



ESP-001-2A Rev.00			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number		
	IOCLFC/PT-DPT/01						
	Rev. No.	00					
		Page	1	of 1			
Gauge Pressure Transmitter (PT) & Differential Pressure Transmitter (DPT) Technical Data Sheet							
GENERAL	1	Range & Qty.	As per skids		29	Universal Mounting Bracket	Reqd, For 2" pipe mounting, SS304
	2	Type	Intrinsic Safe (or) EX 'd' type [Note-(a)]		30	U Clamp+Fastner	Reqd, SS 304
	3				31	Cable Glands (flame proof)	1 No's NI plated brass Double Compr.+Flameproof
	4	Ambient Temp Limit	- 30 to 80°C		32	Cable entry Plugs	Reqd, SS (1 No) + Flameproof
	5	Process Temp. Limit	- 40 to 120°C		33	Vent/Drain Plugs	Reqd, SS 304 (1 No)
SENSOR	6	Accuracy	a) For Range ≥ 760 mmWC: ±0.075% within a turndown of 1:10 of the offered span b) For Range < 760 mmWC: ±0.15% within a turndown of 1:10 of the offered span		34	Tag Plate	Reqd, SS 304 (1 No) [Note-(d)]
	7	Response Time [Note-(g)& (h)]	a) For Range ≥ 760 mmWC: equal to or better than 500 milliseconds. b) For Range < 760 mmWC: equal to or better than 1 second.		35	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H
	8	Stability	As per OEM recommendation		36		
					37		
TRANSMITTER	9	Turn Down Ratio	As per OEM recommendation		38	Bill of Material (model, Tag no's)	100% Witness
	10	Process Connection	1/2" NPT (F)		39	Spares (BOM, part no's)	100% Witness (if ordered)
	11	Electrical Connection	2 No's of 1/2" NPT (F)		40	Statutory approvals (PESO,BIS, etc)	100% Review (For Instrument+Glands+Plugs)
	12	Power Supply	24V DC, Loop Powered, 2 wire		41	Material compliance for housing	100% Review
	13	Over Range Protection	As per Note-(j) given in this data sheet		42	Five point calibration	100% review & 10% or min 2no's witness with random selection.
	14	Protection	IP-65 as defined in IEC 60529 [Note-(c)]		43	Functional test (Output, HART, accuracy, Diagnosis, display)	100% review & 10% or min 2no's witness with random selection.
	15	Zero & Span adjustment	Required.		44	Hydro test for pressure parts	100% Review
	16	Display	Integral LCD Digital (in Engg Units & in %).		45	Internal IR test for all cards, assembly	100% Review
	17	Impulse Entry	Horizontal		46	Ingress Protection Test	100% Review of Type test reports
	18	Load Resistance	600Ω @ 24 VDC		47	Intrinsic Safety Test	100% Review of Type test reports
MATERIAL	19	Output	4-20mA + HART		48		
	20	Diagnostic Features	Required.		49		
	21	Hazardous area class	Suitable for Zone-1, IIC, T3.		50	Manifold Type (MOC: SS316)	2-Vlv for PTs and 5-ylv manifold for DPTs;
	22	Body	SS316 (or) better		51		
	23	Element	SS316 (or) better		52	Corrosive Protection	Required
	24	Sensor O-Ring	Glass-filled PTFE/Teflon		53	Terminal Block type	Integral, Non-fly leads
	25				54	Approved Makes / Vendors	As per approved vendor list
	26	Electronic Housing	Die cast aluminium		55	Surge & Lightning protection	Required
	27	Sensor fill fluid	Silicon Oil		56	FRP canopy	NOT APPLICABLE
	28	Humidity	0 - 100% RH		57		

NOTES::



- If Intrinsically safe item is not available for any instruments, then it must be Flame proof.
- All Transmitters shall comply with NAMUR NE-43 recommended values for abnormal signal levels for 4-20 mA type output signals
- For outdoor locations, the climatic conditions of location class D2 of IEC 60654-1 shall also apply.
- Electronic Instruments shall have the following information stamped:
Instrument Tag No., Make & Model no., Serial number, Instrument Range, Calibrated Range, Body and element material, Power Supply, Area Certification & IP Class.
- Vendor shall submit the consolidated BOM sheet along with accessories of instruments, finalised make /models of instruments, etc for approval.
- GA drawings shall be submitted for approval (if applicable)
- Transmitter shall update the output at least 8 times a second unless otherwise specified
- The response time of the transmitter shall be considered as the sum of dead time and 63.2% step response time of the transmitter.
- Following to be taken care for DPTs:
 - 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.
 - Transmitter shall indicate both DP & flow values.
- Unless specified otherwise, the over-range/static pressure protection of the transmitter shall be as follows;

Range of Transmitter (R)	Over range/ static pressure <N1>		Remarks
	Pressure Transmitter (kg/cm2)	Differential Pressure Transmitter (kg/cm2)	
0 < R < 250 mm WC	20	20	<N1> However if the Over range/ static pressure value specified above is less than the maximum/ design pressure of service conditions, offered instrument shall be suitable for the maximum/ design pressure.
250 < R < 1000 mm WC	45	52	
250 < R < 1000 mm WC	45	70	
5000 < R < 10000 mm WC	45	160	
1 < R < 10 kg/cm2	52	160	
10 < R < 100 kg/cm2	160	210	
R > 100 kg/cm2	210	210	

ESP-001-2A Rev.00				PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number	
						IOCLFC/LT/01	
						Rev. No.	00
						Page	1 of 1
Radar (Guided Wave Type) Level Transmitter (LT) Technical Data Sheet							
GENERAL	1	Range & Qty.	As per skids	ACCESSORIES	29	Universal Mounting Bracket	NOT APPLICABLE
	2	Type	Intrinsic Safe (or) EX 'd' type [Note-(a)]		30	U Clamp+Fastner	NOT APPLICABLE
	3				31	Cable Glands (flame proof)	1No's Ni plated brass Double Compression
	4	Ambient Temp Limit	- 30 to 80°C		32	Cable entry Plugs	Reqd, SS (1 No) + Flameproof
	5	Measuring Media	Gas Condensate		33	Gasket suitable for process conn.	316 SS spiral wound + graphite filler
SENSOR		Type of Detector	Vendor to select.	34	Tag Plate	Reqd, SS 304 (1 No) [Note-(d)]	
	6	Design Press / Temp	As per skids	35	Stud, Nut & bolts for flange	Required	
		Probe Thickness	To be selected based on applicable medium	36			
	7			37			
TRANSMITTER	8	Mounting	As per skids	38			
	9	Accuracy	± 3mm (OR) better	39	Bill of Material (model, Tag no's)	100% Witness	
	10	Instrument flange	By vendor. Size, Material & flange rating : min. 3", SS316, 300#RF or higher (suitable for process parameters); Exact size shall be reviewed during drg approval.	40	Spares (BOM, part no's)	100% Witness (if ordered)	
				39	Statutory approvals like PESO, BIS, etc	100% Review (For Instrument+Glands+Plugs)	
	40	Material compliance for housing	100% Review				
	11	Electrical Connection	2 No's of 1/2" NPT (F)	41	Dimensional and physical check of model no and name plate	100% Witness	
	12	Power Supply	24V DC, Loop Powered, 2 wire	42	Functional test report issued by manufacturer	100% review	
	13	Configuration	By Hand Held Calibrator.	43	Ingress Protection Test	100% Review of Type test reports	
	14	Protection	IP-65 as defined in IEC 60529 [Note-(c)]	44	Intrinsic Safety Test	100% Review of Type test reports	
	15	Zero & Span adjustment	Required.	45			
	16	Display	Integral LCD Digital (in Engg Units & in %).	46			
	17			47			
MATERIAL	18	Load Resistance	600Ω @ 24 VDC	48			
	19	Output	4-20mA + HART	49			
	20	Diagnostic Features	Required.	50			
	21	Hazardous area class	Suitable for Zone-1, IIC, T3.	51	Manifold Type	NOT APPLICABLE	
	22	Probe	SS316 or better	52			
	23	Probe Length	To be decided by bidder based on skid vessel levels	53	Corrosive Protection	Required	
	24	Type of Probe	Rod type for length upto 2000mm and Rope type with gravity weight for length > 2000mm	54	Terminal Block type	Integral, Non-fly leads	
	25			55	Approved Makes / Vendors	As per approved vendor list	
	26	Electronic Housing	Die cast aluminium	56	Surge & Lightening protection	Required	
	27			57	FRP canopy	NOT APPLICABLE	
	28	Humidity	0 - 100% RH	58			

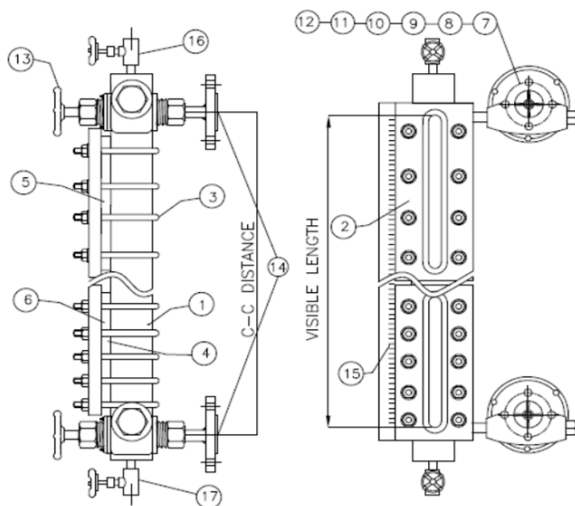
NOTES::

- If Intrinsically safe or FISCO item is not available for any instruments, then it must be Flame proof.
- All Transmitters shall comply with NAMUR NE-43 recommended values for abnormal signal levels for 4-20 mA type output signals
- For outdoor locations, the climatic conditions of location class D2 of IEC 60654-1 shall also apply.
- Electronic Instruments shall have the following information stamped:
Instrument Tag No., Make & Model no., Serial number, Instrument Range, Calibrated Range, Body and element material, Power Supply, Area Certification & IP Class.
- All the offered Field bus instruments shall be mandatorily registered with foundation fieldbus organization[www.fieldbus.org]
- Tag list attached.
- Vendor shall submit the consolidated BOM sheet along with accessories of instruments, finalised make /models of instruments, etc for approval.

ESP-001-2A Rev.00	 	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	Std. / Doc. Number	
			IOCLFC/LG/01	
			Rev. No.	00
			Page	1 of 1

DATA SHEET for REFLEX type LEVEL GAUGE (SIDE MOUNTED)

GENERAL	1	Range & Qty.	Skid vendor to decide	ACCESSORIES	11	Vent & Drain needle valve	2 No's; MOC: SS316; Size : ½" NPT(F)
	2	Type	Field mounted, Weather proof to IP 65		12	Tag Plate	Required, SS 316
	3	Ambient Temp Limit	0 to 50°C and 95% RH max; suitable for tropical climate, ambient of Ammonia & Sulphur; Copper and copper alloys shall be avoided for all the parts exposed to atmosphere.		13	Bolts + Nuts	Required. A193GrB7 + A194Gr2H
LEVEL GAUGE	4	Type	Reflex type	TEST REPORT/CERTIFICATE	14		
	5	Body material	SS 316		15		
	6	Cover plate	SS 316		16		
	7	Glass	Toughened Borosilicate (Klinger/Moxos/Bont)		17		
	8	Gauge Valves	Required at top & bottom of gauge with auto shutoff ball check arrangement		18		
	9	Minimum Visible length	To be decided by vendor		19	Bill of Material (model, dim., Ta	100% Witness
	10	Hydraulic test pressure	1.5 times of Design pressure @ room temp		20	Spares (BOM, part no's)	100% Witness (if ordered)
					21	Material compliance certificate	100% Review
					22	Hydraulic test	100% Review
					23	Radiography for weld joints	100% Review
					24	IBR in Form IIIC (if applicable)	100% Review
					25	Ingress Protection Test	100% Review
					26		



BILL OF MATERIAL		
S.NO.	DESCRIPTION	MATERIAL
1	CHAMBER	S.S-316
2	COVER PLATE	S.S-316
3	'U'BOLTS/NUTS	ASTM A193 Gr.-B7/A194 Gr.2H
4	GASKET	NON ASBESTOS
5	CUSHION	NON ASBESTOS
6	GLASS	TOUGHENED BOROSILICATE
7	VALVE BODY	S.S-316
8	VALVE BONNET	S.S-316
9	SPINDLE (TRIM)	S.S-316
10	BALL CHECK	S.S-316
11	RENEWABLE SEAT	S.S-316
12	VALVE PACKING	GRAFOIL
13	HAND WHEEL	C.S
14	PROCESS CONN. (1"X300# RF)	S.S-316
15	SCALE	S.S-304
16	VENT NEEDLE VALVE 1/2" NPT(F)	S.S-316
17	DRAIN NEEDLE VALVE 1/2" NPT (F)	S.S-316



Std. / Doc. Number

IOCLFC/PG/01

Rev. No.

