



MANGALORE REFINERY & PETROCHEMICALS LTD.
(A subsidiary of Oil & Natural Gas Corpn. Ltd – ONGC)
Regd. Office: Kuthethoor P.O., Via: Katipalla, Mangalore-575030 (India)
Phone: 0091-824-2270400 Fax: 0091-824-2271239



Addendum - 1

To

MRPL Tender No. 96800000C4 dated 12.05.2023

**COMPOSITE TENDER FOR ELECTRICAL AND INSTRUMENTATION WORK FOR LPG AMINE
ABSORBER SYSTEM IN PFCC UNIT AT MRPL, MANGALURU, KARNATAKA**

With reference to the above tender, bidders are requested to note the following:

The items, conditions, specification and stipulations of the Bidding Documents stand modified to the extent indicated in Annexure-1- Commercial Addendum & Annexure -2 - Technical Addendum.

The implications of the same, elsewhere in the tender document shall be taken care of appropriately by the bidders. All other terms and conditions, stipulations and specifications of tender shall remain unaltered.

Bidders shall submit copy of this Addendum-1 including its Annexure-1 & 2 with the techno-commercial bid, duly signed and stamped, as a token of having read and understood the same.

Annexure-1: Commercial Addendum

Sl. No.	Section No. / Clause No.	Addition/Deletion/Modification
1	<p>Commercial Volume-I</p> <p><u>EARNEST MONEY DEPOSIT (EMD):</u> EMD shall be submitted by way of Demand Draft in favour of M/s Mangalore Refinery and Petrochemicals Limited and payable at Mangalore. Bank Guarantee in place of demand draft shall also be accepted as per format enclosed. BG shall be valid for 180 days from the date of bid submission. Offer submitted without requisite / insufficient EMD will be summarily rejected without assigning any reason. The irrevocable Bank Guarantee (BG) in the prescribed format if submitted against Earnest Money Deposit shall be subject to verification from the issuing Bank, the email ID of bank for the same must be Incorporated in the BG. The BG issued by the issuing Bank on behalf of Bidder/Contractor/Supplier in favour of—Mangalore Refinery and Petrochemicals Limited shall be in paper form and also be made available under the —Structured Financial Messaging System (SFMS). A separate advice of the BG will invariably be sent by the issuing bank to the beneficiary’s_ Bank through SFMS and SFMS transmission message reference number (currently 32digits code) is to be sent along with BG directly to MRPL through speed post/regd. Post. The details of beneficiary for issue of BG under SFMS platform is furnished below: Name of Beneficiary: Mangalore Refinery and Petrochemicals Limited Beneficiary Bank, Branch and address: Union Bank of India (Erstwhile Corporation Bank), MRPL Project Site, Kuthethoor Post Mangalore 575030, Karnataka IFSC code: UBIN0905925 SWIFT Code: UBININBBMAP MICR Code: 575026018 Any bank guarantee submitted in physical mode which cannot be verifiable through SFMS will not be accepted under any circumstances.</p>	<p>Commercial Volume-I</p> <p><u>EARNEST MONEY DEPOSIT (EMD):</u> —EMD shall be submitted by way of Online payment through internet banking or Demand Draft in favour of M/s Mangalore Refinery and Petrochemicals Limited, and payable at Mangalore. Bank Guarantee in place of demand draft shall also be accepted as per format enclosed. BG shall be valid For 180 days from the date of bid submission. Offer submitted without requisite / insufficient EMD will be summarily rejected without assigning any reason. The irrevocable Bank Guarantee (BG) in the prescribed format if submitted against Earnest Money Deposit shall be subject to verification from the issuing Bank, the email ID of bank for the same must be Incorporated in the BG. The BG issued by the issuing Bank on behalf of Bidder/Contractor/Supplier in favour of—Mangalore Refinery and Petrochemicals Limited shall be in paper form and also be made available under the —Structured Financial Messaging System (SFMS). A separate advice of the BG will invariably be sent by the issuing bank to the beneficiary’s_ Bank through SFMS and SFMS transmission message reference number (currently 32digits code) is to be sent along with BG directly to MRPL through speed post/regd. Post. The details of beneficiary for issue of BG under SFMS platform is furnished below: Name of Beneficiary: Mangalore Refinery and Petrochemicals Limited Beneficiary Bank, Branch and address: Union Bank of India (Erstwhile Corporation Bank), MRPL Project Site, Kuthethoor Post Mangalore 575030, Karnataka Bank Account No: 560101000026927 IFSC code: UBIN0905925 SWIFT Code: UBININBBMAP MICR Code: 575026018 Any bank guarantee submitted in physical mode which cannot be verifiable through SFMS will not be accepted under any circumstances.</p>

Annexure-2: Technical Addendum

Sl. No.	Section No. / Clause No.	Addition/Deletion/Modification
1	Technical Volume-II SCOPE OF WORK-INSTRUMENTATION FOR COMPOSITE TENDER FOR ELECTRICAL AND INSTRUMENTATION WORK <u>Document Number 9680-09-SOW-001</u>	Technical Volume II Bidder to consider Addendum-1 To SCOPE OF WORK-INSTRUMENTATION FOR COMPOSITE TENDER FOR ELECTRICAL AND INSTRUMENTATION WORK <u>Instrument Hook UP Drawings 9680-332-09-A4-9001</u>

INSTRUMENT HOOK UP DRAWINGS

(EPCM SERVICES FOR INSTALLATION OF
LPG AMINE ABSORBER SYSTEM
IN PFCC UNIT, AT MRPL MANGALORE)

Rev.	Date	Description	Prpd.	Chkd.	Appd.
4	22.02.23	REISSUED FOR CONSTRUCTION	KM	GVM	VHM
3	07.12.22	ISSUED FOR CONSTRUCTION	KM	GVM	GVM
2	05.12.22	ISSUED FOR APPROVAL	KM	GVM	GVM
1	31.10.22	ISSUED FOR REVIEW / COMMENTS	KM	GVM	GVM
0	19.05.22	ISSUED FOR REVIEW	SYB	GVM	SYB



