

ESP-001- 2A Rev . 00 	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number							
			PY 56279							
			Rev. No.	02						
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<u>Specification for Field Transmitters</u> 1. SCOPE This technical specification covers the Design, Engineering, Manufacturing, Assembly, testing at vendor works, inspection by purchaser, packing and transportation to site with necessary documentation like data sheets, statutory approvals, O&M manuals etc., as required for Field Transmitters, Hand held Calibrators and Multifunction Calibrators. 2. Proven Track Record The items being offered as per specification should be operating satisfactorily in captive power plant applications / hydrocarbon industries like Refinery, Petrochemical and gas processing plants under similar process conditions for <u>at least 4000 Hours</u>. The above criteria shall be applicable to main equipment, sub- components as well as bought out items if any. Vendor shall submit necessary supporting documents / past users confirmation supporting to above PTR requirements along with technical offer. If offered instruments / equipments are supplied to BHEL PE&SD within last 5 years, above PTR clause is not applicable. 3. INSTRUCTIONS TO BIDDERS 3.1 Bidders are advised to contact BHEL for essential technical queries in writing within one week of issue of Enquiry. In the event of any conflict between these specifications, data sheets, related standards, codes etc. the vendor shall refer the matter to the purchaser for clarifications before bid submission and the decision of Purchaser shall be final & binding on Bidder, without any cost & delivery implications. In the event of conflict, most stringent requirements shall be followed in general. 3.2 Offers with incomplete information will not be considered for evaluation, and are likely to be rejected outright without any further interaction with the Bidder. 3.3 Any technical features [over & above BHEL enquiry specification requirements] proposed by Bidder will not be given preference for the purpose of evaluation. 3.4 Bidder shall submit the "Duly filled & Signed copy of Check list" compulsorily along with technical offer without which offer is liable for rejection without any further interaction with the Bidder 4. DESIGN VARIABLES to be provided after P.O. Placement / during drawing approval: Following variables to be finalized during drawing approval and vendor shall comply the same without any commercial implication: <table border="1"> <tr> <td>a) Calibration Ranges + Tag List of all Transmitters</td> <td>:</td> <td>Shall be intimated after P.O. placement</td> </tr> <tr> <td>b) Safe working/Static pressure of DPTs</td> <td>:</td> <td>Shall be intimated after P.O. placement</td> </tr> </table>					a) Calibration Ranges + Tag List of all Transmitters	:	Shall be intimated after P.O. placement	b) Safe working/Static pressure of DPTs	:	Shall be intimated after P.O. placement
a) Calibration Ranges + Tag List of all Transmitters	:	Shall be intimated after P.O. placement								
b) Safe working/Static pressure of DPTs	:	Shall be intimated after P.O. placement								
Revisions: Refer to record of revisions										
Prepared By: (Sd/-) Sonalika Sahu		Checked By : (Sd/-) Sujatha Sapavat		Approved : (Sd/-) T. Kamal kumar						
				Date : 19.07.17						

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5. CHECK LIST (To be filled by BIDDER and submitted along with Technical offer is compulsorily)

Vendor shall submit the following documents mandatorily as part of COMPLTE technical offer.

Enquiry No. / Date :

Name of the Bidder :

Project Name :

Item Description :

S. No	Document	Bidder confirmation (Yes/No)	Remarks
1	Technical offer complies with the specifications and its associated annexures, pre-bid clarifications in Toto and there are no technical deviations. Signed and stamped copy of this specification along with annexures enclosed along with technical offer.		
2	In case of deviation, vendor to confirm that these are technically not feasible deviations and same are submitted in BHEL format . In case technically feasible deviations are proposed by the bidder and subsequently withdrawn, <u>no commercial implications can be claimed by the bidder</u>		
3	All items are manufactured conforming to latest version of material grade standard and manufacturing standard mentioned in this specifications		
4	Bidder to quote as per BHEL price format only. No other format is acceptable. Bidder to attach un-priced price bid format by indicating "QUOTED" against each item and submit with technical offer duly signed & stamped.		
5	For addition/reduction of quantity, unit rate quoted in the present offer shall be considered during ordering and shall be valid up to execution of the contract to the extent of + 10% and -30% of order Value.		
6	Bidder to agree that Bill of materials / list of equipment furnished in the offer is only for information; Vendor shall supply all the material to meet the performance, sizing & technical requirement as per specification & its Annexures, scope matrix etc.		
7	All the equipments / items / etc., supplied by bidder are having valid statutory approval certificates and same will be produced at any stage of contract execution to BHEL. The same were eligible to take local statutory regulatory body approval during commissioning of the system		

 (Bidder's Signature and stamp with date)



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DEVIATION FORMAT

Enquiry No.:**Item:****Name of Bidder:****Offer Ref. No.:**

Sl. No.	Clause no. & Spec. no.	Description as per Specification	Deviation taken	Nature of Deviation	Remarks

NOTES:

1. Technical offer of the bidder will be evaluated only on the basis of Deviation Schedule. Deviation Schedule constitutes this sheet (with these Notes) duly signed and stamped.
2. Deviations, if any, shall be clearly brought out only in this format. Deviations mentioned / taken elsewhere or in any other format will be ignored.
3. Additional sheets in the same format can be attached by the vendor, if necessary.
4. Nature of Deviations shall only be of Design / Manufacturing constraints and non-availability of items / components / makes in market.
5. No price implications shall be entertained for deviations withdrawn during the technical scrutiny. If any deviations are accepted by BHEL during technical scrutiny then also there will be no price implication. Hence, in no case there will be consideration of Price implications.
6. Reasons for the deviations shall be specified in the Remarks column.
7. If there are no deviations from the specifications, bidder still has to submit the signed copy of this format by writing "NO Deviations" on this format.
8. If the "Deviation Schedule" is not submitted along with the offer, the bidder's offer is likely to be rejected without any further interaction with the bidder. Only the accepted deviations in conjunction with the original tender shall constitute the contract document for the award of job to the bidder

SIGNATURE OF THE BIDDER_____

NAME_____

DESIGNATION_____

DATE_____

COMPANY SEAL

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6. MANDATORY SPARES - Spares requirement shall be as per [enquiry](#).

