

# Annexure-7A

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## Instrument Datasheets

**PROJECT:** 1X370 MW YELAHANKA COMBINED CYCLE  
POWER PLANT

**Pressure Transmitter (PT) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	0 - 45 Kg/cm <sup>2</sup> (g) & 1 No	<b>ACCESSORIES</b>	28	Mounting Bracket	For 2" pipe mounting, SS304
	2	Type	Electronic Smart (2 wire), HART, Exp. Proof, Intrinsic safe		29	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.,		30	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	4	Ambient Temp Limit	- 40 to 80°C		31	Cable entry Plugs	Reqd, SS 304
	5	Process Temp. Limit	0 to 210°C		32	Vent/Drain Plugs	Reqd, SS 304
<b>SENSOR</b>	6	Accuracy	For a rangeability of 1:10 a) Equal or Above 760 mmWC: $\pm 0.075\%$ b) Less than 760 mmWC: $\pm 0.1\%$	<b>ACCESSORIES</b>	33	Tag Plate	Reqd, SS 304
	7	Response Time	a) If range $\geq 760\text{mmWC}$ , res. time $\leq 130\text{msec}$ . b) If range $< 760\text{mmWC}$ , res. time $\leq 1\text{ sec}$ .		34	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	8	Stability	$\pm 0.1\%$ for 2 year		35	Sensor O-Ring	Extra 2 no. spares req.
					36	Calibration	facility via pc based HART
<b>TRANSMITTER</b>	9	Turn Down Ratio	100:1, 10:1 (if pressure $< 100\text{mmWC}$ )	<b>TEST REPORT/CERTIFICATE</b>	36	5-Point Calibration	100% Review
	10	Process Connection	1/2" NPT (F)		37	Hydro test	100% Review
	11	Electrical Connection	2 Nos of 1/2" NPT (F)		38	Material compliance	100% Review
	12	Power Supply	24V DC, Loop Powered		39	Functional Test	100% Review
	13	Over Range Protection	$> 150\%$ of range.		40	Performance Test	100% Review
	14	Protection	IP 65		41	Ingress Prot. Test	100% Review
	15	Zero & Span adjustment	Required.		42	Intrinsic Safety Test	100% Review
	16	Display	Integral LCD Digital (in Engg Units & in %).		43	Conformity Test	100% Review
	17	Impulse Entry	Side Only		44	Internal tests (like IR etc.)	100% Review
	18	Load Resistance	500 $\Omega$ @ 24 VDC				
	19	Output	4-20mA + HART				
	20	Diagnostic Features	Required.				
<b>MATERIAL</b>	21	Hazardous area class	Zone-1, IIA/IIB, T3.	<b>PROJECT SPECIFIC</b>	45	Certification	PESO
	22	Body	SS316		46	Compartments	Dual
	23	Element	SS316		47	Manifold Type	Non-Coplanar, Integral 2 Way, SS
	24	Sensor O-Ring	Glass-filled PTFE/Teflon		48	Statutory Approvals	For Transmitters+Glands+Plugs
	25	Electronic Housing	aluminum		49	Sensor Type	Non-Inductive type.
	26	Sensor fill fluid	Silicon Oil		50	Corrosive Protection	Required
	27	Humidity	0 - 100% RH		51	Terminal Block type	Integral, Non-fly leads

**Diaphragm seal - Pressure Transmitter (PTD) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>ACCESSORIES</b>	30	Mounting Bracket	For 2" pipe mounting, SS304
	2	Type	Electronic Smart (2 wire), HART, ,Exp. Proof, Intrinsic safe		31	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.,		32	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	4	Ambient Temp Limit	- 40 to 80°C		33	Cable entry Plugs	Reqd, SS 304
	5	Process Temp. Limit	0 to 210°C		34	Vent/Drain Plugs	Reqd, SS 304
<b>SENSOR</b>	6	Accuracy	For a rangeability of 1:10 a) Equal or Above 500 mmWC: ±0.1 % b) Less than 500 mmWC: ±0.5 %	<b>ACCESSORIES</b>	35	Tag Plate	Reqd, SS 304
	7	Response Time	3 sec or better.		36	Spacer Ring & plug	Required, SS
	8	Stability	±0.1 % for 2 year		37	Diaphragm Assembly	SS316L, Flush flange type (Refer fig.1)
					38	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat
					39	Stud Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)
<b>TRANSMITTER</b>	9	Turn Down Ratio	100:1	<b>TEST REPORT/CERTIFICATE</b>	40	Sensor O-Ring	Extra 2 no. spares req.
	10	Process Connection	Raise flanged, 1½" , class 300		40	Gasket	Reqd. Spiral Wound, SS
	11	Instrument Connection	1/2" NPT (F)		41	Calibration	facility via pc based HART
	12	Electrical Connection	2 Nos of 1/2" NPT (F)		42	5-Point Calibration	100% Review
	13	Power Supply	24V DC, Loop Powered		43	Hydro test	100% Review
	14	Over Range Protection	> 150% of range.		44	Material compliance	100% Review
	15	Protection	IP 65		45	Functional Test	100% Review
	16	Zero & Span adjustment	Required.		46	Performance Test	100% Review
	17	Display	Integral LCD Digital (in Engg Units & in %)		47	Ingress Prot. Test	100% Review
	18	Impulse Entry	Side Only		48	Intrinsic Safety Test	100% Review
<b>MATERIAL</b>	19	Load Resistance	500Ω @ 24 VDC	<b>PROJECT SPECIFIC</b>	49	Conformity Test	100% Review
	20	Output	4-20mA + HART		50	Internal tests (like IR etc.)	100% Review
	21	Diagnostic Features	Required.				
	22						
	23	Hazardous area class	Zone-1, IIA/IIB, T3.				
	24	Body	SS316				
	25	Element	SS316		51	Certification	PESO
	26	Sensor O-Ring	Glass-filled PTFE/Teflon		52	Compartments	Dual
	27	Electronic Housing	aluminum		53	Manifold Type	Non-Coplanar, Integral 2 Way, SS
	28	Sensor fill fluid	Silicon Oil		54	Statutory Approvals	For Transmitters+Glands+Plugs
	29	Humidity	0 - 100% RH		55	Sensor Type	Non-Inductive type.
					56	Corrosive Protection	Reqd.
					56	Terminal Block type	Integral, Non-fly leads

