

TECHNICAL SPECIFICATION OF 3 OC / 1 EF NUMERICAL PROTECTION RELAY:

Sr. No.	Relay Feature	Relay Feature Description
1	Application feeder & Transformers	PROTECTIVE NUMERICAL RELAYS PRINCIPAL REQUIREMENTS: For 33&11 kV Feeder and Control Relay Panel OR conforming to IEC 60255 & IS 3231 up to date. Non directional 3 O/C & 1 E/F relay with High set feature shall be provided. Numerical relays shall be suitable for auxiliary supply (18 V to 250 V DC/AC with +20% to -10% tolerance) and shall have a reset push button and a test push button to test the relay function with provision to trip bypass push button. The relays should have following Principal Requirements Three-phase Instantaneous/ Definite Time Phase Over-current protection (50 -50/2), three- phase IDMT Overcurrent protection (51), Instantaneous/ Definite-Time Earth Fault protection (50N – 50N/2), IDMT Earth Fault Protection (51N) Trip Supervision Circuit. (95 ,50 BF),
2	CT Secondary Input Current	(1)The Relay shall be suitable for 1A & 5A CT secondary inputs through software selectable at site (2)The relay shall have three phase CT input of both 1A and 5A (Selectable to either 1 or 5A) (3)The Relay shall have two no. of neutral CT, suitable for 1A & 5A CT secondary inputs selectable at site.
3	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply for 20 V to 230 V DC/ AC with +20 - 10 % tolerance or better)
4	Relay Protections	<p>The Relay shall have at least the following protective elements:</p> <p>(1) Over Current Protection (2) Short Circuit Current Protection (3) Earth Fault Protection (4) High set Earth Fault Protection</p> <p>(A) Instantaneous/ Definite Time Over-Current: The relay shall possess at least two stages of an instantaneous/ definite time over-current feature for short circuit protection in case of phase faults. The time delay in the definite time setting shall be settable to a minimum of 0.05 sec or better.</p> <p>(B) IDMT Over-Current: The relay shall possess at least one stage of an IDMT over- current feature and shall be selectable to any of the IEC characteristic curves. Options shall be available for all type of IDMT IEC curves.</p> <p>(C) Instantaneous/ Definite Time Earth Fault: The relay shall possess at least two stages of an instantaneous/ definite time Earth Fault protection feature for each EF CT input in residual, Neutral CT or CB CT connection as well as calculated Io. The time delay in the definite time setting shall be settable for a minimum of 0.05 sec or better. Minimum setting: 0.1*In or better.</p> <p>(D) IDMT Earth Fault: The relay shall possess at least one stage of an IDMT Earth Fault feature for each EF CT input as well as calculated Io and shall be selectable to any of the IEC characteristic curves. Options shall be available for all type of IDMT IEC curves</p>
5	Protection, Supervision Salient Features	<p>(1) Alphanumeric/Graphical display (2) Event Recording (3) Fault Date Recording (4) RTC Stamp on Fault & Event (5) Six Digital Input (6) Site Selectable 1A/5A CT Secondary Current (7) Display in Primary/Secondary Values (8) Wide Setting Range With Fine Setting Steps (9) Front USB Port (10) Rear Side RS-485 communication Port with MODBUS protocol (11) Self Supervision (12) Hand Reset</p>
6	Online Monitoring/ Measurements Display Parameter	<p>The Relay shall monitor at least the following parameters online</p> <p>(1) Current Measurements (2) Voltage Measurements (3) Measurement Display Auto Scroll Or Manual Scroll Selection (4) Relay Healthiness Status</p>
7	Fault Time Record	<p>Note : IMPORTANT</p> <p>Relay Show All three phase currents, fault currents of each phase and earth, fault alarms, relay show fault/ trip time in the millisecond/ second healthiness status.</p>
8	Operating Characteristics selectable	<p>(1) Normal Inv 0.6 (2) Normal Inv 1.3 (3) IDMT – 3 Sec. (4) Very Inverse (5) Extremely Inverse (6) Definite time (7) User defined inverse (8) Long time inverse</p>