7. DOCUMENTATION

7.1 Information to be included with offer

Vendor shall make the offer in detail, with respect to every item of the Purchaser’s specifications. Any offer not conforming to this shall be summarily rejected.

- a) Duly filled & Signed copy of Check list
- b) Deviation list, if any (as per “No deviation format” given in this specification). If there are no deviations, bidders shall submit “Deviation format” by mentioning deviations “Nil”.
- c) Unpriced price schedule (To be submitted compulsorily without fail)
- d) Proven Track record and reference list (if applicable)
- e) Bill of materials (only for information)

7.2 Documentation submission within 2 weeks of placement of LOI (for approval by BHEL and / or BHEL’s customer in 4 sets)

- a) Consolidated BOM sheet along with accessories of instruments, finalized make /models of instruments, etc for approval.
- b) Detail Data sheets, GA drawings, Type tests, statutory certificates
- c) Comprehensive Quality Assurance plan (QAP).

NOTES::

- a) *BHEL Shall provide the following inputs to vendor immediately (within 7 days) after placement P.O. / LOI:*
 - 1) Instrument schedule with tag no’s, ranges, site identification no’s, etc
 - 2) Typical Cover page for pressure Transmitter: This is to be used for all instruments with necessary modification for each variety of instrument
- b) Following points to be noted while submitting drgs & data sheets for approval:
 - 1) Each instrument data sheet to be submitted along with cover page & tag list.
 - 2) All extra quantities to be marked as “E.spares”.
 - 3) All data sheets & drgs to be submitted in soft copy first and once it is cleared for manufacturing, then same shall be submitted in spiral hard copies for formal approval. Do not submit drgs/data sheets in loose papers as well as in bits & pieces for approval.
- c) *All vendor documents and its sub-items shall be submitted to Customer / Consultant for approval during order execution (if applicable). Any comment furnished by Customer / Consultant / BHEL shall be taken care by vendor during ordering execution.*
- d) Further BHEL will provide comments on vendor submitted document within 07 working days for revision & resubmission. Vendor shall follow up with BHEL for non-receipt of comments/approvals.
- e) Revised drawings / Documents shall be submitted by Bidder in 07 days of receipt of comments / observations from BHEL. BHEL shall revert within 7 days on receipt of these revised documents / drawings from vendor for approvals.
- f) All the approvals required for manufacturing shall be completed within 1 month from P.O to meet the P.O delivery schedule. Accordingly vendor shall ensure the submission of approval category documents (which are required for manufacturing) and obtain their approvals.
- g) Vendor shall obtain final approvals on all technical + quality aspect documents before inspection dates.
- h) It is vendor’s responsibility to obtain approvals from BHEL as earliest as possible to meet PO delivery schedules. Accordingly vendor to plan and execute the supplies in time.

7.3 Documents to be submitted during final shop testing and before equipment dispatch. **(Note: submission of these documents are commercially linked)** - all in 16 sets + 3 CD ROM (2 sets to be included with item dispatch and balance to BHEL purchase department).

- a) Complete O& M manual, Approved Engg documents
- b) Guarantee and all test certificates for review and acceptance by BHEL and / or BHEL’s Customer