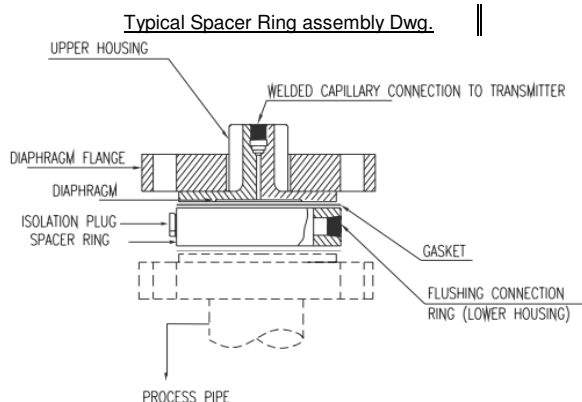


FIGURE - I

**Differential Pressure Transmitter (DPT) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	0 - 5000 mmWC & 1 No	<b>ACCESSORIES</b>	28	Mounting Bracket	For 2" pipe mounting, SS304
	2	Type	Electronic Smart, HART, ,Exp. Proof, Intrinsic safe		29	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.,		30	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	4	Ambient Temp Limit	- 40 to 80°C		31	Cable entry Plugs	Reqd, SS 304
	5	Process Temp. Limit	0 to 210°C		32	Vent/Drain Plugs	Reqd, SS 304
<b>SENSOR</b>	6	Accuracy	For a rangeability of 1:10 a) Equal or Above 760 mmWC: $\pm 0.075\%$ b) Less than 760 mmWC: $\pm 0.1\%$		33	Tag Plate	Reqd, SS 304
	7	Response Time	a) If range $\geq 760\text{mmWC}$ , res. time $\leq 130\text{msec}$ . b) If range $< 760\text{mmWC}$ , res. time $\leq 1\text{ sec}$ .		34	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	8	Stability	$\pm 0.1\%$ for 2 year		35	Sensor O-Ring	Extra 2 no. spares req.
<b>TRANSMITTER</b>	9	Turn Down Ratio	100:1, 10:1 (if pressure $< 100\text{mmWC}$ )	<b>TEST REPORT/CERTIFICATE</b>	36	Calibration	facility via pc based HART
	10	Process Connection	1/2" NPT (F)		36	5-Point Calibration	100% Review
	11	Electrical Connection	2 Nos of 1/2" NPT (F)		37	Hydro test	100% Review
	12	Power Supply	24V DC, Loop Powered		38	Material compliance	100% Review
	13	Over Range Protection	$> 130\%$ of range.		39	Functional Test	100% Review
	14	Protection	IP 65		40	Performance Test	100% Review
	15	Zero & Span adjustment	Required.		41	Ingress Prot. Test	100% Review
	16	Display	Integral LCD Digital (in Engg Units & in %).		42	Intrinsic Safety Test	100% Review
	17	Impulse Entry	Side Only		43	Conformity Test	100% Review
	18	Load Resistance	500 $\Omega$ @ 24 VDC		44	Internal tests (like IR e	100% Review
	19	Output	4-20mA + HART				
	20	Diagnostic Features	Required.				
<b>MATERIAL</b>	21	Hazardous area class	Zone-1, IIA/IIB, T3.	<b>PROJECT SPECIFIC</b>	45	Certification	PESO
	22	Body	SS316		46	Compartments	Dual
	23	Element	SS316		47	Manifold Type	Non-Coplaner, Integral 3 Way, SS
	24	Sensor O-Ring	Glass-filled PTFE/Teflon		48	Statutory Approvals	For Transmitters+Glands+Plugs
	25	Electronic Housing	aluminum		49	Sensor Type	Non-Inductive type.
	26	Sensor fill fluid	Silicon Oil		50	Corrosive Protection	Reqd.
	27	Humidity	0 - 100% RH		51	Terminal Block type	Integral, Non-fly leads

**NOTES:**

- 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. For vacuum service, the element shall have under-range protection to full vacuum.
- 2 The square root extraction for the differential pressure based flow measurement shall be carried out in DCS. Transmitter shall indicate both DP & flow values.

GENERAL	1	Range & Qty.	As per skids	ACCESSORIES	30	Mounting Bracket	For 2" pipe mounting, SS304
	2	Type	Electronic Smart (2 wire), HART, Exp. Proof, Intrinsic safe		31	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.,		32	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	4	Ambient Temp Limit	- 40 to 80°C		33	Cable entry Plugs	Reqd, SS 304
	5	Process Temp. Limit	0 to 210°C		34	Vent/Drain Plugs	Reqd, SS 304
SENSOR	6	Accuracy	For a rangeability of 1:10 a) Equal or Above 500 mmWC: ±0.1 % b) Less than 500 mmWC: ±0.5 %		35	Tag Plate	Reqd, SS 304
	7	Response Time	3 sec or better.		36	Spacer Ring & plug	Required, SS
	8	Stability	±0.1 % for 2 year		37	Diaphragm Assembly	SS316L, Flush flange type (Refer fig.1)
					38	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat
					39	Stud Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)
					40	Sensor O-Ring	Extra 2 no. spares req.
					40	Gasket	Reqd. Spiral Wound, SS
TRANSMITTER				41	Calibration	facility via pc based HART	
	9	Turn Down Ratio	100:1	TEST REPORT/CERTIFICATE	42	5-Point Calibration	100% Review
	10	Process Connection	Raise flanged, 3" , class 300		43	Hydro test	100% Review
	11	Instrument Connection	1/2" NPT (F)		44	Material compliance	100% Review
	12	Electrical Connection	2 Nos of 1/2" NPT (F)		45	Functional Test	100% Review
	13	Power Supply	24V DC, Loop Powered		46	Performance Test	100% Review
	14	Over Range Protection	> 130% of range.		47	Ingress Prot. Test	100% Review
	15	Protection	IP 65		48	Intrinsic Safety Test	100% Review
	16	Zero & Span adjustment	Required.		49	Conformity Test	100% Review
	17	Display	Integral LCD Digital (in Engg Units & in %).		50	Internal tests (like IR etc.)	100% Review
	18	Impulse Entry	Side Only				
	19	Load Resistance	500Ω @ 24 VDC				
	20	Output	4-20mA + HART				
	21	Diagnostic Features	Required.				
22	Remote Seal Assembly	Diaphragm on HP side & capillary on LP side					
MATERIAL	23	Hazardous area class	Zone-1, IIA/IIB, T3.	PROJECT SPECIFIC	51	Certification	PESO
	24	Body	SS316		52	Compartments	Dual
	25	Element	SS316		53	Manifold Type	Non-Coplanner, Integral 3 Way, SS
	26	Sensor O-Ring	Glass-filled PTFE/Teflon		54	Statutory Approvals	For Transmitters+Glands+Plugs
	27	Electronic Housing	aluminum		55	Sensor Type	Non-Inductive type.
	28	Sensor fill fluid	Silicon Oil		56	Corrosive Protection	Reqd.
	29	Humidity	0 - 100% RH		57	Terminal Block type	Integral, Non-fly leads

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. For vacuum service, the element shall have under-range protection to full vacuum.

2 The square root extraction for the differential pressure based flow measurement shall be carried out in DCS. Transmitter shall indicate both DP & flow values.