00

Page

1

of 1

Pressure Gauge (PG) Technical Data Sheet


GENERAL	1	Range & Qty.	As per skid	MATERIAL	24	Case Material	SS304
	2	Type	Surface mount /Local Gauge		25	Element Material	SS316 (minimum)
	3	Ambient Temp Limit	0 to 65°C		26	Window Glass	3mm thick Shatter Proof glass
	4				27	Pointer	Alluminium.
GAUGE	5	Sensor Type	C-Type Bourdon (≤ 40 Kg/cm2(g)) Helical Bourdon (> 40Kg/cm2(g))		28	Blow out Disc	SS 304
	6	Dial Size	150MM		29		
	7	Accuracy	±1% of URV		30	Bezel ring	SS 316 (minimum)
	8	Process Connection	1/2" NPT (M), Bottom entry.		31	Movement	SS 304
	9	Blow out Disc	Required.		32	Socket Material	SS 316 (minimum)
	10	Solid Front Case	Required for toxic service or with ranges 0-100 kg/cm2(g) and above		33	Tip material	SS 316 (minimum)
	11	Over Range Protection	> 130% of full scale.	ACCESSORIES	34	Pulsation Damper (SS316)	Required for services involving rapidly varying pressures
	12	Protection	IP 65		35	Tag Plate	Requirded, 1 No per Gauge, SS304
	13	Zero & Span adjustment	External Required.		36	Gauge Saver (SS316)	Required wherever maximum range is less than design pressure
					37	Manifold Type	2-Vlv manifold (SS 316)
	14	Anti-corrossive Dial	Non-Rusting Plastic, White background with black lettering & shall confirm to IS-3624		38	Pre-fab Hookup Drg	Not applicable
	15	Micro meter Adjustment	Required for pointers.	TEST REPORT/CERTIFICATE	39	Bill of Material (model, dim., Tag no's)	100% Witness
	16	Scale type	Concentric, Graduated units		40	Spares (BOM, part no's)	100% Witness (if ordered)
	17	Pointer-270 ^o Deflection	Yes, Metal with Black Finish		41	Material compliance certificate	100% Review
	18	Pointer Stop	Required at both end		42	Calibration	10% witness or min. 2 of each range
	19	Bezel ring	Bayonet Lock Type		43	Over Protection Test for 30 min.	10% witness or min. 2 of each range
	20	Movement	Geared / Cam-roller type		44	Accuracy Test	10% witness or min. 2 of each range
	21				45	Vibration test	100% Review
	22	Other requirements	Accessories shall be supplied in the installed & pressure-set (gauge saver) condition on the gauge to avoid mismatches at site.		46	Ingress Protection Test	100% Review
23	For vibrations and pressure fluctuations	Oil filled type and snubber to be provided					

NOTES:

- 1 The dial of all gauges shall have yellow, green and red bands to indicate respectively, the lower, middle and upper one-thirds of the calibrated range. This requirement shall be revisited during detailed engineering.

REMARKS:

- (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.

ESP-001-2A Rev.00		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	Std. / Doc. Number	
			IOCLFC/PG-R/01	
			Rev. No.	00
			Page	1 of 1

Pressure Gauge - Diaphragm Seal (PGD) Technical Data Sheet



GENERAL	1	Range & Qty.	As per skid		26	Case Material	SS304
	2	Type / Std	Diaphragm Sealed / IS3624		27	Element Material	SS316 (minimum)
	3	Ambient Temp Limit	0 to 65°C		28	Window Glass	3mm thick Shatter Proof glass
	4				29	Pointer	Alluminium.
GAUGE	5	Sensing Element	Diaphragm, SS 316	MATERIAL	30	Blow out Disc	SS 304
	6	Dial Size	150MM		31	Bezel ring	SS 316 (minimum)
	7	Accuracy	±1% of full scale deflection		32	Movement	SS 304
	8	Process Connection	1½" 300 # RF		33	Socket Material	SS 316 (minimum)
	9	Instrument connection	½" NPT(M)		34	Tip material	SS 316 (minimum)
	10	Solid Front Case	Required for toxic service or with ranges 0-100 kg/cm2(g) and above		35	Process Flange	SS 316
	11	Blow out Disc	Required.		36		
	12	Over Range Protection	> 130% of full scale.	ACCESSORIES	37	Tag Plate	Required, 1 No per Gauge, SS304
	13	Protection	IP 65		38	Spacer Ring	Required, SS
	14	Zero & Span adjustment	External Required.		39	Vent+Drain plugs	Required, SS, In built to Spacer
	15	Anti-corrossive Dial	Non-Rusting Plastic, White background with black lettering & shall confirm to IS-3624		40	Armoured Capillary	Reqd. 3 Mts, SS316L with PVC Coat
	16	Micro meter Adjustment	Required for pointers.		41	Stud Nuts+Bolts	Reqd. A194Gr2H+A193GrB7 (Min 120mm long)
	17	Scale type	Concentric, Graduated units		42	Gasket	Reqd. Spriral Wound, SS
	18	Pointer-270° Deflection	Yes, Metal with Black Finish	TEST REPORT/CERTIFICATE	43	Bill of Material (model, dim., Tag no's)	100% Witness
	19	Pointer Stop	Required at both end		44	Spares (BOM, part no's)	100% Witness (if ordered)
	20	Bezel ring	Bayonet Lock Type		45	Material compliance certificate	100% Review
	21	Movement	Geared / Cam-roller type		46	Calibration	10% witness or min. 2 of each range
	22	Fill fluid	Silicon		47	Over Protection Test for 30 min.	10% witness or min. 2 of each range
	23				48	Accuracy Test	10% witness or min. 2 of each range
	24				49	Vibration test	100% Review
	25				50	Ingress Protection Test	100% Review

NOTES:

- 1 The dial of all gauges shall have yellow, green and red bands to indicate respectively, the lower, middle and upper one-thirds of the calibrated range. This requirement shall be revisited during detailed engineering.

REMARKS:

- (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.

ESP-001-2A Rev.00		<div></div>		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number		
						IOCLFC/DPG/01		
						Rev. No.	00	
						Page	1 of 1	
Differential Pressure Gauge (DPG) Technical Data Sheet								
GENERAL	1	Range & Qty.	As per skids	ACCESSORIES	28	Mounting Bracket	Reqd, For 2" pipe mounting, SS304	
	2	Type	Bottom entry, 2" Pipe mounting		29	U Clamp+Fastner	Reqd, SS 304	
	3	Ambient Temp Limit	0 to 65°C		30			
	4	Static Pressure	As per skids		31			
	5				32	Vent/Drain Plugs	Required, SS 316 (1 No)	
GAUGE	6	Sensing material	Diaphragm in SS 316/ Bellows in SS 316	ACCESSORIES	33	Tag Plate	Required, 1 No per Gauge, SS304	
		Dial Size	150MM (6")		34	Bolts + Nuts	Reqd. A193GrB7 + A194Gr2H	
		Case & Bezel	SS 304, Bayonet type bezel		35			
	7	Windows	Toughened Glass with rubber ring		36			
	8	Accuracy	±1.6% of full scale deflection or Better		37			
	9	Process Connection	1/2" NPT(F)		TEST REPORT/CERTIFICATE	38	Bill of Material (model, Tag no's)	100% Witness
	10	Blow out Disc	Required.			39	Spares (BOM, part no's)	100% Witness (if ordered)
	11	Over Range Protection	> 130% of full scale.	40		Material compliance certificate	100% Review	
	12	Ingress Protection	IP 65	41		Calibration	10% witness or min. 2 of each range	
	13	Zero & Span adjustment	External Required.	42		Over Protection Test for 30 min.	10% witness or min. 2 of each range	
	14	Anti-corrosive Dial	Aluminum, White with black figure & shall confirm to IS-3624	43		Accuracy Test	10% witness or min. 2 of each range	
	15	Micro meter Adjustment	Required for pointers.	44		Vibration test	100% Review	
	16	Scale type	Concentric, Graduated units	45		Ingress Protection Test	100% Review	
	17	Pointer-270° Deflection	Yes, Metal with Black Finish	46				
	18	Pointer Stop	Required at both end	47				
	19	Bezel ring	Bayonet Lock Type	48				
	20	Movement	Geared / Cam-roller type	49				
	MATERIAL	21				PROJECT SPECIFIC	50	Manifold Type
		22	Case Material	SS304	51		Pre-fab Hookup Drg	Not applicable
		23	Element & Wetted parts	SS316 (minimum)	52			
24		Windows	3mm thick Shatter Proof glass	53				
25		Pointer	Aluminum.	54				
26		Movement	SS 304	55				
27		Socket Material	SS 316 (minimum)	56				
NOTES:								
1 The dial of all gauges shall have yellow, green and red bands to indicate respectively, the lower, middle and upper one-thirds of the calibrated range. This requirement shall be revisited during detailed engineering.								

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


GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO.

PY-FH-3-M168-9626-01

SH. 01 OF 19

INSTRUMENT INSTALLATION DRAWINGs

PROJECT: IOCL PARADIP FUEL CONVERSION PROJECT FOR 3 x Fr9E GTGs									
OWNER:  INDIAN OIL CORPORATION LTD NEW DELHI									
		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		DRN. SUBRAHMANYAM	SIGN. 	DATE 08.01.21	NO.OF VAR.		
				CHD. SUJATHA	SIGN. 	DATE 08.01.21	-N.A.-		
				APPD. K. Anand	SIGN. 	DATE 08.01.21	-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: PY-FH-4-M168-9626-01		REV.		
INSTRUMENT INSTALLATION DRAWINGs				N.A.	CUST. DRG. NO:		00		
				SHT. No	01	NO. OF SHT.	19		

INDEX

PAGE No.	DESCRIPTION	REV			
		00	01	02	03
1	TITLE	√			
2	INDEX	√			
3	NOTEs	√			
4	BILL OF MATERIALs	√			
5	Hookup scheme: PG-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
6	Hookup scheme: PG-L/G-3/4" (SS) Pr. Class ≤ 600 + No IBR	√			
7	Hookup scheme: PG-V (CS) Pr. Class ≤ 600 + No IBR	√			
8	Hookup scheme: PT-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
9	Hookup scheme: PT-L/G-3/4" (SS) Pr. Class ≤ 600 + No IBR	√			
10	Hookup scheme: DPG/DPT-L/G-3/4" (CS) Pr. Class ≤ 600 + No IBR	√			
11	Hookup scheme: CV + SOVs (SS) Pr. Class ≤ 600 + No IBR	√			
12	Hookup scheme: TE/TT	√			
13	Tag List for Hookup scheme: TE/TT	√			
14	Hookup scheme: TG	√			
15	Hookup scheme: JB	√			
16	SINGLE INSTRUMENT SUPPORT: INST-SUPPORT-1	√			
17	SINGLE INSTRUMENT SUPPORT: INST-SUPPORT-2	√			
18	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

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
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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		
				</				

		BHARAT HEAVY ELECTRICALS LTD.				NAME	SIGN.	DATE	NO.OF	
		HYDERABAD				SUBRAHMANYAM		08.01.21	VAR.	
				DRN.						
				CHD.		SUJATHA			08.01.21	
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 N.A.	DRG. NO: PY-FH-4-M168-9626-01			REV. 00	
INSTRUMENT INSTALLATION DRAWINGs						CUST. DRG. NO: _____				
						SHT. No 02 NO. OF SHT. 19				

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 loose supplied 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 considering the instruments access & 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).