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COPYRIGHT 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.	8. NAME PLATE			
	Each equipment shall have a 316 SS nameplate attached firmly to it at a visible place furnishing the following information:			
	a) Instrument range & Tag number.			
	b) Manufacturer’s name, Model and emblem.			
	9. MARKING, PACKING AND DESPATCH			
	9.1 All items shall be marked (stamped/etched) in accordance with the applicable code/standard/specification. In addition, the item code, if available, shall also be marked. For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard.			
	9.2 Part number/Dispatch link-up of all the equipment’s/items supplied and also their co-relation with system/drawing/approved BOQ. Paint or ink for marking shall not contain any harmful metal or metal salts which can cause corrosive attack either ordinarily or in service. Special items/smaller items shall have attached corrosion resistant tag providing salient features.			
	9.3 The equipment shall be transported to site by the vendor in fully assembled condition. However, in case some components are liable to be damaged during transit, the same shall be dismantled and supplied separately, to be reassembled at site the vendor. Assembly of the item supplied loose at site and repairing of any item damaged during transport shall be in the vendor’s scope. The vendor shall send each consignment to site with a detailed packing list.			
	9.4 All the equipment shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/rail or trailer. The equipment shall be wrapped in polythene sheets before being placed in crates/cases to prevent damage to the finish. Crates/cases shall have skid bottom for handling.			
	9.5 Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.			
	9.6 The equipment/items may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.			
	9.7 The following minimum packing procedures shall be followed:-			
c) All items shall be dry, clean and free from moisture, dirt and loose foreign material of all kinds.				
d) All items shall be protected from rust, corrosion, and mechanical damage during transportation and handling.				
e) Each variety and size of item shall be supplied in separate packaging marked with the purchase order no., item code (if available), and the salient specifications.				
f) All electrical, instrumentation etc., shall be properly packed to prevent damage during transport, storage, handling at site.				
g) All the items which the Bidders considered liable to be damaged during shipment or storage, shall be packaged for separate shipment. If instruments are removed from the panel, they and their connection shall be suitably tagged to ensure simple re installation at the job site. Each instrument shall be sealed in plastic bags containing moisture absorbing dessicants.				
h) It shall be bidder’s sole responsibility to protect all the material during period of dispatch, storage and erection against corrosion, incidental damage due to vermin, sunlight, rain, high temperature, humid atmosphere, rough handling in transit and including delays in transit.				
i) Commissioning spares, Tools & tackles to be packed separately & suitably tagged.				
9.8 <i>If mandatory spare items are ordered, same shall be sent in pre-decided lots in containers /secure boxes distinctly marked in Red color with boldly written "S "mark on each face of the containers /secure boxes</i>				
9.9 <i>Loose vendor items sent by vendor to sites shall be quantified/numbered/tagged and not merely mentioned as ONE lot of loose items.</i>				
9.10 <i>A packing list covering items having shelf life are to be intimated to site. Also, shelf life items shall be packed separately in black color painted box for easy identification at site.</i>				
9.11 <i>In case of imported/exported items, seaworthy packing shall be done as per specification no: AA0490004 (latest revision) and the type of packing applicable for flow orifice is “CQ”.HY0490573 (latest revision). This specification shall be obtained by vendor on request.</i>				



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VARIANT TABLE-1 (Gauge Pressure Transmitter)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range
00	PY9756279001	Cast Aluminum	4 – 20 mA + HART	0 to 2.5 Kg/cm2(g)
01	PY9756279010	Cast Aluminum	4 – 20 mA + HART	0 to 40 Kg/cm2(g)
02	PY9756279028	Cast Aluminum	4 – 20 mA + HART	0 to 160 Kg/cm2(g)
03	PY9756279036	Cast Aluminum	4 – 20 mA + HART	0 to 250 Kg/cm2(g)
04				
05				
06				
07				
08				
09				
10	PY9756279109	Stainless Steel	4 – 20 mA + HART	0 to 2.5 Kg/cm2(g)
11	PY9756279117	Stainless Steel	4 – 20 mA + HART	0 to 40 Kg/cm2(g)
12	PY9756279125	Stainless Steel	4 – 20 mA + HART	0 to 160 Kg/cm2(g)
13	PY9756279133	Stainless Steel	4 – 20 mA + HART	0 to 250 Kg/cm2(g)
14				
15				
16				
17				
18				
19		Cast Aluminum	Foundation FIELD BUS	0 to 2.5 Kg/cm2(g)
20		Cast Aluminum	Foundation FIELD BUS	0 to 40 Kg/cm2(g)
21		Cast Aluminum	Foundation FIELD BUS	0 to 160 Kg/cm2(g)
22		Cast Aluminum	Foundation FIELD BUS	0 to 250 Kg/cm2(g)
23				
24				
25		Stainless Steel	Foundation FIELD BUS	0 to 2.5 Kg/cm2(g)
26		Stainless Steel	Foundation FIELD BUS	0 to 40 Kg/cm2(g)
27		Stainless Steel	Foundation FIELD BUS	0 to 160 Kg/cm2(g)
28		Stainless Steel	Foundation FIELD BUS	0 to 250 Kg/cm2(g)
29				
30				

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VARIANT TABLE-2 (Remote Seal Gauge Pressure Transmitter)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range
31				
32	PY9756279320	Cast Aluminum	4 – 20 mA + HART	0 to 40 Kg/cm2(g)
33	PY9756279338	Cast Aluminum	4 – 20 mA + HART	0 to 250 Kg/cm2(g)
34				
35	PY9756279354	Stainless Steel	4 – 20 mA + HART	0 to 40 Kg/cm2(g)
36				
37				
38		Cast Aluminum	Foundation FIELD BUS	0 to 40 Kg/cm2(g)
39				
40		Stainless Steel	Foundation FIELD BUS	0 to 40 Kg/cm2(g)

VARIANT TABLE-3 (Differential Pressure Transmitter)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range	Span
41	PY9756279419	Cast Aluminum	4 – 20 mA + HART	0 to 150 mmWC	-150 to +150mmWC
42	PY9756279427	Cast Aluminum	4 – 20 mA + HART	0 to 2500 mmWC	-2500 to +2500mmWC
43	PY9756279435	Cast Aluminum	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)	
44	PY9756279443	Cast Aluminum	4 – 20 mA + HART	0 to 5 Kg/cm2(g)	
45					
46					
47	PY9756279478	Stainless Steel	4 – 20 mA + HART	0 to 150 mmWC	-150 to +150mmWC
48	PY9756279486	Stainless Steel	4 – 20 mA + HART	0 to 2500 mmWC	-2500 to +2500mmWC
49	PY9756279494	Stainless Steel	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)	
50	PY9756279508	Stainless Steel	4 – 20 mA + HART	0 to 5 Kg/cm2(g)	
51					
52					
53		Cast Aluminum	Foundation FIELD BUS	0 to 150 mmWC	-150 to +150mmWC
54		Cast Aluminum	Foundation FIELD BUS	0 to 2500 mmWC	-2500 to +2500mmWC
55		Cast Aluminum	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)	
56		Cast Aluminum	Foundation FIELD BUS	0 to 5 Kg/cm2(g)	
57					
58					
59		Stainless Steel	Foundation FIELD BUS	0 to 150 mmWC	-150 to +150mmWC
60		Stainless Steel	Foundation FIELD BUS	0 to 2500 mmWC	-2500 to +2500mmWC
61		Stainless Steel	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)	
62		Stainless Steel	Foundation FIELD BUS	0 to 5 Kg/cm2(g)	
63					
64					
65					

