

PRODUCT PURCHASING SPECIFICATION

PURCHASE SPECIFICATION

NO. JS 22503 REV.00

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for Fiber Optic direct Hot-Spot Temperature Monitoring System.

TRANSFORMER ENGINEERING DEPARTMENT

A. SYSTEM DETAILS-

Fiber optic temperature monitoring system shall be proven quality and rugged technology. Bidder is required to give the list and performance certificates from end-users in India & abroad for the quoted system. The system shall use high quality optical fibre sensors to accurately measure the hot spots in the windings, top oil and other parts to facilitate hot spot temperature of winding and other important areas for monitoring. The probes shall be suitable to be directly installed in each winding of power transformer to measure the winding hot spot, top oil and core temperature.

B. TECHNICAL PARAMETERS -

Sl.No.	Description	Item-1	Item-2	Item-3	Item-4	Item-5
1	<u>Style no.</u>	JS9006281360	JS9006281370	JS9006281380	JS9006281390	JS90062813
2	<u>Application</u>	Real-time temperature monitoring of transformer oil, winding & core for Transformer				
3	<u>Details of optical sensors</u>	Probes shall be all Silica, double Teflon jacketed fiber with perforations/slits in the outer jacket to allow complete oil filling. The fiber with Teflon jacket shall be strong enough to withstand the severe	Probes shall be 200µ all Silica, double Teflon jacketed fiber with perforations/slits in the outer jacket to allow complete oil filling. The fiber with Teflon jacket shall be strong enough to withstand the severe conditions	Probes shall be 200µ all silica, double PFA Teflon jacketed, kevlar cabled fiber with perforated outer jacket to allow complete oil filling and white Teflon protective Helix wrap having	Probes shall be all Silica, double Teflon jacketed fiber with perforations/slits in the outer jacket to allow complete oil filling. The fiber with Teflon jacket shall be strong enough to	Spares for main item-1/ item-2 / item-3 / item-4

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REV.00

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Signature-B

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	conditions prevailing inside an EHV Transformer.	prevailing inside an EHV Transformer.	improved visibility and mechanical strength. The fiber with Teflon jacket shall be strong enough to withstand the severe conditions prevailing inside an EHV Transformer.	withstand the severe conditions prevailing inside an EHV Transformer.
4	No. of channels in controller	<u>04 nos.</u>	<u>08 nos.</u>	<u>08 nos.</u>

C. BILL OF QUANTITY-

Sl.No.	Item Description	Item-1	Item-2	Item-3	Item-4	Item-5
C.1	FO sensors with internal cable of length 5.0 mtrs – nos.	04 nos.	08 nos.	08 nos.	14 nos.	01
C.2	External cables of length 8.0mtr-nos.	One for each feed through or one for 2/4 feed throughs, as the case may be (to brought out clearly in bid for each item 1-4)				01
C.3	Feed throughs	04 nos	08 nos/ 14 nos.**	08 nos./ 14 nos.**	14 nos.	01

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C.4	Feed through plate (stainless steel)	01 nos.	01 nos.	01 nos	01 nos	01
C.5	Protective cover for feed through plate	01 nos	01 nos	01 nos.	01 nos.	01
C.6	'O' ring gasket for feed through plate	01 nos	01 nos	01 nos.	01 nos.	01
C.7	Stainless steel conduit for external cable of length 8 mtr	01 nos to accommodate all external cable	01 nos to accommodate all external cable	01 nos to accommodate all external cable	01 nos to accommodate all external cable	01
C.8	Controller unit	01 set	01 set	01 set	01 set	01
C.9	Enclosure for controller unit	01 nos.	01 nos.	01 nos.	01 nos.	01
C.10	AC cable/ Adapter for DC input	1 set (if required)	1 set (if required)	1 set (if required)	1 set (if required)	01
C.11	Instruction Manual	a. 01 CD containing all relevant details b. 3 sets in hard copies	a. 01 CD containing all relevant details b. 3 sets in hard copies	a. 01 CD containing all relevant details b. 3 sets in hard copies	a. 01 CD containing all relevant details b. 3 sets in hard copies	-

** In Special cases, as per Site requirement, Feed-throughs of 14 nos. can be requested by BHEL for Item-2 and Item-3, Same will have to be supplied by Supplier without any excess price-implication.

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D. INSTRUCTIONS TO BIDDERS (ITB)-

1. Complete schematic showing the connections of power supply to the display/ control unit, terminal markings and wiring of alarm & trip contacts shall be furnished along with offer. Type and size of terminals used in display/controller unit shall also be furnished.
2. Drawing/details of installation of FO sensor in winding ducts to be furnished along with offer.
3. Bidder should furnish- technical details, schematic drawings, connection/wiring diagram, cooling control circuit scheme along with the offer.
4. Outline and fixing arrangement drawing for display/ controller unit, tank feed through plate, protective cover and enclosure for controller unit to be furnished along with offer.
5. Any other accessories, which is not listed above clauses but is essential for satisfactory operation of fiber optic sensor temperature measurement system is deemed to be included in scope of bidder. Bidder to clearly bring out such item in the bid.
6. Bidders are required to submit checklist attached with this specification. It is expected that answer to all the points of checklist shall be "YES". In the case if any answer is "NO", the same should be substantiated with proper reason etc for review.
7. Bidder shall be given **1 week** time to reply in case of any query from BHEL. Bidder shall note that reply to technical queries must reach us within stipulated time else their offer will be rejected.
8. In case of any problem at site, bidder should respond to BHEL query within a weeks' time. Also bidder shall make all arrangements to immediately attend the problem and the same shall be reported to BHEL along with the solution. If it is found that the bidders are not responsive to attend the site issues, the corresponding bidder may be debarred from quoting in next tender.
9. Bidder shall submit the undertaking that they have clearly understood the specification and there is no deviation from their side.

