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PROJECT:RATE CONTRACT FOR DUAL INPUT FIELD MOUNTED TEMPERATURE TRANSMITTERS

PURCHASE SPECIFICATION FOR
DUAL INPUT FIELD MOUNTED TEMPERATURE TRANSMITTERS

REVISIONS: 00	APPROVED BY S.K.KISAN		
	PREPARED BY SANDEEP.S	ISSUED 416	DATE 05/05/2018

CONTENTS

SECTION- A

GENERAL INSTRUCTIONS TO BIDDERS:

1. All required documents against this Tender/Specification shall be submitted in English only.

2. Introduction: Bidders are required to offer dual input field mounted temperature transmitters for Thermal Power Plant applications.

3. In order to accept the Technical offers / proposals from Bidders for the rate contract in this Specification (refer Sections C & D), certain Pre-qualification criteria are required to be met by Bidder.

4. Pre-qualification requirements (PQR) are clearly mentioned in Cl AA in Section-B of this Specification. Bidder to read the same carefully and submit the details required for BHEL's acceptance separately.

5. In case Bidder does not meet Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.

6. **Evaluation methodology:**

   a) BHEL shall initially open Bidder's PQR documents only as per Section-B of this specification for review & acceptance.

   b) Only after acceptance of PQR reference documents, BHEL shall open Bidder's technical offers for evaluation.

   c) In the event of acceptance of Bidder's technical offers, the names of such Bidders (non PMD Vendors) along with details provided by them for PQR ,technical details and other required documents shall be furnished by vendor and same will be submitted to End users / customers for their acceptance / approval, if applicable. Commercial bids of only accepted / approved Bidders by End users / Customers shall be considered by BHEL for further processing.

7. Bidders are required to submit offers as detailed below:

   aa. Documents pertaining to Pre-Qualification requirement (Cl AA of Section B of this Specification) shall be in a separate cover / soft-folder with reference no. "CE/416/DIFMTTxr/RC/18-19/PQR/Cl AA of Section B" marked on it.

   bb. Documents pertaining to Pre-Qualification requirement (Cl BB of Section B of this Specification) shall be in a separate cover / soft-folder with reference no "CE/416/DIFMTTxr/RC/18-19/PQR/Cl BB of Section B" marked on it.

   cc. Technical offers/proposals for the rate contract, whose requirements are mentioned in Sections C and D & Section E will be submitted in separate cover / soft-folder with reference "CE/416/DIFMTTxr/RC/18-19" and "Section C & D", "Section E" marked on it respectively.

8. Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the vendor documents by End users/Customers, If needed vendor shall accompany BHEL representative for discussions.

SECTION- B

AA. Pre-Qualification Requirements (PQR) of Bidders for dual input field mounted temperature transmitters:

1. Bidders should note that the offered dual input field mounted temperature transmitters shall should have two years satisfactory operation (before 05.05.2018) in at least one power station having unit rating of 200MW or above.
2. Bidder shall be the OEM of the dual input field mounted temperature transmitters or authorized manufacturer/dealer of OEM in India.If Bidder is not a Original Equipment Manufacturer (OEM), then Bidder to include Authorisation letter from OEM for Design, Engineering, Assembly, Testing, supply , and Servicing of the offered Transmitters. This Authorization letter provided by OEM to Bidder shall indicate the Type and Duration of the agreement. Such authorized agents shall be legally registered in India for carrying out above activities. They have to mention clearly in the bidding as Non-OEM & OEM name to be indicated by providing above information.
3. Submit Reference List of Projects wherein offered dual input field mounted temperature transmitters are supplied & commissioned.
4. Reports on successful erection & commissioning like end user certificates from customer with plant address, designation of the customer & contact details etc. for the completed jobs.
5. OEM shall furnish an undertaking that in case of change of Indian representative / agent, OEM shall continue to support supplies w.r.t to service and supply of spare parts.
6. Bidders who are making the offer for this tender shall have authorized representatives in India for support related to documentation, Erection, Commissioning, servicing & any other co-ordination work required.
7. The offered model/series of dual input temperature transmitters should be registered in HART foundation.