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VARIANT TABLE-4 (Differential Pressure Transmitter - with Remote Seal on HP Side)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range
65	PY9756279656	Cast Aluminum	4 – 20 mA + HART	0 to 2500 mmWC
66	PY9756279664	Cast Aluminum	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)
77				
68	PY9756279680	Stainless Steel	4 – 20 mA + HART	0 to 2500 mmWC
69	PY9756279699	Stainless Steel	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)
70				
71		Cast Aluminum	Foundation FIELD BUS	0 to 2500 mmWC
72		Cast Aluminum	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)
73		Stainless Steel	Foundation FIELD BUS	0 to 2500 mmWC
74		Stainless Steel	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)

VARIANT TABLE-5 (Differential Pressure Transmitter – with Remote Seals on HP & LP Sides)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range
75	PY9756279753	Cast Aluminum	4 – 20 mA + HART	0 to 2500 mmWC
76	PY9756279761	Cast Aluminum	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)
67	PY9756279672	Cast Aluminum	4 – 20 mA + HART	0 to 2500 mmWC (for high process temperature 270 Deg C)
78	PY9756279788	Stainless Steel	4 – 20 mA + HART	0 to 2500 mmWC
79	PY9756279796	Stainless Steel	4 – 20 mA + HART	0 to 1.5 Kg/cm2(g)
80				
81		Cast Aluminum	Foundation FIELD BUS	0 to 2500 mmWC
82		Cast Aluminum	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)
83		Stainless Steel	Foundation FIELD BUS	0 to 2500 mmWC
84		Stainless Steel	Foundation FIELD BUS	0 to 1.5 Kg/cm2(g)

VARIANT TABLE-5 (Temperature Transmitter)

Var. No	Material Code	Transmitter Housing	Transmitter Output	Maximum Range
85	PY9756279850	Cast Aluminum	4 – 20 mA + HART	All ranges
86				
87	PY9756279877	Stainless Steel	4 – 20 mA + HART	All ranges
88				
89				
90				

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VARIANT TABLE-6 (Calibrators and other items)

Var. No	Material Code	Item Description
91	PY9756279915	Universal HHC for HART Insts
92		Universal HHC for FIELD BUS Insts
93	PY9756279931	Common Universal HHC for HART & FIELD BUS Insts, Make – Emerson, Model No- TREXCFKLWP3S
94		
95		
96		
97		
98		
99		

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Gauge Pressure Transmitter (PT) Technical Data Sheet							
GENERAL	1	Range & Qty.	Refer BOM(Annexure-1 of this specification)	ACCESSORIES	30	Universal Mounting Bracket	Reqd, For 2" pipe mounting, SS304
	2	Type	Electronic Smart, Ex-proof & intrinsic safe EX 'i" type		31	U Clamp+Fastner	Reqd, SS 304
	3				32	Cable Glands	2 No's SS Double Compression+Flameproof
	4	Ambient Temp Limit	- 30 to 80°C		33	Cable entry Plugs	Reqd, SS 304 (1 No)
	5	Process Temp. Limit	- 40 to 120°C		34	Vent/Drain Plugs	Reqd, SS 316 (1 No)
SENSOR	6	Accuracy (combined effect of linearity, hysteresis and repeatability)	For a rangeability of 1:10 a) Equal or Above 760 mmWC: ± 0.065 % b) Less than 760 mmWC: ± 0.15 %		35	Tag Plate	Reqd, SS 304 (1 No)
	7	Response Time	150 msec		36	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	8	Stability	± 0.15 % of URL for 5 years		37	SIL-2 certification	Required
					38		
TRANSMITTER	9	Turn Down Ratio	Not applicable	TEST REPORT/CERTIFICATE	39		
	10	Process Connection	1/2" NPT (F)		40	Bill of Material (model, Tag no's)	100% Witness
	11	Electrical Connection	2 No's of 1/2" NPT (F)		41	Spares (BOM, part no's)	100% Witness (if ordered)
	12	Power Supply	24V DC, Loop Powered		42	Statutory approvals like PESO, BIS, etc	100% Review (if applicable)
	13	Over Range Protection	> 150% of range.		43	Material compliance certificate	100% Review
	14	Protection	IP 65		44	Five point calibration	100% review & 10% or min 2no's witness with random selection.
	15	Zero & Span adjustment	Required.		45	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.
	16	Display	Integral LCD Digital (in Engg Units & in %).		46	Hydro test for pressure parts	100% Review
	17	Impulse Entry	Horizontal (Bottom entry is not acceptable)		47	Internal IR test for all cards, assembly	100% Review
	18	Load Resistance	600Ω @ 24 VDC		48	Ingress Protection Test	100% Review of Type test reports
	19	Output	4-20mA + HART		49	Intrinsic Safety Test	100% Review of Type test reports
	20	Also suitable for	Installation in open Racks (if required)		50		
	21	Sensitivity	0.05% of span or better		51		
	22	Diagnostic Features	Required.		52		
MATERIAL	23	Hazardous area class	Zone-1, IIC, T3.	PROJECT SPECIFIC	53		
	24	Body	SS316 (or) better		54		
	25	Element	SS316 (or) better		55	Compartments	Dual Compartment
	26	Sensor O-Ring	Glass-filled PTFE/Teflon		56	Manifold Type	Non-Coplanar, non-Integral 2-Way, 1/2" NPT(F), SS 316
	27	Electronic Housing	Die Cast Aluminium		57	Statutory Approvals	PESO (For Instrument+Glands+Plugs)
	28	Sensor fill fluid	Silicon Oil		58	Sensor Type	Non-Inductive type.
	29	Humidity	0 - 100% RH		59	Corrosive Protection	Required
				60	Terminal Block type	Integral, Non-fly leads	