INSTRUMENT HOOK UP DRAWINGS
COVER SHEET

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SHEET NO.	DESCRIPTION	REVISION INDEX				
		0	1	2	3	4
1	COVER SHEET	X	X	X	X	X
2	INDEX SHEET	X	X	X	X	X
3	GENERAL NOTES & ABBREVIATION	X	X	X	X	
4	LIST OF ITEM	X	X	X	X	
5	PRESSURE GAUGE LIQUID SERVICE GAUGE BELOW	X	X	X	X	
6	PRESSURE GAUGE DIAPHRAGM SEAL TYPE WITH DRIP RING FOR FLUSHING/PURGING	X	X	X	X	
7	PRESSURE TRANSMITTER LIQUID/GAS SERVICE WITH 3 WAY VALVE MANIFOLD DIRECT INSTALLATION (PRE FABRICATED)	X	X	X	X	
8	PRESSURE TRANSMITTER DIAPHRAGM SEAL TYPE WITH DRIP RING FOR FLUSHING/PURGING ON PIPE	X	X	X	X	
9	PRESSURE TRANSMITTER DIAPHRAGM SEAL TYPE WITH DRIP RING FOR FLUSHING/PURGING ON VESSEL	X	X	X	X	
10	DIFFERENTIAL PRESSURE TRANSMITTER WITH 5 WAY MANIFOLD AND TUBING FOR LIQUID SERVICE (METER BELOW)	X	X	X	X	
11	DIFFERENTIAL PRESSURE TRANSMITTER DIAPHRAGM SEAL TYPE WITH DRIP RING FOR FLUSHING/PURGING	X	X	X	X	
12	FLOW TRANSMITTER DP TYPE LIQUID SERVICE DIRECT INSTALLATION (PRE FABRICATED)	X	X	X	X	
13	FLOW TRANSMITTER DP TYPE WITH DIAPHRAGM SEAL & WITH DRIP RING	X	X	X	X	
14	QUAD FLOW TRANSMITTER DP TYPE DIAPHRAGM SEAL & WITH DRIP RING	X	X	X	X	
15	ROTAMETER WITH OR WITHOUT TRANSMITTER	X	X	X	X	
16	MAGNETIC LEVEL GAUGE ON VESSEL 2 INCH CONNECTION	X	X	X	X	
17	MAGNETIC LEVEL GAUGE ON VESSEL 2 INCH CONNECTION	X	X	X	X	
18	MAGNETIC LEVEL GAUGE ON VESSEL 3 INCH CONNECTION	X	X	X	X	
19	LEVEL TRANSMITTER DP TYPE WITH DIAPHRAGM SEAL & DRIP RING FOR FLUSHING/PURGING	X	X	X	X	
20	GWR & CAPACITANCE TYPE LEVEL TRANSMITTER (WITH STILLING WELL) 2 INCH CONNECTION	X	X	X	X	
21	TEMPERATURE GAUGE & TEMPERATURE ELEMENT (1.5 INCH FLANGED CONNECTION)	X	X	X	X	
22	H2S ANALYSER (TUBING CONNECTIVITY)	X	X	X	X	X
23	ON-OFF VALVE WITH TWO SOLENOID VALVE WITH VOLUME TANK (12mm OD TUBING)	X	X	X	X	
24	CONTROL VALVE WITH SMART POSITIONER (12mm OD TUBING)	X	X	X	X	
25	VOLUME BOTTLE TANK WITH PRESSURE GAUGE & PRESSURE TRANSMITTER	X	X	X	X	
26	INSTRUMENT AIR MANIFOLD WITH 10 TAKE OFF POINT	X	X	X	X	X
27	PRESSURE GAUGE LIQUID/GAS SERVICE WITH 3 WAY VALVE MANIFOLD DIRECT INSTALLATION	X	X	X	X	
28	FLOW TRANSMITTER INTEGRAL DP TYPE LIQUID SERVICE DIRECT INSTALLATION (PRE FABRICATED)	X	X	X	X	
29	ON-OFF VALVE WITH TWO SOLENOID VALVE (12mm OD TUBING)	X	X	X	X	
30	PRESSURE GAUGE LIQUID SERVICE GAUGE BELOW	X	X	X	X	

