

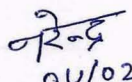
TECHNICAL SPECIFICATIONS OF SECONDARY INJECTION KIT


S/no	Specifications
1	Main Features of Universal Protective Relay Test System
1.1	IEC 61850 compliant dynamic portable relay test kit with 6 current, 4 voltage & 1 battery emulator (aux. DC supply) modules allowing dynamic and steady state testing capabilities. Exhaustively incorporating but not limited to features mentioned hereunder.
1.2	The Disturbance Recorder recording of the line / generator in standard IEEE COMTRADE or EMTP simulations shall be compatible for transient testing of protections with this test system.
1.3	The various functional relays (Electromechanical / Static / Numerical) which needs to be frequently tested are listed below:
1.3.1	2 Time Delay Relays.
1.3.2	21 Distance Relays, 3 phase, all types.
1.3.3	24 Volts / Hertz Relays.
1.3.4	25 Check Synchronising Relays.
1.3.5	25A Auto Synchronising Relays.
1.3.6	27/59 AC/DC Under / Over Voltage Relays.
1.3.7	32 Directional Power Relays, 1 and 3 phase.
1.3.8	40 Field failure Relays.
1.3.9	46 Phase balance Current Relays.
1.3.10	46N Negative Phase Sequence overcurrent Relays
1.3.11	47 Phase sequence voltage (open delta) Relays
1.3.12	50 Instantaneous Overcurrent Relays 25A 3Phase / 75A single phase.
1.3.13	51 IDMT Over Current Relays.
1.3.14	67 Directional Over Current Relays.
1.3.15	67N Directional Earth Fault Relays.
1.3.16	79 AC Auto reclosing Relays.
1.3.17	81 Under / Over Frequency Relays with df/dt feature.
1.3.18	85 Carrier or Pilot Wire Relays.
1.3.19	86 Lock-out Relays upto 250 V DC rating.
1.3.20	87 Differential Relays.
1.3.21	Besides the above relays, the other items, which need to be tested/calibrated, include disturbance (transient) recorders, energy meters (0.2S class), transducers, indicating instruments, multi-function meters, etc.
1.4	The kit should be capable of testing relays on programmed test sequence in form of *.rio files.
2	Hardware Specification
2.1	Amplifiers
2.1.1	The amplifier stages are to be fully electronic. Range switching is not permissible.
2.1.2	All current amplifiers to be fully overload-, overburden-, over temperature- protected and proof.
2.1.3	All amplifiers to use linear amplification elements and to be DC-coupled. Able to generate DC and AC.
2.1.4	The amplifiers neutrals, the binary inputs and the main power supply to be galvanically isolated from each other.
2.2	Internal Voltage Amplifiers (4 phases)
2.2.1	Setting Range : 4 x 0....300Vrms (PhN)/phase
2.2.2	Output Power : 75 VA/Phase at 85...300Vrms with maximum 4x50VA
2.3	Internal Current Amplifiers (6 phases)
2.3.1	Setting Range : 6 x 0....12.5A/phase or 3 x 0...25A/phase or 1 x 0...75Amps
2.3.2	Output Power : 6 x 70 VA/phase at 7.5 Arms (1x280 VA at 7.5Arms)
2.4	Signal generation
2.4.1	All outputs to be continuously & independently adjustable in amplitude, phase (0 to $\pm 359.99^\circ$) and frequency.
2.4.2	Maximum error to be less than 0.1% of scale and distortion (THD+N) not to exceed 0.05% for voltage and 0.1% for current outputs.
2.4.3	Able to generate continuous sine waves with a frequency between 10 and 1000 Hz and to generate transient files with a bandwidth from DC up to 3KHz.
2.4.4	Frequency error to be less than 1 ppm. Phase resolution to be less than 4" (sec. of degree)