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Diaphragm seal - Pressure Transmitter (PTD) Technical Data Sheet

GENERAL	1	Range & Qty.	As per enquiry	ACCESSORIES	32	Universal Mounting Bracket	Reqd, For 2" pipe mounting, SS304
	2	Type	Electronic Smart, Ex-proof & intrinsic safe EX "I" type		33	U Clamp+Fastner	Reqd, SS 304
	3				34	Cable Glands	2 No's SS Double Compression+Flameproof
	4	Ambient Temp Limit	- 30 to 80°C		35	Cable entry Plugs	Reqd, SS 304 (1 No)
	5	Process Temp. Limit	- 40 to 120°C		36	Tag Plate	Reqd, SS 304 (1 No)
SENSOR	6	Accuracy (combined effect of linearity, hysteresis and repeatability)	For a rangeability of 1:10		37	Spacer Ring & plug	Required, SS, with SS316 Vent/Drain Plugs
	7		a) Equal or Above 500 mmWC: ±0.25 %		38	Diaphragm Assembly	SS316L, Flush flange type (Refer fig.1)
	8		b) Less than 500 mmWC: ±0.5 %		39	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat
	9	Response Time	As per OEM recommendation		40	Gasket	Reqd. Sprial Wound, SS
	10	Stability (for base transmitter)	± 0.15 % of URL for 5 years		41	Stud+Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)
TRANSMITTER	11	Turn Down Ratio	Not applicable	42	SIL-2 certification	Required	
	12	Process Connection	Raise flanged, 1½" , class 300#	43	NACE complied	Required	
	13	Electrical Connection	2 No's of 1/2" NPT (F)	44	Bill of Material (model, Tag no's)	100% Witness	
	14	Power Supply	24V DC, Loop Powered	45	Spares (BOM, part no's)	100% Witness (if ordered)	
	15	Over Range Protection	As per flange rating	46	Statutory approvals like PESO, BIS, etc	100% Review (if applicable)	
	16	Protection	IP 65	47	Material compliance certificate	100% Review	
	17	Zero & Span adjustment	Required.	48	Five point calibration	100% review & 10% or min 2no's witness with random selection.	
	18	Display	Integral LCD Digital (in Engg Units & in %).	49	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.	
	19	Impulse Entry	Not applicable	50	Hydro test for pressure parts	100% Review	
	20	Load Resistance	600Ω @ 24 VDC	51	Internal IR test for all cards, assembly	100% Review	
	21	Output	As per enquiry	52	Ingress Protection Test	100% Review of Type test reports	
	22	Diagnostic Features	Required.	53	Intrinsic Safety Test	100% Review of Type test reports	
	23	Also suitable for	Installation in open Racks (if required)	54			
	24	Sensitivity	0.05% of span or better	55			
MATERIAL	25	Hazardous area class	Zone-1, IIC, T3.	PROJECT SPECIFIC	56		
	26	Body	SS316 (or) better		57	Compartments	Dual Compartment
	27	Element	SS316 (or) better		58	Manifold Type	Not applicable
	28	Sensor O-Ring	Glass-filled PTFE/Teflon		59	Statutory Approvals	PESO (For Instrument+Glands+Plugs)
	29	Electronic Housing	As per enquiry		60	Sensor Type	Non-Inductive type.
	30	Sensor fill fluid	Silicon Oil		61	Corrosive Protection	Required
	31	Humidity	0 - 100% RH		62	Terminal Block type	Integral, Non-fly leads