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GENERAL NOTES:-

1. CAPILLARY MATERIAL SHALL BE STAINLESS STEEL AISI 316(L) MIN. AND SHALL BE MECHANICALLY PROTECTED BY FLEXIBLE SS ARMORING.
2. ALL CAPILLARY SHALL BE NEATLY DRESSED ON 25 MM ANGLE SUPPORTS NEATLY FABRICATED & INSTALLED AT LOCATION. SPARE CAPILLARY SHALL BE ROLLED AND STACKED NEATLY AND FIRMLY ON INSTRUMENT STANCHION SUPPORT.
3. IF CAPILLARY TUBING IS EXPOSED TO DIRECT SUN RADIATION, THERMAL INSULATION (SOLAR RADIATION REFLECTING TYPE – NOT BLACK) OF THE CAPILLARY TUBING SHALL BE USED.
4. IMPULSE LINE TUBING SHALL BE AS SHORT AS POSSIBLE AND NUMBER OF IMPULSE JOINTS SHALL BE KEPT TO MINIMUM. "HORIZONTAL" LINES SHALL BE SLOPE DOWNWARDS BETWEEN THE TRANSMITTER & PROCESS CONNECTION AT A RATIO OF APPROXIMATELY 1:10. FOR LIQUID SERVICE SLOPE DOWNWARDS TOWARDS TRANSMITTER FOR SELF VENTING TO PROCESS LINE WHILE FOR GAS SERVICE IMPULSE LINE SHALL BE SLOPING DOWNWARDS TOWARDS MAIN LINE FOR SELF DRAINING TO MAIN LINE.
5. IMPULSE LINES LENGTH ARE INDICATED FOR PROCUREMENT PURPOSE ONLY, HENCE ALL TUBE LENGTH TO BE VERIFIED AT SITE BEFORE INSTALLING. ALL TUBE SHALL BE THOROUGHLY CLEANED BEFORE INSTALLING.
6. ALL INSTRUMENTATION TAPPING ACCESSIBILITY REQUIREMENT SHALL BE AS PER INSTRUMENT DESIGN BASIS (DOC. NO. 9680-09-DB-001 REV 1 CLAUSE NO. 36.
7. ALL THREADED CONNECTION SHALL BE IN NPT. AS PER ANSI/ASTM B16.11.
8. LENGTH OF NIPPLE SHALL BE 100 mm(TYP.) & SHALL BE SHORTENED, IF REQUIRED, FOR SITE INSTALLATION REQUIREMENT.
9. REFER INSTRUMENT INSTALLATION DRAWING (DWG NO. 9680-332-09-A4-9002) FOR MOUNTING AND SUPPORT DETAIL.
10. ALL THERMOWELL FLANGES RATING SHALL BE 300# AS MIN. OR AS PER PIPING MATERIAL SPECIFICATION
11. ALL THREADED CONNECTIONS SHALL BE SEALED ADEQUATELY BY INSTRUMENT CONTRACTOR.
12. IMPULSE TUBING SHALL BE 12MM OD X 1.2MM THK. ASTM A269 TP316 STAINLESS STEEL SEAMLESS TUBES. HARDNESS SHALL BE LIMITED TO HRB 70 TO 79.
13. TUBE FITTINGS SHALL BE SS316, FLAMELESS DOUBLE COMPRESSION, FOUR PIECE CONSTRUCTION TYPE. HARDNESS OF THE FRONT FERRULE SHALL BE IN RANGE OF HRB 85-90. HARDNESS OF THE REAR FERRULE SHALL BE MORE THAN HRC 50.
14. TUBE AND TUBE FITTINGS SHALL BE OF SWAGelok/PARKER/HOKE/COMFIT OR EQUIVALENT ONLY.
15. ALL CS MATERIALS SHALL BE NACE MR0103 (HIC) & AXENS-3 (HIC) AS PER AXENS STD IN-0043 COMPLIANT.
16. ALL SS MATERIALS SHALL BE NACE MR-0103 COMPLIANT.
17. PWHT/ SR SHALL BE DONE FOR THE IMPULSE PIPING JOINTS BY THE SITE CONTRACTOR & RECORDS FOR THE SAME SHALLBE MAINTAINED (IF PWHT/ SR REQUIREMENT EXISTS FOR THE MAIN LINE/PROCESS LINE. REFER MAINLINE/PROCESS LINE PMS REQUIREMENT)
18. PMI SHALL BE CARRIED OUT FOR ALL SS MATERIALS USED & THE REPORT SHALL BE RECORDED.

ABBREVIATIONS

1. PE – PLAIN END
2. SW – SOCKET WELD
3. TH – THREADED
4. FL – FLANGED
5. OD – OUTSIDE DIAMETER
6. INST – INSTRUMENTATION
7. CONTR– CONTRACTOR
8. NACE– MR0103
9. HIC– (AXENS) STD. IN,43
10. A/R– AS REQUIRED

