

PROJECT: IOCL BARAUNI FUEL CONVERSION

 HYDERABAD			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Doc No.- REV. 0 Data sheet No:PG-DS-01			
Pressure Gauge (PG) Technical Data Sheet									
GENERAL	1	Range & Qty.	Refer BOM (Annexure-I & II)			MATERIAL	20	Hazardous area class	NOT APPLICABLE
	2	Type	Surface mount /Local Gauge				21	Case Material	SS304
	3	Ambient Temp Limit	0 to 65°C				22	Element Material	SS316
GAUGE SPECIFICATION	4	Sensor Type	Bourdon Tube			23	Window Glass	Shatter Proof.	
	5	Dial Size	150MM (6")			24	Pointer	Aluminium.	
	6	Accuracy	±1% of full scale deflection			25	Blow out Disc	SS 304	
	7	Process Connection	1/2" NPT (M), Bottom entry.			26	Tag Plate	Reqd, SS 304	
	8	Blow out Disc	Required.			27	Bezel ring	SS 304	
	9	Solid Front Case	Required for >100Kg/Cm2.			28	Movement	SS 304	
	10	Over Range Protection	> 130% of full scale.			29	Socket Material	SS 304	
	11	Protection	IP 65			CERTIFICATE	30	Calibration	100% Review
	12	Zero & Span adjustment	External Required.				31	Vibration test	100% Review
	13	Anti-corrossive Dial	Non-Rusting Plastic, White with black figure				32	Material compliance	100% Review
	14	Micro meter Adjustment	Required for pointers.				33	Ingress prot. Test	100% Review
	15	Scale type	Concentric, Graduated units			TEST	34	Calibration	5-POINT,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 Pressure Range color band for dial required on each pressure gauge. 2 The elastic element material shall be as follows: a) 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. b) For range > 60 Kg/cm2 - AISI-316 bored stainless steel. 3 Item to be sourced from as per approved vendor list as mentioned in specification.									

ESP-001-2A Rev.00		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number Rev. No. 00 Sheet 1 of 1					
				Differential Pressure Gauge (DPG) Technical Data Sheet					
				GENERAL	ACCESSORIES	28 Mounting Bracket 29 U Clamp+Fastner 30 Cable Glands 31 Cable entry Plugs 32 Vent/ Drain Plugs 33 Tag Plate 34 Bolts + Nuts 35 36 37	Ranges shall be so specified that the gauge normally operates in the middle third of the scale and shall conform to IS-3624 standard dials, wherever possible. Bottom entry, 2" Pipe mounting 0 to 65°C 1 Range 2 Type 3 Ambient Temp Limit 4 Static Pressure 5 Sensing material Double Diaphragm in SS316 6 Dial Size 150MM (6") Case & Bezel SS304, Bayonet type bezel 7 Windows Toughened Glass with rubber ring 8 Accuracy ±2% of full scale deflection or Better 9 Process Connection 1/2" NPT(F) 10 Blow out Disc Required. 11 Over Range Protection > 130% of full scale. 12 Ingress Protection IP 65 13 Zero & Span adjustment External Required. 14 Anti-corrosive Dial Aluminum, White with black figure & shall confirm to IS-3624 15 Micro meter Adjustment Required for pointers. 16 Scale type Concentric, Graduated units 17 Pointer-270° Deflection Yes, Metal with Black Finish 18 Pointer Stop Required at both end 19 Bezel ring Bayonet Lock Type 20 Movement Geared / Cam-roller type 21 22 Case Material SS304 23 Element & Wetted parts SS316 24 Windows Shatter Proof. 25 Pointer Aluminum. 26 Movement SS304 27 Socket Material SS316	Reqd, For 2" pipe mounting, SS304 Reqd, SS304 Not applicable Not applicable Reqd, SS304 (1 No) Required, 1 No per Gauge, SS304 Reqd. A193GrB7 + A194Gr2H 38 Bill of Material (model, Tag no's) 100% Witness 39 Spares (BOM, part no's) 100% Witness (if ordered) 40 Material compliance certificate 100% Review 41 Calibration 10% witness or min. 2 of each range 42 Over Protection Test for 30 min. 10% witness or min. 2 of each range 43 Accuracy Test 10% witness or min. 2 of each range 44 Vibration test 100% Review 45 Ingress Protection Test 100% Review 46 PMI Test (for SS & AS Materials) 100% Review 47 48 49	
GAUGE	TEST REPORT/ CERTIFICATE	38 Bill of Material (model, Tag no's) 100% Witness 39 Spares (BOM, part no's) 100% Witness (if ordered) 40 Material compliance certificate 100% Review 41 Calibration 10% witness or min. 2 of each range 42 Over Protection Test for 30 min. 10% witness or min. 2 of each range 43 Accuracy Test 10% witness or min. 2 of each range 44 Vibration test 100% Review 45 Ingress Protection Test 100% Review 46 PMI Test (for SS & AS Materials) 100% Review 47 48 49	Reqd, For 2" pipe mounting, SS304 Reqd, SS304 Not applicable Not applicable Reqd, SS304 (1 No) Required, 1 No per Gauge, SS304 Reqd. A193GrB7 + A194Gr2H 38 Bill of Material (model, Tag no's) 100% Witness 39 Spares (BOM, part no's) 100% Witness (if ordered) 40 Material compliance certificate 100% Review 41 Calibration 10% witness or min. 2 of each range 42 Over Protection Test for 30 min. 10% witness or min. 2 of each range 43 Accuracy Test 10% witness or min. 2 of each range 44 Vibration test 100% Review 45 Ingress Protection Test 100% Review 46 PMI Test (for SS & AS Materials) 100% Review 47 48 49						
		MATERIAL	PROJECT SPECIFIC			50 51 Manifold Type Non-Coplanar, Integral 5-Way, 1/2" NPT(F), SS316 52 Statutory Approvals Not applicable 53 54 55 56	50 51 Manifold Type Non-Coplanar, Integral 5-Way, 1/2" NPT(F), SS316 52 Statutory Approvals Not applicable 53 54 55 56		
						NOTES: 1 This data sheet shall be used for inspection along with BOM sheet and Tag List. No further approval is required after P.O. placement 2 Tag list shall be furnished by BHEL after P.O. placement Vendor shall submit the consolidated BOM sheet along with accessories of instruments, finalised make / models of instruments, etc for approval. 3 Vendor shall not submit any data sheet for approval after P.O. placement. 4 GA drawings shall be submitted for approval (if applicable)	Approved Makes / Vendors	50 51 Manifold Type Non-Coplanar, Integral 5-Way, 1/2" NPT(F), SS316 52 Statutory Approvals Not applicable 53 54 55 56	50 51 Manifold Type Non-Coplanar, Integral 5-Way, 1/2" NPT(F), SS316 52 Statutory Approvals Not applicable 53 54 55 56

PROJECT:IOCL BARAUNI FUEL CONVERSION

			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Doc No.- REV. 0 Data sheet No:PGD-DS-01			
Diaphragm Seal - Pressure Gauge (PGD) Technical Data Sheet									
GENERAL	1	Range & Qty.	Refer BOM (Annexure-I & II)			MATERIAL	27	Hazardous area class	NOT APPLICABLE
	2	Type / Std	Diaphragm Sealed / IS3624				28	Case	SS304
	3	Ambient Temp Limit	0 to 65°C				29	Element	SS316
GAUGE SPECIFICATION	4	Sensing Element	Diaphragm			CERTIFICATE	30	Window Glass	Shatter Proof.
	5	Dial Size	150MM (6")				31	Pointer	Aluminium
	6	Accuracy	±1% of full scale deflection				32	Blow out Disc	SS 304
	7	Process Connection	1.5" RFLGD, Min 300#.				33	Bezel Ring	SS 304
	8	Instrument connection	1/2" NPT(M)				34	Capillary fill fluid	Silicon Oil
	9	Blow out Disc	Required.				35	Movement	SS 304
	10	Over Range Protection	> 130% of full scale.				36	Socket	SS 304
	11	Protection	IP 65				37	Calibration	100% Review
	12	Zero & Span adjustment	External Required.				38	Vibration test	100% Review
	13	Anti-corrossive Dial	Non-Rusting Plastic, White with black figure				39	Material compliance	100% Review
ACCESSORIES	14	Micro meter Adjustment	Required for pointers.			TEST	40	Ingress prot. Test	100% Review
	15	Scale type	Concentric, Graduated units				41	Calibration	5-POINT ,10% or min. 2 of each range
	16	Pointer-270° Deflection	Yes,Metal with Black Finish				42	Over Protection Test for 30 min.	10% or min. 2 of each range
	17	Pointer Stop	Required at both end				43	Accuracy Test	10% or min. 2 of each range
	18	Bezel ring	Bayonet Lock Type						
	19	Movement	Geared / Cam-roller type						
	20	Tag Plate	Required, SS304				Project Sp. Requ.	44	Pressure range color band for dial
21	Spacer Ring	Required, SS							
22	Vent+Drain plugs	Required, SS, In built to Spacer							
23	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat							
24	Stud Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)							
25	Flange	ASTM A105, Face finish = 125AARH							
26	Gasket	Reqd. Spiral Wound, SS							
NOTES: 1 The elastic element material shall be as follows: a) 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. b) For range > 60 Kg/cm2 - AISI-316 bored stainless steel. C) Item to be sourced from as per approved vendor list as mentioned in specification.									

PROJECT: IOCL BARAUNI FUEL CONVERSION

			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Doc No.- REV. 0 Data sheet No:DPT-DS-01			
Differential Pressure Transmitter (DPT) Technical Data Sheet									
GENERAL	1	Range & Qty.	Refer BOM (Annexure-I & II)			ACCESSORIES	28	Mounting Bracket	For 2" pipe mounting, SS304
	2	Type	Electronic Smart, HART, Intrinsic safe				29	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Standard				30	Cable Glands	SS Double Compression+Flameproof
	4	Ambient Temp Limit	- 40 to 80°C				31	Cable entry Plugs	Reqd, SS 304
	5	Process Temp. Limit	- 40 to 120°C				32	Vent/Drain Plugs	Reqd, SS 304
SENSOR	6	Accuracy	For a rangeability of 1:10 a) Equal or Above 760 mmWC: $\pm 0.075\%$ b) Less than 760 mmWC: $\pm 0.15\%$			33	Tag Plate	Reqd, SS 304	
	7	Response Time	a) If range $\geq 760\text{mmWC}$, res. time $\leq 500\text{msec}$. b) If range $< 760\text{mmWC}$, res. time $\leq 1\text{ sec}$.			34	Bolts + Nuts	Reqd. SS 304	
	8	Stability	$\pm 0.15\%$ for 2 year			35	Sensor O-Ring	Extra 2 no. spares req.	
TRANSMITTER	9	Turn Down Ratio	100:1, 10:1 (if pressure $< 100\text{mmWC}$)			TEST REPORT/CERTIFICATE	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	$> 130\%$ 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 e	100% Review
	18	Load Resistance	600 Ω @ 24 VDC						
	19	Output	4-20mA + HART						
	20	Diagnostic Features	Required.						
MATERIAL	21	Hazardous area class	Zone-1, IIC, T3.			PROJECT SPECIFIC	45	Certification	SIL-2, PESO
	22	Body	SS316				46	Compartments	Dual
	23	Element	SS316				47	Manifold Type	Non-Coplanner, Integral 3 Way, SS
	24	Sensor O-Ring	Glass-filled PTFE/Teflon				48	Statutory Approvals	For Transmitters+Glands+Plugs
	25	Electronic Housing	SS304 min.				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.
- 3 Item to be sourced from as per approved vendor list as mentioned in specification.