UPPER HOUSING

WELDED CAPILLARY CONNECTION TO TRANSMITTER

DIAPHRAGM FLANGE

DIAPHRAGM

ISOLATION PLUG

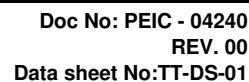
SPACER RING


GASKET


FLUSHING CONNECTION RING (LOWER HOUSING)

PROCESS PIPE

FIGURE - 1



 HYDERABAD			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Doc No: PEIC - 04240 REV. 00 Data sheet No:LT(G-R)-DS-01			
Radar (Guided Wave Type) Level Transmitter (LT) Technical Data Sheet									
GENERAL	1	Range & Qty.	As per skids			ACCESSORIES	26	Mounting Bracket	For 2" pipe mounting, SS304
	2	Transmitter Type	Guided wave, Electronic Smart, HART,Exp. Proof, Intrinsic safe				27	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.(Pulse/Freq)				28	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	4	Ambient Temp Limit	- 40 to 80°C				29	Cable entry Plugs	Reqd, SS 304
	5	Measuring Media	As per skids				30	Tag Plate	Reqd, SS 304
SENSOR	6	Type of Detector	Vendor to select.			TEST REPORT/CERTIFICATE	31	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	7	Max Press / Temp	45 Kg/cm2(g) / 210 °C				32	Gasket	SS 316, Spiral wound type.
TRANSMITTER	8	Accuracy	± 3mm OR better				33	Calibration	facility via pc based HART
	9	Process Connection	2", 300# RF			33	5-Point Calibration	100% Review	
	10	Electrical Connection	2 Nos of 1/2" NPT (F)			34	Material compliance	100% Review	
	11	Power Supply	24V DC, Loop Powered, 2 wire			35	Functional Test	100% Review	
	12	Mounting	On closed chamber			36	Performance Test	100% Review	
	13	Protection	IP 65			37	Ingress Prot. Test	100% Review	
	14	Lighting and surge Protection	Required			38	Intrinsic Safety Test	100% Review	
	15	Display	Integral LCD Digital (in Engg Units & in %)			39	Conformity Test	100% Review	
	16	Load Resistance	600Ω @ 24 VDC						
	17	Output	4-20mA + HART						
MATERIAL	18	Diagnostic Features	Required						
	19	Hazardous area class	Zone-1, IIA/IIB, T3.						
	20	Sensor Body	SS316			40	Certification	PESO	
	21	chamber body	same as tank material			41	Compartments	Dual	
	22	Humidity	0 - 100% RH			42	StatutoryApprovals	For Transmitters+Glands+Plugs	
	23	Sensor O-Ring	Glass-filled PTFE/Teflon			43	Corrosive Protection	Required	
	24	Electronic Housing	SS304 min.						
	25	Flange	SS						

 HYDERABAD			<b>PRODUCT STANDARD</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b> <b>HYDERABAD</b>			<b>Doc No: PEIC - 04240</b> <b>REV. 00</b> <b>Data sheet No:LT(NC-R)-DS-01</b>		
<b>Radar (Non-Contact Type) Level Transmitter (LT) Technical Data Sheet</b>								
<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>ACCESSORIES</b>	26	Mounting Bracket	For 2" pipe mounting, SS304	
	2	Transmitter Type	Non-contact, Electronic Smart, HART,Exp. Proof, Intrinsic safe		27	U Clamp+Fastner	Reqd, SS 304	
	3	Principle of Sensor	Vendor Std.(Pulse/Freq)		28	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe	
	4	Ambient Temp Limit	- 40 to 80°C		29	Cable entry Plugs	Reqd, SS 304	
	5	Measuring Media	As per skids		30	Tag Plate	Reqd, SS 304	
<b>ANTENNA</b>	6	Type of Detector	Vendor to select.	<b>ACCESSORIES</b>	31	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H	
	7	Max Press / Temp	45 Kg/cm2(g) / 210 °C		32	Gasket	SS 316, Spiral wound type.	
					33	Calibration	facility via pc based HART	
<b>TRANSMITTER</b>	8	Accuracy	± 3mm OR better	<b>TEST REPORT/CERTIFICATE</b>	33	5-Point Calibration	100% Review	
	9	Process Connection	3", 150#.		34	Material compliance	100% Review	
	10	Electrical Connection	2 Nos of 1/2" NPT (F)		35	Functional Test	100% Review	
	11	Power Supply	24V DC, Loop Powered, 2 wire		36	Performance Test	100% Review	
	12	Mounting	Top of Fix Tank (Pit)		37	Ingress Prot. Test	100% Review	
	13	Protection	IP 65		38	Intrinsic Safety Test	100% Review	
	14	Lighting and surge Protection	Required		39	Conformity Test	100% Review	
	15	Display	Integral LCD Digital (in Engg Units & in %)					
	16	Load Resistance	600Ω @ 24 VDC					
	17	Output	4-20mA + HART					
<b>MATERIAL</b>	18	Diagnostic Features	Required	<b>PROJECT SPECIFIC</b>				
	19	Hazardous area class	Zone-1, IIA/IIB, T3.		40	Certification	PESO	
	20	Body	SS316		41	Compartments	Dual	
	21	Antenna	SS316		42	Statutory Approvals	For Transmitters+Glands+Plugs	
	22	Humidity	0 - 100% RH		43	Corrosive Protection	Required	
	23	Sensor O-Ring	Glass-filled PTFE/Teflon					
	24	Electronic Housing	SS304 min.					
	25	Flange	SS					




## DIFFERENTIAL PRESSURE GAUGE

UNITS: Flow-> Kg/Cm2      Gas->NM3/hr,      Steam->TPH,      Temperatyre-> deg C      Level/Length-> mm

GENERAL	1	Design std	IS 3624	MISCELLANEOUS	14	Filling plug	Neoprene
	2	Pressure Elem	Bourdon		15	Joints	TIG Argon Arc Welding
	3	Mounting	Direct, Bottom entry		16	Pointer	Al,black micromtr.
	4	Process conn	1/2" NPT(M)		17	Zero Adj	Micro mtr pointer
	5	Dial Size (MM)	150		18	Enclosure	Weather Proof to IP 65
Matl of constn	6	Dial Colour	Black on white Back ground	19	Accuracy	0.5% FSR	
	7	Case Matl	Alluminium.	20	Solid front	Yes	
	8	Bezel ring	SS304, Bayonet Lock Type	21	Hook up sch		
	9	Window matl	Shatter Proof Glass	22	Static pressure(Kg/cm2)		
	10	Element Matl	SS316L	OPTIONS	a	Over range prot	150% of FS
	11	Socket Matl	SS316L		b	Snubber	No
	12	Movement	SS304		c	Syphon	For steam services only
	13	Blow out	SS304		d	Gauge saver	No
	14	Max Press / Temp	45 Kg/cm2(g) / 210 OC		e	Vacuum prot'n	No
	15	Hazardous area class	Zone-1, IIA/IIB, T3.		f	Range (kg/cm² g)	0-2.5, 0- 400 mmWC, 0-2000
					a	Make & Model No.	VENDOR TO SPECIFY

[illegible]