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. C/M/F		SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE 450		TITLE INSTRUMENT INSTALLATION DRAWINGS		CARD CODE N.A.	DRG. NO: PY-FH-4-M168-9626-01 CUST. DRG. NO:		REV. 00
		SHT. No 03		NO. OF SHT. 19			


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

BILL OF MATERIAL

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	C/M/F		NTS	N.A	-N.A.-	-N.A.-	-N.A.-
TITLE				CARD CODE	DRG. NO: PY-FH-4-M168-9626-01		REV.
INSTRUMENT INSTALLATION DRAWINGS				N.A	CUST. DRG. NO:		00
				SHT. No	04	NO. OF SHT.	19

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COMPUTER FILE NAME

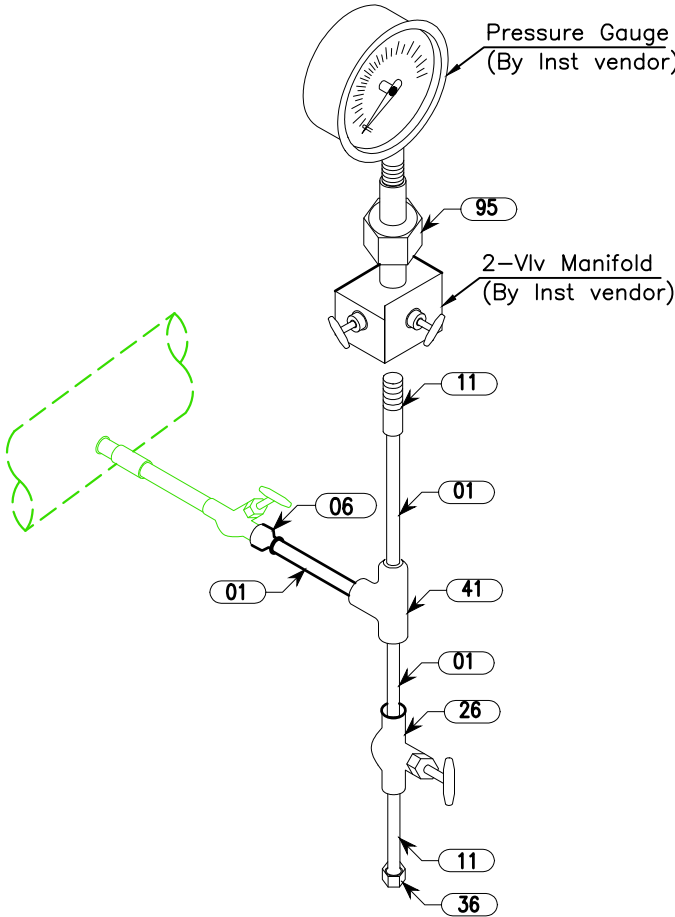
REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For Liquid/AIR/Gas



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

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

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH80	No	1	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 80	No	6	Mtrs
31	ELBOW	A 105	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 80, L=150mm	No	2	No's
95	3-piece Union	SS 316	1/2" NPT(M) x 1/2" NPT(F), CL3000	No	1	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	1	No's
41	EQUAL TEE	A105	1/2" SW, CL 3000	No	1	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	1	No's

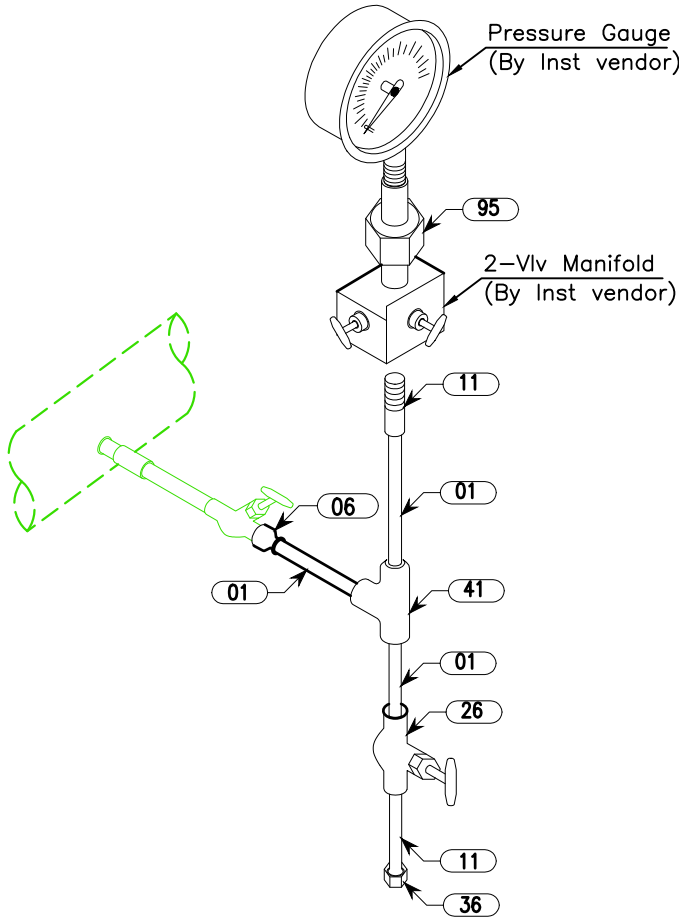
BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO.OF VAR.
DRN. SUBRAHMANYAM		CHD. SUJATHA		08.01.21	
APPD. K. Anand				08.01.21	-N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR. C/M/F	SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-
CODE 450					
TITLE INSTRUMENT INSTALLATION DRAWINGS		CARD CODE N.A	DRG. NO: PY-FH-4-M168-9626-01	REV. 00	
			CUST. DRG. NO:	SHT. No 05	NO. OF SHT. 19

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

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GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For Liquid/AIR/Gas




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

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

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 312 TP 304	3/4" PL x 1/2" PLXPL, SCH80S	No	1	No's
01	PIPE (SMLS)	A 312 TP 304	1/2" SCH 40S	No	6	Mtrs
31	ELBOW	A 182 F304	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	A 182 F 304	1/2" PL x NPT(M), SCH 40S, L=150mm	No	2	No's
95	3-piece Union	SS 316	1/2" NPT(M) x 1/2" NPT(F), CL3000	No	1	No's
28	GLOBE VALVE	A 182 F 304	1/2" SW, CL 800	No	1	No's
41	EQUAL TEE	A 182 F 304	1/2" SW, CL 3000	No	1	No's
36	CAP	A 182 F 304	1/2" NPT(F), CL 3000	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. C/M/F	SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE 450						
TITLE INSTRUMENT INSTALLATION DRAWINGs				CARD CODE N.A	DRG. NO: PY-FH-4-M168-9626-01	REV. 00
				CUST. DRG. NO:	SHT. No 06	NO. OF SHT. 19

NAME SUBRAHMANYAM	SIGN.	DATE 08.01.21	NO.OF VAR.
CHD. SUJATHA		08.01.21	-N.A.-
APPD. K. Anand		08.01.21	-N.A.-

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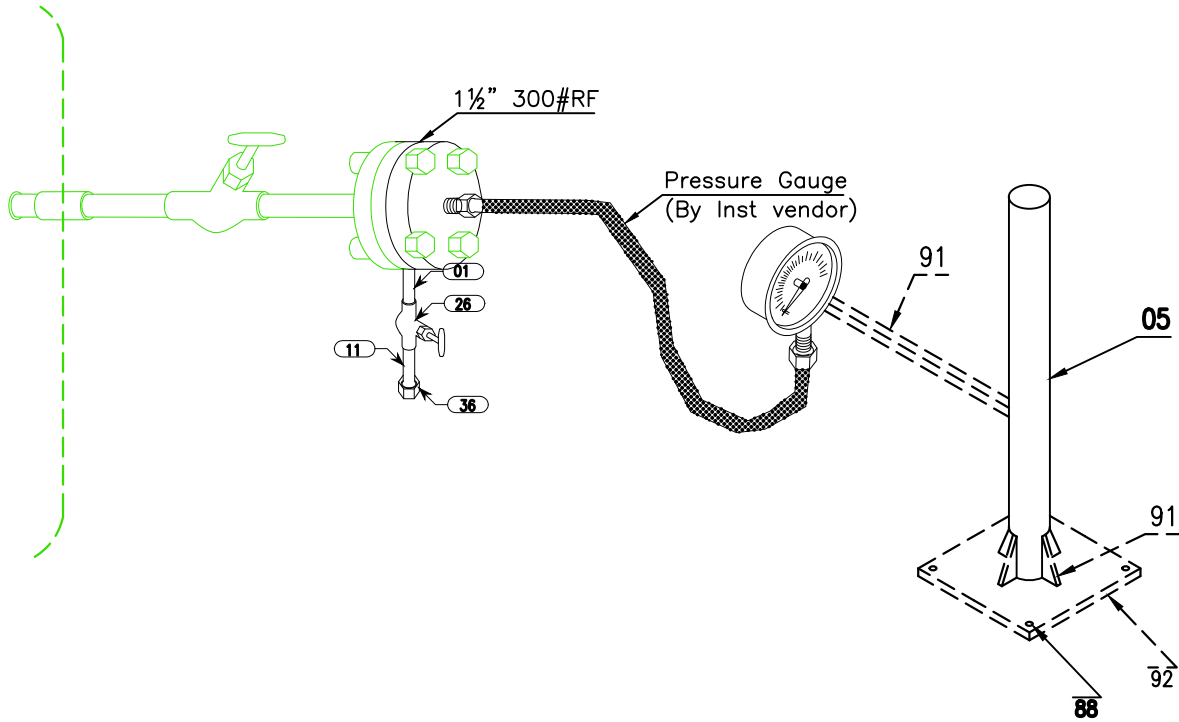
COMPUTER FILE NAME

SIGN. AND DATE REF. DRG. NO.

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

VESSEL / STAND PIPE




PG-V (CS)
Pr. Class ≤ 600 + No IBR

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

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 80	No	3	Mtrs
31	ELBOW	A 105	1/2" SW, CL 3000	No	1	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 80, L=150mm	No	1	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	1	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	1	No's
05	PIPE	IS 1239	2" SCH HVY	No	1.5	No's
86	U-BOLT GALVZD	IS 226	1/2"	No	6	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	4.05	Kg's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.94	Kg's

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

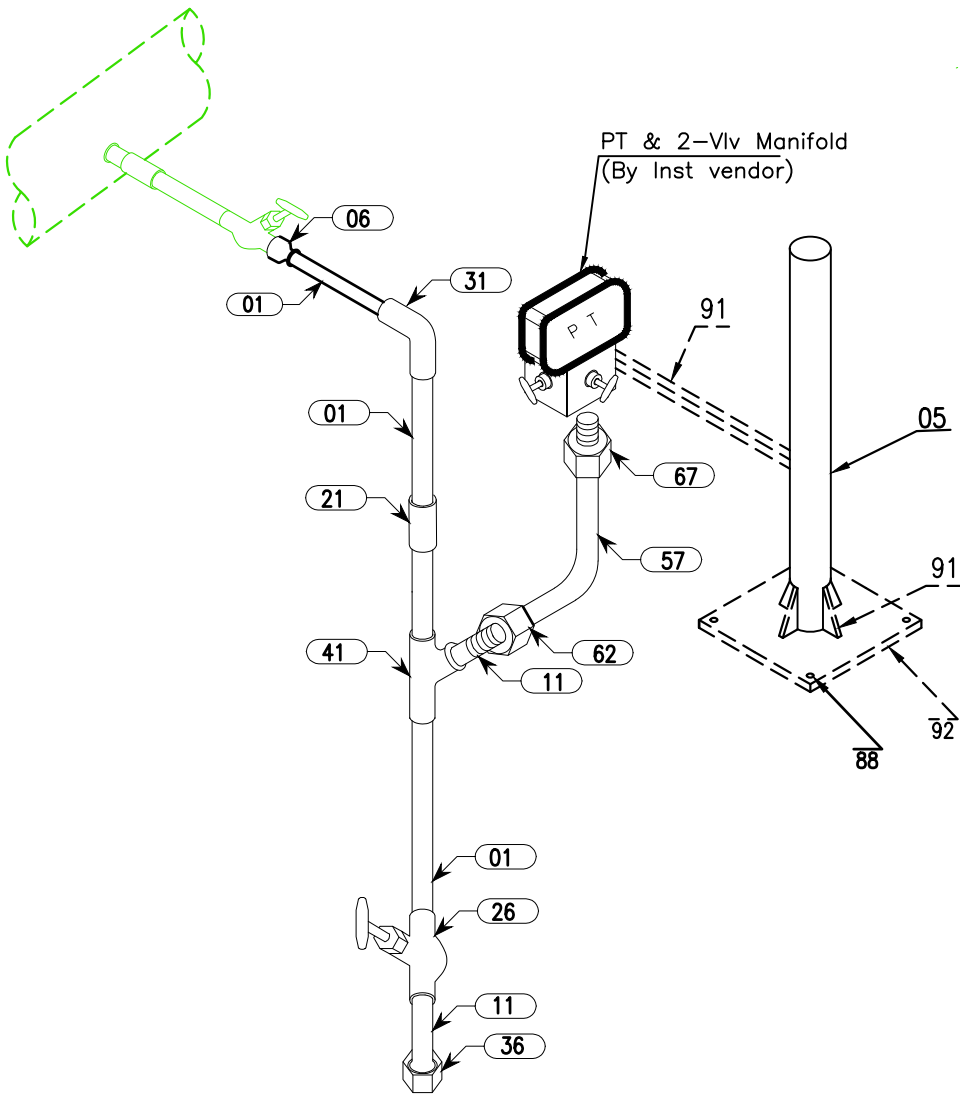


BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

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

TITLE	CARD CODE	DRG. NO: PY-FH-4-M168-9626-01	REV. 00
INSTRUMENT INSTALLATION DRAWINGS	N.A.	CUST. DRG. NO:	
		SHT. No 07	NO. OF SHT. 19