 HYDERABAD			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Spec No.- REV. 00 Data sheet No:LT(R)-DS-01		
Radar Type Level Transmitter (LT) Technical Data Sheet								
GENERAL	1	Range & Qty.	As per Enquiry	ACCESSORIES	27	Mounting Kit	As required	
	2	Transmitter Type	Non-contact, Electronic Smart, HART, Ex-proof. Intrinsic safe		28	U Clamp+Fastner	Reqd, SS 304	
	3	Principle of Sensor	Vendor Std.(Pulse/Freq)		29	Cable Glands	SS, Double Compression+Flameproof	
	4	Ambient Temp Limit	- 40 to 80°C		30	Cable entry Plugs	Reqd, SS 304	
	5	Measuring Media	As per Enquiry		31	Tag Plate	Reqd, SS 304	
ANTENNA	6	Type of Detector	Vendor to select.		32	Bolts + Nuts	Reqd. SS	
	7	Max Press / Temp	3 Kg/cm2(g) / 65 °C		33	Gasket	SS 316, Spiral wound type.	
TRANSMITTER	8	Accuracy	± 3mm OR better		TEST REPORT/CERTIFICATE	34	5-Point Calibration	100% Review
	9	Process Connection	As per Enquiry BOM			35	Material compliance	100% Review
	10	Electrical Connection	2 Nos of 1/2" NPT (F)	36		Functional Test	100% Review	
	11	Power Supply	24V DC, Loop Powered, 2 wire	37		Performance Test	100% Review	
	12	Mounting	Top of Fix Tank	38		Ingress Prot. Test	100% Review	
	13	Protection	IP 65	39		Intrinsic Safety Test	100% Review	
	14	Lighting and surge Protection	Required	40		Conformity Test	100% Review	
	15	Display	Integral LCD Digital (in Engg Units & in %)					
	16	Load Resistance	600Ω @ 24 VDC					
	17	Output	4-20mA + HART					
	18	Diagnostic Features	Required					
MATERIAL	19	Hazardous area class	Zone-1, IIA, IIB, IIC, T3.	PROJECT SPECIFIC	41	Certification	SIL-2, PESO	
	20	Body	SS316		42	Housing Compartments	Dual	
	21	Antenna	SS316		43	Statutory Approvals	For Transmitters+Glands+Plugs	
	22	Antenna Size	4"		44	Corrosive Protection	Required	
	23	Humidity	0 - 100% RH					
	24	Sensor O-Ring	Glass-filled PTFE/Teflon					
	25	Electronic Housing	SS304 min.					
	26	Flange	SS 316, Face finish = 125AARH					

 HYDERABAD			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Spec No.- REV. 00 Data sheet No:LT(GWR)-DS-01		
Radar Type Level Transmitter (LT)-Guided wave-Side Mounted-Technical Data Sheet								
GENERAL	1	Range & Qty.	As per enquiry.		ACCESSORIES	30	Mounting Kit	As required
	2	Transmitter Type	Guided Wave,Side mounted, Electronic Smart, HART, Ex-proof. Intrinsic safe			31	U Clamp+Fastner	Reqd, SS 304
	3	Principle of Sensor	Vendor Std.(Pulse/Freq)			32	Cable Glands	SS Double Compression+Flameproof
	4	Ambient Temp Limit	- 40 to 80°C			33	Cable entry Plugs	Reqd. SS 304
	5	Measuring Media	Condensate and gas			34	Tag Plate	Reqd, SS 304
CHAMBER & PROBE	6	Max Press / Temp	3 Kg/cm2(g) / 65 °C		MATERIAL	35	Bolts + Nuts	Reqd. SS
	7	Chamber Material	SS 304/Same as tank material to which it is connected.			36	Gasket	SS 316, Spiral wound type.
	8	Chamber Size & schedule	2" XS			37	Hazardous area class	Zone-1, IIC, T3.
	9	Chamber centre-Centre distance(in mm)	As per enquiry.			38	Body	SS316
	10	Side Process Connection size of chamber/Flange Material	2" 300# RF/A182 GR.F316			39	Humidity	0 - 100% RH
	11	Connection Location : Upper-Lower	Side-Side			40	Sensor O-Ring	Glass-filled PTFE/Teflon
	12	Case Orientation	Vertical			41	Electronic Housing	SS304 min.
	13	Drain & Vent Conn Size	1/2" NPT with plug			42	5-Point Calibration	100% Review
	14	Probe Type	Vendor to select.			43	Material compliance	100% Review
	15	Top Flange connection /Material	3" 300# RF/SS 316, Face finish = 125AARH			44	Functional Test	100% Review
TRANSMITTER	16	Probe Material / Probe length	SS316L /Suitable length to be provided		TEST REPORT/CERTIFICATION	45	Performance Test	100% Review
	17	Measuring Range in mm	As per enquiry.			46	Ingress Prot. Test	100% Review
	18	Accuracy	± 3mm OR better			47	Intrinsic Safety Test	100% Review
	19	Process Connection	2" 300#RF			48	Conformity Test	100% Review
	20	Flange connection	2" 300#RF					
	21	Electrical Connection	2 Nos of 1/2" NPT (F)			49	Certification	SIL-2, PESO
	22	Power Supply	24V DC, Loop Powered, 2 wire			50	Housing Compartments	Dual
	23	Mounting	Side mounted			51	Statutory Approvals	For Transmitters+Glands+Plugs
	24	Protection	IP 65			52	Corrosive Protection	Required
	25	Lighting and surge Protection	Required					
	26	Display	Integral LCD Digital (in Engg Units & in %)					
	27	Load Resistance	600Ω @ 24 VDC					
	28	Output	4-20mA + HART					
	29	Diagnostic Features	Required					

Item to be sourced from as per approved vendor list as mentioned in specification.

	Project:IOCL FUEL CONVERSION		PESD/C&I/IOCL-FUEL CON/PIPING/001	
	Customer:IOCL BARAUNI			Rev. no: 00
	BHEL - HYDERABAD			
	INTERFACE WITH PIPING			
S.No	Instrument Description	Process Connection		
		Inst connection	Rating	
1	Temperature gauge	1.5" flanged	min 300# RF, higher rating as per Job Specification	
2	Temperature Element (RTD)	1.5" flanged	min 300# RF, higher rating as per Job Specification	
3	Temperature Element (Thermocouple)	1.5" flanged	min 300# RF, higher rating as per Job Specification	
4	Pressure Gauge	3/4" , SW		
5	Pressure Transmitter	3/4" , SW		
6	Flow Element (Orifice)	Equal to line size & BW	Rating as per piping class	
7	Flow Element (Nozzle)	Equal to line size & BW	Rating as per piping class	
8	Orifice/nozzle straight distance	Inlet - 36D Outlet - 8D	Note(1)	
9	Mass flow meter	Note(1)	min 300# RF, higher rating as per piping class	
10	Ultrasonic type flow meter	Note(1)	min 300# RF, higher rating as per piping class	
Notes: (1) Size will be intimated after receipt of vendor drawings (2) Wherever flanged connection is indicated, counter flange, gaskets, stud, nut, bolts will be in PE&SD(M) scope.				
PE&SD (C&I)		PE&SD (PIPING)		

C & I REQUIREMENTS FOR CONTROL VALVE/ DESUPER HEATER/ PRDS ACCESSORIES INPUT TO MECHANICAL(VALVE) GROUP		
PROJECT NAME		IOCL BARAUNI FUEL CONVERSION
DOCUMENT NO.		0
REV. NO.		00
A)	SOLENIOD VALVE	
I)	APPLICATION	ON/OFF VALVES PNEUMATIC OPERATED
II)	ENCLOSER	INTRINSIC SAFE
III)	COIL VOLTAGE	24VDC
IV)	MOUNTING	ON CONTROL VALVE BODY
V)	TYPE OF COIL	SINGLE COIL
VI)	BODY MATERIAL	SS304 WITH 'H' -CLASS COIL
VII)	MANUAL-RESET	AS PER P&ID
VIII)	SIL REQUIRE	NOT APPLICABLE
B)	LIMIT SWITCH	
I)	APPLICATION	OPEN AND CLOSE INDICATION
II)	TYPE	PROXIMITY NAMUR TYPE
III)	CONTACT RATING	24VDC, IS
IV)	SIL REQUIRE	NOT APPLICABLE
C)	POSITIONER	
I)	APPLICATION	FOR MODULATING CONTROL VALVE
II)	TYPE	ELECTRO-PNEUMATIC WITH SMART(IN BUILT POSITION TRANSMITTER)
III)	DIAGNOSTICS SOFTWARE	REQUIRED
IV)	AIR FILTER REGULATOR	BY CONTROL VALVE VENDOR
V)	SIZE OF PNEUMATIC CONNECTION	1/4 " NPT (F)
VI)	SIL REQUIRE	NOT APPLICABLE

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME 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

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED	
		CHD/APPD				CHD/APPD				CHD/APPD	
ZONE				ZONE				ZONE			
											

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD				NAME	SIGN.	DATE	NO. OF VAR.		
DEPT. PE&SD		UNTOL. DIMS. GR. 6/M/F				SCALE		WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
CODE 450				NTS		N.A		-N.A.-		-N.A.-	-N.A.-
TITLE INSTRUMENT INSTALLATION DRAWINGS		CARD CODE N.A.		DRG. NO:		CUST. DRG. NO:		REV.		00	
		SHT. No				NO. OF SHT.		17			

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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO.

PY-FH-4-M1051-201-01

SH. 01 OF 17

INSTRUMENT INSTALLATION DRAWINGS

CUSTOMER:									
IOCL BARAUNI									
CONSULTANT:									
PROJECT: IOCL BARAUNI- FUEL CONVERSION PROJECT									
		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME		SIGN.	DATE	NO.OF VAR.	
DEPT. PE&SD		UNTOL. DIMS. GR.		CHD.		KAMAL	-SD/-	09.03.19	-N.A.-
CODE 450		G/M/F		APPD.		ANAND	-SD/-	09.03.19	
TITLE		SCALE		WEIGHT (KG)		REF. TO ASSY. DRG.		ITEM NO.	
INSTRUMENT INSTALLATION DRAWINGS		NTS		N.A		-N.A.-		-N.A.-	
CARD CODE		N.A.		DRG. NO:		CUST. DRG. NO:		REV.	
				SHT. No 01		NO. OF SHT. 17		00	

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COMPUTER FILE NAME

SIGN. AND DATE REF. DRG. NO.

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

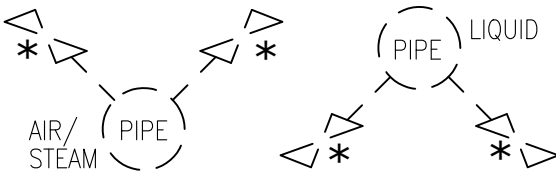
INDEX

PAGE No.	DESCRIPTION	REV			
		00	01	02	03
1	TITLE	√			
2	INDEX	√			
3	NOTEs	√			
4	Hookup scheme: PG-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
5	Hookup scheme: PG-L/G-3/4" (SS) Pr. Class ≤ 600 + No IBR	√			
6	Hookup scheme: PG/PT-V (CS) Pr. Class ≤ 600 + No IBR Hookup scheme: PG/PT-V (SS) Pr. Class ≤ 600 + No IBR	√			
7	Hookup scheme: PT-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
8	Hookup scheme: PT-L/G-3/4" (SS) Pr. Class ≤ 600 + No IBR	√			
9	Hookup scheme: FT/DPT/DPG-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
10	Hookup scheme: FT/DPT/DPG-L/G-1/2" (SS) Pr. Class ≤ 600 + No IBR	√			
11	Hookup scheme: CV + SOVs (SS) Pr. Class ≤ 600 + No IBR	√			
12	Hookup scheme: TE/TT	√			
13	Hookup scheme: TG	√			
14	Hookup scheme: JB	√			
15	SINGLE INSTRUMENT SUPPORT: INST-SUPPORT-1	√			
16	SINGLE INSTRUMENT SUPPORT: INST-SUPPORT-2	√			
17	SINGLE INSTRUMENT SUPPORT: INST-SUPPORT-3	√			

NOTEs ::

- (1) All the hookup items shall be supplied in loose condition.
- (2) Welding shall be done at site.

Tapping Orientations



*-> Double isolation valves shall be provided for High pressure applications.

- Supply by Hookup vendor
- Supply by PIPING agency
- Supply by INST. vendor

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		
								

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO.OF VAR.
				DRN.	SUNIL	-SD/-	09.03.19
				CHD.	KAMAL	-SD/-	09.03.19
DEPT. PE&SD		UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
CODE 450		G/M/F		NTS	N.A	-N.A.-	-N.A.-
TITLE				CARD CODE	DRG. NO:	REV.	
INSTRUMENT INSTALLATION DRAWINGS				N.A.	CUST. DRG. NO:	00	
					SHT. No 02		
						NO. OF SHT. 17	

INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

COMPUTER FILE NAME

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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

NOTES

- (1) For all line mounted flanged instruments or wherever first isolation valve is flanged, gasket, bolts nuts etc shall be in piping scope.
- (2) Supply of tank standpipe shall be as shown on respective P&ID's.
- (3) Installation of JB/ Inst shall at a height upto 1.5M from grade level/finished floor level. same shall be finalized at site.
- (4) Root valves for all the instruments are in piping scope. Root valves shown in these installation drawings are indicative. No. of roots valves (single/double) for low/high pressure services shall be as per P & ID's.
- (5) Impulse line routing shown in this drawing are indicative. Actual routing shall be decided at site & unnecessary bends in impulse line shall be avoided as far as possible.
- (6) Instrument orientation shall be suitable for meter reading accessibility. Suitable space shall be provided for maintenance accesibility.
- (7) The orientation of tapping from process pipe (vertical/horizontal) shall be selected such that pressure gauge shall be accessible for maintenance.
- (8) Instrument impulse line shall be supported as interval of 3m.
- (9) Capillary tube and instrument air tubing shall be supported in light steel channel (50x50mm).
- (10) FRP Canopies are supplied for applicable instruments with respective instruments Tag number marking. Hence same shall be erected along with canopies.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		



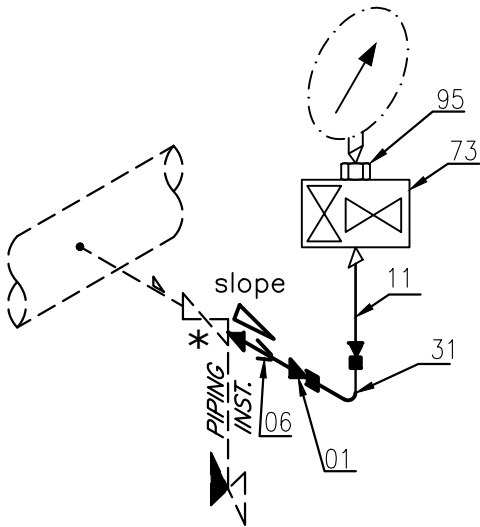
BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
CODE 450	G/M/F		NTS	N.A	-N.A.-	-N.A.-	-N.A.-
TITLE INSTRUMENT INSTALLATION DRAWINGS				CARD CODE N.A.	DRG. NO: CUST. DRG. NO:		REV. 00
				SHT. No	03	NO. OF SHT. 17	

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME 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