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INSTRUMENT HOOK UP DRAWINGS
GENERAL NOTES & ABBREVIATIONS

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LIST OF ITEMS

TUBE & TUBE FITTINGS

ITEM NO.	DESCRIPTION	SIZE & END CONNECTION	MATERIAL	TOTAL QTY. SUPPLIED BY			REMARKS
				PIPING	INST. CONT.	INST. VEN.	
001	PIPE	1/2" PE ASTM B36.10, A 106 GR.B, SEAMLESS, S160	CS	120 METER.	-	-	-
011	PIPE	1/2" PE ASTM 836.19, ASTM A312 TP 316L, SEAMLESS, 80S	SS316L	24 METER.	-	-	-
012	PIPE	1" PE ASTM B36.10, ASTM A 106 GR.B SEAMLESS, XS	CS	6 METER.	-	-	-
016	NIPPLE	1/2" PE x 1/2" PE ASTM B36.10, A106 GR.B, S160 (100mm LONG)	CS	70 NO.	-	-	-
017	NIPPLE	1/2" NPT(M) x 1/2" PE ASTM B36.10, A106 GR.B, S160 (100mm LONG)	CS	110 NO.	-	-	-
019	NIPPLE	1" PE x 1" PE ASTM B36.10, A106 GR.B, S160 (100mm LONG)	CS	2 NO.	-	-	-
020	NIPPLE	3/4" PE x 3/4" NPT (M) B36.19, ASTM A312 TP316L, 80S (100mm LONG)	SS316L	20 NO.	-	-	-
021	NIPPLE	3/4" PE x 3/4" PE 836.19, ASTM A312 TP316L, 80S (100mm LONG)	SS316L	10 NO.	-	96 NO.	-
032	NIPPLE	1/2" PE x 1/2" PE 836.19, ASTM A312 TP316L, 80S (100mm LONG)	SS316L	20 NO.	-	98 NO.	-
033	NIPPLE	1/2" NPT(M) x 1/2" PE 836.19, ASTM A312 TP316L, 80S (100mm LONG)	SS316L	35 NO.	-	212 NO.	-
034	NIPPLE	1/2" NPT(M) x 1/2" NPT(M) B36.19, ASTM A312L TP316L, 80S (100mm LONG)	SS316L	8 NO.	-	-	-
038	SWAGE NIPPLE	1/2" PE x 3/4" PE BS3799, ASTM A105N, S160,	CS	12 NO.	-	-	-
050	SWAGE NIPPLE	1/2" PE x 3/4" PE BS3799, ASTM A182 GR.316L,80S	SS316L	10 NO.	-	-	-
077	COUPLING	1/2" SW x 1/2" SW B16.11, ASTM A182 GR 316L CL 6000#	SS316L	10 NO.	-	-	-
078	COUPLING	1/2" SW x 1/2" SW B16.11, ASTM A105, CL 6000#	CS	30 NO.	-	-	-
081	EQUAL TEE	1/2" NPT(F) ASTM B16.11, ASTM A105N, CL 6000#	CS	12 NO.	-	-	-
082	EQUAL TEE	1/2" SW ASTM B16.11, ASTM A105N, CL 6000#	CS	80 NO	-	-	-
093	EQUAL TEE	1/2" NPT(F) B16.11, ASTM A182 GR. F316L, CL 6000#	SS316L	4 NO.	-	-	-
094	EQUAL TEE	1/2" SW ASTM B16.11, ASTM A182 GR.F316L, CL 6000#	SS316L	15 NO.	-	-	-
100	UNEQUAL TEE	1/2" SW x 1/2" SW x 3/4" SW B16.11, ASTM A182 GRF316L, CL 6000#	SS316L	0 NO.	-	48 NO.	-
102	ELBOW	1/2" SW 90° ASTM B16.11, A105N, CL	CS	12 NO.	-	-	-
125	ELBOW	1/2" SW 90° ELBOW, ASTM B16.11, ASTM A182 GR.F316L, CL 6000#	SS316L	10 NO.	-	50 NO.	-
141	PIPE CAP	1/2" NPT(F) ASTM B16.11, A105N, CL 6000#	CS	70 NO.	-	-	-
146	PIPE CAP	1/2" NPT(F) ASTM B16.11, A182 GR.F316L, CL 6000#	SS316L	25 NO.	-	106 NO.	-
147	PLUG	1/2" NPT(M) ASTM B16.11, A106N, CL 6000#	CS	10 NO.	-	-	-
150	PLUG	1/2" NPT(M) PLUG, ASTM B16.11, A 182 GR.F316L, CL 6000#	SS316L	25 NO .	-	-	-
176	BALL VALVE	1/2" NPT(F) BALL VALVE, WITH LOCKABLE HANDLE IN OPEN POSITION, ASTM A182 GR.316, TRIM-F316L, STEM-F316L CL 800#	SS316	25 NO.	-	-	-
186	GATE VALVE	1/2" SW ASTM A 105N, TRIM-F316L, STEM-316L, CL 800#	CS	110 NO.	-	-	-
189	GATE VALVE	3/4" SW ASTM A 105N, TRIM-F316L, STEM-F316L,CL 800#	SS316L	10 NO.	-	48 NO.	=
190	GATE VALVE	1" SW ASTM A 105, TRIM-F316L, STEM-F316L, B 16.11, CL 800#	CS	2 NO.	-	-	-
197	GATE VALVE	1/2" NPT(F) ASTM A182 GR.316L, TRIM-316L, STEM-316L, CL 800#	SS316L	4 NO.	-	-	-
198	GATE VALVE	1/2" SW ASTM A182 GR. F316L, TRIM-316L, STEM-316L, CL 800#	SS316L	25 NO.	-	106 NO.	-
199	CHECK VALVE	1" SW ASTM A 105, TRIM-F316L, STEM-F316L, B 16.11, CL 800#	CS	2 NO.	-	-	-
201	FLANGE	1/2" SW ASTM A105N, CL 300#, ASME B16.5, SCH160	CS	50 NO	-	-	-
205	FLANGE	1" SW ASTM A105N, CL 300#, ASME B16.5, RF/125AARH	CS	7 NO.	-	-	-
207	FLANGE	1-1/2" SW ASTM A105N, CL 300#, ASME B16.5, SCH 160	CS	0 NO.	-	20 NO.	-
213	FLANGE	3/4" SW ASTM B16.5, ANSI A182 GR.F316L, 300# RF,125AARH 80S	SS316L	70 NO.	-	96 NO.	-
214	FLANGE	1/2" SW ASTM B16.5, ANSI A182 GR.F316L, 300# RF, 125AARH 80S	SS316L	5 NO.	-	-	-
246	GASKET	1/2" SP WND 316SS+GRAFIL, SPIRAL 300#, B16.20-ASME B16.5	SS316	38 NO.	-	-	-
247	GASKET	3/4" SP WND 316SS+GRAFIL, SPIRAL 300#, B16.20-ASME B16.5	SS316	60 NO. SET	-	96 NO.	-
248	GASKET	1" SP. WND SS316+GRAFIL, SPIRAL, 150# B-16.20- ANSI B16.5	SS316	6 NO SET.	-	-	-
249	GASKET	1-1/2" SP WND 316SS+GRAFIL, SPIRAL 300#, B16.20-ASME B16.5	SS316	100 NO. SET.	-	-	-
250	GASKET	2" SP WND 316SSL+GRAFIL, SPIRAL 300#, B16.20-ASME B16.5	SS316	3 NO. SET.	-	-	-
251	GASKET	3" SP WND 316SSL+GRAFIL, SPIRAL 300#, B16.20-ASME B16.5	SS316	90 NO. SET.	-	-	-
256	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 1/2" x 75MM LONG, 4NOS	SS316	38 NO. SET.x4	-	-	1/2" FLANGES
260	STUDS & BOLTS	BOLT-A193 GR.B7, NUT-A194 GR.2H B-18.2 5/8" x 85MM LONG 4NOS	SS316	10 NO. SET.x4	-	-	1" FLANGES
265A	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 3/4" x 100MM LONG, 4NOS	SS316	30 NO. SET.x4	-	-	1-1/2" FLANGES
265B	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 3/4" x 140MM LONG, FOR SPACER RING, 4NOS	SS316	55 NO. SET.x4	-	-	1-1/2" FLANGES
267	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 3/4" x 160MM LONG, FOR SPACER RING, 8NOS	SS316	100 NO. SET.x8	-	-	3" FLANGES
268A	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 5/8" x 85MM LONG , 4NOS	SS316	50 NO. SET.x4	-	-	3/4" FLANGES
268B	STUDS & BOLTS	BOLT-A193GRB8 CLASS II, NUT-A194GR.8, B18.2 5/8" x 95MM LONG, FOR SPECTACLE BLIND 4NOS	SS316	70 NO. SET.x4	-	-	-
303	SEAMLESS TUBEING	12mm OD ASTM A269/A269M, SS316L, 1.2mm Thick	SS316L	-	495 METER	-	-
311	MALE CONNECTOR	1/4" NPT(M) x 12mm OD SS316L, FLARELESS DOUBLE COMPRESSION TYPE TUBE	SS316L	-	20 NO	-	-
314	MALE CONNECTOR	1/2" NPT(M) x 12mm OD SS316L, FLARELESS DOUBLE COMPRESSION TYPE TUBE	SS316L	-	138 NO.	-	-
361	TUBE UNION	12mm OD SS316L, FLARELESS DOUBLE COMPRESSION TYPE	SS316	-	92 NO.	-	-
379	TUBING CAP	12mm OD SS316L,FLARELESS DOUBLE COMPRESSION TYPE	SS316L	-	15 NO.	-	-
447	AIR MANIFOLD	SS316L-1/2"(1-1/2" FLANGED INLET, 1/2" DRAIN & 10 NOS OF 1/2"NPT(M) DISTRIBUTION POINTS)	SS316	-	3 NO.	-	-
489	DRIP RING	3" (WITH 1/2" NPT (F) DRAIN & VENT)	SS316	-	-	45 NO.	-
490	DRIP RING	1-1/2" (WITH 1/2" NPT (F) DRAIN & VENT)	SS316	-	-	20 NO.	-
501	SPECTACLE BLIND	3/4" ASTM B16.48, A182 GR F316L, CL 300#, FF/125AARH	SS316L	10 NO.	-	57 NO.	-
502	FLEXIBLE HOSE	SUTABLE FOR 1/2" NPT(F) PIPE THREADS AT BOTH ENDS, CORE OF AISI316L, SS316 BRAIDING, RATED FOR 80BAR, 2MTR LONG.	SS316L	8 NO.	-	-	-