For Liquid/AIR/Gas



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

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


Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH80	No	1	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 80	No	12	Mtrs
31	ELBOW	A 105	1/2" SW, CL 3000	No	2	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 80, L=150mm	No	2	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	1	No's
21	COUPLING	A105	1/2" SW, CL 3000	No	2	No's
41	EQUAL TEE	A105	1/2" SW, CL 3000	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	6	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	IS 1239	2" SCH HVY	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	6	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	4.0518	Kg's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.94375	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		

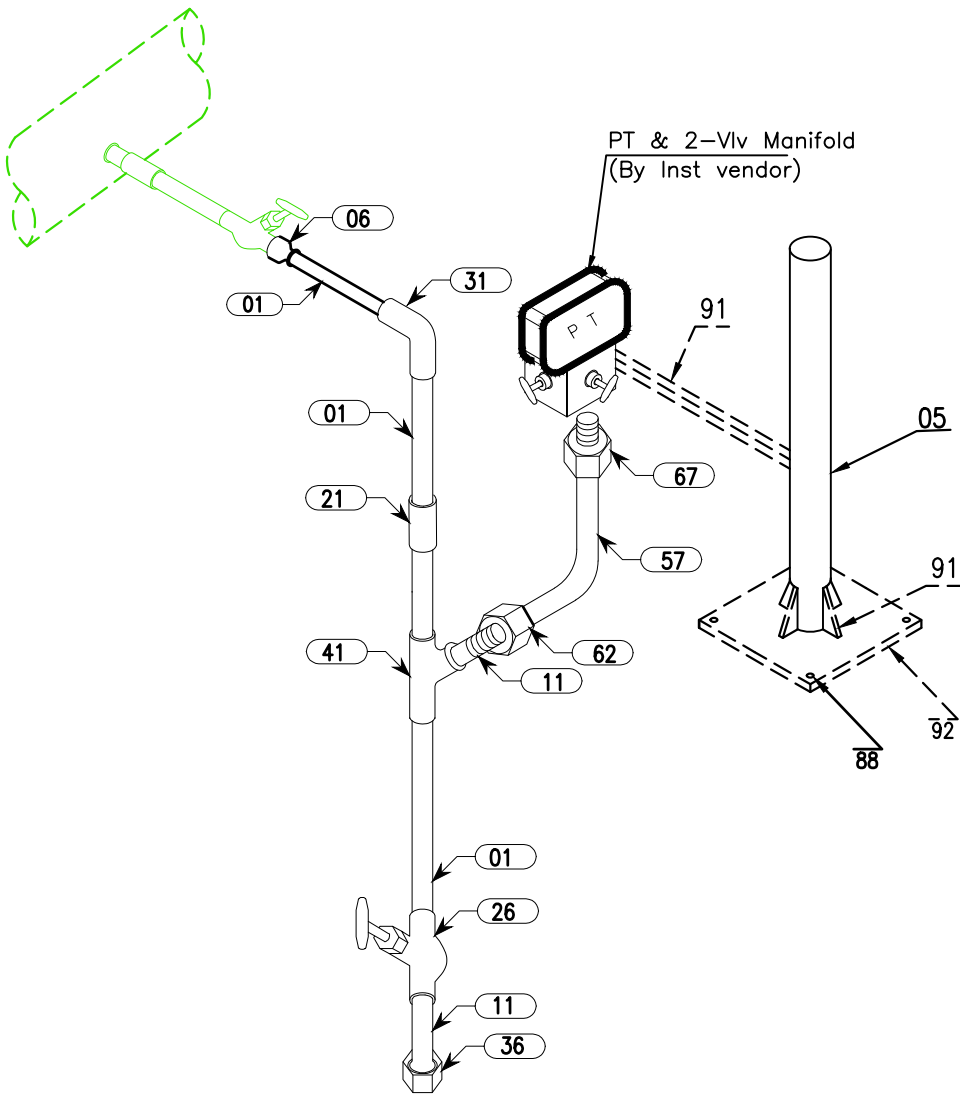


BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

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

TITLE	CARD CODE	DRG. NO: PY-FH-4-M168-9626-01	REV.
INSTRUMENT INSTALLATION DRAWINGS	N.A.	CUST. DRG. NO:	00
		SHT. No 08	NO. OF SHT. 19

For Liquid/AIR/Gas



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	A 312 TP 304	3/4" PL x 1/2" PLXPL, SCH80S	No	1	No's
01	PIPE (SMLS)	A 312 TP 304	1/2" SCH 40S	No	12	Mtrs
31	ELBOW	A 182 F304	1/2" SW, CL 3000	No	2	No's
11	NIPPLE (SMLS)	A 182 F 304	1/2" PL x NPT(M), SCH 40S, L=150mm	No	2	No's
28	GLOBE VALVE	A 182 F 304	1/2" SW, CL 800	No	1	No's
21	COUPLING	A 182 F 304	1/2" SW, CL 3000	No	2	No's
41	EQUAL TEE	A 182 F 304	1/2" SW, CL 3000	No	1	No's
36	CAP	A 182 F 304	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	6	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	IS 1239	2" SCH HVY	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	6	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	4.05	Kg's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.94	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

DEPT. PE&SD	UNTOL. DIMS. GR. C/M/F	SCALE NTS	WEIGHT (KG) N.A
CODE 450			

TITLE	CARD CODE	DRG. NO: PY-FH-4-M168-9626-01	REV. 00
INSTRUMENT INSTALLATION DRAWINGS		CUST. DRG. NO:	
		SHT. No 9	NO. OF SHT. 19

NAME	SIGN.	DATE	NO.OF VAR.
SUBRAHMANYAM		08.01.21	
SUJATHA		08.01.21	-N.A.-
K. Anand		08.01.21	-N.A.-

REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
-N.A.-	-N.A.-	-N.A.-

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COMPUTER FILE NAME

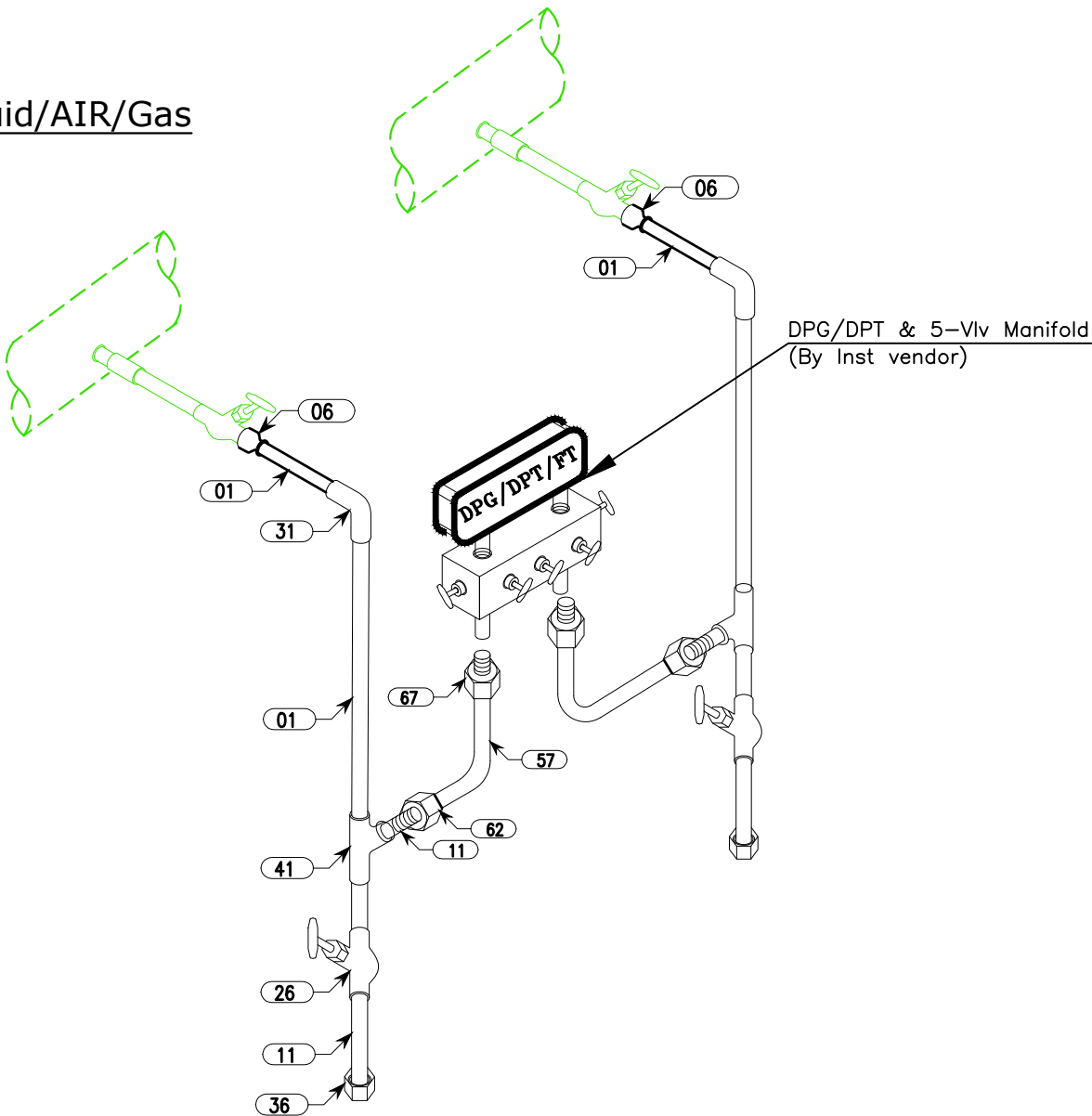
REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For Liquid/AIR/Gas




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

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

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 105	3/4" PL x 1/2" PLXPL, SCH80	No	2	No's
01	PIPE (SMLS)	A 106 Gr B	1/2" SCH 80	No	24	Mtrs
31	ELBOW	A 105	1/2" SW, CL 3000	No	4	No's
11	NIPPLE (SMLS)	A 106 Gr B	1/2" PL x NPT(M), SCH 80, L=150mm	No	4	No's
28	GLOBE VALVE	A105	1/2" SW, CL 800	No	2	No's
21	COUPLING	A105	1/2" SW, CL 3000	No	2	No's
41	EQUAL TEE	A105	1/2" SW, CL 3000	No	2	No's
36	CAP	A105	1/2" NPT(F), CL 3000	No	2	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	12	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	IS 1239	2" SCH HVY	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	12	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	4.05	Kg's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.94	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.	SUBRAHMANYAM	SIGN.	DATE	NO.OF VAR.
CHD.	SUJATHA		08.01.21	
APPD.	K. Anand		08.01.21	-N.A.-

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

TITLE	CARD CODE	DRG. NO: PY-FH-4-M168-9626-01	REV.
INSTRUMENT INSTALLATION DRAWINGS	N.A.	CUST. DRG. NO:	00
		SHT. No 10	NO. OF SHT. 19

