

ANNEXURE-1 PI 240957316 Rev 00

ITEM	QTY	DESCRIPTION	VENDOR'S COMPLIANCE	REMARKS
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1	1	Microprocessor based Disturbance/ Fault Recorder (DR) used to record the graphic form of instantaneous values of voltage and current in all three phases and neutral for large generators having 8 analog/16 digital inputs and atleast 2 output contacts (to be used for DR triggered & DR failed conditions) in both fast and slow scan mode. DFR shall	Yes/NO	
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Analog Input Description with nominal range	Fast Scan	Slow Scan
Gen. Current (R Ph) 0-5A, 50Hz	YES	NO
Gen. Current (Y Ph) 0-5A, 50Hz	YES	NO
Gen. Current (B Ph) 0-5A, 50Hz	YES	NO
Gen. Neutral Current 0-5A, 50Hz	YES	NO
Gen. Voltage (R-N) 0-63.5V, 50Hz	YES	YES
Gen. Voltage (Y-N) 0-63.5V, 50Hz	YES	YES
Gen. Voltage (B-N) 0-63.5V, 50Hz	YES	YES
Gen. Field Current, 4-20mA DC	NO	YES
Gen. Field Voltage, 4-20mA DC	NO	YES
Gen. Watts, 4-20mA DC	NO	YES
Gen. VARs, 4-20mA DC	NO	YES
Gen. Frequency, 63.5V, 50Hz	NO	YES
Open delta Voltage 0-200V, 50Hz	YES	YES

Yes/NO

The DR shall have the facility of fast scan as well as slow scan recording of transient as well as dynamic performance of the system. The slow scan feature shall have scan rate suitable to capture dynamic MW/MVAR power oscillations and shall also be suitable to record the frequency excursions and response of generator field and governor control on system fluctuations. Necessary auxiliary VTs or open delta box for open delta voltage shall also be supplied, if required.

Yes/NO

The DR shall have scan rate in the range 2.0 to 50.0 Hz. The non volatile memory in the DR shall be suitable for recording for a minimum of 15 minutes at scan rate corresponding to 2.0 Hz with possibility to dedicate 10% of the memory space in pre-fault zone of recording. The frequency response of analog channels shall be 25Hz or better.

Yes/NO

The scan rate for fast scan mode shall be selectable in the range of 500Hz to 2000Hz. For the fast scan the pre-fault and post-fault record time shall be atleast 200ms and 5.0 seconds respectively. For the fast scan mode, the system shall have non-volatile memory of last three records of at least 5 seconds duration each.

Yes/NO

If another disturbance occurs during one post-fault run time, the recorder shall be able to record the same. The bidder shall indicate the post-fault memory corresponding to 2000Hz without any data compression.

Yes/NO

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	The DR shall be suitable so that the data can be accessed for further analysis on owner's computers and / or testing equipment for on line testing / diagnosis. The output shall be in IEEE COMTRADE formats. Necessary interfacing equipment, software for transfer of data and software for analysis of fault data shall also be provided.	Yes/NO	
	For each generator, the bidder may offer one DR having slow as well as fast scan facility or separate DRs for slow scan and fast scan. The amplitude resolution shall not be less than 16 bits and event resolution shall be 1 milli seconds or better.	Yes/NO	
	The DR shall have its own time generator, which shall be synchronized on SNTP protocol when connected on LAN. Alternatively , the bidder shall include GPS time synchronizer card and associated antenna in one DR to act as a master. The cable length with antenna shall be of the order of 60 meters. The clock of the DR's time generator shall not have a drift more than 0.5 second per day when allowed to operate without synchronization from external source. Facility shall be provided for inter triggering and inter time synchronization of the recorders of each generator. All necessary interfacing equipment including cables and connectors as per site requirement for time synchronisation of all the disturbance recorders shall be supplied.	Yes/NO	
	The DR shall have inherent to it starting sensors based on over voltage, under voltage and rate of change of frequency. The starting sensors of the DFR, and pick up, shall preserve the disturbance/fault data on the non-volatile solid state memory of the acquisition unit. The settings of all these starting sensors shall be programmable.	Yes/NO	
	Auxiliary supply: 220V DC with +10% and -20% variation.	Yes/NO	
	CT ratio: Programmable at site PT ratio: Programmable at site	Yes/NO	
	Case: Switchboard flush pattern mounting with rear access terminals.	Yes/NO	
	The Fault/disturbance logs shall be clearly identified by following: a) Generator identity. b) Date & time (in hour, minute, seconds and milliseconds). c) Identity of trigger source. d) Graphic form of analogue and digital signals of all the channels.	Yes/NO	
	The disturbance recorder shall acquire the fault data for the pre fault and post fault period and transfer them to engineering work station (not covered in this enquiry) automatically to store in the hard disk.	Yes/NO	

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	All necessary pre-fabricated interconnecting cables for connection of inputs, outputs, inter triggering & inter time synchronisation of disturbance recorders and any other hardware and software necessary for completion of the system including cables and connectors from time synchroniser to disturbance recorders shall be supplied as per site requirement whether specifically mentioned or not.	Yes/NO	
	Original authenticated licensed software for analysis of disturbances, software for setting the various parameters & any other software necessary for system integration shall be supplied.	Yes/NO	
	Vendor to note that Engineering workstation of Industrial grade is being procured seperately. It will be vendors responsibility to ensure software pertaining to DR configuration will be uploaded into the workstation during commissioning and demonstrated to end user.	Yes/NO	
	Engineering workstation will have ethernet/USB port for hooking the DR covered in this enquiry. Necessary interconnecting cable of length 100M shall be supplied by the vendor.	Yes/NO	
	System architecture showing all interfacing items and interconnections between Disturbance recorders etc shall be furnished with the offer.	Yes/NO	
	Complete Bill of Material shall be furnished with the offer.	Yes/NO	
	GENERAL NOTES:-		
	1) Compliance to each clause of the specification without deviation shall be given in the offer, failing which, the offer may not be considered.	Yes/NO	
	2) Two sets of type test reports shall be furnished immediately on receipt of order as per relevant National/International standards. The type test reports shall not be more than 5 years old. The type test reports are to be approved by customer. Any discrepancy or inadequacy found in the type test reports shall be resolved by supplier with customer by way of re-test without any binding on BHEL and free	Yes/NO	
	3) Two copies of Technical literature, wiring diagram, panel cutout, overall dimension drawings and one set of commissioning instruction and programming manuals shall be furnished along with the offer.	Yes/NO	
	4) Recommended settings for disturbance recorders shall be furnished by the supplier at the time of order execution.	Yes/NO	
	5) Any special lugs / sockets / cables / hardware required for use with the system shall be supplied with the equipment whether specifically mentioned or not.	Yes/NO	

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		6) Ten copies of bound manuals comprising programming and commissioning instruction and maintenance manuals shall be furnished before dispatch of equipment for submission to customer.	Yes/NO	
		7) Detailed routine test reports as per relevant standards shall be furnished in six copies for the equipment, before dispatch.	Yes/NO	
		8) Complete system integration of & demonstrated shall be done by the supplier at BHEL Bhopal works during inspection without any price implication.	Yes/NO	
		9) The supplier shall do commissioning at site and establish communication with engineering work station without any price implication. The programming, testing, time synchronisation and all function of the DR shall be demonstrated at site to the satisfaction of customer. The site in this case is 1*500 MW Feroze Gandhi Unchahar TPP of M/s NTPC Limited & M/s NBPPL, a joint venture between M/s NTPC and M/s BHEL.	Yes/NO	