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 INSTRUMENT HOOK UP DRAWINGS
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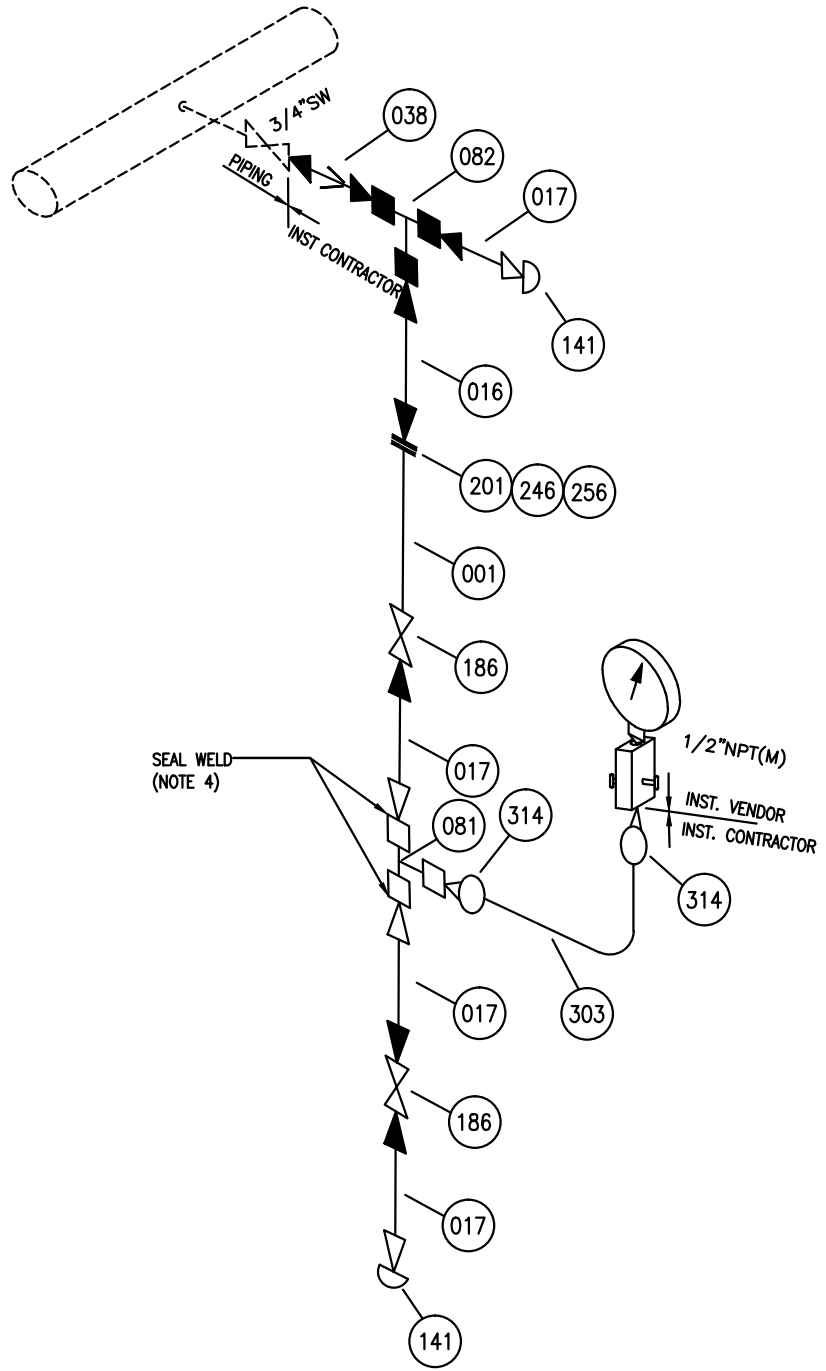
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NOTES:-