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For LIQUID/AIR



PG-L/G-3/4" (CS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH160	No	1	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 160	No	6	Mtrs
31	ELBOW	A 105	1/2" SW, CL 6000	No	1	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 160, L = 150mm	No	1	No's
73	2-WAY MANIFOLD (T-Type) with drain tube	SS 316	1/2" NPT(F), CL3000	No	1	No's
95	3-piece Union	SS 316	1/2" NPT(M) x 1/2" NPT(F), CL3000	No	1	No's

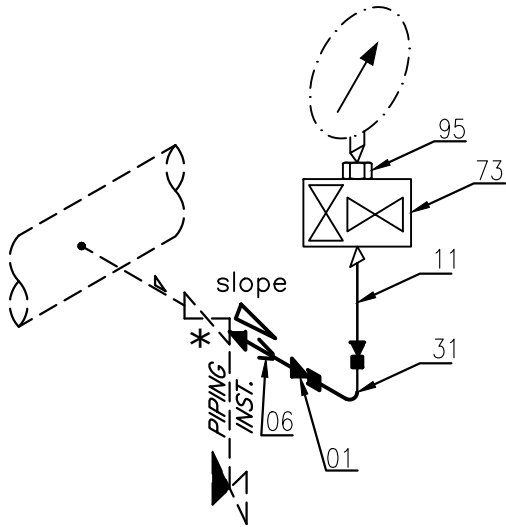
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO.OF VAR.
DEPT. PE&SD		UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
CODE 450		C/M/F	NTS	N.A		-N.A.-	-N.A.-
TITLE				CARD CODE	DRG. NO:		REV.
INSTRUMENT INSTALLATION DRAWINGS				N.A	CUST. DRG. NO:		00
				SHT. No	04	NO. OF SHT.	17

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME 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

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For LIQUID/AIR



PG-L/G-3/4" (SS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	SS 316	3/4" PL x 1/2" PLXPL, SCH80S	No	1	No's
01	PIPE (SMLS)	SS 316L	1/2" SCH 80S	No	6	Mtrs
31	ELBOW	SS 316	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	SS 316L	1/2" PL x NPT(M), SCH 80S, L = 150mm	No	1	No's
73	2-WAY MANIFOLD (T-Type) with drain tube	SS 316	1/2" NPT(F), CL3000	No	1	No's
95	3-piece Union	SS 316	1/2" NPT(M) x 1/2" NPT(F), CL3000	No	1	No's

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE 450	G/M/F						

TITLE	CARD CODE	DRG. NO:	REV.
INSTRUMENT INSTALLATION DRAWINGS	N.A.	CUST. DRG. NO:	00
		SHT. No 05	

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

The diagram illustrates a piping system configuration. A dashed box at the bottom is labeled "PIPE / VESSEL". A vertical line with a valve symbol (two triangles meeting at a point) connects this box to a horizontal line. Above the horizontal line, a curved line with multiple 'x' marks leads to a dashed circle containing an arrow pointing upwards and to the right. This curved line is labeled "By PIPING and INST Vendor". The horizontal line continues to the right, where it meets a vertical line labeled "01". From this junction, a line goes down to a valve symbol, labeled "By HOOKUP VENDOR". To the right of the "01" label, the horizontal line continues to a square symbol, labeled "31". From this square, a vertical line goes down to another square symbol, labeled "01". This second square is connected to a zigzag line labeled "26", which is then connected to a line labeled "11". Finally, a line labeled "36" connects to a circular symbol with a zigzag line inside.

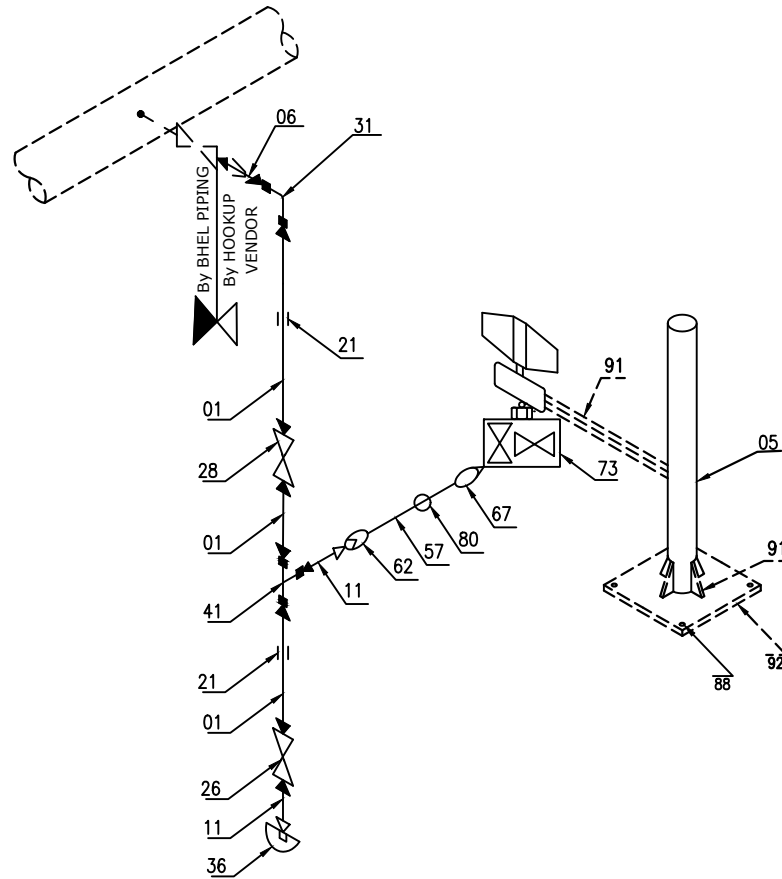
The diagram illustrates a piping system configuration. A dashed box at the bottom is labeled PIPE / VESSEL. A vertical line extends upwards from this box, passing through a dashed section with two 'X' marks. This line then turns horizontal to the right. A label 'By HOOKUP VENDOR' with an arrow points to this horizontal section. This horizontal line connects to a vertical line that goes upwards. A label 'By PIPING and INSTR VENDOR' with an arrow points to this vertical section. The vertical line terminates in a dashed circle containing an arrow pointing upwards and to the right. To the right of the main horizontal line, there is a vertical branch. This branch starts with a horizontal segment labeled '01', followed by a vertical segment labeled '31'. This vertical segment leads to a valve symbol labeled '01'. Below this valve is another valve symbol labeled '26'. Below '26' is a third valve symbol labeled '11'. The line continues downwards from '11' to a final valve symbol labeled '36'.

Pos. No	Item	MOC	Size	IBR	QTY	Units
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 160	No	3	Mtrs
31	ELBOW	A 105	1/2" SW, CL 6000	No	1	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 160, L = 150mm	No	1	No's
26	GATE VALVE	A105	1/2" SW, CL 800	No	1	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	1	No's

Pos. No	Item	MOC	Size	IBR	QTY	Units
01	PIPE (SMLS)	SS 316L	1/2" SCH 80S	No	3	Mtrs
31	ELBOW	SS 316	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	SS 316L	1/2" PL x NPT(M), SCH 80S, L = 150mm	No	1	No's
26	GATE VALVE	SS 316	1/2" SW, CL 800	No	1	No's
36	CAP	SS 316	1/2" NPT(F), CL 3000	No	1	No's

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO.OF VAR.
				DRN.	SUNIL	-SD/-	09.03.19	
				CHD.	KAMAL	-SD/-	09.03.19	
				APPD.	ANAND	-SD/-	09.03.19	
DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS
CODE 450	C/M/F		NTS	N.A	-N.A.-		-N.A.-	-N.A.-
TITLE				CARD CODE N.A.	DRG. NO: _____			REV. 00
INSTRUMENT INSTALLATION DRAWINGS					CUST. DRG. NO: _____			
					SHT. No 06 NO. OF SHT. 17			

For LIQUID/AIR



PT-L/G-3/4" (CS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH160	No	1	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 160	No	6	Mtrs
31	ELBOW	A 105	1/2" SW, CL 6000	No	1	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 160, L=150mm	No	2	No's
26	GATE VALVE	A105	1/2" SW, CL 800	No	1	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	1	No's
21	COUPLING	A105	1/2" SW, CL 6000	No	2	No's
41	EQUAL TEE	A105	1/2" SW, CL 6000	No	1	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	1	No's
62	FEMALE CONNECTOR	SS 316	1/2" NPT(F) x 1/2" OD TUBE, CL3000	No	1	No's
57	TUBE (SMLS)	SS 316L	1/2" OD X 2.1 mm	No	3	Mtrs
80	TUBE UNION	SS 316	1/2" OD, CL3000	No	1	No's
67	MALE CONNECTOR	SS 316	1/2" NPT(M) x 1/2" OD TUBE, CL3000	No	1	No's
05	PIPE (SMLS)	SA 106 Gr. B	2" SCH 40	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	4	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
73	2 WAY MANIFOLD (By Transmitter Vendor)			No	1	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	2.7012	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.95	KG's

INVENTORY NO
SIGN. AND DATE
REF. DRG. NO.
COMPUTER FILE NAME
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

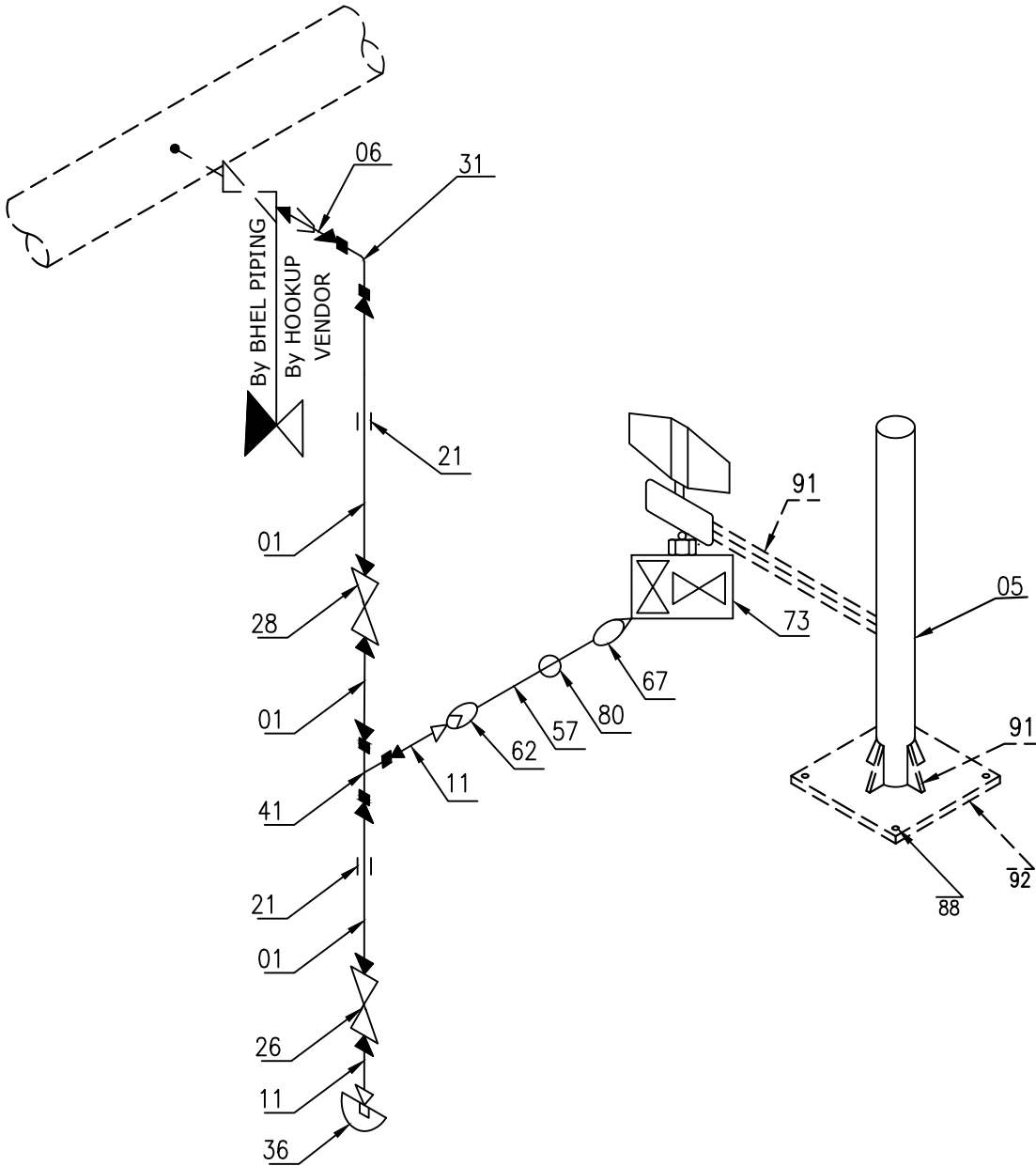
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO. OF VAR.
DEPT. PE&SD	UNTO. DIMS. GR. 6/M/F	SCALE NTS	WEIGHT (KG) N.A	DRN. SUNIL	-SD/-	09.03.19	-N.A.-
CODE 450				CHD. KAMAL	-SD/-	09.03.19	-N.A.-
				APPD. ANAND	-SD/-	09.03.19	-N.A.-
TITLE		REF. TO ASSY. DRG.		ITEM NO.	NO. OF ITEMS	REV.	
INSTRUMENT INSTALLATION DRAWINGS		-N.A.-		-N.A.-	-N.A.-	00	
		DRG. NO.		SHT. No 07		NO. OF SHT. 17	