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10. If during the tenure of the rate agreement, OEM makes any changes in the equipment or the equipment is superseded by some other advanced equipment, Bidder is deemed to supply the updated equipment/advanced equipment without any price implication to BHEL. An undertaking for the same shall be furnished by the Bidder in its bid.
11. All the items being supplied with the system shall be compatible with each other and shall work coherently as a complete system.
12. The above specification is issued without any prejudice to BHEL's standard terms & Conditions. The specification doesn't absolve the Bidder from his basic responsibility of supplying a quality material to BHEL which guarantees successful operation.
13. Item 1-4 shall be purchased from customer approved vendors only. It is responsibility of bidders to get their make/model approved by end-customer as and when required by BHEL. Items-5 spares will be procured whenever there is problem/damages in main set.

E. INSPECTION & DESPATCH-

1. The Bidder shall furnish a list of all fittings and components in the dispatch details giving description, quantity and weight of each item (Quantity of each item shall be mentioned). All items shall be properly packed in jerk-free packing to international standards so as to avoid damage during the transit.
2. a. Each items to be packed set wise. Each and every item to be tagged with BHEL-PO and the same shall be displayed on Box and also on the packing list, to be sent along with the consignment.
- b. Hard copy in 3sets of routine/acceptance/calibration test reports & instruction manual (along with a soft copy as per BOQ SI.No. C.11) shall be sent with the consignment.
- c. Dispatches should be made set wise.

F. DELIVERY-

Fiber optic sensors along with the internal cables shall be supplied within 4 weeks of the placement of PO and balance consignment shall be delivered within 8 weeks from the placement of PO.

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G. PACKING & SHIPPING-

All items shall be packed Transformer wise, i.e, the complete set of items required for one Transformer shall be packed separately & packing list shall be sent before dispatch. In no case, items of two or more Transformers shall be combined in one box. Box shall be weather and water proof. All these boxes shall be sealed by Vendor before dispatch. It shall be opened at Site, in presence of Vendor before start of installation.

H. INSTALLATION, COMMISSIONING & TRAINING-

If required by BHEL, bidder may be called for installation & demonstration of system at our work. Also, bidder has to provide training for operation of the equipment and installation & commissioning of system at the site on intimation by BHEL and obtain certificate for successful installation from the customer for the same. Bidder should quote the charges for the same in the price-bid separately.

I. GUARANTEE-

The system shall be guaranteed for satisfactory operation and against defects in design, materials and workmanship for a period of at least 30 months from date of supply or 24 months from the date of commissioning. The date of commissioning shall be reckoned from submission of certificate as mentioned above. **Bidder shall also quote separate charges towards incremental guarantee for every six month.**

J. CUSTOMER APPROVAL-

It is responsibility of Vendor to get them approved in Customer Vendor List. BHEL shall assist. Also, Bidder to provide list of Organizations under which they are approved.

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K. ADDITIONAL REQUIREMENT-

Vendor has to indicate the Compatibility of their FO System with other make Sensors/ Controllers/ Display Units. If Required, additional cost may be considered and provided for modifications involved in the FO System to meet suitability with other make. However, it may be noted that this is only an additional requirement and will not be considered for Technical/ Commercial evaluation.

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ANNEXURE-I CHECKLIST FOR FO

Sl.No.	Essential features	YES to all is mandatory. If reply to any answer is NO then, specific reason to be mentioned.
1	Probes shall be suitable to be completely immersed in hot transformer oil. They shall also be able to withstand exposure to hot kerosene vapour during the transformer insulation drying process. There shall be no partial discharges from the probes even if the probes are placed in the high electrical stress are inside the transformer	
2	Temperature range of the offered system should be -30°C to +200°C with an accuracy of $\pm 2^\circ\text{C}$	
3	Accuracy of the system should be $\pm 2^\circ\text{C}$ with no recalibration required.	
4	System shall have a microprocessor based monitoring and recording unit having 8(eight) channels	
5	Analog output (two nos. for each channel, 4-20 mA) with temperature resolution of $\pm 0.1^\circ\text{C}$ for each channel shall be provided	
6	The system shall offer user programmable temperature alarm outputs, alarm lights and controller system status indicators for each channel. Indicate no. of relays	
7	System meets the requirements of surge test of 4000V when applied to all the inputs and outputs without permanent damage to the instrument as per IEEE C37.90.1	
8	Data storage capability of the offered system shall be 90 days at an interval of one (01) reading/minute	
9	Retention capability of maximum temperature for each channel provided	IP-55
10	The controller shall be housed in a separate enclosure having degree of protection IP55 class.	IP-55
11	Enclosure shall be made of 1.6mm stainless steel or 3.00mm CRCA sheet	
12	RS-232 port for USB port shall be provided.	
13	For Remote/ SCADA, communication shall be as per IEC-61850 Protocol with following: 1. Ethernet 2. RS-485 3. FO Cable	
14	Operating voltage shall be 230V, 50Hz single phase AC / 24V DC.	
15	If operating voltage in (14) above is DC, suitable adapter included	
16	As per applicable IEEE/ IEC Standards, Test Reports of FO System shall be submitted before dispatch	
17	Confirmation on Packing & Shipping (Clause-G, Page 6 of 8)	

Signature