1. 3 WAY 2 VALVE MANIFOLD WITH ISOLATION VALVE SHALL BE IN SCOPE OF INSTRUMENT VENDOR.
2. PRESSURE GAUGE SHALL BE PROVIDED WITH DAMPENER BY INSTRUMENT VENDOR AS APPLICABLE.
3. ALL CS MATERIALS SHALL BE NACE MR0103 (HIC) AXEN-43 STD-IN-43 COMPLIANT.
4. THREADED CONNECTIONS (AS MARKED) SHALL BE SEAL WELDED BY INSTRUMENT CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
001	PIPE	1/2" PE	CS	2M	8M	256	STUD & BOLTS	1/2" FL	SS	1 SET	4 SET
016	NIPPLE	1/2" PE X PE	CS	1	4	303	SEAMLESS TUBE	12MM OD	SS	1.5 M	6 M
017	NIPPLE	1/2" NPT(M) X PE	CS	4	16	314	MALE CONNECTOR	1/2" NPT(M) X 12MM OD	SS	2	8
038	SWAGE NIPPLE	3/4"PE X 1/2"PE	CS	1	4						
081	EQUAL TEE	1/2" NPT(F)	CS	1	4						
082	EQUAL TEE	1/2" SW	CS	1	4						
141	CAP	1/2" NPT(F)	CS	2	8						
186	GATE VALVE	1/2" SW	CS	2	8						
201	FLANGE	1/2" SW	CS	2	8						
246	GASKET	1/2" FL	SS	1 SET	4 SET						

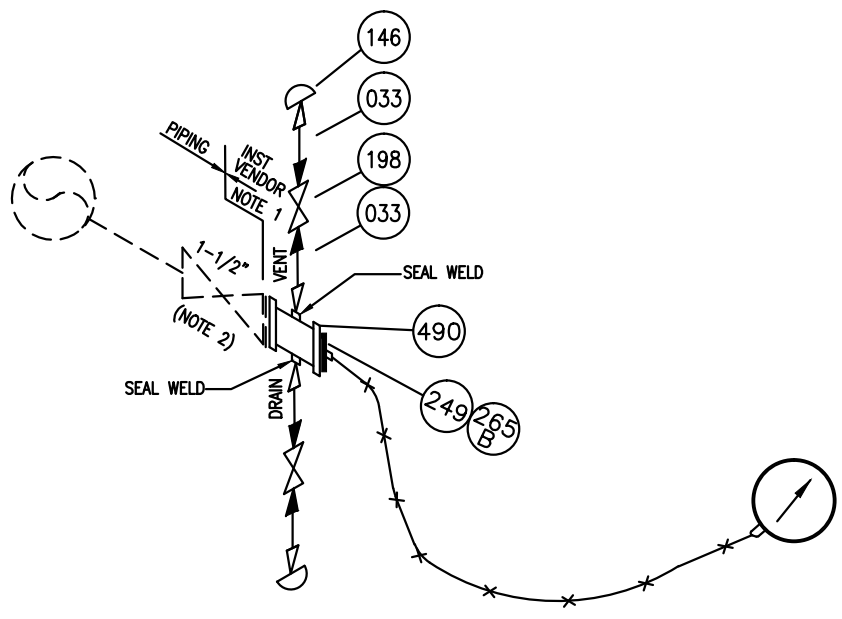
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**INSTRUMENT HOOK UP DRAWINGS
PRESSURE GAUGE LIQUID SERVICE
GAUGE BELOW**

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6. PI-3321160
7. PI-3321161
8. PI-3321167
9. PI-3321168
10. PI-3321169
11. PI-3321170



NOTES:-

1. FOLLOWING ITEMS PER TAG SHALL BE LOOSE SUPPLIED BY INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
 - a. REMOTE SEAL DIAPHRAGM WITH CAPILLARY
 - b. DRIP RING WELD WITH NIPPLE NPT(M) X PE, VENT & DRAIN BOTH SIDE. ALONG WITH GASKET, STUD & BOLTS.
 - c. SW GATE VALVE WITH SW NIPPLE PE NTP (M) AT OTHER END.
 - d. ELBOW SW
 INSTALLATION BY INSTRUMENT SITE CONTRACTOR. (INCLUDING REQUIRED FIT-UP, WELDING TESTING)
2. 1-1/2" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
032	NIPPLE	1/2" PE x 1/2" PE	SS	2	22						
033	NIPPLE	1/2" NPT(M) x 1/2" PE	SS	4	44						
125	ELBOW	1/2" SW	SS	2	22						
146	PIPE CAP	1/2" NPT(F)	SS	2	22						
198	GATE VALVE	1/2" SW	SS	2	22						
249	GASKET	1-1/2" FLANGE	SS	2 SET	22 SET						
265B	STUDS & BOLTS	1-1/2" FLANGE LONG	SS	2 SET	22 SET						
490	DRIP RING	1-1/2" FL (WITH 1/2" NPT (F) DRAIN & VENT)	SS	1	11						

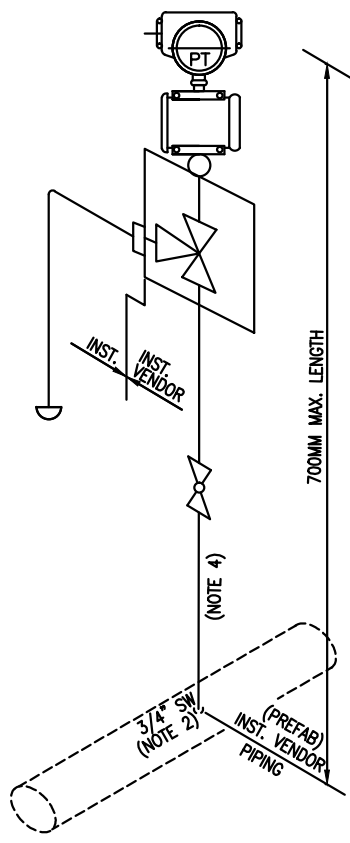
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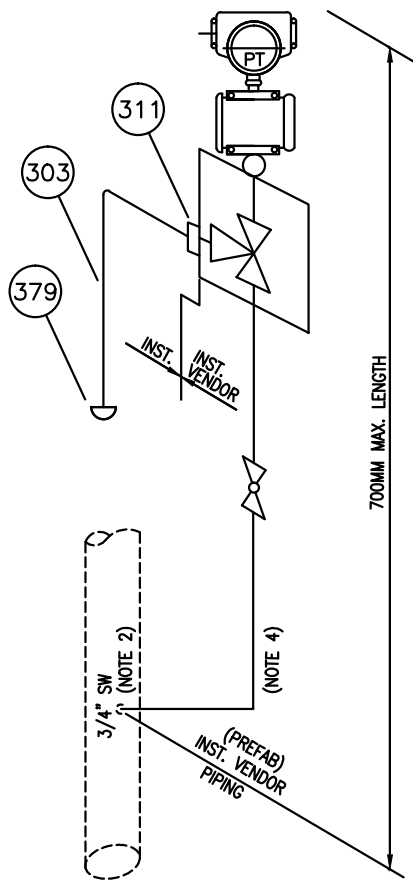
**INSTRUMENT HOOK UP DRAWINGS
PRESSURE GAUGE DIAPHRAGM SEAL TYPE
WITH DRIP RING**