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COMPUTER FILE NAME

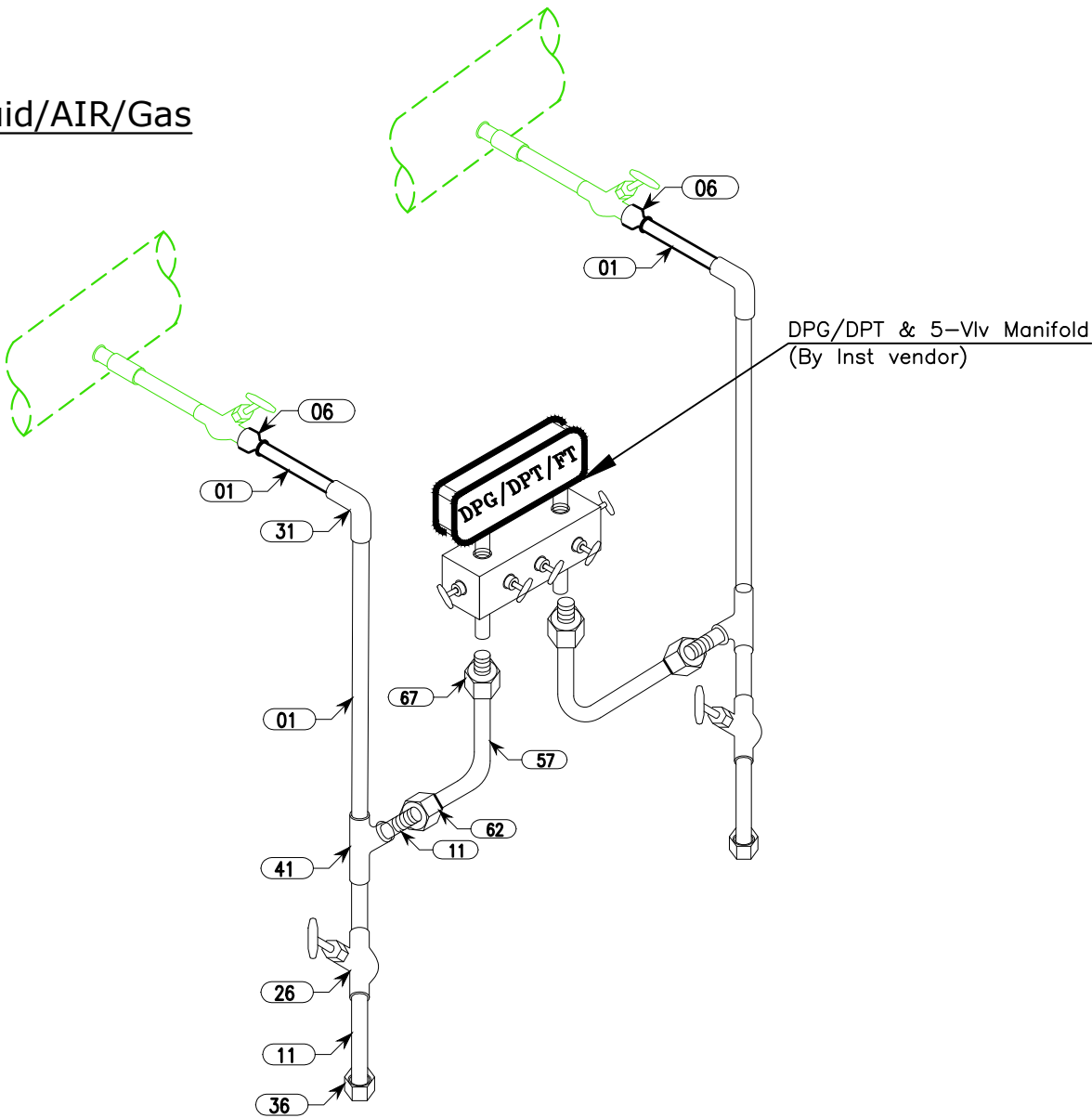
REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

For Liquid/AIR/Gas




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

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

Bill of Material::

Pos. No	Item	MOC	Size	IBR	QTY	Units
06	Swage Nipple	A 312 TP 304	3/4" PL x 1/2" PLXPL, SCH80S	No	2	No's
01	PIPE (SMLS)	A 312 TP 304	1/2" SCH 40S	No	24	Mtrs
31	ELBOW	A 182 F304	1/2" SW, CL 3000	No	4	No's
11	NIPPLE (SMLS)	A 182 F 304	1/2" PL x NPT(M), SCH 40S, L=150mm	No	4	No's
28	GLOBE VALVE	A 182 F 304	1/2" SW, CL 800	No	2	No's
21	COUPLING	A 182 F 304	1/2" SW, CL 3000	No	2	No's
41	EQUAL TEE	A 182 F 304	1/2" SW, CL 3000	No	2	No's
36	CAP	A 182 F 304	1/2" NPT(F), CL 3000	No	2	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	12	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	IS 1239	2" SCH HVY	No	1.5	Mtrs
86	U-BOLT GALVZD	IS 226	1/2"	No	12	No's
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	4	No's
91	STR STEEL MS ANGLE(50x50x6) (BY BHEL PIPING)			No	4.05	KG's
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	2.94	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
CODE 450

UNTOL. DIMS. GR. C/M/F



SCALE NTS


WEIGHT (KG) N.A


DRN. SUBRAHMANYAM
CHD. SUJATHA
APPD. K. Anand


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

ITEM NO. -N.A.-

NO.OF ITEMS -N.A.-

NAME SUBRAHMANYAM
SIGN. 
DATE 08.01.21

NAME SUJATHA
SIGN. 
DATE 08.01.21

NAME K. Anand
SIGN. 
DATE 08.01.21

DRG. NO: PY-FH-4-M168-9626-01

CUST. DRG. NO:

SHT. No 11

NO. OF SHT. 19

REV. 00

INSTRUMENT INSTALLATION
DRAWINGS

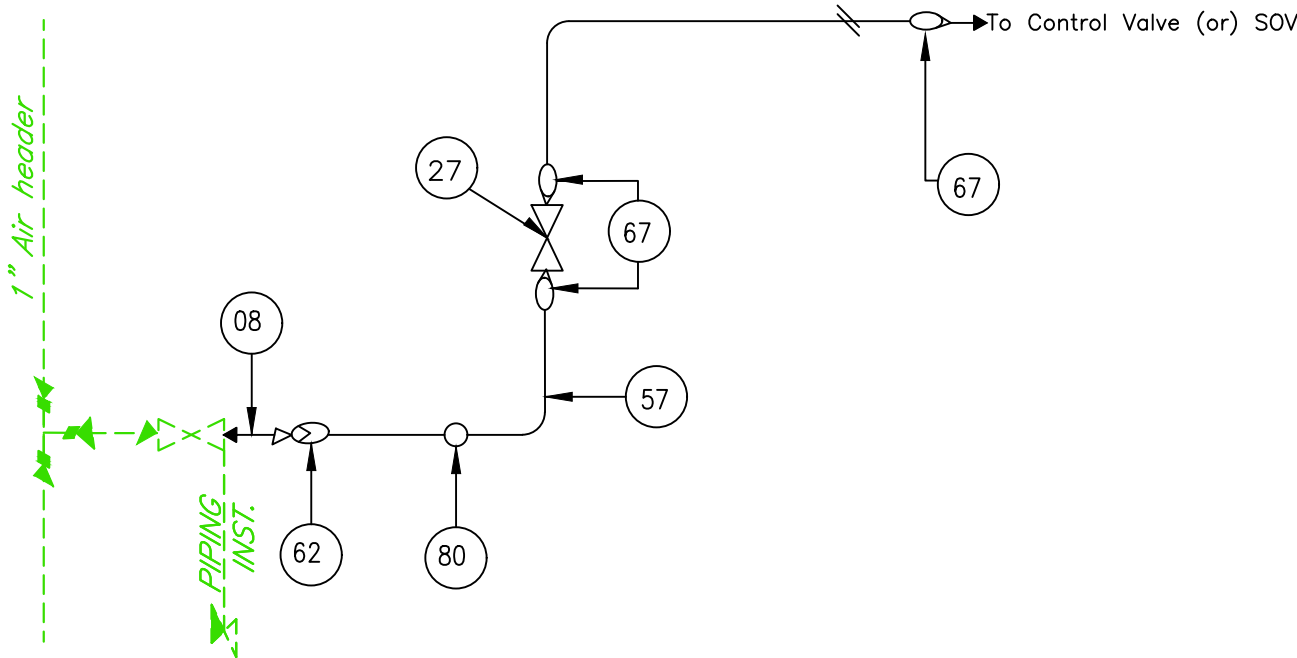
CARD CODE N.A

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

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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

NOTES ::

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

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

Bill of Material::

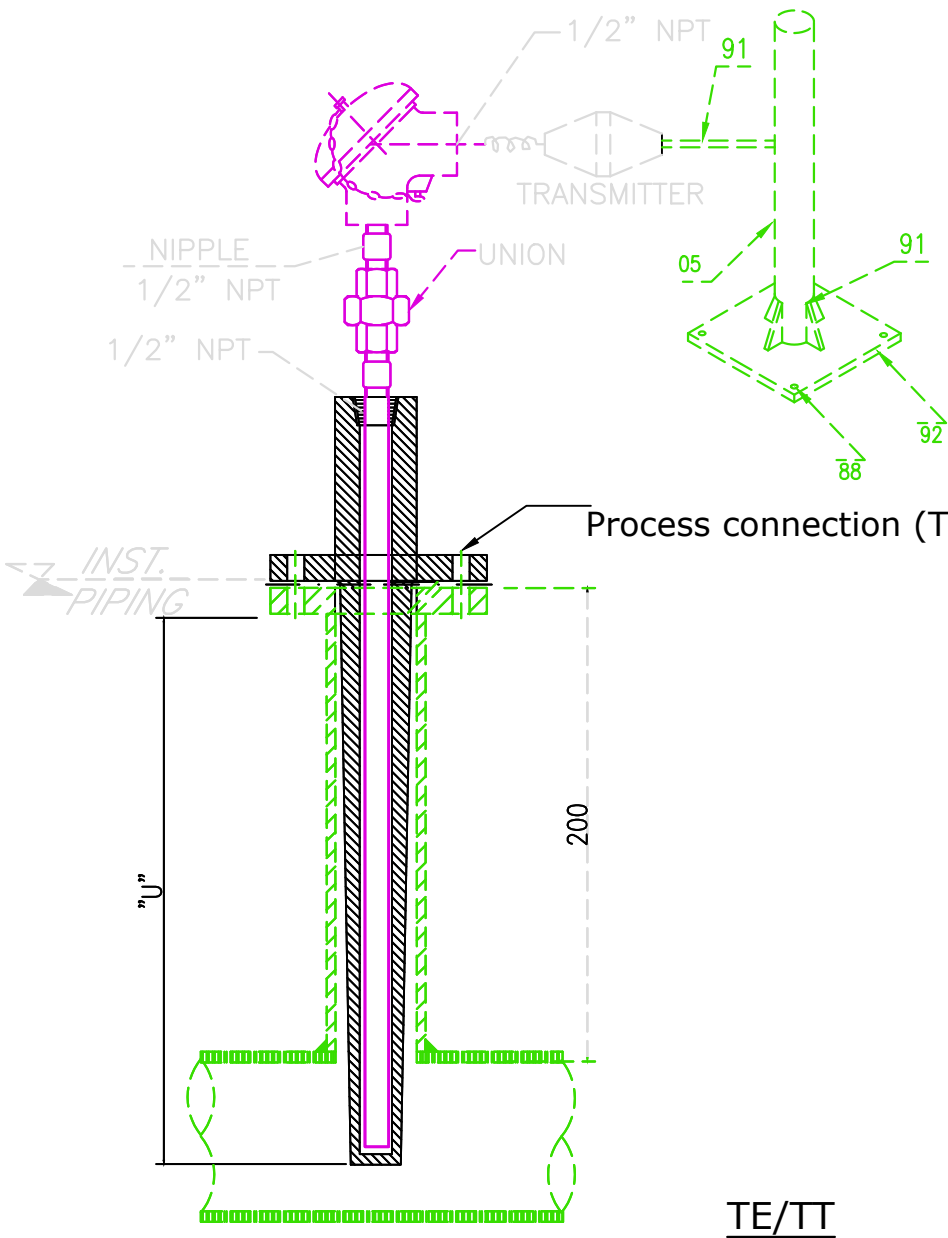
Pos. No	Item	MOC	Size	IBR	QTY	Units
08	REDUCER	SS 316	1/2" SW x 1/4" NPT(M), SCH 80S	No	1	No's
27	Ball VALVE (Quarter turn)	SS 316	1/4" NPT(F), CL 800	No	1	Mtrs
62	FEMALE CONNECTOR	SS 316	1/4"NPT(F) x 6 mm OD TUBE, CL3000	No	1	No's
57	TUBE (SMLS)	SS 316L	6 mm OD X 1 mm	No	12	Mtrs
80	TUBE UNION	SS 316	6 mm OD, CL3000	No	1	No's
67	MALE CONNECTOR	SS 316	1/4"NPT(M) x 6 mm OD TUBE, CL3000	No	3	No's
83	SHELL TYPE PIPE CLAMP	MS	1/4"	No	4	No's