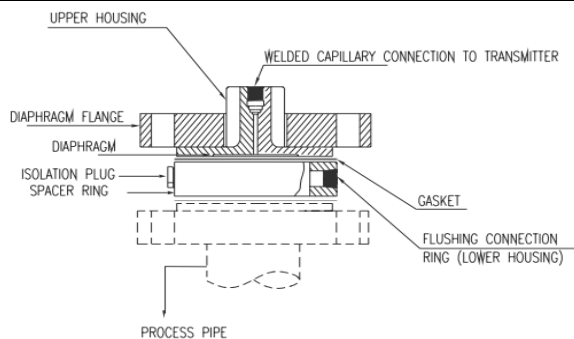


FIGURE - I

Differential Pressure Transmitter (DPT) Technical Data Sheet

GENERAL	1	Range & Qty.	As per enquiry	ACCESSORIES	32	Universal Mounting Bracket	Reqd, For 2" pipe mounting, SS304
	2	Type	Electronic Smart, Ex-proof & intrinsic safe EX 'i' type		33	U Clamp+Fastner	Reqd, SS 304
	3				34	Cable Glands	2 No's SS Double Compression+Flameproof
	4	Ambient Temp Limit	- 30 to 80°C		35	Cable entry Plugs	Reqd, SS 304 (1 No)
	5	Process Temp. Limit	- 40 to 120°C		36	Vent/Drain Plugs	Reqd, SS 316 (1 No)
SENSOR	6	Accuracy (combined effect of linearity, hysteresis and repeatability)	For a rangeability of 1:10		37	Tag Plate	Reqd, SS 304 (1 No)
	7		a) Equal or Above 760 mmWC: ± 0.065 %		38	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	8		b) Less than 760 mmWC: ± 0.15 %		39	SIL-2 certification	Required
	9	Response Time	150 msec		40	NACE complied	Required
	10	Stability	± 0.15 % of URL for 5 years		41		
TRANSMITTER	11	Turn Down Ratio	100:1	TEST REPORT/CERTIFICATE	42	Bill of Material (model, Tag no's)	100% Witness
	12	Process Connection	1/2" NPT (F)		43	Spares (BOM, part no's)	100% Witness (if ordered)
	13	Electrical Connection	2 Nos of 1/2" NPT (F)		44	Statutory approvals like PESO, BIS, etc	100% Review (if applicable)
	14	Power Supply	24V DC, Loop Powered		45	Material compliance certificate	100% Review
	15	Over Range Protection	> 150% of range.		46	Five point calibration	100% review & 10% or min 2no's witness with random selection.
	16	Protection	IP 65		47	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.
	17	Zero & Span adjustment	Required.		48	Hydro test for pressure parts	100% Review
	18	Display	Integral LCD Digital (in Engg Units & in %).		49	Internal IR test for all cards, assembly	100% Review
	19	Impulse Entry	Horizontal (Bottom entry is not acceptable)		50	Ingress Protection Test	100% Review of Type test reports
	20	Load Resistance	600Ω @ 24 VDC		51	Intrinsic Safety Test	100% Review of Type test reports
	21	Output	As per enquiry		52		
	22	Also suitable for	Installation in open Racks (if required)		53		
	23	Sensitivity	0.05% of span or better		54		
	24	Diagnostic Features	Required.		55		
MATERIAL	25	Hazardous area class	Zone-1, IIC, T3.	PROJECT SPECIFIC	56		
	26	Body	SS316 (or) better		57	Compartments	Dual Compartment
	27	Element	SS316 (or) better		58	Manifold Type	Non-Coplanar, non-Integral 5-Way, 1/2" NPT(F), SS 316
	28	Sensor O-Ring	Glass-filled PTFE/Teflon		59	StatutoryApprovals	PESO (For Instrument+Glands+Plugs)
	29	Electronic Housing	As per enquiry		60	Sensor Type	Non-Inductive type.
	30	Sensor fill fluid	Silicon Oil		61	Corrosive Protection	Required
	31	Humidity	0 - 100% RH		62	Terminal Block type	Integral, Non-fly leads

REMARKs:

- (1) All integral parts of the transmitter shall be suitable for the differential over-range in either direction equal to the full rated pressure of the body with the opposite side vented to atmosphere without permanent distortion or calibration error.
- (2) The square root extraction for the differential pressure based flow measurement shall be carried out in Transmitter and transmitters shall indicate flow values.



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Diaphragm seal - Differential Pressure Transmitter (DPT-2D) Technical Data Sheet

GENERAL	1	Range & Qty.	As per enquiry	ACCESSORIES	33	Universal Mounting Bracket	Reqd, For 2" pipe mounting, SS304
	2	Type	Electronic Smart, Weatherproof type		34	U Clamp+Fastner	Reqd, SS 304
	3				35	Cable Glands	1 No's Double Compression Nickel plated Brass
	4	Ambient Temp Limit	- 10 to 60°C		36	Cable entry Plugs	Reqd, SS 304 (1 No)
	5	Process Temp. Limit	- 40 to 120°C & 270°C for PY9756279672		37	Tag Plate	Reqd, SS 304 (1 No)
SENSOR	6	Accuracy (combined effect of linearity, hysteresis and repeatability)	For a rangeability of 1:10		38	Spacer Ring & plug	Required, SS, with SS316 Vent/Drain Plugs
	7		a) Equal or Above 500 mmWC: ±0.1 % of total span;		39	Diaphragm Assembly	SS316L, Flush flange type (Refer fig.1)
	8		b) Less than 500 mmWC: ±0.5 %		40	Armoured Capillary	Reqd. 3 Mts, SS316L with SS304 PVC sheathed / coated
	9	Response Time	As per OEM recommendation		41	Gasket	Reqd. Spiral Wound, SS
	10				42	Stud+Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)
TRANSMITTER	11	Turn Down Ratio	100:1	43			
	12	Process Connection	Raise flanged, 3", class 300#, ASTM A105	44			
	13	Electrical Connection	2 No's of 1/2" NPT (F)	45	Bill of Material (model, Tag no's)	100% Witness	
	14	Power Supply	24V DC, Loop Powered	46	Spares (BOM, part no's)	100% Witness (if ordered)	
	15	Over Range Protection	As per flange rating	47			
	16	Protection	IP 65	48	Material compliance certificate	100% Review	
	17	Zero & Span adjustment	Required.	49	Calibration	100% review & 10% or min 2no's witness with random selection.	
	18	Display	Integral LCD Digital (in Engg Units & in %) with push buttons for zero & span adjustments	50	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.	
	19	Impulse Entry	Not applicable	51	Hydro test for pressure parts	100% Review	
	20	Load Resistance	600Ω @ 24 VDC	52	Internal IR test for all cards, assembly	100% Review	
	21	Output	As per enquiry	53	Ingress Protection Test	100% Review of Type test reports	
	22	Diagnostic Features	Required.	54			
	23	Remote Seal Assembly	Diaphragm on HP side & capillary on LP side	55			
	24			56			
	25			57	Compartments	Dual Compartment	
MATERIAL	26			58	Manifold Type	Not applicable	
	27	Body	SS316	59			
	28	Element	SS316 (or) better	60	Capillary connection	Center	
	29	Sensor O-Ring	Glass-filled PTFE/Teflon	61	Base Transmitter and Remote Seal should be from same OEM		
	30	Electronic Housing	As per enquiry	62	DD file and calibration certificate under the mentioned process parameters to be provided		
	31	Sensor fill fluid	Silicon Oil	63	Corrosive Protection	Required	
	32	Humidity	0 - 100% RH	64	Terminal Block type	Integral, Non-fly leads	