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TAG NO.
TYPE 'A'
1. PT-332805
2. PT-332807
3. PT-332868
TYPE 'B'
1. PT-332804
2. PT-332806



(ON HORIZONTAL LINE)
TYPE 'A'



(ON VERTICAL LINE)
TYPE 'B'

NOTES:-

1. 3 WAY 2 VALVE MANIFOLD, ISOLATION VALVE AND NIPPLE WILL BE IN SCOPE OF INSTRUMENT VENDOR.
2. 3/4" SW SOCKOLET TAPPING SHALL BE PROVIDED BY PIPING.
3. TIG WELDING OF DIFFERENT MATERIALS SHALL BE IN THE SCOPE OF SITE CONTRACTOR.
4. MATERIAL OF CONSTRUCTION FOR PREFAB HOOKUP SHALL BE 316SS AS MINIMUM.

BILL OF MATERIALS

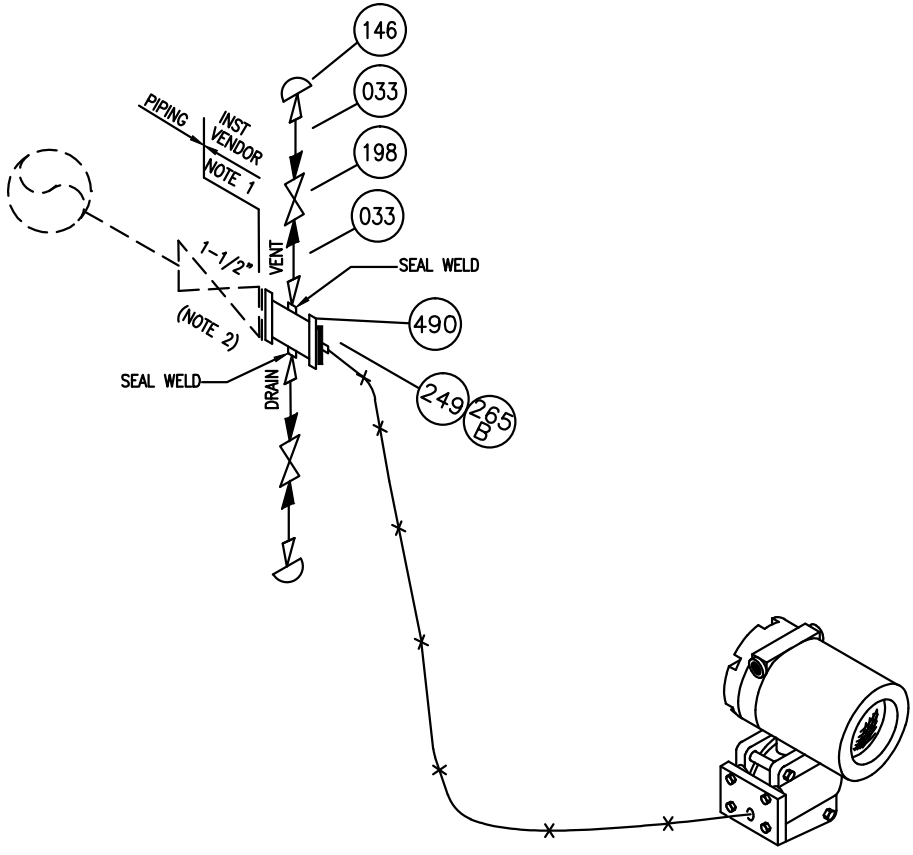
ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
303	SEAMLESS TUBE	12 MM O.D.	SS	2 M	10 M						
311	MALE CONNECTOR	1/4" NPT(M) X 12 MM O.D.	SS	1	5						
379	TUBING CAP	12 MM O.D.	SS	1	5						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG

**INSTRUMENT HOOK UP DRAWINGS
PRESSURE TRANSMITTER LIQUID/GAS SERVICE
WITH 3 WAY VALVE MANIFOLD
DIRECT INSTALLATION (PREFABRICATED)**

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TAG NO.
1. PT-332860
2. PT-332861
3. PT-332862
4. PT-332863
5. PT-332864
6. PT-332870



NOTES:-

- FOLLOWING ITEMS PER TAG SHALL BE LOOSE SUPPLIED BY INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
 - REMOTE DIAPHRAGM WITH CAPILLARY
 - DRIP RING WELD WITH NIPPLE NPT(M) X PE, VENT & DRAIN BOTH SIDE. ALONG WITH GASKET, STUD & BOLTS.
 - SW GATE VALVE WITH SW NIPPLE PE NPT (M) AT OTHER END.
 - ELBOW SW
 INSTALLATION BY INSTRUMENT SITE CONTRACTOR. (INCLUDING REQUIRED FIT-UP, WELDING TESTING)
- 1-1/2" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
032	NIPPLE	1/2" PE x 1/2" PE	SS	2	12						
033	NIPPLE	1/2" NPT(M) x 1/2" PE	SS	4	24						
125	ELBOW	1/2" SW	SS	2	12						
146	PIPE CAP	1/2" NPT(F)	SS	2	12						
198	GATE VALVE	1/2" SW	SS	2	12						
249	GASKET	1-1/2" FLANGE	SS	2 SET	12 SET						
265B	STUDS & BOLTS	1-1/2" FLANGE LONG	SS	2 SET	12 SET						
490	DRIP RING	1-1/2" FL (WITH 1/2" NPT (F) DRAIN & VENT)	SS	1	6						