☐ Deviation      ☐ NO-Deviation      VENDORS SIGNATURE WITH SEAL

Vendor Name		PO No		DATE	PREP	CHK
Vendor Dwg no:		Requisition No				
		Client:				
 <div><b>BHARAT HEAVY ELECTRICALS Ltd</b> PROJECT ENGG. AND SYSTEM DIV. RC PURAM, HYDERABAD-32</div>		Plant:		Data Sheet No		



**Solid Front Pressure Gauge (ABOVE 60 KG/CM2(G))**

Units : Flow =>Liquid-	Gas-	Steam-	Pressure=>	Temperature=> <sup>0</sup> C	Level / Length=>
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1.	Type	Local	13.	Connection	1/2" NPT(M)
2.	Mounting	Direct bottom entry		Connection Location	Bottom
3.	Dial Size	150mm	14.	Movement	SS304
	Colors	markings	15.	Diaphragm Seal	Not Applicable
4.	Case Material	SS304, SOLID FRONT		Type :	Not Applicable
5.	Bezel Ring	SS304, SOLID FRONT		Wetted Parts Matl.	Not Applicable
6.	Window Material	Shatter proof glass		Others Matl.	Not Applicable
7.	Enclosure	Weather proof to IP.65 as per IS2147		Process C : Size & Rating	Not Applicable
8.	Pressure Element	Bourdon		Facing & Finish :	Not Applicable
9.	Element Material	SS316L		Capillary Material :	Not Applicable
10.	Socket Material	SS316L		Armour - Flexible :	Matl.: Not Applicable
11.	Accuracy	± 0.5% of FSV		Capillary Length :	Not Applicable
12.	Zero Adjustment	Provided on pointer		Flushing / filling Connection with	Not Applicable
14.	Hazardous area class	Zone-1, IIA/IIB, T3.	16.	Over Range Protection	130% of FSD
			17.	Blow out Protection	Neoprene
			18.	Option	
				a) Snubber	Not Applicable
				b) Syphon	Not Applicable
				c) Gauge Saver	Not Applicable
				e) Liquid Filled Casing	Not Applicable
				f) Vacuum Protection	Not Applicable
			19.	Ranges	0-100, 0-160, 0-250, 0-400 kg/cm² g
			20.	Make and Model No.	<b>VENDOR TO SPECIFY</b>

[illegible]

\_\_\_\_\_

VENDORS SIGNATURE WITH SEAL

Vendor Name	Product	Price	Quantity	Total
ABC Company	Product A	100	5	500
ABC Company	Product B	200	3	600
XYZ Company	Product A	150	4	600
XYZ Company	Product B	250	2	500
DEF Company	Product A	120	6	720
DEF Company	Product B	180	3	540

PO No	
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DATE	PREP
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PREP

CHK	AI
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APR
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Vendor Dwg no:

Requisition No	
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Client:	
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Plant:	Data Sheet No
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Rev
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**BHARAT HEAVY ELECTRICALS Ltd**  
PROJECT ENGG. AND SYSTEM DIV.  
RC PURAM, HYDERABAD-31

Plant:

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**Pressure Gauge (PG) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>MATERIAL</b>	20	Hazardous area class	Zone-1, IIA/IIB, T3.
	2	Type	Surface mount /Local Gauge		21	Case Material	Alluminium.
	3	Max Press / Temp	45 Kg/cm2(g) / 210 °C		22	Element Material	SS316
<b>GAUGE SPECIFICATION</b>				<b>MATERIAL</b>	23	Window Glass	Shatter Proof.
	4	Sensor Type	Bourdon Tube		24	Pointer	Alluminium.
	5	Dial Size	150MM (6")		25	Blow out Disc	SS 304
	6	Accuracy	±0.5% of full scale deflection		26	Tag Plate	Reqd, SS 304
	7	Process Connection	1/2" NPT (M), Bottom entry.		27	Bezel ring	SS 304
	8	Blow out Disc	Required.		28	Movement	SS 304
	9	Solid Front Case	Required for >100Kg/Cm2.		29	Socket Material	SS 304
	10	Over Range Protection	> 150% of full scale.	<b>CERTIFICATE</b>	30	Calibration	100% Review
	11	Protection	IP 65		31	Vibration test	100% Review
	12	Zero & Span adjustment	External Required.		32	Material compliance	100% Review
	13	Anti-corrossive Dial	Non-Rusting Plastic, White with black figure		33	Ingress prot. Test	100% Review
	14	Micro meter Adjustment	Required for pointers.	<b>TEST</b>			
	15	Scale type	Concentric, Graduated units		34	Calibration	10% or min. 2 of each range
	16	Pointer-270° Deflection	Yes, Metal with Black Finish		35	Over Protection Test for 30 min.	10% or min. 2 of each range
	17	Pointer Stop	Required at both end		36	Accuracy Test	10% or min. 2 of each range
	18	Bezel ring	Bayonet Lock Type				
	19	Movement	Geared / Cam-roller type				

**NOTES:**

1 The elastic element material shall be as follows:

- For range ≤ 60 Kg/cm2 - AISI-316 seamless drawn stainless steel tube, argon arc welded at AISI-316 forged or wrought stain less steel tube anchorage and tube end piece.
- For range > 60 Kg/cm2 - AISI-316 bored stainless steel.



**PRODUCT STANDARD**  
**PROJECT ENGINEERING & SYSTEMS DIVISION**  
**HYDERABAD**

**Doc No: PEIC - 04240**  
**REV. 00**  
**Data sheet No:PGD-DS-01**

**Diaphragm Seal - Pressure Gauge (PGD) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>MATERIAL</b>	26	Hazardous area class	Zone-1, IIA/IIB, T3.
	2	Type / Std	Diaphragm Sealed / IS3624		27	Case	Alluminium.
	3	Ambient Temp Limit	0 to 65°C		28	Element	SS316
<b>GAUGE SPECIFICATION</b>	4	Sensing Element	Diaphragm	<b>CERTIFICATE</b>	29	Window Glass	Shatter Proof.
	5	Dial Size	150MM (6")		30	Pointer	Alluminium
	6	Accuracy	±0.5% of full scale deflection		31	Blow out Disc	SS 304
	7	Process Connection	1.5" RFLGD, Min 300#.		32	Bezel Ring	SS 304
	8	Instrument connection	1/2" NPT(M)		33	Capillary fill fluid	Silicon Oil
	9	Blow out Disc	Required.		34	Movement	SS 304
	10	Over Range Protection	> 150% of full scale.		35	Socket	SS 304
	11	Protection	IP 65		36	Calibration	100% Review
	12	Zero & Span adjustment	External Required.		37	Vibration test	100% Review
	13	Anti-corrossive Dial	Non-Rusting Plastic, White with black figure		38	Material compliance	100% Review
<b>ACCESSORIES</b>	14	Micro meter Adjustment	Required for pointers.	<b>TEST</b>	39	Ingress prot. Test	100% Review
	15	Scale type	Concentric, Graduated units				
	16	Pointer-270° Deflection	Yes,Metal with Black Finish				
	17	Pointer Stop	Required at both end				
	18	Bezel ring	Bayonet Lock Type				
	19	Movement	Geared / Cam-roller type				
	20	Tag Plate	Reqdured, SS304		39	Calibration	10% or min. 2 of each range
	21	Spacer Ring	Required, SS		40	Over Protection Test for 30 min.	10% or min. 2 of each range
	22	Vent+Drain plugs	Required, SS, In built to Spacer		41	Accuracy Test	10% or min. 2 of each range
	23	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat				
	24	Stud Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)				
	25	Gasket	Reqd. Spirial Wound, SS				

**NOTES:**

1 The elastic element material shall be as follows:

- For range  $\leq 60$  Kg/cm<sup>2</sup> - AISI-316 seamless drawn stainless steel tube, argon arc welded at AISI-316 forged or wrought stain less steel tube anchorage and tube end piece.
- For range  $> 60$  Kg/cm<sup>2</sup> - AISI-316 bored stainless steel.