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME 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

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For LIQUID/AIR



PT-L/G-3/4" (SS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	SS 316	3/4" PL x 1/2" PLXPL, SCH80S	No	1	No's
01	PIPE (SMLS)	SS 316L	1/2" SCH 80S	No	6	Mtrs
31	ELBOW	SS 316	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	SS 316L	1/2" PL x NPT(M), SCH 80S, L = 150mm	No	2	No's
26	GATE VALVE	SS 316	1/2" SW, CL 800	No	1	No's
28	GLOBE VALVE	SS 316	1/2" SW, CL 800	No	1	No's
21	COUPLING	SS 316	1/2" SW, CL 3000	No	2	No's
41	EQUAL TEE	SS 316	1/2" SW, CL 3000	No	1	No's
36	CAP	SS 316	1/2" NPT(F), CL 3000	No	1	No's
62	FEMALE CONNECTOR	SS 316	1/2"NPT(F) x 1/2" OD TUBE, CL3000	No	1	No's
57	TUBE (SMLS)	SS 316L	1/2" OD X 2.1 mm	No	3	Mtrs
80	TUBE UNION	SS 316	1/2" OD, CL3000	No	1	No's
67	MALE CONNECTOR	SS 316	1/2"NPT(M) x 1/2" OD TUBE, CL3000	No	1	No's
05	PIPE (SMLS)	SA 106 Gr. B	2" SCH 40	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	4	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
73	2 WAY MANIFOLD (By Transmitter Vendor)			No	1	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	2.7012	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.95	KG's

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE 450	G/M/F						

TITLE	CARD CODE	DRG. NO:	REV.
INSTRUMENT INSTALLATION DRAWINGS	N.A	CUST. DRG. NO:	00
		SHT. No 08	NO. OF SHT. 17

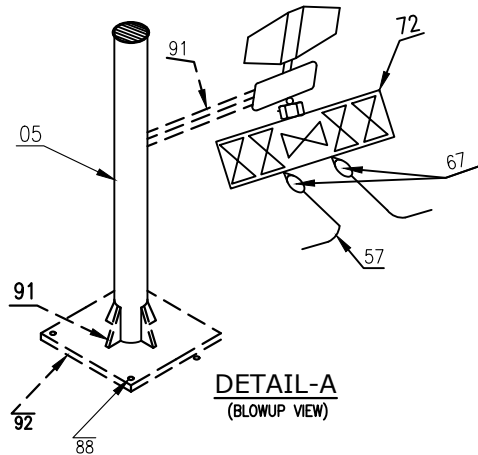
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SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME

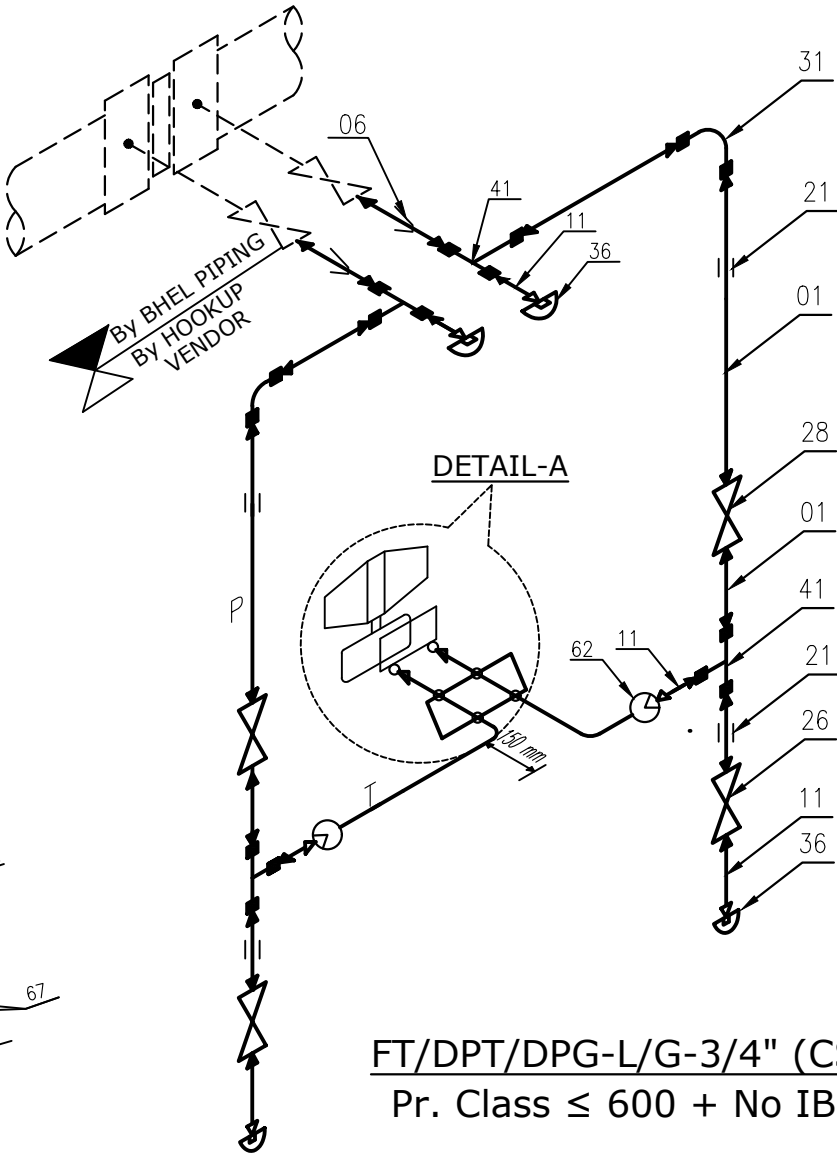
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

INVENTORY NO

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		



For LIQUID/AIR



FT/DPT/DPG-L/G-3/4" (CS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH160	No	2	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 160	No	12	Mtrs
31	ELBOW	A 105	1/2" SW, CL 6000	No	2	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 160, L = 150mm	No	6	No's
26	GATE VALVE	A105	1/2" SW, CL 800	No	2	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	2	No's
21	COUPLING	A105	1/2" SW, CL 6000	No	4	No's
41	EQUAL TEE	A105	1/2" SW, CL 6000	No	4	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	4	No's
62	FEMALE CONNECTOR	SS 316	1/2" NPT(F) x 1/2" OD TUBE, CL3000	No	2	No's
57	TUBE (SMLS)	SS 316L	1/2" OD X 2.1 mm	No	6	Mtrs
80	TUBE UNION	SS 316	1/2" OD, CL3000	No	2	No's
67	MALE CONNECTOR	SS 316	1/2" NPT(M) x 1/2" OD TUBE, CL3000	No	2	No's
05	PIPE (SMLS)	SA 106 Gr. B	2" SCH 40	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	4	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	2.7012	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.95	KG's
74	5 WAY MANIFOLD (By Transmitter Vendor)			No	1	No's

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD
CODE 450

UNTOL. DIMS. GR. C/M/F

SCALE NTS

WEIGHT (KG) N.A

TITLE
INSTRUMENT INSTALLATION
DRAWINGS

CARD CODE N.A

DRG. NO: _____
CUST. DRG. NO: _____
SHT. No 09

REF. TO ASSY. DRG. -N.A.-

ITEM NO. -N.A.-

NO.OF SHT. 17

NAME SUNIL
SIGN. -SD/-
DATE 09.03.19

NAME KAMAL
SIGN. -SD/-
DATE 09.03.19

NAME ANAND
SIGN. -SD/-
DATE 09.03.19

NO.OF VAR. -N.A.-

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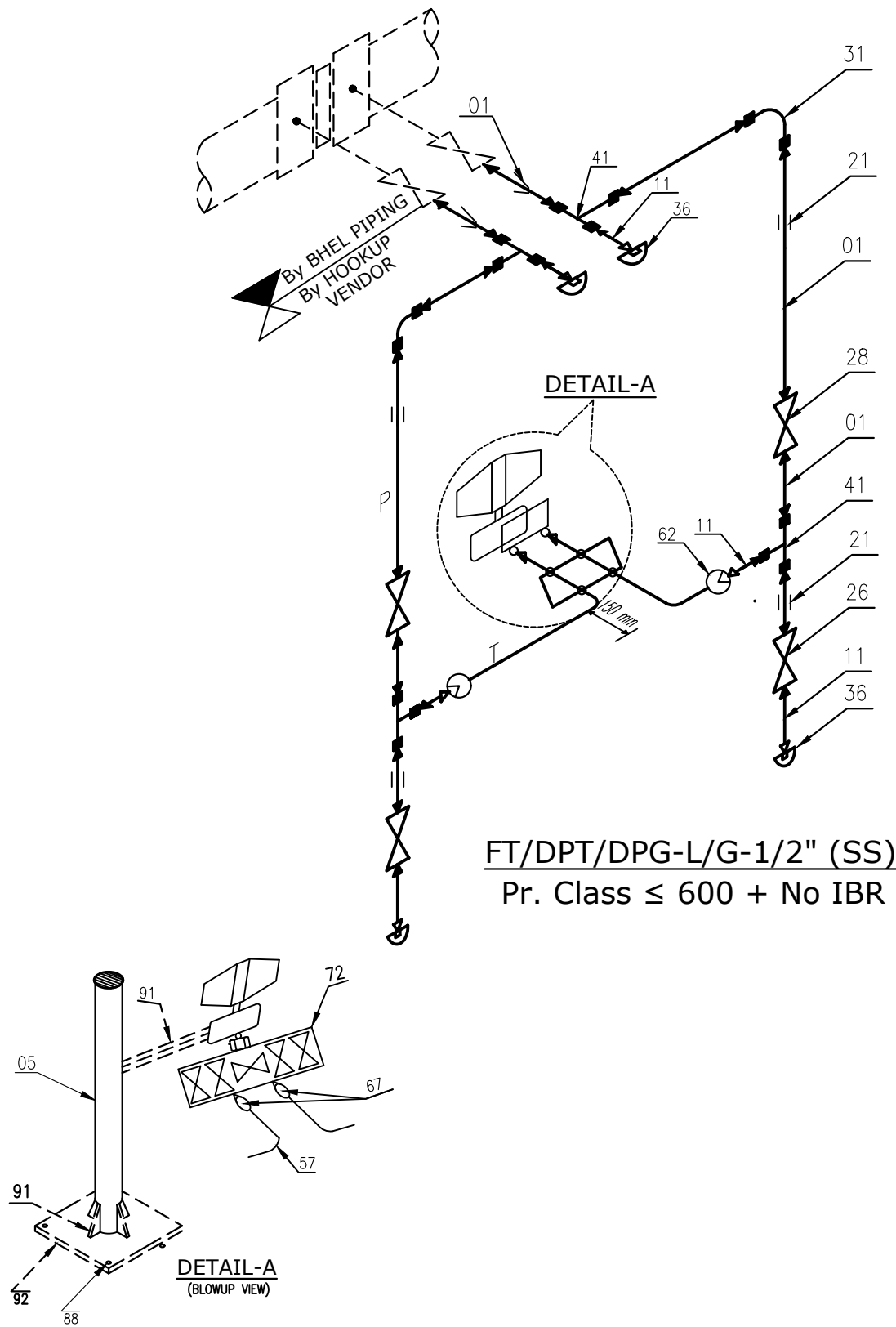
COMPUTER FILE NAME

SIGN. AND DATE REF. DRG. NO.