BB. Along with the details related to PQR above, following additional documents shall also be included in the Offer for reference:

1. Technical literature / Manuals of offered dual input field mounted temperature transmitters and its accessories.
2. In the Technical literature submitted by Vendor shall include all parameters/details/Features mentioned in the BHELs Specifications. If any such part of BHEL specifications not covered in the Technical literature submitted by the vendor, compliance/Deviation for the same shall be obtained from OEM and attach as part of the vendor offers.
3. Submit Unpriced Purchase Order copies for executed projects.
4. Name & registered address of the Indian branch office or Indian representative for support of sales service, with Organization chart.
5. Bidder shall have facility in India for Engineering activities, preparation of Documents, trouble shooting and calibration of the system. Submit these details.

Important note: In case Bidder does not submit details mentioned in above clauses or meet the requirements of Pre-qualification requirements, Offers will be summarily rejected and Bidder's Technical offers/proposals will not be evaluated.

Bidder has to submit PQR checklist / tabulation sheet mentioning the page numbers / references from their submitted offer against Section-B (sub-section AA & BB).

SECTION - C

SCOPE OF SUPPLY:

C1 Following items are required to be supplied as per Specifications enclosed Section-D.

Items and accessories quantity shall be supplied as Mentioned Section –E to various projects.

C2 OTHER REQUIREMENTS:

1. Documents to be furnished in the event of order, before manufacturing clearance/ dispatch clearance from BHEL of items:-

(i) Detailed BOM including all items. Data sheets / GA drawings and erection drawings / wiring diagram. These documents shall be submitted for approval, from end-user.

(ii) Test certificates / reports and calibration reports, for approval.

(iii) O & M manuals – 4 sets hardcopies (2 sets to BHEL-EDN & 2 sets with consignment to site). Also, a soft copy of O & M manual to be provided.

SECTION-D

A. TECHNICAL REQUIREMENT FOR DUAL INPUT FIELD MOUNTED TEMPERATURE TRANSMITTERS:

REQUIREMENTS FOR TEMPERATURE TRANSMITTERS

1.0 Temperature transmitter shall be of SMART type and shall be used for receiver instrument or control loop requiring signal conversion. They shall have either resistance or thermocouple type measuring system.

2.0 Following types of 2-wire dual compartment temperature transmitter (directly powdered from 4-20 mA input cards of DDCMIS) shall be provided. The temperature transmitter shall be universal type and fully compatible with thermocouples and RTDs being provided by the BHEL. Temperature compensation of the thermocouples shall be performed in the temperature transmitter itself.

2.1 Dual-input Temperature Transmitter with 5 digit LCD display:

These shall be suitable for mounting on pipes/ support. These shall be provided for temperature measurement which are used for tripping/ protection of auxiliaries e.g. for bearing temperature on which trip is envisaged. These transmitters shall also be used for temperature measurement used for close loop controls, in which case, both elements of the duplex thermocouple/RTD shall be used in a single transmitter. 5 digit LCD display shall be provided with these transmitters. These transmitters shall have bump less change over facility to second sensor in case first sensor fails .This change-over is to be alarmed. Aluminum enclosure shall be provided .Protection class shall be NEMA 4 / IP66 or equivalent and explosion/flame proof for NEC Class-1 division 1 area / IEC-79.1 part 1,as applicable.

2.2 Common requirements for each of the above type of temperature transmitters

2.2.1 The transmitter output shall be compatible with major instrumentation selected. Adjustable spans and suppressed ranges shall be provided where required by process consideration. Thermocouple burn-out or RTD wire-break protection for "failsafe" condition shall be provided.

2.2.2 Transmitters shall have easily accessible span and zero adjustment facilities and shall meet the following minimum requirements:-

Output	:	2-wire (power supply from input card of Control System) with 4-20mA output with superimposed HART protocol signal.
Input	:	Same transmitter shall be capable to handle Pt-100 RTD , Thermocouples –K, R & other types (input type to be selectable at site through HART terminal at site from TC to RTD & vice versa)
Isolation	:	should be optically isolated from power circuit (Min. 500V AC)
Output load	:	min 600 ohms at 24VDC.