**PRODUCT STANDARD**  
**PROJECT ENGINEERING & SYSTEMS DIVISION**  
**HYDERABAD**

**Doc No: PEIC - 04240**  
**REV. 00**  
**Data sheet No:JB-DS-01**

**Junction Box (JB) Technical Data Sheet**

GENERAL	1	Range & Qty.	As per skids	ACCESSORIES	19	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe
	2	Type	60 Way, Exp. Proof, Intrinsic safe		20	Cable entry Plugs	All cable entry with SS 304
	3	Ambient Temp Limit	- 40 to 80°C		21	Tag Plate	Reqd, SS 304
					22	Gasket	SS 316, Spiral wound type.
			23		Screws/Hinges	SS	
			24		Earthing Screws	Internal and external 1 no each with washers	
JB SPECIFICATION	4	Ingress Protection	IP65	TEST	25	Dimensional Check	10% or min. 2 of each type
	5	Fixing type	External Wall mount		26	Inlet & outlet entries size	10% or min. 2 of each type
	6	Door type	Bolted		27	Tag Plate Marking	10% or min. 2 of each type
	7	Telephone Socket	Required.				
	8	Protection	IP-65	CERTIFICATE	28	Material compliance	100% Review
	9	Inlet Cable entries	1/2" NPT - 6 Nos at Right Side		29	PESO certificate	100% Review
	1/2" NPT - 6 Nos at Left Side						
	10	Outlet Cable entries	1½" NPT x 2 nos at bottom side				
	11	Internal Dimensions	375 x 375 x 200 MM (±10%)				
	12	Outer Dimensions	400 x 400 x 256 MM (±10%)				
	13	Terminal size	2.5 Sq.mm, Clip on screw less, 2 Rows				
	14	Terminal type	DIN Rail Mount,Stack Type,				
	Non Double decker.						
	15						
	16	Terminal make	Elmex/Connectwell/Phonix/Wago				
17	Hazardous area class	Zone-1, IIA/IIB, T3.					
18	Body Material	LM-6					

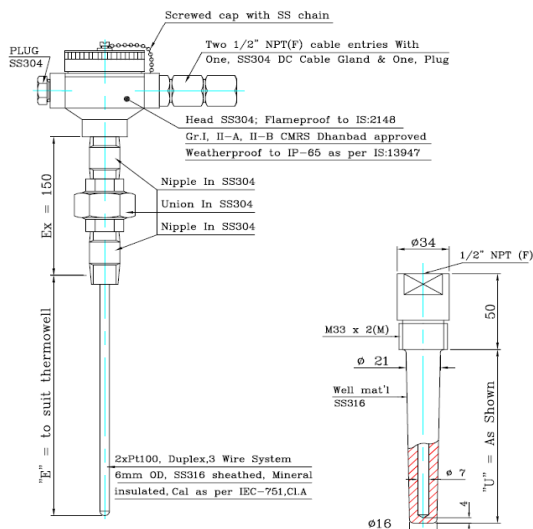
**NOTES:**

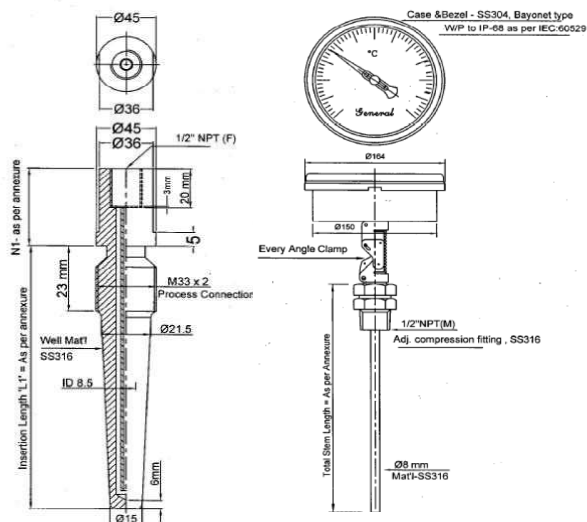
1 Criteria for selection of number of Junction Box shall be as follows:

- a) For AI & AO signal is one JB
- b) For DI signal is one JB
- c) For DO signal is one JB

**Thermocouple (T/C) With ThermoWell (TW) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>THERMOWELL</b>	27	TW Const.	Drilled Bar Stock, SS 316 / 446
	2	Type	K-Type, Thermocouple		28	Insertion length "U"	Refer BOM (Annexure-I & II)
	3	Response time	2 to 6 sec.		29	Dimension	As per below drawing
<b>ELEMENT SPECIFICATION</b>	3	Sensor Type	Duplex, Insulated, filled with MgO	<b>THERMOWELL</b>	30	Process Conn.	M33*2(M)
	4	Leads	Hermitically sealed		31	Flange rating & material	Refer BOM (Annexure-I & II)
	5	Accuracy	ClassA/Class1 as per IEC751 / 584-2 (0.5%)		32	Instrument connection	M20 * 1.5(F)
	6	Instrument connection	M20 * 1.5(M)		33	Bore diameter	9MM & Above
	7	Head Type/Connection	Screwed / 1/2" NPT (F)	<b>GAUGE TEST</b>	34	Compatibility (TG+TW)	10% or min. 2 of each range / type
	8	Protection	IP 65		35	Functional Test	10% or min. 2 of each range / type
	9	Sensor Wire Size	16AWG		36	Calibration & Accuracy	10% or min. 2 of each range / type
	10	Element outer dia	Suitable to fit in TW without Air gap				
	11	Element Length	Suitable to reach at bottom of TW	<b>GAUGE CERTIFICATE</b>	37	Material compliance	100% Review
	12	Hot Junction	Grounded		38	Internal Test Reports	100% Review
<b>ACCESSORIES</b>	13	Terminal Block	Screw Type		39	Calibration	100% Review
	14	Electrical Connection	2 Nos of 1/2" NPT (F)		40	Functional test	100% Review
	15	Immersion Adjustment	Required, 100mm to 300mm	<b>WELL TEST</b>	41	Ingress prot. Test	100% Review
	16	Thermoelectric properties	as per ANSI MC 96.1		42	Over Temp Stability	100% Review
<b>MATERIAL</b>	17	Adjustable, 3-piece union	Required for 150 MM.		43	Compatibility (TG+TW)	10% or min. 2 of each type
	18	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe		44	Dimensional Check	10% or min. 2 of each type
	19	Cable entry Plugs	Reqd, SS 304	<b>WELL CERTIFICATE</b>	45	Hydrotest	10% or min. 2 of each type
	20	Cap Chain	Reqd, SS 304				
<b>MATERIAL</b>	21	Hazardous area class	Zone-1, IIA/IIB, T3.		46	Material compliance	100% Review
	22	Case	SS304		47	Radiography	100% Review
	23	Sheath	SS316		48	Dimensional Check	100% Review
	24	Head	SS304		49	Hydrotest	100% Review
	25	Terminal Block	Heat Resist Ceramic		50	Liquid penetration test	100% Review for weld joints
	26	Tag Plate	SS		51	IBR Form-IIIC	100% Review
	26	Housing	aluminum		52	PMI test-SS & AS	100% Review