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For LIQUID/AIR



Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
01	PIPE (SMLS)	SS 316L	1/2" SCH 80S	No	12	Mtrs
31	ELBOW	SS 316	1/2" SW, CL 3000	No	2	No's
11	NIPPLE (SMLS)	SS 316L	1/2" PL x NPT(M), SCH 80S, L= 150mm	No	6	No's
26	GATE VALVE	SS 316	1/2" SW, CL 800	No	2	No's
28	GLOBE VALVE	SS 316	1/2" SW, CL 800	No	2	No's
21	COUPLING	SS 316	1/2" SW, CL 3000	No	4	No's
41	EQUAL TEE	SS 316	1/2" SW, CL 3000	No	4	No's
36	CAP	SS 316	1/2" NPT(F), CL 3000	No	4	No's
62	FEMALE CONNECTOR	SS 316	1/2"NPT(F) x 1/2" OD TUBE, CL3000	No	2	No's
57	TUBE (SMLS)	SS 316L	1/2" OD X 2.1 mm	No	6	Mtrs
80	TUBE UNION	SS 316	1/2" OD, CL3000	No	2	No's
67	MALE CONNECTOR	SS 316	1/2"NPT(M) x 1/2" OD TUBE, CL3000	No	2	No's
05	PIPE (SMLS)	SA 106 Gr. B	2" SCH 40	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	4	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	2.7012	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.95	KG's
74	5 WAY MANIFOLD (By Transmitter Vendor)			No	1	No's

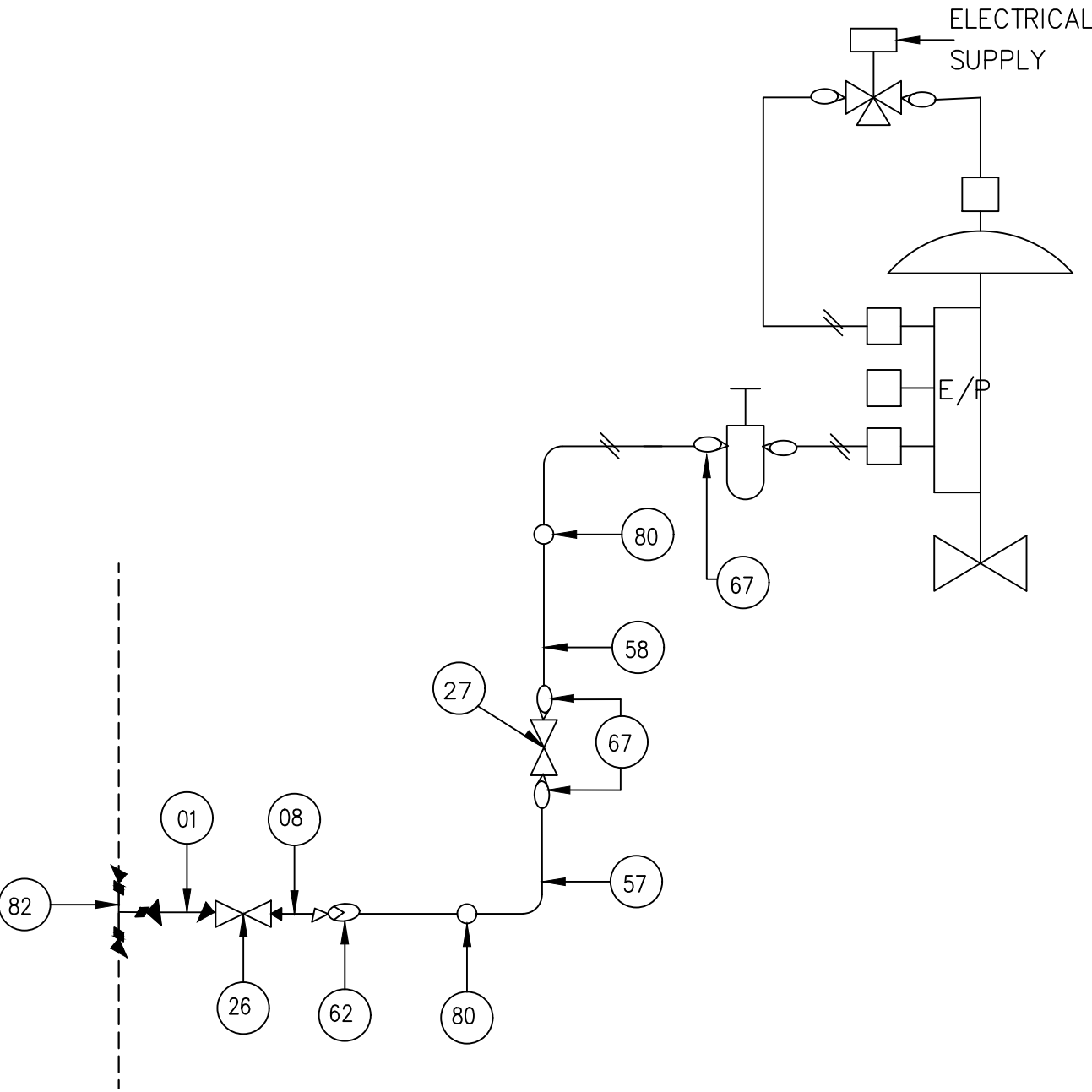
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO.OF VAR.
DEPT. PE&SD		UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.
CODE 450	G/M/F	NTS	N.A		-N.A.-		-N.A.-
TITLE				CARD CODE	DRG. NO:		REV.
INSTRUMENT INSTALLATION DRAWINGS				N.A	CUST. DRG. NO:		00
				SHT. No 10	NO. OF SHT. 17		

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME 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

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

Hookup scheme for pneumatic line of
E/P Positioner and SOVs



CV+SOVs (SS)
Pr. Class ≤ 600 + No IBR

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
08	REDUCER	SS 316	1/2" SW x 1/4" NPT(M), SCH 80S	No	1	No's
01	PIPE (SMLS)	SS 316L	1/2" SCH 80S	No	3	Mtrs
26	GATE VALVE	SS 316	1/2" SW, CL 800	No	1	No's
27	Ball VALVE (Quarter turn)	SS 316	1/4" NPT(F), CL 800	No	1	No's
62	FEMALE CONNECTOR	SS 316	1/4"NPT(F) x 8 mm OD TUBE, CL3000	No	1	No's
57	TUBE (SMLS)	SS 316L	8 mm OD X 2.1 mm	No	12	Mtrs
80	TUBE UNION	SS 316	8 mm OD, CL3000	No	1	No's
67	MALE CONNECTOR	SS 316	1/4"NPT(M) x 8 mm OD TUBE, CL3000	No	3	No's
86	U-BOLT GALVZD	IS 226	1/2"	No	2	No's
82	UNEQUAL TEE	SS 316	1" x 1" x 1/2" SW, CL 3000	No	1	No's
83	SHELL TYPE PIPE CLAMP	MS	1/4"	No	4	No's

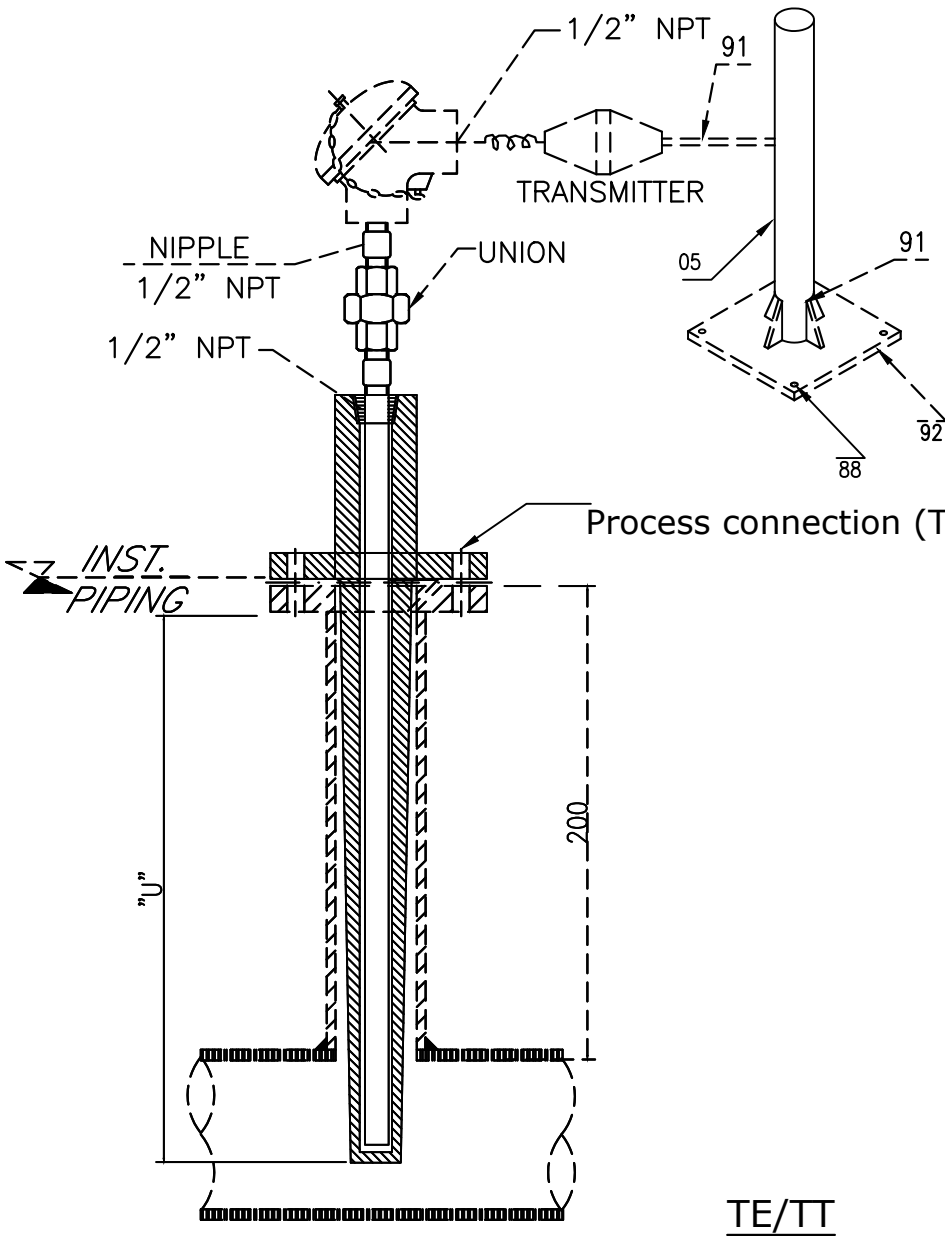
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ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD.					NAME	SIGN.	DATE	NO.OF VAR.
		HYDERABAD			DRN.	SUNIL	-SD/-	09.03.19		
					CHD.	KAMAL	-SD/-	09.03.19		
					APPD.	ANAND	-SD/-	09.03.19		-N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.		NO.OF ITEMS	
CODE 450	G/M/F		NTS	N.A	-N.A.-		-N.A.-		-N.A.-	
TITLE					DRG. NO: _____		REV. _____			
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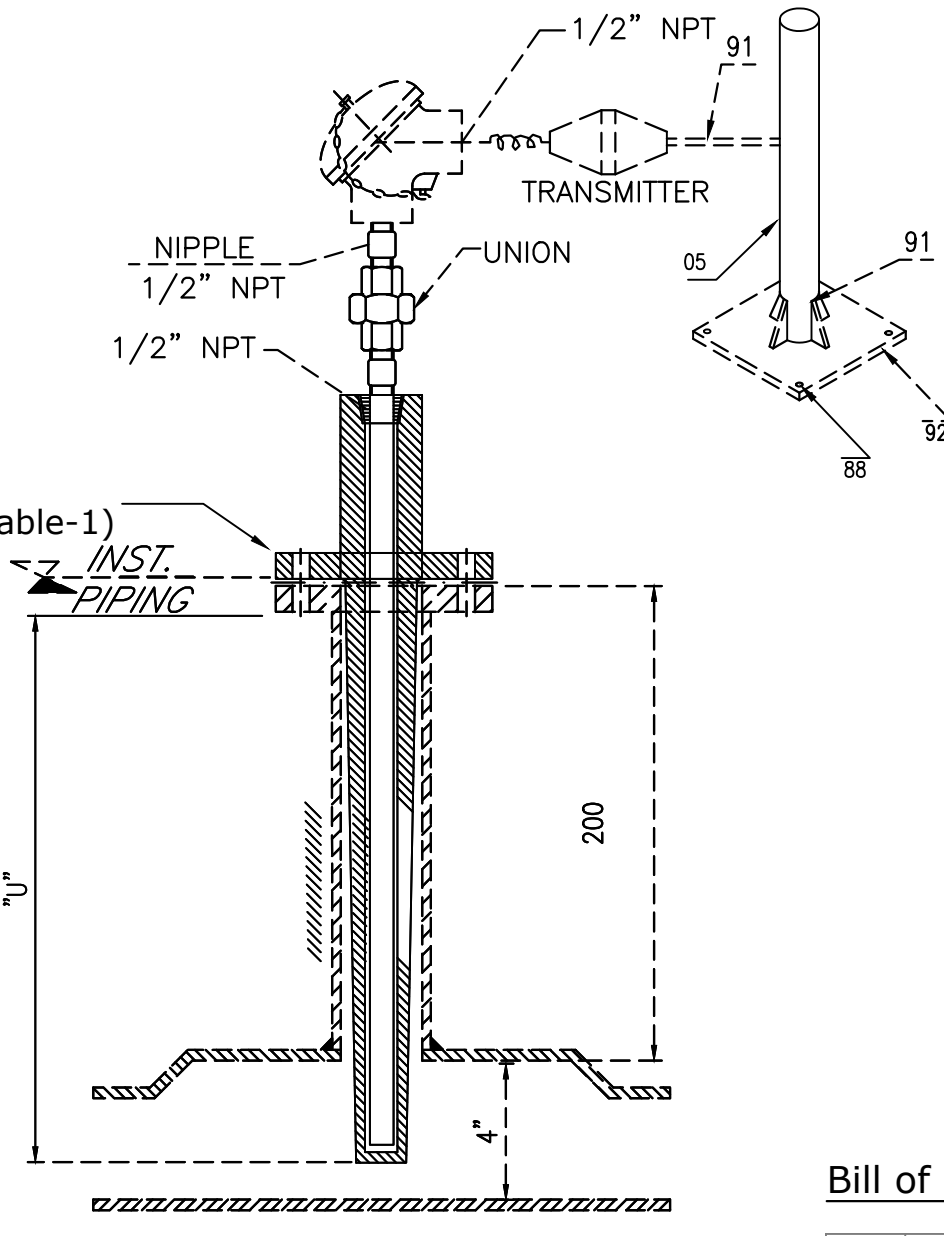
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

FOR LINE SIZE 4" & ABOVE



FOR LINE SIZE BELOW 4"



Line Size	Immersion Length (U)*
4" to 6"	280 mm
8" & above	320 mm
Vessels	400 mm

* -> U length shall vary for tags whose medium velocity is higher. Refer TE approved data sheets/drgs for details.