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

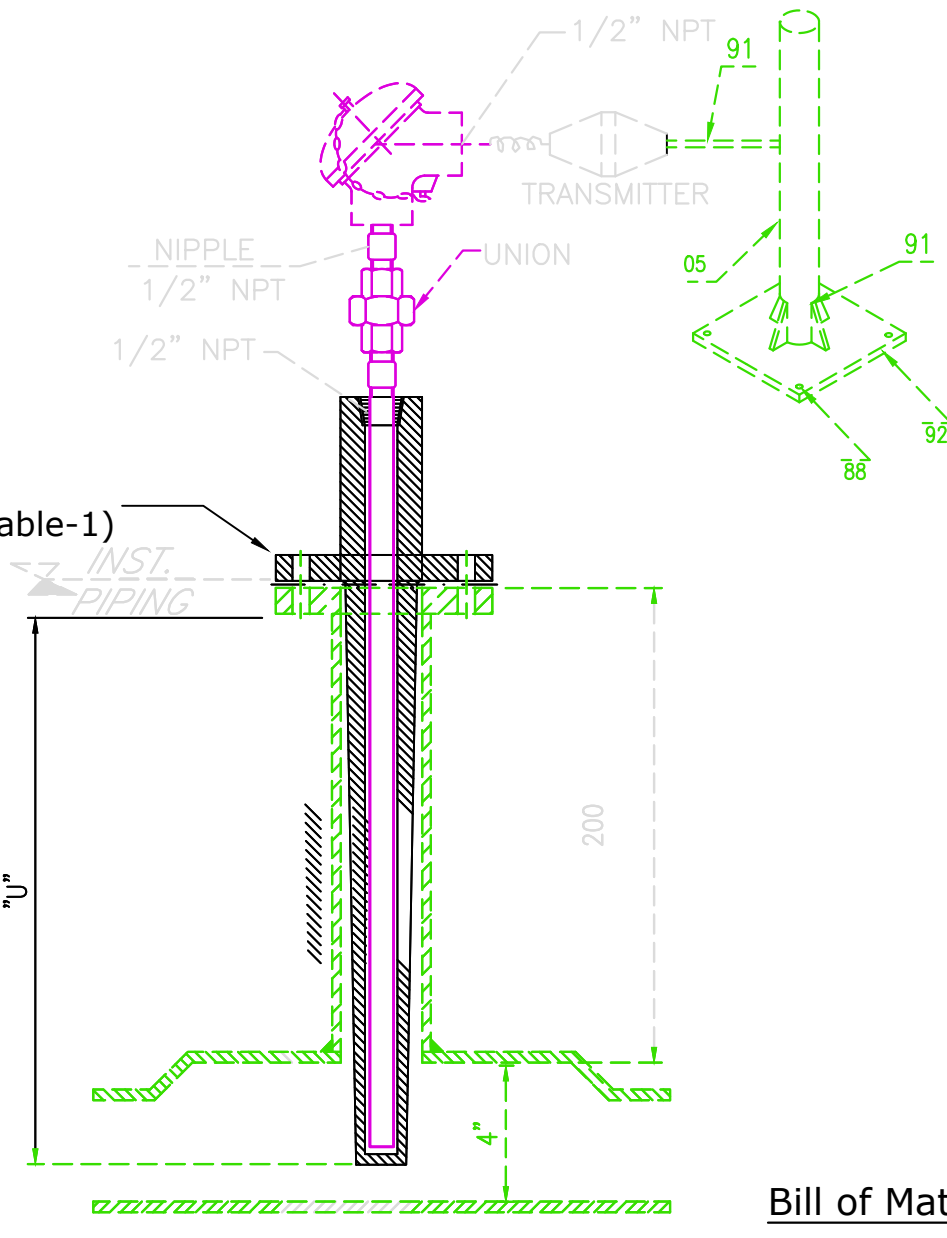
BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD	UNTOL. DIMS. GR.	SCALE	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: PY-FH-4-M168-9626-01	REV.	
INSTRUMENT INSTALLATION DRAWINGS			N.A.	CUST. DRG. NO:	00	
			SHT. No 12	NO. OF SHT. 19		

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/drags 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	IS 1239	2" SCH HVY	No	1	No's
86	U-BOLT GALVZD	IS 226	1/2"	No	1	Mtrs
88	ANCHOR BOLT	Chro coated MS	M10x160mm	No	1	No's
91	STR STEEL MS ANGLE (50x50x6) (BY BHEL PIPING)			No	12	Mtrs
92	STR STEEL 6 mm PLATE (BY BHEL PIPING)			No	1	No's

INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

COMPUTER FILE NAME

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

REV. DATE
CHD/APPD

ZONE

REV. DATE
CHD/APPD

REV. DATE
CHD/APPD

ZONE

REV. DATE
CHD/APPD

ZONE

REV. DATE
CHD/APPD

ZONE

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

DEPT. PE&SD	UNTOL. DIMS. GR. C/M/F	SCALE NTS	WEIGHT (KG) N.A	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE 450						
TITLE INSTRUMENT INSTALLATION DRAWINGS				CARD CODE N.A	DRG. NO: PY-FH-4-M168-9626-01	REV. 00
				CUST. DRG. NO:	SHT. No 13	NO. OF SHT. 19

NAME SUBRAHMANYAM

SIGN. [Signature]

DATE 08.01.21

DRN. SUJATHA

CHD. [Signature]

DATE 08.01.21

APPD. K. Anand

DATE 08.01.21

NO.OF VAR. -N.A.-






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

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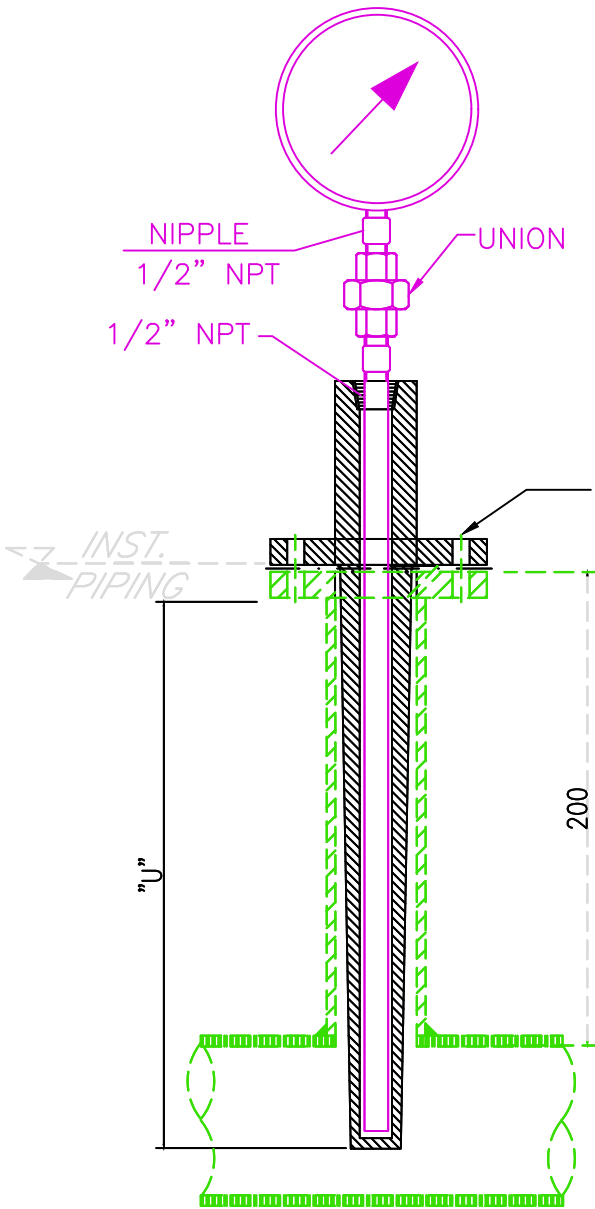
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

Applicable Tags:: for scheme [TE/TT]

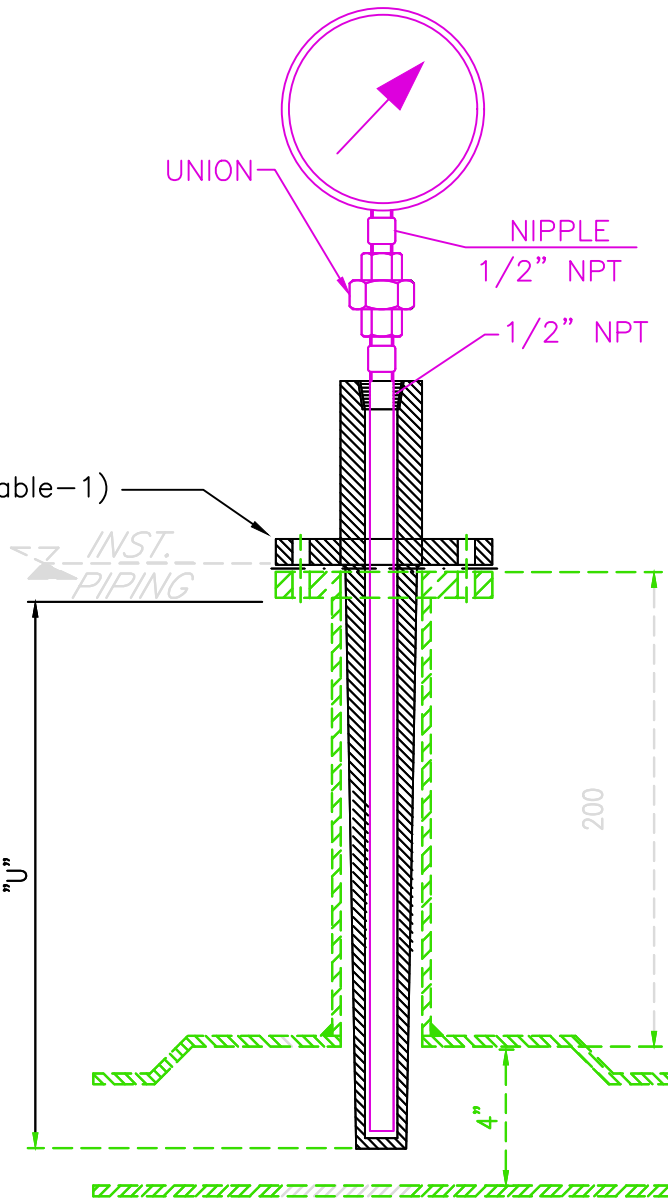
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

		BHARAT HEAVY ELECTRICALS LTD.			NAME	SIGN.	DATE	NO.OF
		HYDERABAD		DRN.	SUBRAHMANYAM		08.01.21	VAR.
				CHD.	SUJATHA		08.01.21	
				APPD.	K. Anand		08.01.21	-N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF
CODE 450	C/M/F		NTS	N.A	-N.A.-		-N.A.-	ITEMS
TITLE				CARD CODE	DRG. NO: PY-FH-4-M168-9626-01		REV.	
INSTRUMENT INSTALLATION DRAWINGs				N.A.	CUST. DRG. NO:		00	
					SHT. No	14	NO. OF SHT.	19

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

Applicable Tags::

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

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 SUBRAHMANYAM	SIGN.	DATE 08.01.21	NO.OF VAR.
		CHD. SUJATHA		08.01.21	-N.A.-
		APPD. K. Anand		08.01.21	-N.A.-
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 INSTRUMENT INSTALLATION DRAWINGS		CARD CODE N.A.	DRG. NO: PY-FH-4-M168-9626-01		REV. 00
			SHT. No 15	NO. OF SHT. 19	

Applicable Tags::

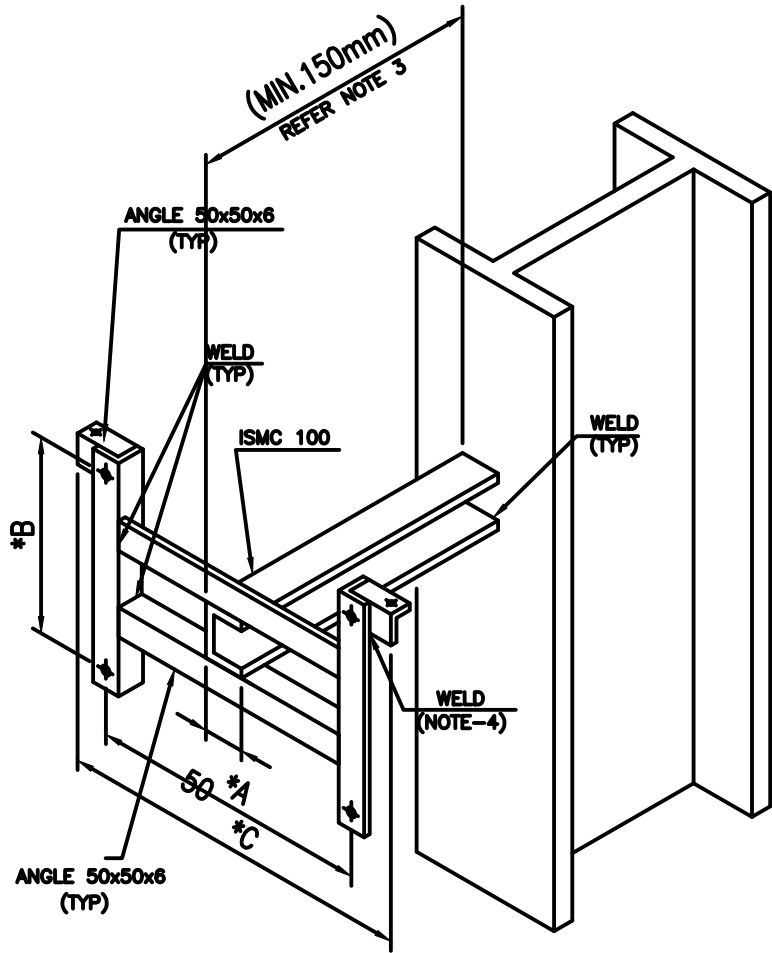
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COMPUTER FILE NAME

SIGN. AND DATE REF. DRG. NO.