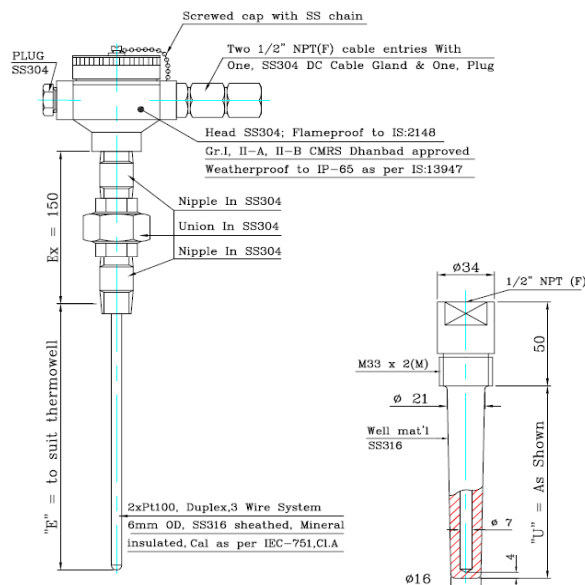






**RTD With ThermoWell (TW) Technical Data Sheet**

<b>GENERAL</b>	1	Range & Qty.	As per skids	<b>THERMOWELL</b>	26	TW Const.	Drilled Bar Stock, SS 316 /446
	2	Type	3-Wire, PT100, Duplex		27	Insertion length "U"	Refer BOM (Annexure-I & II)
	3	Response time	1 to 2 sec.		28	Dimension	As per below drawing
<b>ELEMENT SPECIFICATION</b>	3	Sensor Type	Duplex, Insulated, filled with MgO	<b>GAUGE TEST</b>	29	Process Conn.	M33*2(M)
	4	Leads	Hermitically sealed		30	Flange rating & material	Refer BOM (Annexure-I & II)
	5	Accuracy	As per DIN43760, ClassA / IEC 751(0.5%)		31	Instrument connection	M20 * 1.5(F)
	6	Instrument connection	M20 * 1.5(M)		32	Bore diameter	9MM & Above
	7	Head Type/Connection	Screwed / 1/2" NPT (F)	<b>GAUGE CERTIFICATE</b>	33	Compatibility (TG+TW)	10% or min. 2 of each range / type
	8	Protection	IP 65		34	Functional Test	10% or min. 2 of each range / type
	9	Sensor Wire Size	20 AWG		35	Calibration & Accuracy	10% or min. 2 of each range / type
	10	Element outer dia	Suitable to fit in TW without Air gap				
	11	Element Length	Suitable to reach at bottom of TW	<b>WELL TEST</b>	36	Material compliance	100% Review
	12	Hot Junction	Grounded		37	Internal Test Reports	100% Review
<b>ACCESSORIES</b>	13	Terminal Block	Screw Type		38	Calibration	100% Review
	14	Electrical Connection	2 Nos of 1/2" NPT (F)		39	Functional test	100% Review
	15	Immersion Adjustment	Required, 100mm to 300mm	<b>WELL CERTIFICATE</b>	40	Ingress prot. Test	100% Review
	16	Adjustable, 3-piece union	Required for 150 MM.		41	Over Temp Stability	100% Review
<b>MATERIAL</b>	17	Cable Glands	SS Double Compression+Exp. Proof Intrinsic safe		42	Compatibility (TG+TW)	10% or min. 2 of each type
	18	Cable entry Plugs	Reqd, SS 304		43	Dimensional Check	10% or min. 2 of each type
	19	Cap Chain	Reqd, SS 304		44	Hydrotest	10% or min. 2 of each type
	20	Hazardous area class	Zone-1, IIA/IIB, T3.	<b>WELL CERTIFICATE</b>	45	Material compliance	100% Review
	21	Case	SS304		46	Radiography	100% Review
	22	Sheath	SS316		47	Dimensional Check	100% Review
	23	Head	SS304		48	Hydrotest	100% Review
<b>MATERIAL</b>	24	Terminal Block	Heat Resist Ceramic	<b>WELL CERTIFICATE</b>	49	Liquidd penetration test	100% Review for weld joints
	25	Tag Plate	SS		50	IBR Form-IIIC	100% Review
	26	Housing	aluminum		51	PMI test-SS & AS	100% Review



## Level Gauges [Transparent with Illuminator]

UNITS: Flow-> Gas->M3/hr, Steam->TPH, Temperature-> deg C Level/Length-> mm

GENERAL	1	Type	Dual plate with illuminator	ILLUMINATOR	15	Illuminator	Required.
	2	Process Conn	1", 300#		16	Power Supply	210 V AC,
	3	Pressure Rating	As per Piping Class		17	Area Class	II A / II B
	4	Max Pressure	60 Kg/Cm2(g)		18	Enclosure	IP-65
	5	Max Temp	300 Deg C		19	Cable Entry	1/2" NPT
MATERIAL	6	Gauge Body	As per Piping Class	TESTS	20	Material Test	Yes, Review
	7	Glass	Toughened Borosilicate		21	IBR certification	For CS material
	8	Chamber	As per Piping Class		22	Thermal shock	Yes, Review
	9	Cover Plate	As per Piping Class		23	Hydrotest test	Yes, Review
	10	Gaskets	As per Piping Class		24		
	11	Studs	As per Piping Class		25	<b>Make&amp;Model No.</b>	<b>VENDOR TO SPECIFY</b>
	12	Bolts	As per Piping Class				
	13	Cable glands	SS Double Compression+Exp. Proof Intrinsic saf				
	14	Dummy plugs	SS 304.				

