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COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.		PURCHASE SPECIFICATION FOR DUAL INPUT FIELD MOUNTED TEMPERATURE TRANSMITTERS								
		REVISIONS: 00				APPROVED BY				
						S.K.KISAN				
						PREPARED BY		ISSUED		DATE
						SANDEEP.S		416		10/01/2021

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SECTION- A

GENERAL INSTRUCTIONS TO BIDDERS

- 3.1 Considering possibilities of change in requirement, i.e. addition & deletion of quantities for individual project BOM at a later date after system design finalisation, the vendor must clearly quote unit price as well as lot price for all items for indisputable calculations of lot prices in case of revised quantities later.
- 3.2 In case of quantity change, unit rates shall be applicable. However in case of item change for a project, if the required model is not available in the original offer, the unit price of another model, for the same range but with features having the closest similarity to the required one, quoted elsewhere in another variant or another group, shall be applicable.
- 3.3 Although transmitter are allowed to be indigenously assembled, calibrated & certified, but considering the fact that not yet any indigenous sensors & electronics are offered, site-proven and acceptable to most customers, the sensors and electronics should preferably be procured from vendors' own principals abroad..
- 3.4 Model selection is sole responsibility of vendor with clear understanding of specification requirement. Any change in basic model & accessories during technical evaluation shall not be allowed. In case of any doubt regarding the intent of specification technically, vendor shall interact with the purchaser & get the doubts clarified well before the due date of technical bid submission to minimize the deviation from spec. & the chances of rejection. Also any doubt is there in spec. for the parameters to be offered or not then same may be offered as alternate without any ambiguity.

SECTION- B

SCOPE OF SUPPLY:

B1 Following items are required to be supplied as per Specifications enclosed Section-D.

- Dual Input field mounted temperature transmitters, Dual compartment type with display(Non ex-proof) : Apprx. Qty : 1200Nos
- Plug in socket with PG16 cable gland (1set) should be offered with each transmitter.
- ½" NPT double compression Ni-plated brass cable gland (1no) suitable for each transmitter should be offered.
- Mounting accessories suitable for 2" pipe mounting.
- 5-Point calibration for Transmitters.

B2 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-C

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 temperature transmitter (directly powered from 4-20 mA input cards of DDCMIS) shall be provided. The temperature transmitter shall be 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 Indicator:

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. Indicator 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. Protection class shall be IP65 minimum.

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 : $U_v=24\text{VDC}$ (admissible tolerance $13\text{Vdc} \leq U_v \leq 45\text{Vdc}$) or compatible with input module of Control System.

Composite Accuracy : For dual input-type:
RTD $\leq 0.25\%$ of 0-250 deg C span
T/C-K type $\leq 0.2\%$ of 0-600 deg C span
CJC accuracy (for T/C) shall be $\leq 1\text{deg C}$

(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.)

EMC Compatibility : as per EN 61326

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 ranges 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, 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. Degree of protection shall be > IP55. IP65 is required for outside installation or installation in spray-water affected areas.

2. Special Requirement:

5-Point calibration for Transmitters.

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.