Operating ambient : 0 to 85 deg C (Without indicator)
Temperature 0 to 70 deg C (With indicator)

Electrical connection: Plug-in-socket with PG16 cable gland to be provided for output & Double compression Ni plated brass to be provided for input suitable for 4-Pair cable (13mm Dia OD) with 1/2" electrical connection

Power supply : Uv=24VDC (admissible tolerance 13Vdc <= Uv <= 45Vdc) or compatible with input module of Control System.

Basic Accuracy : +/-0.1% for both RTD & thermocouple input

Composite Accuracy : For dual input-type:
RTD =<0.25% of 0-250 deg C span
T/C-K type =<0.2% of 0-600 deg C span
CJC accuracy (for T/C) shall be =< 1deg C

(Composite Accuracy is to be calculated as summation of all applicable accuracies of temp transmitter, for converting sensor input to output in 4-20 mA (e.g., basic accuracy, digital accuracy, D/A accuracy, etc.) and temperature effect on these accuracies at ambient temperature of 50 deg C, based on the figure/ formula given in the standard product catalogue for span as specified above for various types of Temperature Elements. specified. All such accuracy/ temp effect figures in catalogue shall be first converted to deg C, and then percentage of this converted accuracy in specified span shall be calculated to compare with the specified composite accuracy figures.)

Stability : +/-0.1% or +/-0.1 deg C of reading(whichever is better)
for 2 years in case of RTD inputs
for 1 year in case of thermocouple inputs

EMC Compatibility : as per EN 61326

Ambient temperature error : 0.1% per 10°C change

Calibration : As per NIST monograph 125 for T/C & European curve alpha = 0.00385 for RTD.

3.0 Transmitters shall be provided with following features

- Sensor drifts alarm for sensor failure prediction also for zero shifts.
- Differential & average temperature measurement if required.
- Automatic switch – over to back –up sensor on primary sensor failure.
- Accepts any combination of two sensor types (RTDs, TCs, mV or ohms)
- Ambient temperature compensation (Cold junction compensation shall be provided in-built with the equipment).
- Fault detection for electronics & sensors with fail-safe alarming.
- In case of failure (open or burn-out) of RTD/thermocouple, temp. Transmitter shall provide low temperature output.

2. The product and make shall be selected so that with one make of transmitter all applications with respect to measuring rages temperature sensor (resistance thermometer / thermocouple) and

connection type (2/3/4) wire connection of resistance thermometers) shall be covered. In a nutshell, the transmitter shall be universal type.

3. The offered model DDL (Device Driver list) shall be registered in HART foundation, which is mandatory for device operable by universal HART communicator & HMS system. These HMS & HART communicator are being procured by BHEL separately. If this technicality is not met, the offer will be technically rejected.

4. All transmitters cases shall be dust-tight and rugged weather-proof and explosion - proof cases shall be used in outer and hazardous areas respectively. Type test for IP protection and explosion proof / flame proof(as applicable) to be provided.

2. Special Requirement:

5-Point calibration for Transmitters for both the sensor inputs. Also, other parameters to be complied as per the enclosed quality plan.

3. Packing :

The materials shall be properly packed to ensure that it is capable of withstanding transit risks. Following details shall be marked on packing case

- Manufacturer's name
- BHEL purchase order

B. Bidder shall furnish with the offer Clause-wise compliance / deviation list. This is must for evaluating the offer.

Customer:	Manufacturer's Name & address:-	MANUFACTURING QUALITY PLAN	NTPC QP No:	Project:
		ITEM: TEMPERATURE TRANSMITTER,	Revision No: 00	
			Date:	Contractor: M/s BHEL-EDN,
		Confirming to code: BS 6447 & IEC 60770		End User :