Table-1::

S.No	Type of Instrument	Process connection	Rating
1a	Thermowell [for Temperature Gauge & Temperature Element (RTD or Thermocouple)] ≤ 600 #	1.5" flanged	min 300# RF, higher rating as per piping class, stub provision as per EIL spec
1b	Thermowell [for Temperature Gauge & Temperature Element (RTD or Thermocouple)] > 600 #	2" Flanged	higher rating as per piping class, stub provision as per EIL spec

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
05	PIPE (SMLS)	SA 106 Gr. B	2" SCH 40	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	4	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	2.7012	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.95	KG's

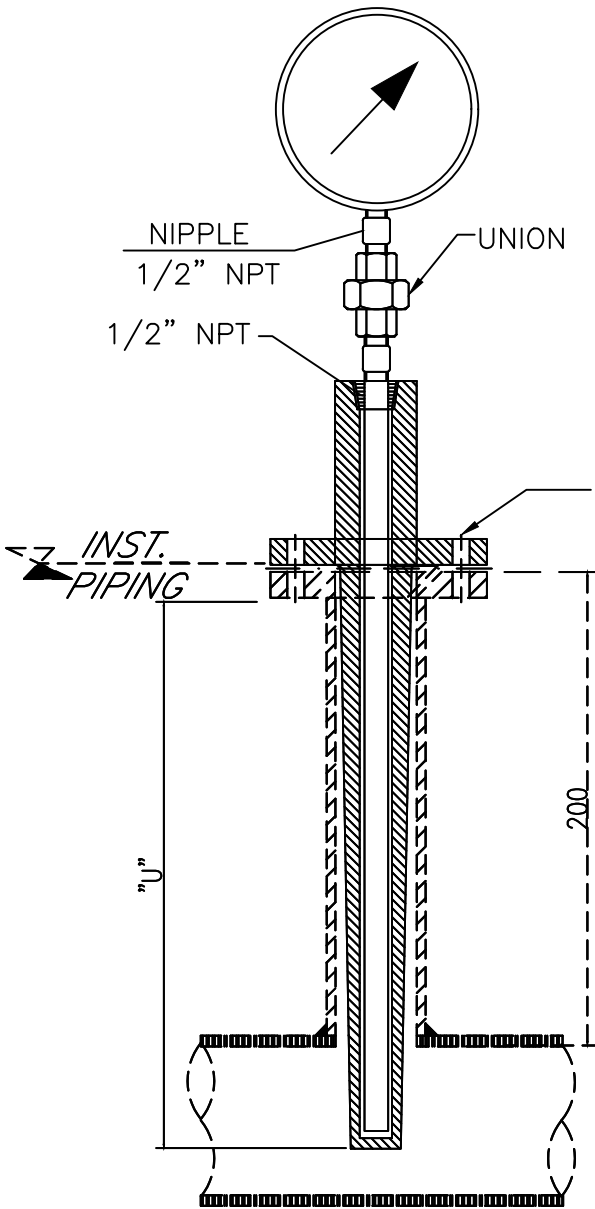
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ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD.		NAME	SIGN.	DATE	NO.OF
		HYDERABAD		DRN.	SUNIL	-SD/-	09.03.19
				CHD.	KAMAL	-SD/-	09.03.19
DEPT. PE&SD		UNTOL. DIMS.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.
CODE 450	GR. C/M/F	NTS	N.A		-N.A.-		-N.A.-
TITLE				CARD CODE	DRG. NO:		REV.
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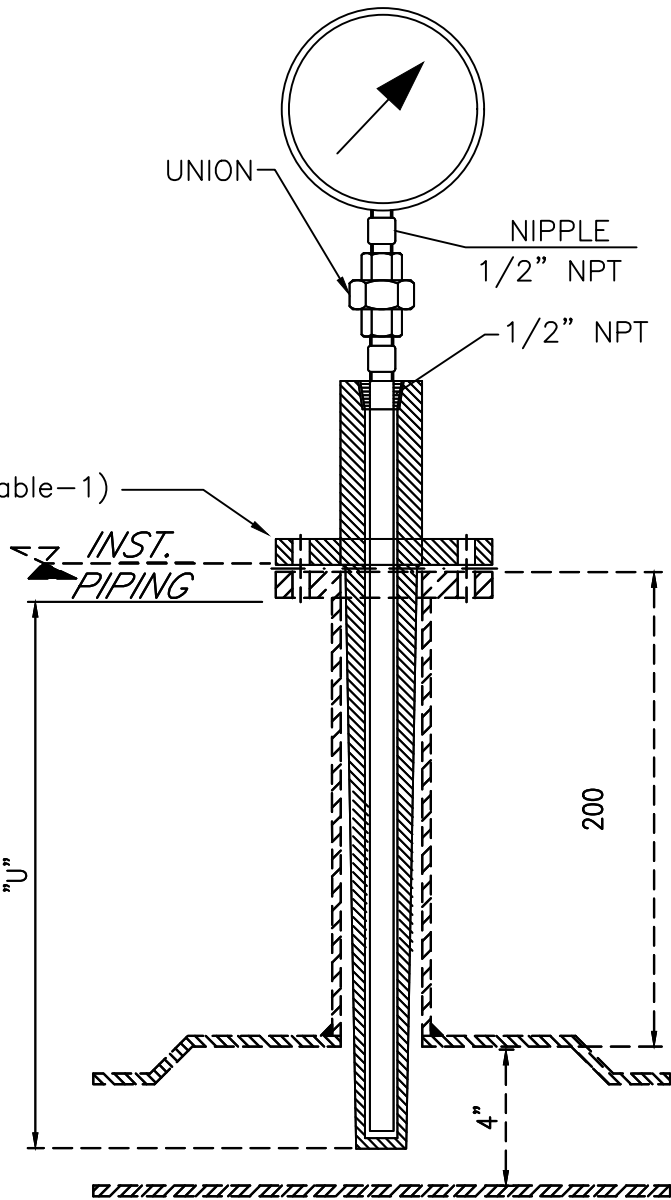
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

FOR LINE SIZE 4" & ABOVE



FOR LINE SIZE BELOW 4"



Line Size	Immersion Length (U)*
4" to 6"	280 mm
8" & above	320 mm
Vessels	400 mm

Table-1::

S.No	Type of Instrument	Process connection	Rating
1a	Thermowell [for Temperature Gauge & Temperature Element (RTD or Thermocouple)] ≤ 600 #	1.5" flanged	min 300# RF, higher rating as per piping class, stub provision as per EIL spec
1b	Thermowell [for Temperature Gauge & Temperature Element (RTD or Thermocouple)] > 600 #	2" Flanged	higher rating as per piping class, stub provision as per EIL spec

* -> U length shall vary for tags whose medium velocity is higher. Refer TE approved data sheets/ drgs for details.

TG

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO.OF VAR.
				DRN.	SUNIL	-SD/-	09.03.19	
				CHD.	KAMAL	-SD/-	09.03.19	
				APPD.	ANAND	-SD/-	09.03.19	-N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS
CODE 450	G/M/F		NTS	N.A	-N.A.-		-N.A.-	-N.A.-
TITLE					CARD CODE	DRG. NO: _____		REV.
INSTRUMENT INSTALLATION DRAWINGSs					N.A.	CUST. DRG. NO: _____		00
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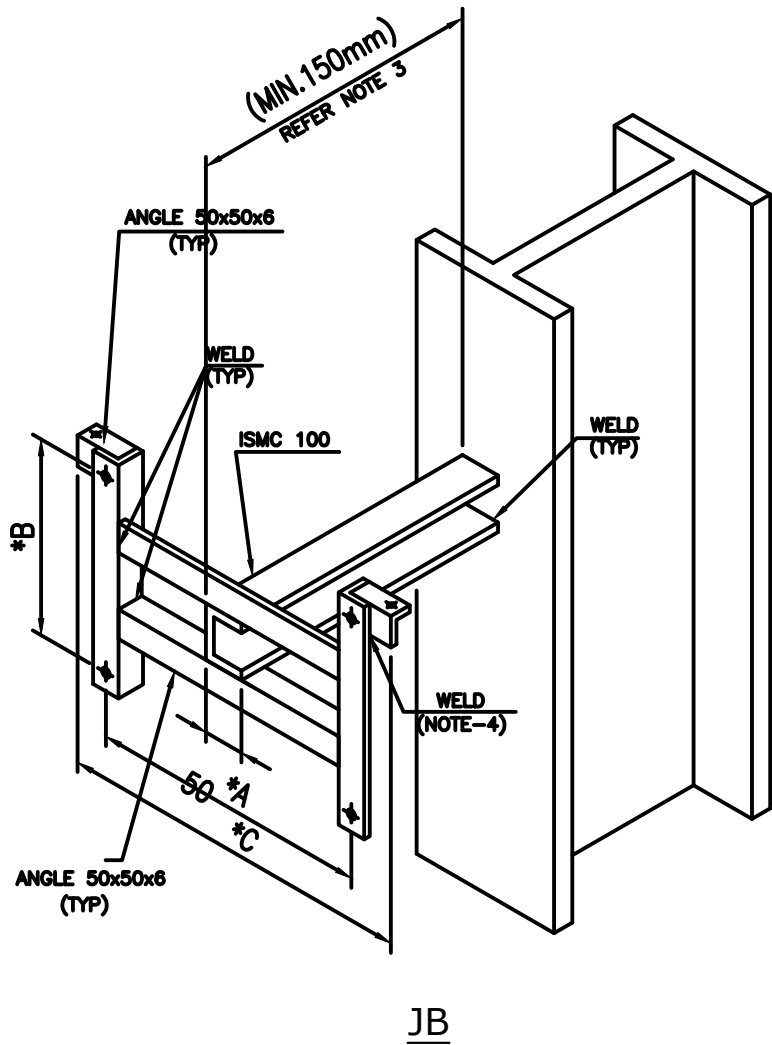
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REF. DRG. NO.

INVENTORY NO

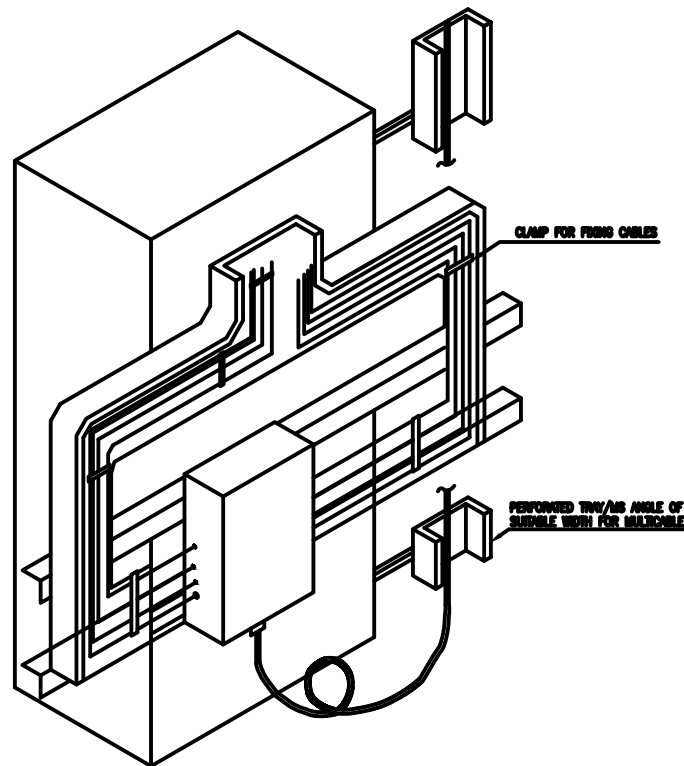
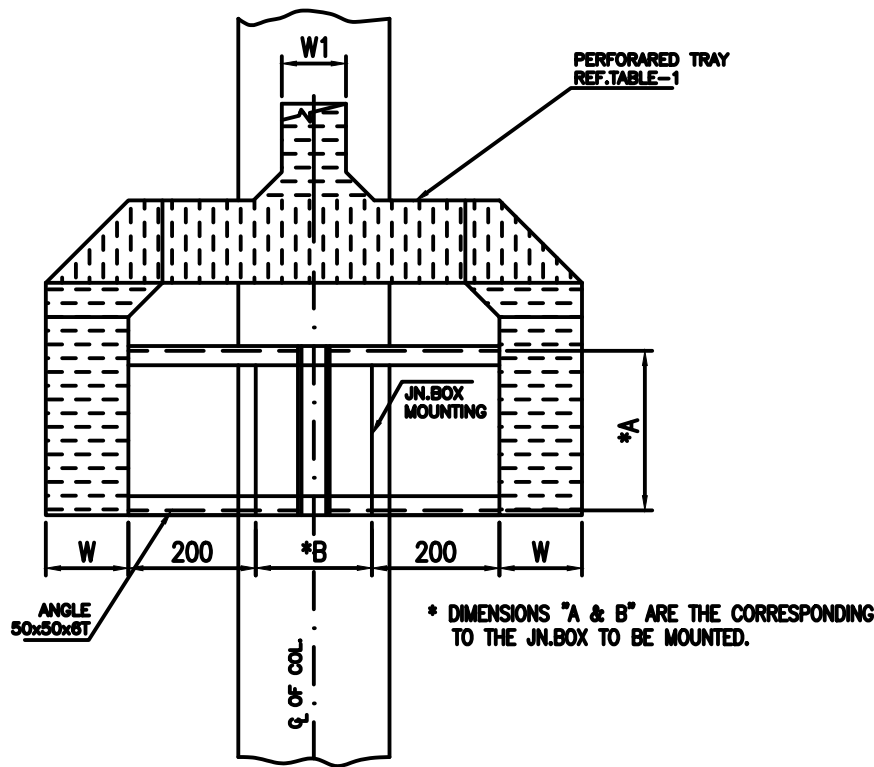
COMPUTER FILE NAME