9	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision (TCS) feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware and components required for hook up of Trip Circuit Supervision (TCS) to the relay shall be supplied as a part of the relay with each relay. The TCS connection diagram shall be submitted along with the offer. The TCS feature shall work on the same voltage as the relay auxiliary power supply level
10	Memory storage for fault information	Storing of latest 15 events with date & time stamping and storage of latest 10 fault records, fault amplitude, type of fault, faulty phase with FIFO feature (available on display & shall be retrievable through software)
11	Operational indicator	LED, OR Display
12	IS reference	IEC 60255, OR, IS 3231 amended up to date
13	Relay Front Display	The Relay shall have a backlit alphanumeric LCD / Graphical display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable
14	Mounting	(1) Relay should be flush mounted with preferably Draw Out type model. OR (2) Flush Mounted with fixed type connections shall also be considered (3) All relay connections shall be fixed screw type terminals with adequate spacing on back side. (3) Galvanic isolation between field connection & relay hardware.
15	LED indications	The Relay shall be provided with LEDs for indicating at least the Protection Trip, Alarm and Relay Healthy indications. Additional minimum 4 no's of LEDs, to be provided, and shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision Total 7 no's Led on the front side.
16	Push buttons	Reset push button for resetting the relay manually. Functional keys should be available for separate trip command.
17	Digital Input/ Output contacts	(1) The relay shall 5 NO + 2 changeover potential free and heavy duty programmable contacts. Min 7 no's relay output contacts shall be provided for specific function outputs for alarm, trip & trip circuit supervision. All output contacts should be freely programmable. (2) The interrogation supply (Pickup voltage) for the Digital Inputs shall be 60% of the Relay auxiliary voltage or better, and shall not work in any other AC or DC Voltage range due to accidental occurrence of any voltage mixing voltage superimposition or induced voltages in addition to the rated auxiliary supply mentioned above
18	Contact rating	Continuous carry -5A, Make & carry for 0.2 sec-30A
19	Human Machine Interface (HMI)	The vendor shall provide latest version of software (full registered version) on CD/pen-drive. of communication cables with Each relay). The communication cable should be compatible with USB/ LAN port of laptop.
20	Testing and Acceptance	1. The Relay shall have been type tested as per relevant test authority. Type tests shall include as minimum but not be limited to the following. The type test certificate to be submitted along with technical bid Temperature withstand 3. Disturbance immunity 4 Electromagnetic compatibility 5. Electromagnetic compatibility (EMC) 7. HV withstands test for insulation 8. Impulse voltage test 9. Functional tests and Communication integrity 10. Relay characteristics verification 11 Degree of protection 12. Mechanical stress/ vibration Bidder to submit the type test report carried out at the reputed and nationally like KEMA, CPRI, ERDA (Electronic Test AND Development Center STQC) etc for the conformance testing of the communication of the offered relay without any interfacing hardware in line with IEC-60870-5-103 edition-2 failing which the offer shall be liable for rejection 2. Final acceptance tests shall be carried out at manufacturer/ supplier/ assembler's works under his care and expense. Manufacturer/ supplier shall also arrange instruments and equipment as required for testing. Manufacturer shall furnish test checks, heat run tests and functional tests as a minimum or as per the manufacturer/ supplier