INVENTORY NO

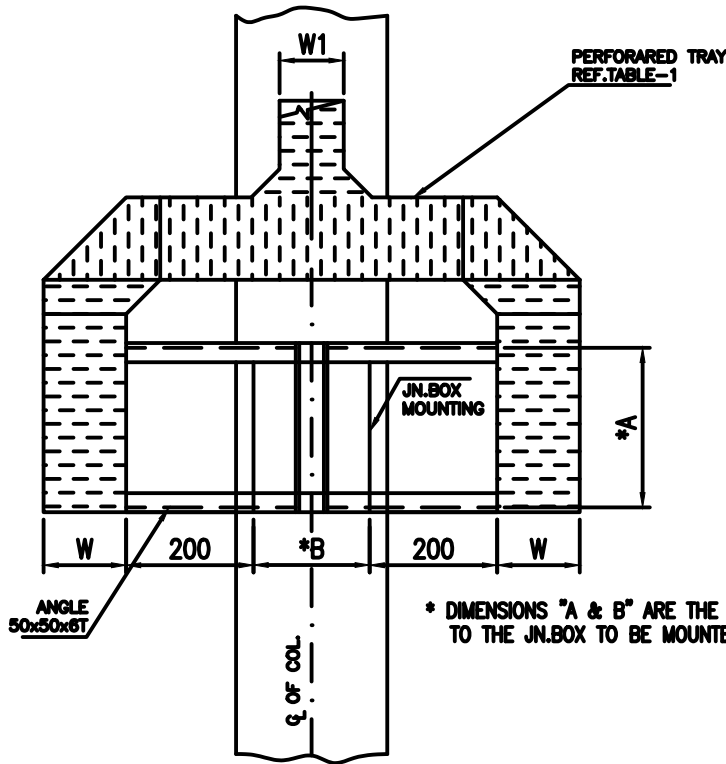
GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261



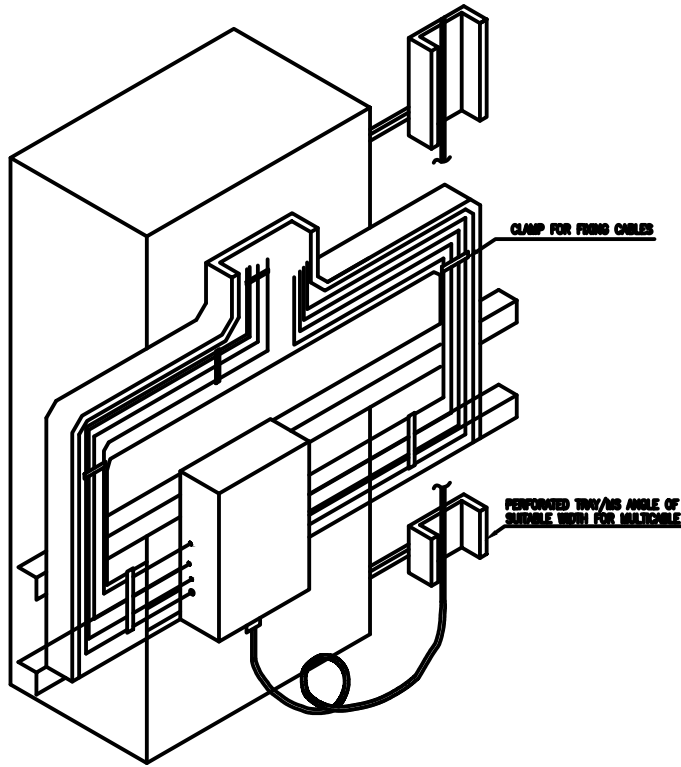
JB

TABLES-1 (TYP)

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





* DIMENSIONS "A & B" ARE THE CORRESPONDING TO THE JN.BOX TO BE MOUNTED.

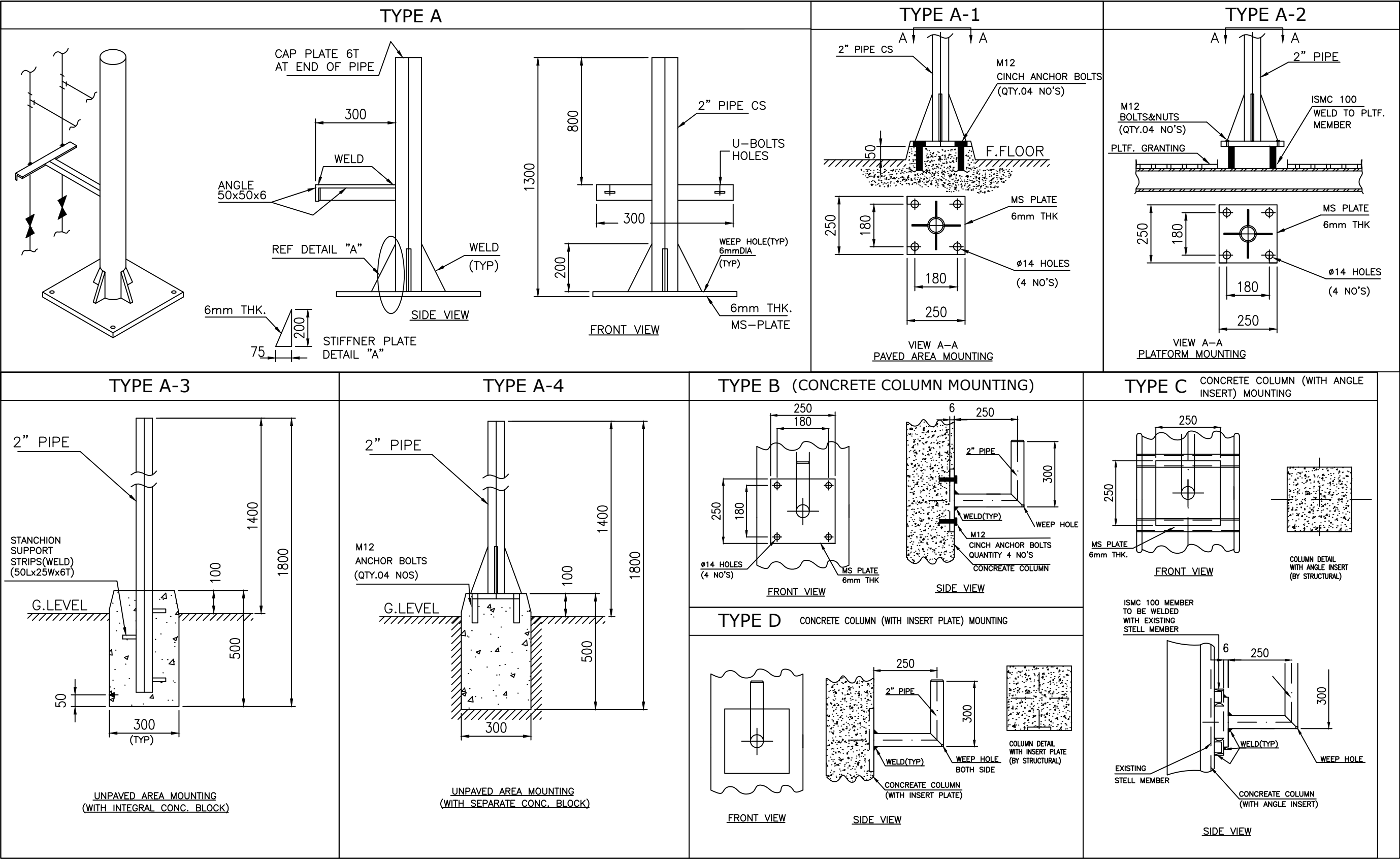


Bill of Material::

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

		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD			DRN.	SUBRAHMANYAM		SIGN.	08.01.21		NO.OF VAR.
					CHD.	SUJATHA		<i>Sujatha</i>	08.01.21		-N.A.-
					APPD.	K. Anand		<i>K. Anand</i>	08.01.21		
DEPT. PE&SD	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.			ITEM NO.		NO.OF ITEMS	
CODE	450		NTS	N.A	-N.A.-			-N.A.-		-N.A.-	
TITLE					CARD CODE N.A.	DRG. NO: PY-FH-4-M168-9626-01					REV.
INSTRUMENT INSTALLATION DRAWINGS						CUST. DRG. NO:					00
						SHT. No 16					NO. OF SHT. 19

SINGLE INSTRUMENT SUPPORT- GENERAL ARRANGEMENT



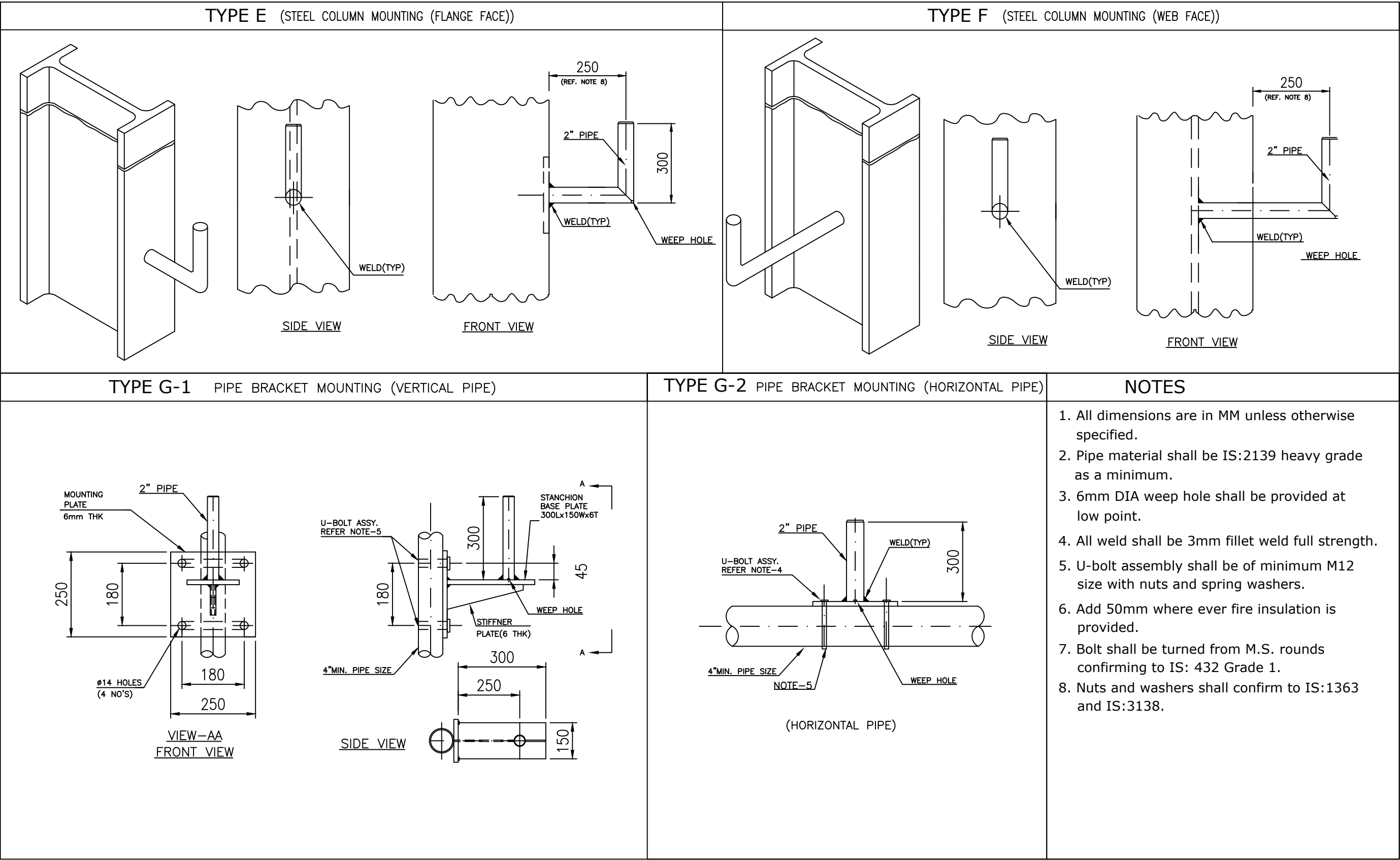
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