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261



TABLES-1 (TYP)

JN.BOX	W1	W
12PAIR	300	150
8PAIR	300	150
6PAIR	200	100
4PAIR	150	100



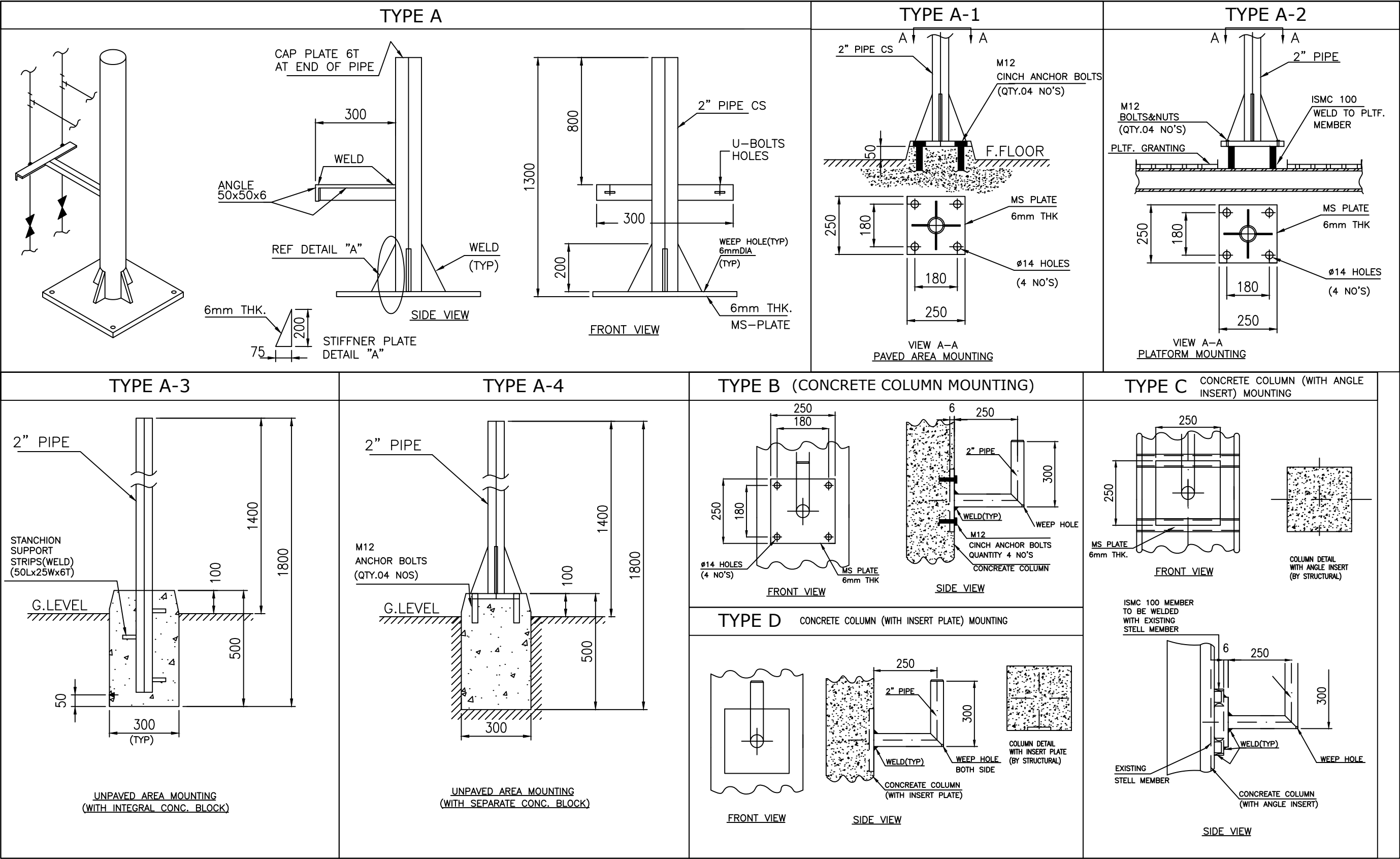
Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
93	SCRU HEX M10X50 P8.8			No	6	No's
94	NUT HEX P M10-8			No	6	No's
95	WASHER MCD 10.5-ST			No	12	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	21.385	KG's

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD.		HYDERABAD	
		DRN.	SUNIL	SIGN.	-SD/-
		CHD.	KAMAL	SIGN.	-SD/-
		APPD.	ANAND	SIGN.	-SD/-
DEPT. PE&SD	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
CODE 450	G/M/F	NTS	N.A	-N.A.-	-N.A.-
TITLE		CARD CODE		DRG. NO:	REV.
INSTRUMENT INSTALLATION		N.A.		CUST. DRG. NO:	00
DRAWINGS				SHT. No 14	NO. OF SHT. 17

SINGLE INSTRUMENT SUPPORT- GENERAL ARRANGEMENT



INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

COMPUTER FILE NAME

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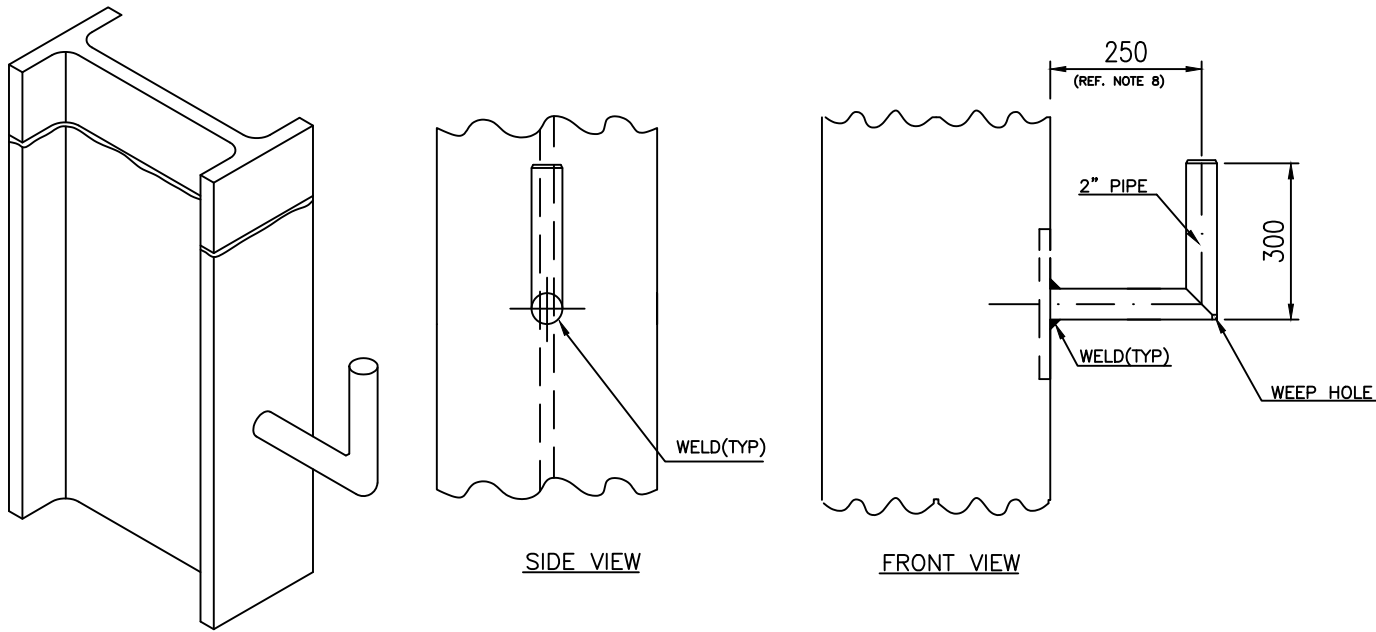
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
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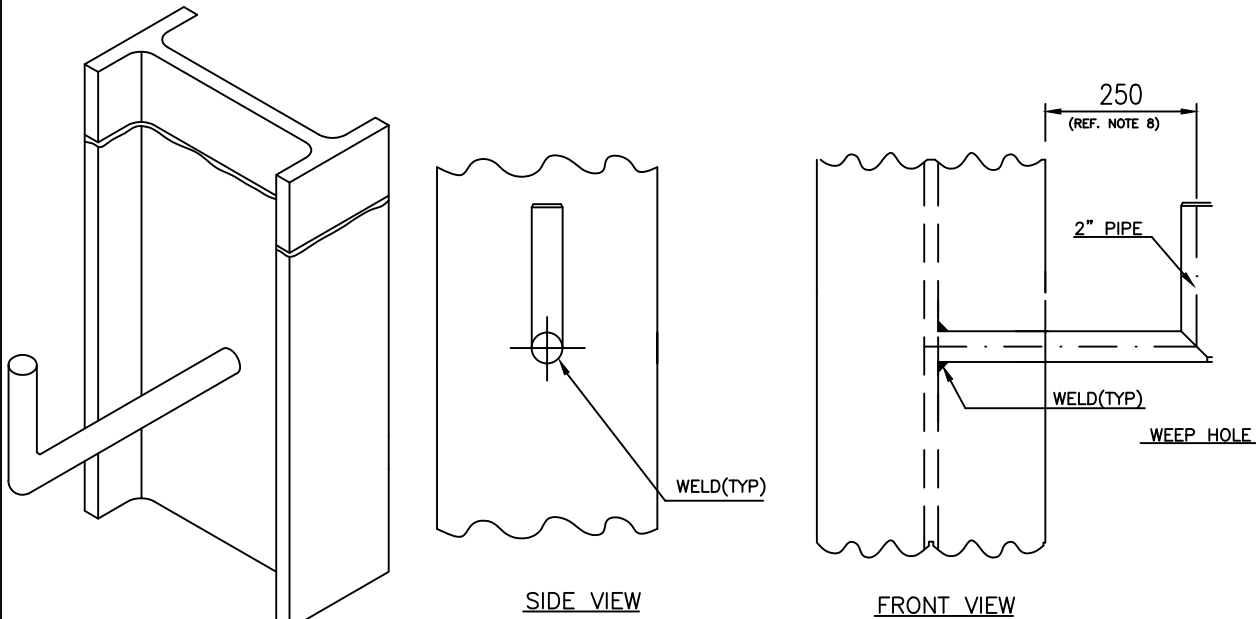
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DRN.	SD	SUNIL	-SD/-	09.03.19			
CHD.	SD	KAMAL	-SD/-	09.03.19			
APPD.	SD	ANAND	-SD/-	09.03.19			N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS	
CODE 450	C/M/F	NTS	N.A	-N.A.-	-N.A.-	-N.A.-	
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SINGLE INSTRUMENT SUPPORT- GENERAL ARRANGEMENT

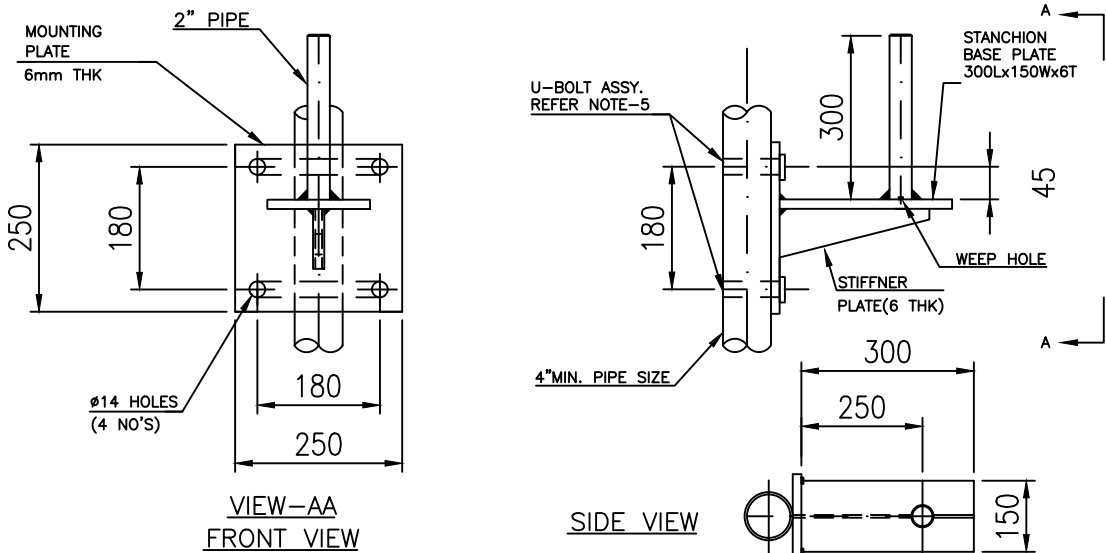
TYPE E (STEEL COLUMN MOUNTING (FLANGE FACE))



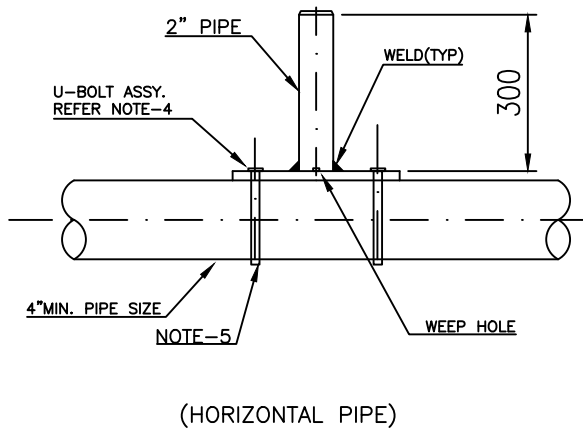
TYPE F (STEEL COLUMN MOUNTING (WEB FACE))



TYPE G-1 PIPE BRACKET MOUNTING (VERTICAL PIPE)



TYPE G-2 PIPE BRACKET MOUNTING (HORIZONTAL PIPE)



NOTES

- 1. All dimensions are in MM unless otherwise specified.
- 2. Pipe material shall be IS:2139 heavy grade as a minimum.
- 3. 6mm DIA weep hole shall be provided at low point.
- 4. All weld shall be 3mm fillet weld full strength.
- 5. U-bolt assembly shall be of minimum M12 size with nuts and spring washers.
- 6. Add 50mm where ever fire insulation is provided.
- 7. Bolt shall be turned from M.S. rounds confirming to IS: 432 Grade 1.
- 8. Nuts and washers shall confirm to IS:1363 and IS:3138.