Note:

1. Vendor to indicate the C-C Distance.


☐


Deviation

☐


NO-Deviation

VENDORS SIGNATURE WITH SEAL

Vendor Name		PO No		DATE	PRE	CHK	APR
Vendor Dwg no:		Requisition No					
		Client:					
 <b>BHARAT HEAVY ELECTRICALS Ltd</b> PROJECT ENGG. AND SYSTEM DIV. RC PURAM, HYDERABAD-32	Plant:			Data Sheet No		Rev	

Signal Cables							
1	Application - Signal Cable	Intrinsically Safe / Non Intrinsically Safe					
2	Number of pairs / triads / cores	1 / 6 / 8/ 12 pair and Traid					
3	Conductor Cross Section	1.5 mm <sup>2</sup> Stranded					
4	Conductor Material	Copper (minimum 7 wires)					
5	Construction	Annealed tinned electrolytic grade stranded copper conductor of 1.5 mm <sup>2</sup> (7x0.53mm) or 0.5 mm <sup>2</sup> (7x0.3mm) as per IS 8130					
6	Twisted Pair	Yes, 13 times / meter					
7	Individual Pair Shielding	Each pair/triad individually shielded with 0.05 mm thick (min) Aluminium mylar tape with 25% overlap giving 100% coverage.Plus annealed tinned stranded copper drain wire of size 0.5mm2 (7x0.3 mm) in continuous contact with aluminium side of shield.					
8	Cable Bundling (For Multi Pair)	Each pair/triad of individual shielding as above shall be individually wrapped with mylar / polyester tape of thickness 0.075 mm & bundled together to form a cable with 4 to 6 twists per meter. Plus a pair of communication wire of annealed tinned stranded copper wire of 0.5 mm2 (7x0.3 mm). Conductor with type-C, HR PVC 85°C insulation of thickness 0.4 mm (min.) bundled together with multi pair cables & overall wrapped withmylar / polyester tape.					
9	Overall Shielding	Aluminum mylar tape of minimum thickness 0.075 mm (100% coverage with 25% overlapping) along with annealed tinned stranded copper drain wire of size 0.5mm2 (7x0.3 mm) in continuous contact with aluminum side of the shield shall be provided.					
10	Communication Wire	Required					
11	Conductor : Insulation	Extruded, type C, 85° C, HR PVC compound as per IS 5831. The thickness shall be 0.5 mm minimum for 0.5 mm <sup>2</sup> conductor & 0.8 mm for 1.5 mm <sup>2</sup> conductor. Negative tolerance on					
12	Insulation : Identification Color	Colour of core insulation shall be normally black & blue in pair, black, blue and brown for triad					
13	Multi Pair Identification	By number printing on both cores of each pair at an interval of not more than 200 mm.					
14	Inner Sheath / colour	Extruded PVC or Fire Retardant (FRLS)Low Smoke Extruded PVC as per material code, 90° C, type- ST2 as per IS:5831 with nonmetallic rip cord under the sheath. The thickness shall be as per IS 1554 Part 1. Inner sheath colour shall be normally black					
15	Outer Sheath / colour	Extruded PVC with Flame Retardant Low Smoke (FRLS) or Flame Retardant Low Smoke (FRLS) properties as per material code, 90° C, type- ST2 as per IS 5831. The thickness shall be as per IS 1554 Part 1. Colour shall be normally black for non-intrinsic safe & light blue for intrinsic safe cable					
16	Armor Type	Armour over inner sheath shall be galvanised round steel wire or flat strips as per IS 1554, Part-I, latest revision.					
17	Rip cord	Provided					
18	Overall Diameter	VENDOR TO SPECIFY					
19	Insulation Resistance	100 Mohms / Km					
20	Voltage Grade	600 / 1100 V					
21	Max. DC Conductor Resistance at 20 Deg C	≤ 12.3 ohms / km for cables with 1.5 mm <sup>2</sup> conductors and ≤ 39.7 ohms / km for 0.5 mm <sup>2</sup> conductors.					
22	Mutual Capacitance at 1 KHz	≤ 0.2 µ F/km between adjacent cores in a pair at 1000 Hz.					
23	Cap. between any core or between any screen	≤ 0.4 µ F/ Km at 1000 Hz					
24	Inductance at 1KHz	≤ 1.0 mH / Km between conductor of each pair					
25	L/R Ratio	≤ 25 µ H / Ohm (For 0.5 mm2 ) / ≤ 40 µ H / Ohm (For 1.5 mm2 )					
26	Drain wire + Shield Resistance	≤ 30 Ohm / Km.					
27	Electrostatic noise rejection ratio	Over 76 dB					
28	Attenuation	≤ 1.2 dB / Km					
29	Special Requiements for cables of Intrinsically – safe circuits						
	Primary Insulation	Low density 70° C polyethylene (LDPE) as per IS-6474					
	Inductance	≤ 0.9 µ H /Km between conductors of each pair at 1000 HZ					
	Capacitance	≤0.06 µ F/ Km between conductors of each pair at 1000 Hz					
	Oxygen index	Over 30% at room temperature					
30	Temperature index	Over 250° C.					
31	HCL gas emission	20% (max.)					
32	Smoke density	60% (max.)					
33	Manufacturer	Vendor to Specify					
34	Quantity	1 Pair	1 Traid	6/8/12 Pair	6/8/12 Traid		
	in meters						
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Vendor Name		PO No		DATE	PREP	CHK	APR
Vendor Dwg no:		Requisition No					
		Client:					
 <b>BHARAT HEAVY ELECTRICALS Ltd</b> PROJECT ENGG. AND SYSTEM DIV. RC PURAM, HYDERABAD-31		Plant:			Data Sheet No		Rev