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		UNTOL. DIMS. GR. C/M/F		DRN.	SUBRAHMANYAM	08.01.21	
CODE 450		SCALE NTS		CHD.	SUJATHA	08.01.21	-N.A.-
TITLE		WEIGHT (KG) N.A.		APPD.	K. Anand	08.01.21	-N.A.-
INSTRUMENT INSTALLATION DRAWINGS		REF. TO ASSY. DRG. -N.A.-		ITEM NO. -N.A.-		NO.OF ITEMS -N.A.-	
CARD CODE N.A.		DRG. NO: PY-FH-4-M168-9626-01		CUST. DRG. NO:		REV. 00	
		SHT. No 17		NO. OF SHT. 19			

SINGLE INSTRUMENT SUPPORT- GENERAL ARRANGEMENT



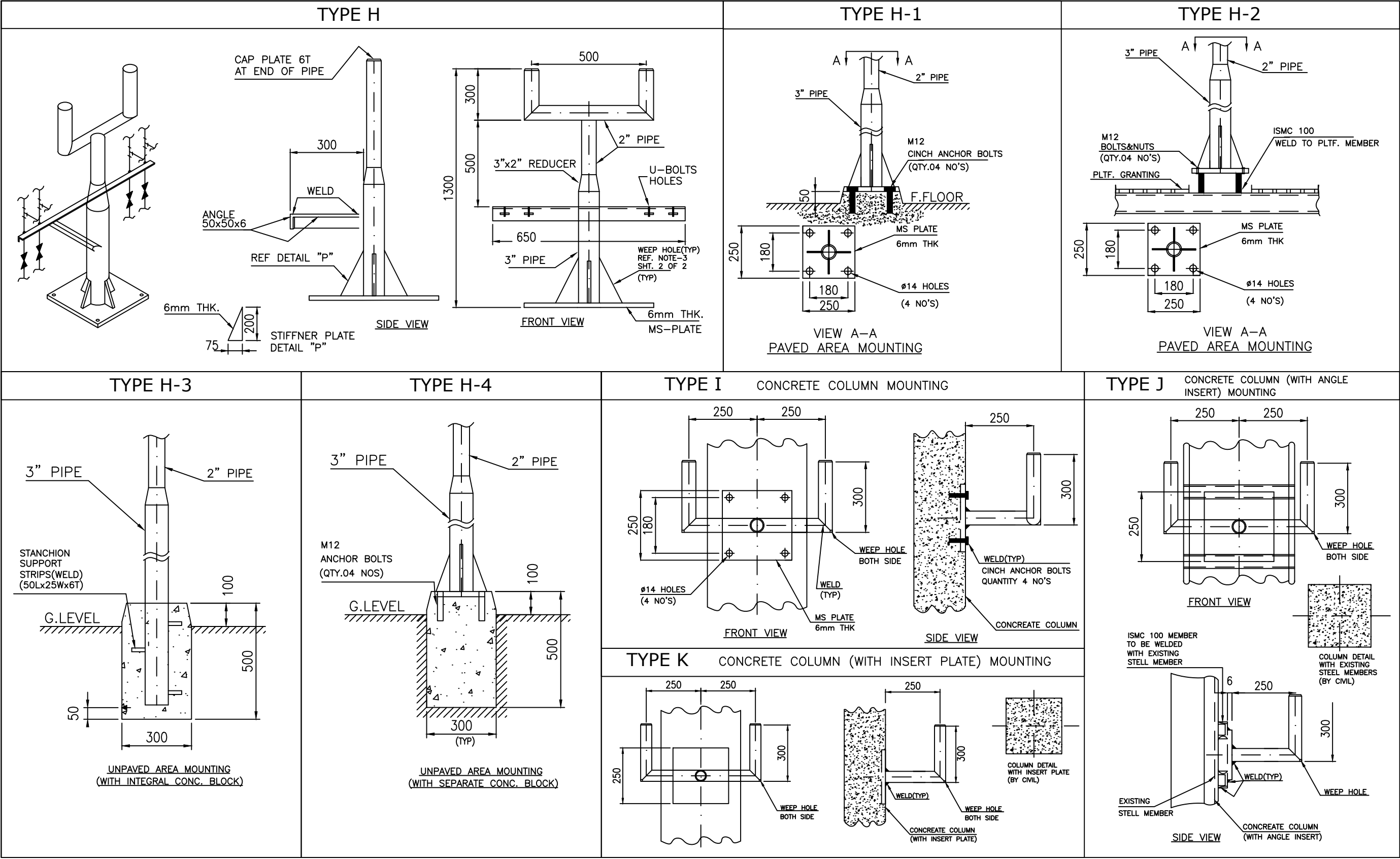
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SIGN. AND DATE
REF. DRG. NO.
COMPUTER FILE NAME
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GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

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.
DRN.		SUBRAHMANYAM				08.01.21	
CHD.		SUJATHA				08.01.21	-N.A.-
APPD.		K. Anand				08.01.21	
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: PY-FH-4-M168-9626-01	REV.	
INSTRUMENT INSTALLATION DRAWINGS				N.A.	CUST. DRG. NO:	00	
					SHT. No 18	NO. OF SHT. 19	

TWO 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
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

Bharat Heavy Electricals Ltd.		NAME	SIGN.	DATE	NO. OF VAR.
HYDERABAD		DRN. SUBRAHMANYAM		08.01.21	
		CHD. SUJATHA		08.01.21	-N.A.-
		APPD. K. Anand		08.01.21	-N.A.-
DEPT. PE&SD	UNTOL. DIMS. GR. C/M/F	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
CODE 450		NTS	N.A	-N.A.-	-N.A.-
TITLE		CARD CODE	DRG. NO. PY-FH-4-M168-9626-01	REV. 00	
INSTRUMENT INSTALLATION DRAWINGS		N.A	CUST. DRG. NO.	SHT. No 19 NO. OF SHT. 19	

ESP-001-2A Rev.00		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Std. / Doc. Number	
				PY-AI-4-M168-9402-01	
				Rev. No.	00
				Sheet	1
<u>Solenoid Valve</u>					
S.No.	Description	:	Specification		
1	Make	:	As per approved Vendor List		
2	Model Number	:	Bidder to Specify		
3	Body Material	:	SS		
4	Reset Type	:	As per P&ID		
5	Supply Voltage	:	24 VDC		
6	Design	:	Intrinsic safe Design suitable for Zone-2 (To be confirmed by Layout group), Gas group-IIA/IIB, Temp. Class T3.		
7	Enclosure	:	Weather proof to IP-65		
8	Ingress Protection	:	IP-65 as min.		
9	Cable Entry	:	1/2" NPT		
10	Cable Gland	:	Double Compression, MOC:Ni plated brass, 1/2"NPT. Suitable for ZONE-2 (To be confirmed by Layout group), GAS GROUP-IIA/IIB, TEMP. CLASS T3, PESO Certified with Slipper type PVC Shrouds.; Supply Quantity = 1 No's/SOV		
11	Dummy Plug	:	MOC:SS; Quantity = 1 No's/SOV		
12	SIL	:	SIL-3		
13	Type of Coil	:	Single coil		
14	Insulation Type	:	H class insulation		
15	Redundant of SOV	:	As per P&ID		
16	Command Philosophy	:	SOV shall be energized under normal conditions and de-energized which will drive the valve to failsafe condition.		
17	Special Feature	:	Surge suppression diode shall be integral part of solenoid vatve.		
18	Prefabricated FRP Canopy (Machine moulded)	:	Not applicable		

<u>Air Filter Regulator</u>		
S.No.	Description	: Specification
1	Make	: As per Vendor List
2	Model Number	: Bidder to Specify
3	Body Material	: To be decided by system group/fuel group
4	Enclosure	: Weather Proof
5	Ingress Protection	: IP-65
6	Filter Element Material	: Bidder to Specify
7	Filter element Size	: To be decided by system group/fuel group
8	Pneumatic Connection size	: 1/4" NPT(F)
9	Drain	: Manual

<u>Limit Switches</u>		
S.No.	Description	: Specification
1	Make	: As per vendor list
2	Model Number	: Bidder to Specify
3	Type	: Proximity Design with metallic enclosure
4	Design	: Intrinsic Safe
5	Intrinsic safe to	: Suitable for ZONE-2 (To be confirmed by Layout group), GAS GROUP-IIA/IIB, TEMP. CLASS T3
6	Switch Make	: As per vendor list
7	Cable Entry	: 1/2" NPT
8	Cable Gland Material	: Double Compression, MOC:Ni plated Brass, 1/2"NPT. Suitable for ZONE-2 (To be confirmed by Layout group), GAS GROUP-IIA/IIB, TEMP. CLASS T3, PESO Certified with Slipper type PVC Shrouds; Supply Quantity = 1 No's/Switch
9	Supply Voltage	: 24VDC, 1 Amp
10	Barriers at DCS/PLC	: BHEL's Scope
11	SIL	: SIL-3
12	Special Feature	: Limit Switch mounting arrangements plates, linkages, etc shall be min SS316

<u>Pneumatic Tube & Tube Fittings</u>		
S.No.	Description	: Specification
1	Make	: As per approved Vendor List
2	Material	: SS316
3	Type	: double ferrule type(Double compression) type
4	Tube size	: 6mm (Based on requirement)

<u>Positioner</u>		
S.No.	Description	: Specification
1	Make	: As per approved Vendor List
2	Type	: 1) Smart type with HART protocol (latest version) 2) Positioner shall be of Non-Contact type design 3) Intrinsic safe design to be followed.
3	Position Transmitter (Integral with positioner)	: Required for all control- Valves
4	Advance Diagnostic Softwares	: Not applicable
5	SIL	: --
6	Enclosure	: Metallic
7	Ingress Protection	: IP-65 as min.
8	Special Feature	: Mounting plates, linkages and connecting rods, etc shall be min SS316
9	Goose Neck/Vent protection from water	: Required
10	Prefabricated FRP Canopy (Machine moulded)	: Not applicable
11	Cable Entry	: 1/2" NPT

12	Cable Gland Material	:	Double Compression, MOC:Ni plated Brass, 1/2"NPT. Suitable for ZONE-2 (To be confirmed by Layout group), GAS GROUP-IIA/IIB, TEMP. CLASS T3, PESO Certified with Slipper type PVC Shrouds; Supply Quantity = 1 No's/Positioner
13	Positioner mounting	:	As per OEM recommendation
14			
15	Valve Travel Indication (Local)	:	SS Scale With Travel marking in %
16	Packing Type	:	Live Loadable only (without disconnecting actuator)
17	Any other requirements	:	Valve & Actuator Colour Coding shall be decided during detail engineering

Notes:

- (1) Exproof/Intrinsic safe Certification : Yes
- (2) CCOE certificate required: Yes (for all exproof/intrinsic safe applications for Positioner, Junction Box, Limit Switch, Solenoid Valve & Cable Glands)
- (3) All bolts used for mounting of Instruments, Junction Boxes shall be of SS.
- (4) Positioner shall be universal in nature to facilitate use with any type of pneumatic actuator like single acting and double acting for both sliding stem and rotary shaft valves.