INVENTORY NO
SIGN. AND DATE
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COMPUTER FILE NAME
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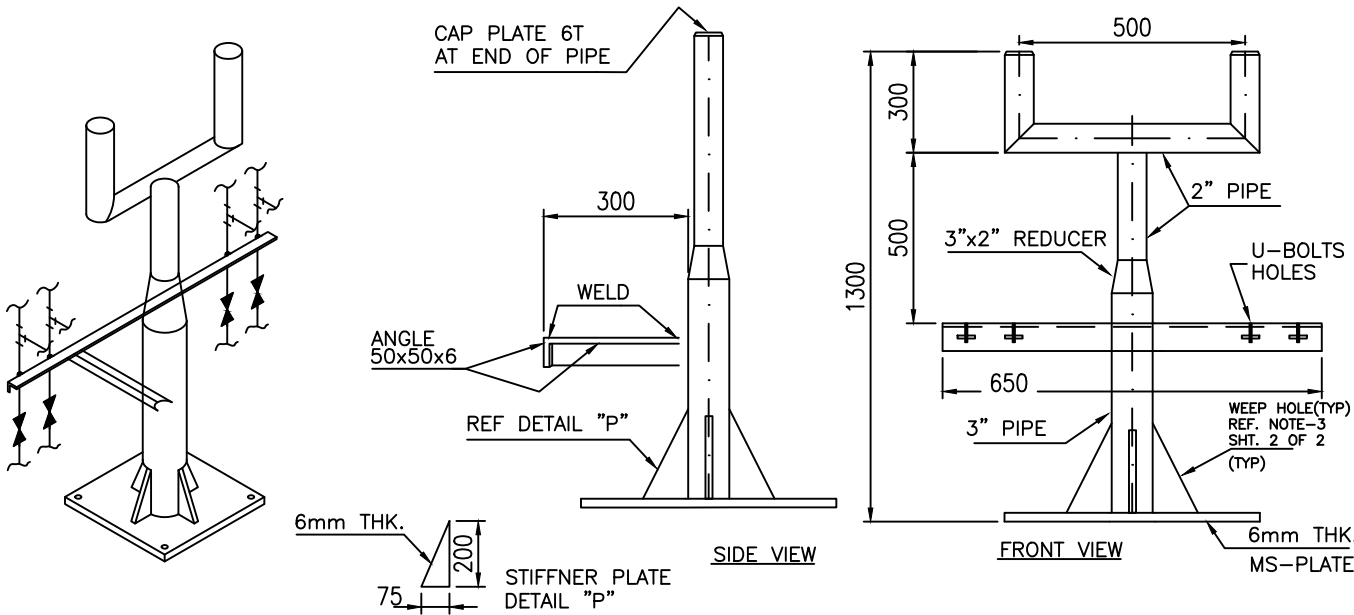
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
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ZONE			ZONE			ZONE		

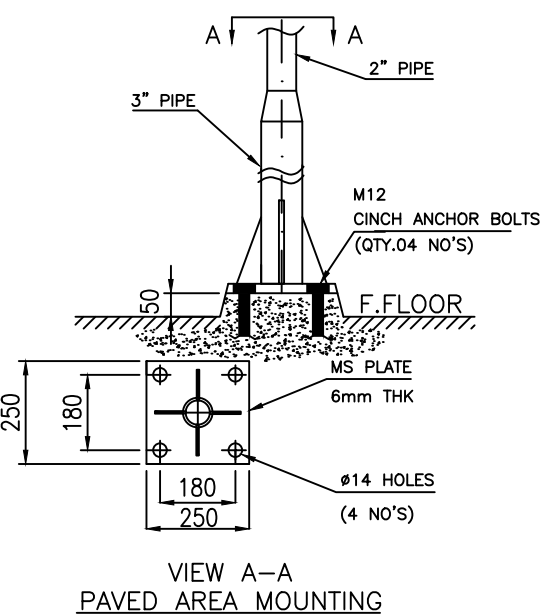
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DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS		
CODE 450	G/M/F		NTS	N.A	-N.A.-		-N.A.-	-N.A.-		
TITLE				CARD CODE N.A.	DRG. NO: _____			REV.		
INSTRUMENT INSTALLATION DRAWINGS					CUST. DRG. NO: _____			00		
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TWO INSTRUMENT SUPPORT- GENERAL ARRANGEMENT

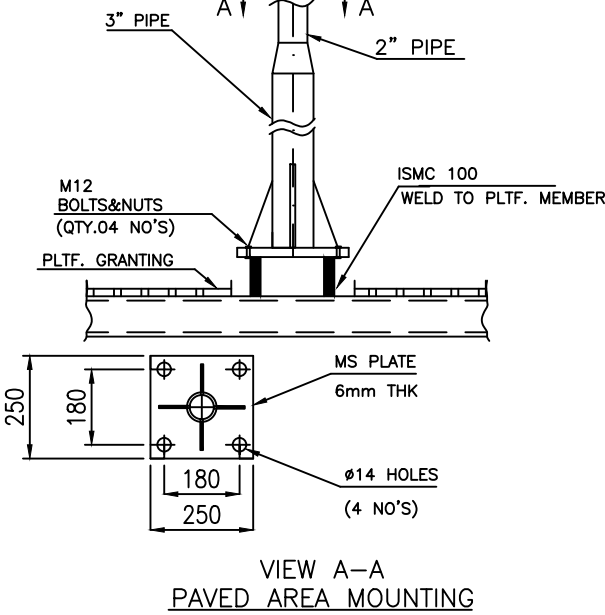
TYPE H



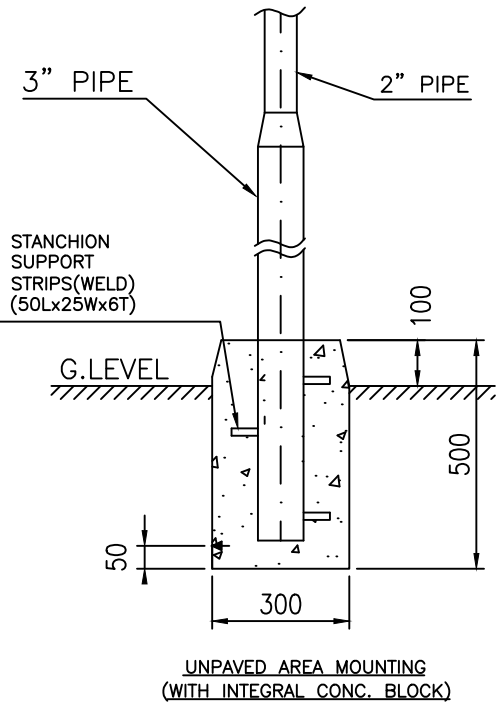
TYPE H-1



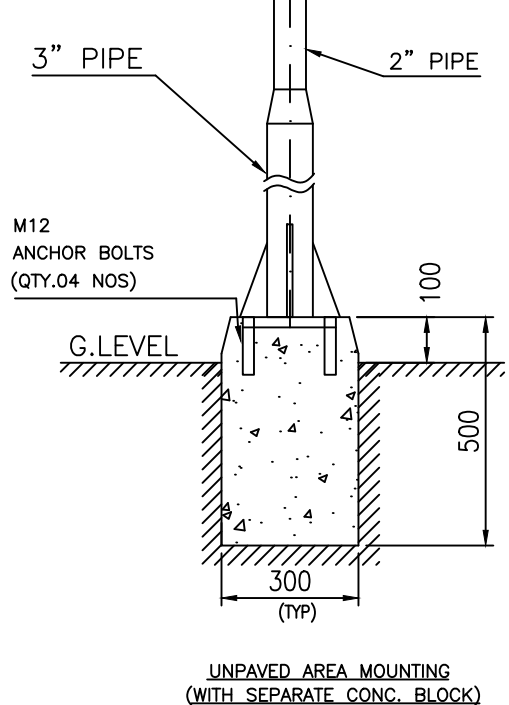
TYPE H-2



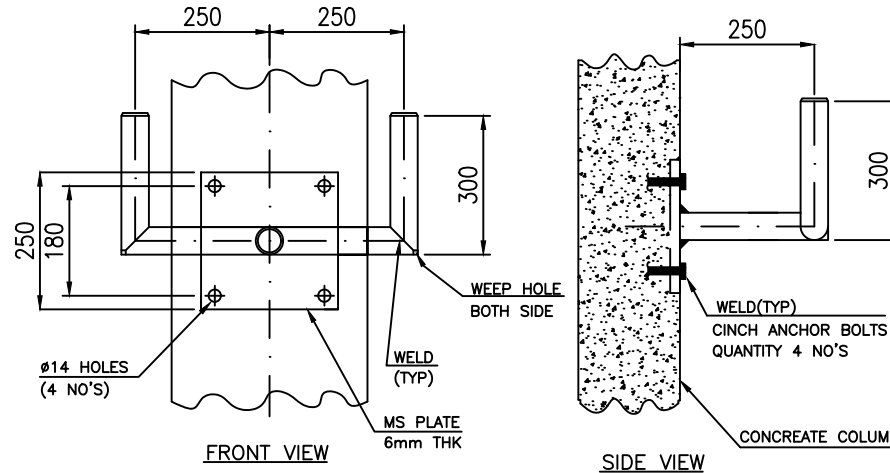
TYPE H-3



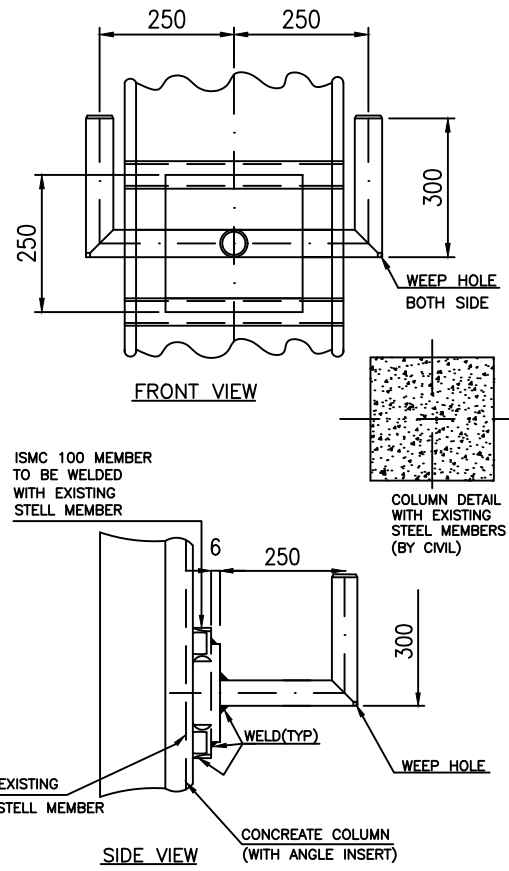
TYPE H-4



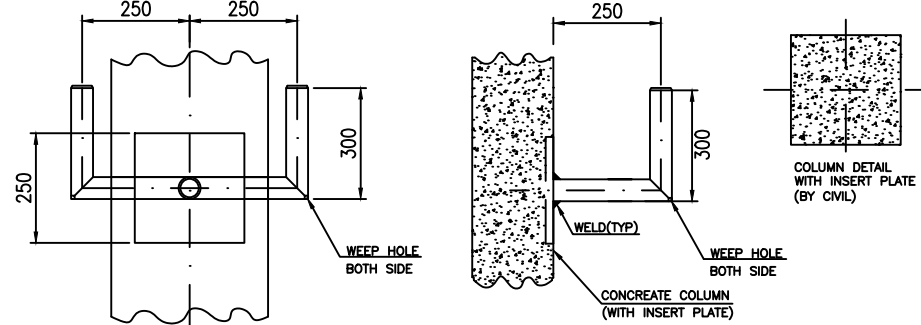
TYPE I CONCRETE COLUMN MOUNTING



TYPE J CONCRETE COLUMN (WITH ANGLE INSERT) MOUNTING



TYPE K CONCRETE COLUMN (WITH INSERT PLATE) MOUNTING



INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

COMPUTER FILE NAME

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD				NAME	SIGN.	DATE	NO. OF VAR.
				DRN.	SUNIL	-SD/-	09.03.19
				CHD.	KAMAL	-SD/-	09.03.19
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CODE 450	CA/M/F	NTS	N.A	-N.A.-	-N.A.-	-N.A.-	
TITLE				DRG. NO.	CUST. DRG. NO.	REV.	
INSTRUMENT INSTALLATION DRAWINGS				N.A		00	
				SHT. No	17	NO. OF SHT.	17