Sl.No	Components & Operations	Characteristics	Class	Type of Check	Quantum of Check		Reference Documents	Acceptance Norms	Format of Record	Agency			Remarks
					M	C/N				M	C	N	
1	2	3	4	5	6a	6b	7	8	9	D*	10		11
1.00	Raw Materials												
1	Raw Materials & Components (Housing, Electronic & other components)	a) Material properties, Size, Rating, Make, Type/Model No.	Major	Internal Test/ Checks	As per Manufacturer's Standard	-	Purchase Order Specification / Manufacturers Catalogues / Mfr Drawing	Purchase Order Specification / Manufacturers Catalogues / Mfr Drawing	Internal Records	-	P	-	-
2.00	In Process Inspection												
2	Assembly & Fitting	a) Soundness of Fitting, Connections & Terminals Marking	Major	Verification	100%	-	Purchase Order Specification / Manufacturers Catalogues / Drawing	Purchase Order Specification / Manufacturers Catalogues / Drawing	Internal Records	-	P	-	-
3.00	Final Inspection												
3	Routine Test	a) Dimensional details & Visual checking (Size, Rating, Make, Type/ Model No., Serial No./ Tag)	Major	Measurement / Visual	100%	10%	Approved Drawing / Approved Dataseet / Specifications / Manufacturers Catalogues	Approved Drawing/ Approved Dataseet / Specifications / Manufacturers Catalogues	TC	✓	P	V	V/W	Inspection applicable for indigenous manufacturers only.For imported vendors,review of calibration test reports is applicable.
		b) Calibration Check (at 5 point) for Accuracy	Critical	Measurement	100%	10%	- do-	- do-	TC	✓	P	V	V/W	Communication for HART Protocol shall be checked during Calibration

Customer:	Manufacturer's Name & address:-	MANUFACTURING QUALITY PLAN	NTPC QP No:	Project:
		ITEM: TEMPERATURE TRANSMITTER,	Revision No: 00 Date:	Contractor: M/s BHEL-EDN, End User :
		Confirming to code: BS 6447 & IEC 60770		

Sl.No	Components & Operations	Characteristics	Class	Type of Check	Quantum of Check		Reference Documents	Acceptance Norms	Format of Record	D*	Agency			Remarks
					M	C/N					M	C	N	
1	2	3	4	5	6a	6b	7	8	9		10			11
		c) Bump less Change over (As applicable) and other functional & optional features	Major	Measurement	100%	10%	- do-	- do-	TC	_	P	V	V	
		d) Review of Test and Calibration certificates	Major	Review	100%	-	- do-	- do-	TC	✓	P	V	V	
4.00	Packing & Dispatch													
		a) Completeness of TC's, COC's, Inspection Reports.	Major	Verification	100%	-	Ord Specn & QP	Ord Specn & QP	Documents	_	P	-	-	
		b) Identification Marking / Tagging of each instrument	Major	Verification	100%	-	Ord Specn	Ord Specn	Internal Records	_	P	-	-	
		c) Soundness of Packing against Transit	Major	Verification	100%	-	Ord Specn	Ord Specn	Internal Records	_	P	-	-	

Manufacturer/ Sub contractor:	Contractor: M/s. BHEL-EDN, Bangalore	LEGEND:	For Customer use:-	
		* Records identified ✓ with shall be essentially included by the contractor in QA documentation.	Reviewed By	
Signature & Date	Signature & Date	M: Manufacturer / Sub contractor, C: Contractor /Nominated inspection agency, N: Customer Indicate " P " - Perform, " W " - Witness & " V "- Verification	Name & Sign of approving authority & Seal	

SECTION- E

PRICING SHEET- DUAL INPUT FIELD MOUNTED TEMPERATURE TRANSMITTERS.
Note: This Pricing sheet shall be filled by the bidder.

E1.MAIN QUANTITY

E1	Main Items					
Sl.No.	Description	Material Code	Quantity (X)	Unit	Unit Price(INR) (Y)	Total Price(INR)
1	Dual I/P field mounted, dual compartment type temperature transmitters with display(Non ex-proof)	PR0110000153	1700	Nos		
2	(a) Plug in socket with PG16 cable gland (1set) should be offered with each transmitter.	PR0900001798	1700	Nos		
	.(b) ½" NPT double compression Ni-plated brass cable gland (1no) suitable for each transmitter should be offered.		1700	Nos		
	.(c) Mounting accessories SS316 suitable for 2" pipe mounting		1700	Nos		

Note 1: - Vendor to mandatorily provide details of minimum order quantity above the mentioned quantity (X) requirement in order to get 5% discount on the quoted unit price(Y).
Note 2 : - Splitting of orders will be done among the technically qualified vendors agreed for L1 price as per BHEL procedures/guidelines.