Control Cables								
1	Application - Control Cable	Non Intrinsically Safe						
2	Number of pairs / triads / cores	3 / 7 / 12 / 16 / 19/ 24 Core						
3	Conductor Cross Section	7 no/0.67 each for 2.5 sqmm						
4	Conductor Material	Stranded E.C grade High Conductivity Copper class 2 as per IS-8130.						
5	Construction	Annealed tinned electrolytic grade stranded copper conductor of 1.5 mm <sup>2</sup> (7x0.53mm) or 0.5 mm <sup>2</sup> (7x0.3mm) as per IS 8130						
6	Twisted Pair	Yes, 13 times / meter						
7	Individual Pair Shielding	Not Applicable						
8	Overall Shielding	Aluminum mylar tape of minimum thickness 0.075 mm (100% coverage with 25% overlapping) along with annealed tinned stranded copper drain wire of size 0.5mm <sup>2</sup> (7x0.3 mm) in continuous contact with aluminum side of the shield shall be provided.						
9	Communication Wire	Not Applicable						
10	Conductor : Insulation	Extruded PVC type A IS:5831. Nominal Thickness as per IS:1554.						
11	Insulation : Identification Color	Colour of core insulation shall be normally black & red						
12	Multi Core Identification	By number printing on both cores of each pair at an interval of not more than 200 mm.						
13	Inner Sheath / colour	Type ST-1 Extruded PVC.with FRLS property Black and Red						
14	Outer Sheath / colour	Type ST-1 , Extruded PVC with FRLS property. Black						
15	Armor Type	Armouring shall be as per method (b) of IS-1554 (part-1). (i) calculated dia under armour <13 mm –GI wire armour (ii) calculated dia under armour >13 mm –GI strip armour						
16	Rip cord	Provided						
17	Overall Diameter	VENDOR TO SPECIFY						
18	Insulation Resistance	100 Mohms / Km						
19	Voltage Grade	650/1100 V.						
20	Max. DC Conductor Resistance at 20 Deg C	≤ 7 ohms / km						
21	Mutual Capacitance at 1 KHz	≤ 0.2 μ F/km between adjacent cores in a pair at 1000 Hz.						
22	Cap. between any core or between any screen	≤ 0.4 μ F/ Km at 1000 Hz						
23	Inductance at 1KHz	≤ 1.0 mH / Km between conductor of each pair						
24	L/R Ratio	≤ 25 μ H / Ohm (For 0.5 mm <sup>2</sup> ) / ≤ 40 μ H / Ohm (For 1.5 mm <sup>2</sup> )						
25	Drain wire + Shield Resistance	≤ 30 Ohm / Km.						
26	Electrostatic noise rejection ratio	Over 76 dB						
27	Attenuation	≤ 1.2 dB / Km						
28	Primary Insulation	-						
29	Inductance	-						
30	Capacitance	-						
31	Oxygen index	29%						
32	Temperature index	Over 250° C.						
33	HCL gas emission	20% (max.)						
34	Smoke density	60% (max.)						
35	Manufacturer	Vendor to Specify						
36	Quantity	3 Core	7 Core	12 Core	16 Core	19 Core	24 Core	
	in meters							
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Vendor Name			PO No		DATE	PREP	CHK	APR
Vendor Dwg no:			Requisition No					
			Client:					
 <b>BHARAT HEAVY ELECTRICALS Ltd</b> PROJECT ENGG. AND SYSTEM DIV. RC PURAM, HYDERABAD-31		Plant:		Data Sheet No		Rev		

Thermocouple Cables (K - Type)				
1	Application	Thermocouple extension cable with individual & overall shielding.		
2	Number of pairs / triads / cores	1 Pair x 16AWG , 6/8/12 Pair X 20 AWG		
3	Conductor Cross Section	Solid thermocouple conductor of diameter 16 AWG or 20 AWG		
4	Conductor Material	As per IS-8784. / IEC 584		
5	Construction	Annealed tinned electrolytic grade stranded copper conductor of 1.5 mm <sup>2</sup> (7x0.53mm) or 0.5 mm <sup>2</sup> (7x0.3mm) as per IS 8130.		
6	Twisted Pair	Yes, 13 times / meter		
7	Individual Pair Shielding	Each pair individually shielded with 0.05 mm thick (min)aluminum mylar tape with 25% overlap giving 100% coverage. Plus annealed tinned multistranded copper drain wire of size 0.5mm2 (7x0.3 mm) in continuous contact with aluminum side of shield.		
8	Cable Bundling (For Multi Pair)	Each pair/triad of individual shielding as above shall be individually wrapped with mylar / polyester tape of thickness 0.075 mm & bundled together to form a cable with 4 to 6 twists per meter. Plus a pair of communication wire of annealed tinned stranded copper wire of 0.5 mm2 (7x0.3 mm). Conductor with type-C, HR PVC 85°C insulation of thickness 0.4 mm (min.) bundled together with multi pair cables & overall wrapped withmylar / polyester tape.		
9	Overall Shielding	Aluminum mylar tape of minimum thickness 0.075 mm (100% coverage with 25% overlapping) along with annealed tinned stranded copper drain wire of size 0.5mm2 (7x0.3 mm) in continuous contact with aluminum side of the shield shall be provided.		
10	Communication Wire	Not Applicable		
11	Conductor : Insulation	Extruded, type C, 85° C, HR PVC compound as per IS 5831. The thickness shall be 0.5 mm minimum for 20 AWG (0.5 mm2) conductor & 0.8 mm minimum for 16 AWG (1.32 mm2) conductor. Negative tolerance on insulation thickness is not acceptable. Higher thickness may be considered to meet the electrical parameters.		
12	Core Identification	For IEC 584 cables - Colour of core insulation shall be as per IS 8784. For ANSI M.C. 96.1 cables - Colour of core insulation shall be as per ANSI M.C. 96.1.		
13	Inner Sheath / colour	Extruded PVC or Flame Retardant Low Smoke (FRLS) Extruded PVC as pervariant table, 90° C, type- ST2 as per IS:5831 with non-metallic rip cord under the sheath. The thickness shall be as per IS 1554 Part 1. Inner sheath colour shall be normally black		
14	Outer Sheath / colour	Extruded PVC with Flame Retardant Low Smoke (FRLS) or FRLS properties as per enquiry, 90° C, type- ST2 as per IS 5831. The thickness shall be as per 'Nominal value' of IS 1554 Part 1, with tolerance of ±0.2 mm. Colour shall be normally IS 8784 or ANSI MC 96.1		
15	Aarmor Type	Armour over inner sheath shall be galvanised round steel wire as per Table – 5, schedule -'b' of IS 1554, Part-I.		
16	Rip cord	Provided		
17	Overall Diameter	VENDOR TO SPECIFY		
18	Themo EMF accuracy & calibration tolerance	For IEC 584- 2 : class-1 For ANSI M.C. 96.1: class- Special		
19	Insulation Resistance	100 Mohms / Km		
20	Voltage Grade	600 / 1100 V		
21	Cap. between any core or between any screen	≤ 0.18 µ F/ Km at 1000 Hz		
22	Inductance at 1KHz	≤ 4.0 mH / Km between conductor of each pair		
23	L/R Ratio	≤ 25 µ H / Ohm (For 20n AWG ) / ≤ 40 µ H / Ohm (For 16 AWG )		
24	Drain wire + Shield Resistance	≤ 30 Ohm / Km.		
25	Electrostatic noise rejection ratio	Over 76 dB		
26	Attenuation	≤ 1.2 dB / Km		
27	Primary Insulation	-		
28	Inductance	-		
29	Capacitance	-		
30	Oxygen index	29%		
31	Temperature index	Over 250° C.		
32	HCL gas emission	20% (max.)		
33	Smoke density	60% (max.)		
34	Manufacturer	Vendor to Specify		
35	Quantity	1 Pair x 16AWG	6Pair X 20 AWG	8 Pair X 20 AWG
	in meters			
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Vendor Name		PO No	DATE	PREP
Vendor Dwg no:		Requisition No		CHK
		Client:		APR
 <b>BHARAT HEAVY ELECTRICALS Ltd</b> PROJECT ENGG. AND SYSTEM DIV. RC PURAM, HYDERABAD-31		Plant:	Data Sheet No	Rev