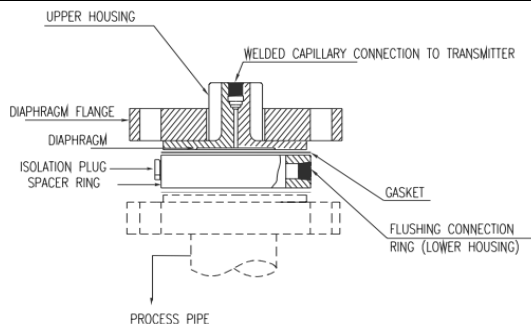


FIGURE - 1

ESP-001-2A Rev.00				PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number PY 56369		
						Rev. No.	02	
						Sheet	07 09	
DIN RAIL Temperature Transmitter (DIN RAIL TTs) Technical Data Sheet								
GENERAL	1	Range & Qty.	As per enquiry		31	Universal Mounting Bracket	Not applicable	
	2	Type	Electronic Smart, Weather Proof		32	U Clamp+Fastner	Not applicable	
	3	Ambient Temp Limit	- 40 to 75°C		33	Cable Glands	Not aaplicable	
	4				34			
TRANSMITTER	5	Input	2/3/4 wire RTD as per IEC751 and all types of T/C inputs as per IEC584 (both grounded/ungrounded) with Single Input	ACCESSORIES	35	Tag Plate	Reqd	
	6	Dual sensor inputs	Bumpless automatic switchover		36	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H	
	7	Accuracy	± 0.075%% of span		37	SIL-2 certification	Not Applicable	
	8	Zero Drift	1 micro volt per Deg.C or better		38	NACE complied	NOT APPLICABLE	
	9	Updated Time	As per OEM recommendation		39			
	10	Ref. Junction Compensation	Required (automatic for thermocouple sensors).		40			
	11	Burnout protection	Required and selectable UP scale / DOWN scale		41			
	12	Process Connection	Not applicable	TEST REPORT/CERTIFICATE	42	Bill of Material (model, Tag no's)	100% Witness	
	13	Electrical Connection	2 Nos of 1/2" NPT (F)		43	Spares (BOM, part no's)	100% Witness (if ordered)	
	14	Power Supply	24V DC, Loop Powered		44	Statutory approvals like PESO, BIS, etc	100% Review (if applicable)	
	15	Configuration	By Hand Held Calibrator.		45	Material compliance for housing	100% Review	
	16	Surge & Lightning Protection	In built		46	Five point calibration	100% review & 10% or min 2no's witness with random selection.	
	17	Protection	IP 65		47	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.	
	18	Impulse Entry	Not applicable		48	Hydro test for pressure parts	NOT APPLICABLE	
	19	Display	Not applicable		49	Conformity & update time test	100% Review of Type test reports	
	20	Damping	0-32 Sec Adjustable		50	Ingress Protection Test	100% Review of Type test reports	
	21	Load Resistance	600Ω @ 24 VDC		51	Intrinsic Safety Test	Not applicable	
	22	Output	As per enquiry		52	PMI Test (for SS & AS Materials)	Not Applicable	
	23	Diagnostic Features	Required.	PROJECT SPECIFIC	53			
	24	Suitable for	Installation in closed Racks		54	Compartments	As required	
	25	Sensitivity	0.05% of span or better		55	Statutory Approvals	As required	
	MATERIAL	26	Hazardous area class		Zone-1, IIC, T3.	56	Corrosive Protection	Required
		27	Humidity		0 - 100% RH	57	Terminal Block type	Integral, Non-fly leads
		28	Electronic Housing		Aluminum Epoxy painted	58		
		29				59		
30				60				

