Oil, Vacuum circuit breakers etc.
3. The Instrument should also have facility to give 30 V DC operated trigger commands for close, open and close-open operations of breaker
4. The instrument should display the operation timings on four line backlit LCD

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- directly in milliseconds.
5. Range of instrument should be from 0.1 to 1000 milliseconds and resolution of the instrument should be 0.1 milliseconds.
 6. The Test Kit should be able to measure the pole discrepancy timing i.e. the operational time delay between the poles during the closing & opening operation
 7. The instrument should have an accuracy of value $0.05\% + 1\text{digit}$.
 8. The instrument should work on power supply of 240 V AC $\pm 20\%$ at 50 Hz $\pm 5\%$. It should be mains as well as (rechargeable with continuous operation for 5 to 6 hrs) battery operated.
 9. The instrument should have inbuilt clock to tag the test results with date and time of test.
 10. The instrument should have inbuilt memory to hold 100 test results.
 11. The instrument should have easy to use menu driven user interface for its operation. The selection of menu options should be through the keypad.
 12. The manufacturer should supply the complete set of test leads of suitable length and insulation grade along with the proper terminators & connectors. The shrouded banana plug type connectors providing additional safety are preferable.
 13. All test leads provided with the time interval meter should be of sufficient length to test HV circuit breakers (minimum 15 meters along with PVC bobbin for winding of leads).
 14. The instrument should be designed to work most reliably in the electromagnetic noisy conditions generally found in live HV switchyards. Instrument should have internal protection facility against Inductive/Capacitive voltage generated across the Circuit breaker terminals in open condition
 15. The instrument should be portable so as to facilitate its movement from one site to another & should be robust enough to withstand rough handling in transportation.
 - 14 The instrument should be housed in sturdy carrying case for easy handling.
 15. It may have facility of self diagnosis for instrument condition and calibration watch.
 16. Only a standard USB port should be provided to download data to latest OS windows PC. Instrument should have inbuilt software for plug and play facility with PC via USB Port
 17. The instrument should be capable of working in the temperature range from 5 to 50 deg C and up-to 95% RH (non - condensing).
 18. The Instrument should meet safety class requirements as per IEC 61010-1: 2001 (2nd Edition).
 19. The meter should be such that even at low battery indication the instrument gives accurate readings. A Li-ion, 12V, 4 Ah should be provided.

20. Single charge battery life for the instrument should be approx.5-6 Hrs of continuous operation.
- 19 The Instrument should have CE marking which shall prove compliance with European Union standards for health, safety and environmental protection legislation and confirms a product's compliance with relevant requirements.
- 20 The Test Kit should have an internal LCD / TFT display of 5" or more enabling the user to do the settings, operation and result analysis easily.
- 21 The Instrument shall have thermal and overload protection.
- 22 For breaker control, Two solid state contacts rated at 35A,300VAC/DC for breaker operation shall be provided.
- 23 After sales support: The after – sales service support / warranty services has to be provided.
- 24 Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- 25 Documentation- Sufficient no. of Operating/Service Manuals shall be provided along with supplied material

5.0 CALIBRATION CERTIFICATE

The calibration of equipment shall be carried out at approved laboratory by National Board of Accreditation of Laboratories (NABL).

The manufacturer's calibration certificates for all other equipment under supply with report from NABL approved laboratory shall be submitted for approval of C.E. (Testing & QC) before commencement of supply. Validity of calibration certificate shall be one year.

The equipment shall be type tested for IP 54 degree of protection as per IS: 12063/ IEC 60529 against ingress of dust, moisture & vermin. The type test certificate shall be submitted along with the offer

6.0 ACCESSORIES

- a) 4 Channel X 10m Lead set with PVC Bobbin
- b) Control lead
- c) Earthing Lead
- d) Mains Cord
- e) Calibration Certificate

7.0 PRE DESPATCH INSPECTION

The inspection shall be carried out at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchases. For imported equipments the supplier/bidder shall offer the equipment at the authorized service centre /works of the original manufacturer in India or at the supplier's works/Testing centre.

8.0 NAME PLATE & MARKING

Equipment shall have name plate clearly visible, effectively secured against removal and indelibly and distinctly marked with all essential particulars as per relevant standards. Following details shall be marked on the Name Plate

Manufacturer's name & address:

Serial no.

Purchase Order No.

Month and Year of manufacture

Name of purchaser: MSEDCL

Guarantee: Five Years

ISI mark if applicable

9.0 GUARANTEE

The instrument shall be guaranteed for the period of **Five** years from the date of Dispatch.

10.0 PACKING

The instrument shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each instrument may be suitably packed in the first Instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case adequate strength with extra cushioning if considered necessary. The cases may then be properly sealed against accidental opening in transit. The packing cases may be marked to indicate the fragile nature of the contents.

The following information shall be furnished with the consignment:

- a. Name of consignee.
- b. Details of consignment
- c. Destination
- d. Total Weight of consignment.
- e. Sign showing upper / lower side of the crate.
- f. Sign showing fragility of the material.
- g. Handling and unpacking instructions

11.0 TRAINING OF ENGINEERS:

The successful supplier shall train Engineers of MSEDCL free of charge at their works for familiarization of design, operation and maintenance of testing equipments

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GUARANTEED TECHNICAL PARTICULARS OF CIRCUIT BREAKER TIMER

Sr. No.	Particulars	Required GTP	Offered GTP
1	Manufacturer name & country of manufacture		
2	Type / Model details of the equipment		
3	Applicable Indian / International standards to which the equipment confirms.		
4	Capable of working in hostile electrostatic noisy conditions prevailing in charged HV substations?	Yes	
5	The instrument should be capable of measuring Open, Close & Close-Open timings of all three poles simultaneously with end to end connections	Yes	
6	Useable to measure the operation timings of all types of circuit breakers namely SF6, Air Blast, Minimum Oil, Bulk Oil, Vacuum circuit breakers etc.	Yes	
7	Display of the operation timings should be on four line backlit LCD, directly in milliseconds.	Yes	
8	Range of instrument	0.1 to 1000 ms.	
9	Resolution	0.1 ms	
10	Accuracy	Value 0.05% + 1 digit	
11	Input Power Supply	240 V AC \pm 20% at 50 Hz \pm 5%.	
12	Inbuilt Real Time Clock to tag the test results with date and time of test	Yes	
13	Inbuilt memory to hold at least 100 Test Results	Yes	
14	The selection of menu options through the keypad.	Yes	
15	Facility of self diagnosis for instrument condition and calibration watch.	Yes	
16	Standard USB port should be provided to download data to latest OS windows PC. Instrument should have inbuilt software for plug and play facility with PC via USB Port.	Yes	
17	The necessary compatible Serial to USB Converter cable supplied	Yes	
18	Temperature range and Humidity	5 to 55 deg C and up-to 95% RH (non-condensing)	
20	The necessary accessories like test minimum 10 Mtr. leads, Connecting clamps & Aluminum carrying case are to be supplied by supplier	Yes	