21	Conformity to Standards	<p>1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.</p> <ul style="list-style-type: none"> ☑ IEC 60255-151 over current & earth fault functional test ☑ IEC 60255-151 Reset Time ☑ IEC 60255-151 Over Shoot Time Test ☑ IEC 60529 Ed 2.2 Ingress Protection Test, IP54 CAT-2 ☑ IEC 60255-21-2 Shock Response / Withstand Test ☑ IEC 6100-4-17 Ed 1.1 Ripple Test On Dc Input Power Port ☑ IEC 60255-26 / IEC 6100-4-29 Voltage Dips & Interruption Test ☑ IEC 60255-27 Safety Related Electrical Test Ac Dielectric Voltage Test, Insulation Resistance Test Impulse Voltage Test ☑ IEC 60255-27/ IEC 60255-1 Thermal Short Time Test, Continues Withstand, Over Current ☑ IEC 60255-1 Burden Tests for Current Transformers, For Dc Supply for Binary Input ☑ IEC 60255-26/ IEC 61000-4-4 Electrical Fast Transient Test ☑ IEC 60255-26/ IEC 61000-4-18 Damped Oscillatory Wave Test ☑ IEC 60255-1 / IEC 60068-2-2 Climatic Test, Dry Heat Test, Cold Test ☑ IEC 60255-1/ IEC 61810-1 Contact Performance Test Mechanical Endurance, Limiting Making Capacity, Limiting Braking Capacity ☑ IEC 61000-4-2 Electrostatic Discharge Immunity Test ☑ IEC 61000-4-5 Power Frequency Magnetic Field Test ☑ IEC 61000 4-8 Magnetic Field Test ☑ IEC 60255-6 Measurement of accuracy, rated burden, thermal test <p>2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are</p> <p>3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations</p> <p>4. In case Indian standards are not available for any equipment, standards issued by /NEMA or IEC/BS/VDE/IEEE</p> <ul style="list-style-type: none"> ☑ IEC 60529 Degree of protection by enclosure ☑ IEC 61000-4-5 Surge immunity test ☑ IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field ☑ IEC 61000-4-8 Power frequency magnetic field immunity test ☑ IEC 61000-4-9 Pulse magnetic field immunity test ☑ IEC 61000-4-10 Damped oscillatory magnetic field immunity test ☑ IEC 61000-4-11 AC auxiliary supply requirement ☑ IEC 61000-4-16 Immunity to conducted, common mode disturbances ☑ ENV 50204 Radiated electromagnetic field disturbance test <p>2. All three phase currents, fault currents of each phase and earth, fault alarms, relay healthiness status, status of binary inputs and output relays shall be accessible through the network in open protocol.</p> <p>3. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.</p> <p>4. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:</p> <ul style="list-style-type: none"> ☑ Statutory regulations ☑ Data sheets ☑ This specification ☑ Codes and standards
22	Other Requirements	<p>1. The Vendor shall quote with complete technical literature, Operating Manual and description of Laptop interface software. Specific Model meeting the above requirements shall be mentioned.</p> <p>2. The vendor shall provide warranty for the relay for free service / replacement of 12 (Twelve) months from the date of delivery or 18 (Eighteen) months after the same has been put in service or commissioned, whichever is earlier.</p>

Technical Specification of 24 Volt DC Master Trip Relay

SI No	Feature and Function	Technical Requirement
1	Purpose and Application	Relays will be used as replacement of old Master trip relay of existing 11 kV VIRUS TYPE Switch gear & 33 control Relay Panel Substation. Master trip relay with mechanical latching and high speed operation with hand reset.
2	Auxiliary Supply	24 V DC 2 wire unearthed system Purpose Application 1. 2 Auxiliary Supply Voltage range 70% to 110 % of Rated DC voltage
3	Ambient condition	Operating ambient temperature up to 55 Deg c Operating Humidity up to 100 %
4	Module and Mounting	Operating Humidity up to 100 % Relay should be flush mounted type Mounting in switchgears located in non AC rooms. Galvanic isolation between field connection and relay hardware should be there
5	Operating time at the rated auxiliary voltage	12 to 18 Milli Second (ms)
6	Burden variant	Less than 10 W
7	Relay Contacts	Minimum 4 number output contacts are required (2 "NO' and 2 "NC' contact) All contacts should be potential free. Rating of contacts: Contact durability > 10K operation Relay Contacts Rated current = 5A Max Making current 50A, 0.5 sec Max breaking capacity- DC resistive load= 5A, DC inductive load (L/R=15mS)= 5A, DC inductive load (L/R=40mS)= 4A Switching rate: Up to 500 times per hour at full breaking current or 50000 times per hour with reduced breaking current.
8	Operation indicator	Mechanical flag indication should be there during relay operation
9	Relay Reset	Hand reset

SCOPE OF WORK

1. The erection portion involves installation of the relays in the existing panels, testing & commissioning along with necessary scheme wiring. Dismantling of Old relays which are to be retrofitted, shall be in the scope of the Contractor. Any modification of internal panel wiring, if required, including test block, lugging & cross-ferruling shall be in the scope of the bidder. **Field wiring outside the CRP shall not be in the scope of the bidder.**
2. Bidder will have to do the new wiring for commissioning of their supplied numerical relays, for integration of the same in the existing protection schematics of the feeder. Similarly, all the mechanical works, cutting of panel, providing blanking plates (if required), installation of T.B.s, Fuses & Links etc. are also in scope of bidder. Wiring modifications which are internal to CRP, including supply of wire / cables required for relay Retrofitting shall be in the scope of bidder.
3. Bidder shall arrange all necessary tools and plants, as well as testing instruments and any other special devices required for successful installation and commissioning of the numerical relays in their place.
4. Relay Test kit shall be provided by Bidder for testing free of charge.
5. After completion of relay testing/ work one (01) sets of as built relay parameter setting data and test reports as well as well as hard copy.