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Universal Hand Held Configurator (HHC) Technical Data Sheet										
GENERAL	1	Qty.	As per enquiry		TEST REPORT/CERTIFICATE	16	Bill of Material (model, Tag no's)		100% Witness	
	1	Type	As per enquiry (Suitable either for HART / FIELDBUS devices or both)							
	2	Support & Type	Suitable for Zone-1, IIA/IIB/IIC, T3; suitable for all makes of SMART/FIEDBUS transmitters and valve positioners with all engineering capability like calibration, diagnostics, configuration, inhibition of HART signal etc			17	Spares (BOM, part no's)		100% Witness (if ordered)	
	3	Ambient Temp Limit	As per OEM recommendation			18	Internal Test Reports		100% Review	
	4					19				
						20				
						21				
CALIBRATOR	5	Configuration	Universal			22				
	6	Application requirement	Calibration & configuration of HART devices			23				
	7	Memory	Memory module shall be sufficient to store min. 1000 transmitters configuration, which can be used at later date to download in any of the failed transmitters.			24				
	8	Device data storage Capacity	As per vendor standard			25				
	9	Power supply	100-240V AC			26	Model quoted for material code: PY9756279931		Shall be Emerson - TREXCFPKLWP3S model or latest its equivalent model of other makes	
	10	Easy upgrade option	Applicable & required			27				
	11	Battery type	Rechargeable Li-ION Battery inbuilt in Base Kit			28				
	12	Battery Charger	Power Supply/Charger for NiMH/Li-Ion (100-240 VAC, 50/60Hz,)			29				
	13	Connection Leads	Applicable			30				
	14	Carrying case	Applicable			31				
	15	Battery operating time	As per vendor standard			32				
					33					



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RECORD OF REVISIONS

Rev. No.

Date _____

Revision Details

Revised By

Approved By

00

20.07.2018

Original issue

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K. Anand Babu (Sd/-)

01

27.02.2019

- 1) Variant-67 added.
- 2) Span for DPTs added

Sujatha

K. Anand Babu

02

11.12.2019

Description of variant no 93 is updated.

Sujatha

K. Anand Babu

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CUSTOMER: M/s. BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING & SYSTEMS DIVISION, HYDERABAD

CONTRACTOR:

GA Drawing, DATASHEET & TAG LIST
for
Level Transmitter [Remote seal (LP&HP side)
Differential Pressure Transmitter]

BHEL PO NO:

DOCUMENT TITLE : DATASHEET & TAG LIST for Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]

CONTRACTOR DOC. NO:

REV: 00

BHEL DOC. NO. : IISCO/LT (DP type)/001

REV	FOR	DATE	PREPARED	CHECKED	APPROVED

BILL OF MATERIAL for Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]

 		ITEM	Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]			Std. / Doc. Number	
		CUSTOMER	BHARAT HEAVY ELECTRICALS LIMITED			IISCO/LT (DP type)/001	
		PROJECT	Power & Blowing Station-SAIL IISCO Steel Plant, Burnpur			Rev. No.	00
		PO NO.					
Sr. No.	Type of Instrument		P.O. ref	Range	Supply Qty (No's)	Remarks	
1	Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]		LATER	As per Tag List	12		
				Sub-total ::	12		
2	Tag plates; MOC : SS 304 (Wired with Transmitter) Scrwd Name Plate on Transmitter: SS 304 MOC				12	1 No per instrument	
3	Spacer Ring; SS				12	1 No per instrument	
4	Vent+Drain plugs; SS, In built to Spacer				12	1 No per instrument	
5	Armoured Capillary; 3 Mts, SS316L with PVC Coat				12	1 No per instrument	
6	Gasket; Spriral Wound, SS; Suitable for 3" 300# RF				12	1 No per instrument	
7	Cable Gland Double Compression Nickel plated Brass, 1/2"NPTM with Slipper type PVC Shrouds.				12	1 No's per instrument	
8	SS 304 dummy plugs, 1/2" NPT(M)				12	1 No per instrument	
9	Mounitng Bracket with U clamp and fastners suitable for 2" pipe Mounting for above Transmitters; MOC: SS304 with mounting nuts + bolts (MOC:SS)				12	1 No per instrument	
10	SS Stud Nuts+Bolts; (Remote Seal Flange)				12	1 Set per instrument	

TAG LIST for Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]

Annexure-1 of PY56279

TAG LIST for Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]											Annexure-1 of PY56279	
ESP-001-6A, Rev. 00		ITEM	Level Transmitter [Remote seal (LP&HP side) Differential Pressure Transmitter]							Std. / Doc. Number		
		CUSTOMER	BHARAT HEAVY ELECTRICALS LIMITED							IISCO/LT (DP type)/001		
		PROJECT	Power & Blowing Station-SAIL IISCO Steel Plant, Burnpur							Rev. No.	00	
		PO NO.										
S. No	Tag No.	Description	Medium	PROCESS PARAMETERS [Min./Nor./Max./Des.]		Calibration Range	Engg. Units	Process Connection	Model No.	Span Limit	REMARKS	Rev
				Pressure	Temp. (°C)							
1	LATER	Hotwell-1 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
2	LATER	Hotwell-1 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
3	LATER	Hotwell-2 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
4	LATER	Hotwell-2 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
5	LATER	Hotwell-3 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
6	LATER	Hotwell-3 Level (STG)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/60/100 Deg C	0 - 1500	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
7	LATER	Hotwell-4 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
8	LATER	Hotwell-4 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
9	LATER	Hotwell-5 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
10	LATER	Hotwell-5 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
11	LATER	Hotwell-6 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00
12	LATER	Hotwell-6 Level (STB)	Condensate	--/0.1/0.11/1 Kg/cm2(abs)	--/46.4/49.6/100 Deg C	0 - 900	mmWC	3" 300 RF, CS	Vendor to fill	(-)1 to 1.5 kg/cm2(g)		00