2.4.5	Specifications to be maximum & guaranteed figures over a temperature range of 23°C ±5°C.
2.5	Analog measuring inputs for transducers
2.5.1	• Number 2
2.5.2	• Direct current range 0...± 20mA
2.5.3	• Direct voltage range 0...± 10V
2.5.4	• Max. error < 0.05%
2.6	Auxiliary DC supply
2.6.1	• Voltage output 12...250Vdc
2.6.2	• Power Maximum 50W
2.7	Binary Inputs / Outputs
2.7.1	Binary Inputs 8 or more.
2.7.2	Binary Outputs 4 or more.
3	Additional Features
3.1	The test kit shall have the provision to synchronise its clock from a GPS time synchronizer. Details of time synchronisation of test kit from GPS Time synchroniser shall be furnished in the offer.
3.2	It should also be suitable for synchronisation on SNTP Protocol when connected on IEC 61850 communication LAN.
3.3	The test kit shall be suitable for end to end testing of a transmission line using programmable inter-tripping scheme.
3.4	The test kit shall be suitable for testing of IEDs communicating on IEC 61850 communication protocol, simulating GOOSE messages.
3.5	The kit should have Ethernet Interface:- 10/100 Mbit/s (10/100 base -TX, auto-sensing, auto-crossover, RJ45 connector for CAT5 twisted pair cable)
4	Software
4.1	All necessary softwares required for steady state and dynamic testing of various protection relays shall be supplied. Softwares necessary for programming the test kit, generating test reports and analysing the results shall also be supplied along with each test kit.
4.2	Software package + installation instructions, for above test kit for testing relays and other equipments listed in Item 1.3 above.
4.3	List of software modules shall be furnished with the offer.
4.4	Any issue arising at later stage due to inadequacy of above software package with the changing requirement shall be resolved by Supplier with no additional charges on BHEL, i.e. in case BHEL insists, at a later date, for advanced software, Software update for this same kit, the same shall be supplied by Supplier at no extra cost.
4.5	Software shall be suitable for testing of IEDs communicating on IEC 61850 communication protocol including GOOSE messaging & other features. (to be listed out)
4.6	Software shall be suitable for steady state/dynamic testing of the protection relays. Software shall be suitable for end to end test capability.
4.7	Authenticated copies of the softwares on CD ROMs shall be supplied, against each test kit, for steady state and dynamic testing of various protection relays and other items specified above.
4.9	Test Plans in the form of Test Libraries for testing protective relays of all major manufacturers (*.rio files) shall be supplied. These will form the base document to generate the testing procedures for any protective relay.
4.10	Latest Laptop PC with i5 processor or above configuration and working with marketed on date & running latest & licensed version of operating system. Hardware should be of latest configuration & reputed make with Windows based operating S/W.
4.11	Make & Configuration of Laptop shall be furnished in the offer.
5	Power Supply
5.1	• Nominal input voltage 110-240V AC, Single Phase
5.2	• Range input Voltage 99-264 V AC
5.3	• Frequency 50/60 Hz
5.4	• Permissible range 47-63 Hz
6	Environment:
6.1	• Operating Temperature: 0...50°C
6.2	• Storage Temperature: -15.... +60°C
6.3	• Humidity Range: 5...90% RH, non-condensing
7	Certification/standards complied with :

7.1	EMC: EN 61326 or equivalent
7.2	Immunity EN 61000 or equivalent
7.3	Safety : EN 61010-1 or equivalent
8 Accessories:	
8.1	Accessories kit including PC cable, combination plug along with cable, test leads, power cord and hard carrying case.
8.2	Any special sockets / cables / accessories required for use with the test kit shall be supplied along with the test kit.
9 Calibration & Test Certificates:	
9.1	Calibration: the instruments should be calibrated at any accredited lab such as NABL / UKAS / NIST or National lab of any country before delivery & calibration certificate should be sent with the instrument.
9.2	Type test reports shall be furnished in the event of order. The type tests should have been carried out within last five years. Any discrepancy or inadequacy found by customer in any of the type test reports during approval shall have to be resolved by re-test by supplier without any price implication.
9.3	KEMA Certificates shall be furnished with the offer for IEC 61850 compliance.
9.4	Two copies of Test certificates for each test kit shall be furnished before dispatch of equipment.
10 Guarantee/warranty: One year from supply	
11 Manuals:	
11.1	One set of Technical literature and one set of operational manual shall be furnished with the offer.
11.2	The supplier shall supply technical literature enabling guidance on how to :
11.2.1	Programming of test kit.
11.2.2	Use of test kit for testing various types of protective relays, transient recorders, energy meters etc. This can be clubbed with inspection of equipment at supplier's works before dispatch.
11.3	Two sets of the following documents (hard copy) shall be supplied along with the equipment and 01 soft copy in a CD for each test kit .
11.3.1	Descriptive technical leaflets.
11.3.2	Programming, operation and maintenance manuals.
12 Training & Technical support:	
12.1	The supplier shall depute his representative at BHEL PSWR HQ works to demonstrate programming and operation of the test kits during inspection by customers.
12.2	The supplier shall provide technical support to BHEL commissioning group at site and demonstrate programming & use of test kit at site for at least a one year.
13	Compliance to every clause of the specification shall be furnished with the offer, failing which the offer may be rejected.


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 04/02/2016
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