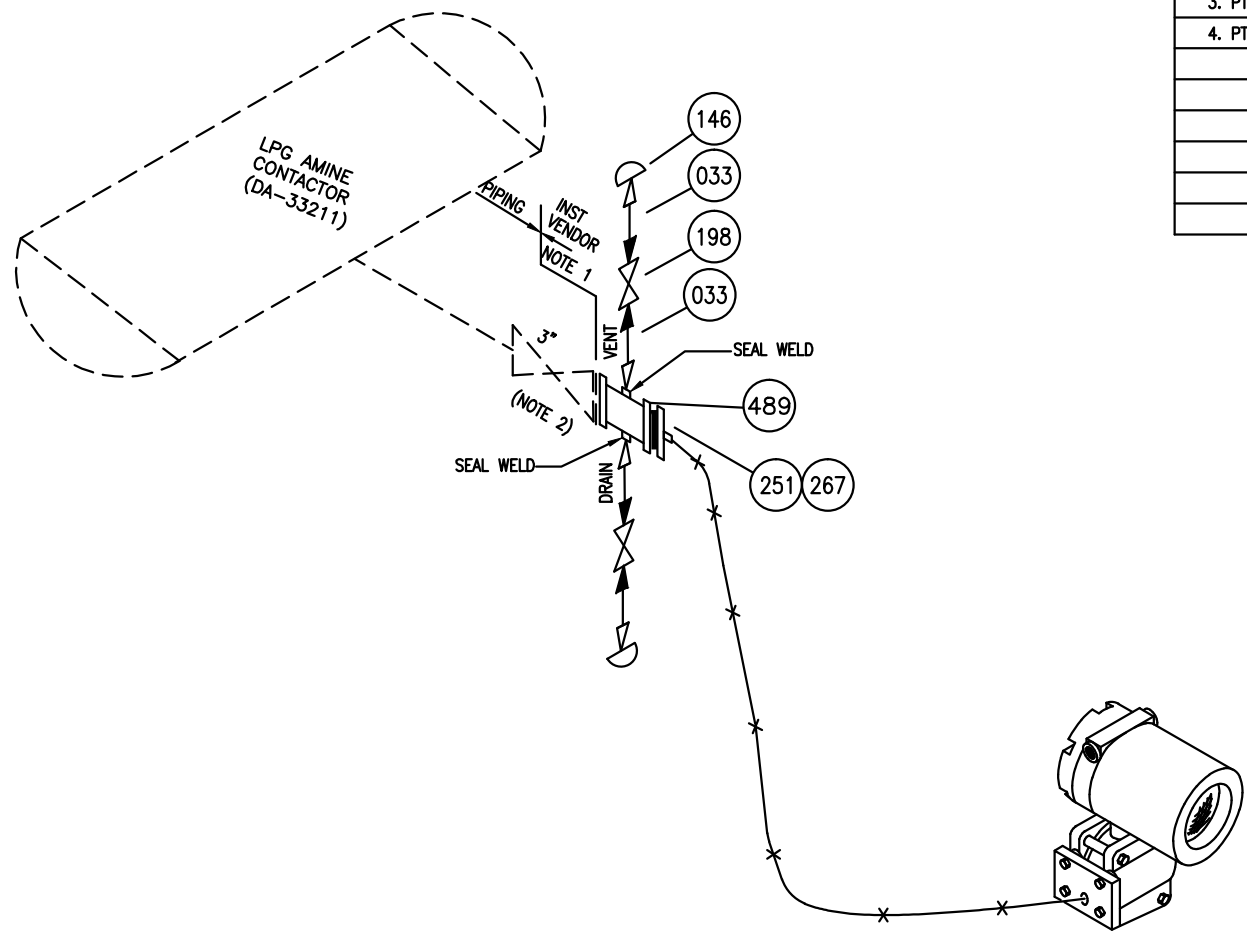
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INSTRUMENT HOOK UP DRAWINGS
PRESSURE TRANSMITTER DIAPHRAGM
SEAL TYPE WITH DRIP RING

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TAG NO.
1. PT-332808
2. PT-332809
3. PT-332810
4. PT-332811



NOTES:-

1. FOLLOWING ITEMS PER TAG SHALL BE LOOSE SUPPLIED BY INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
 - a. REMOTE SEAL DIAPHRAGM WITH CAPILLARY
 - b. DRIP RING WITH WELD NIPPLE NPT(M) X PE, VENT & DRAIN BOTH SIDE. ALONG WITH GASKET, STUD & BOLTS.
 - c. SW GATE VALVE WITH SW NIPPLE PE NPT (M) AT OTHER END.
 - d. CAP NPT(F)

INSTALLATION BY INSTRUMENT SITE CONTRACTOR. (INCLUDING REQUIRED FIT-UP, WELDING TESTING)
2. 3" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
033	NIPPLE	1/2" NPT(M) x 1/2" PE	SS	4	16						
146	PIPE CAP	1/2" NPT(F)	SS	2	8						
198	GATE VALVE	1/2" SW	SS	2	8						
251	GASKET	FOR 3" FLANGE	SS	2 SET	8 SET						
267	STUDS & BOLTS	FOR 3" FLANGE LONG	SS	2 SET	8 SET						
489	DRIP RING	3" FL (WITH 1/2" NPT (F) DRAIN & VENT)	SS	1	4						

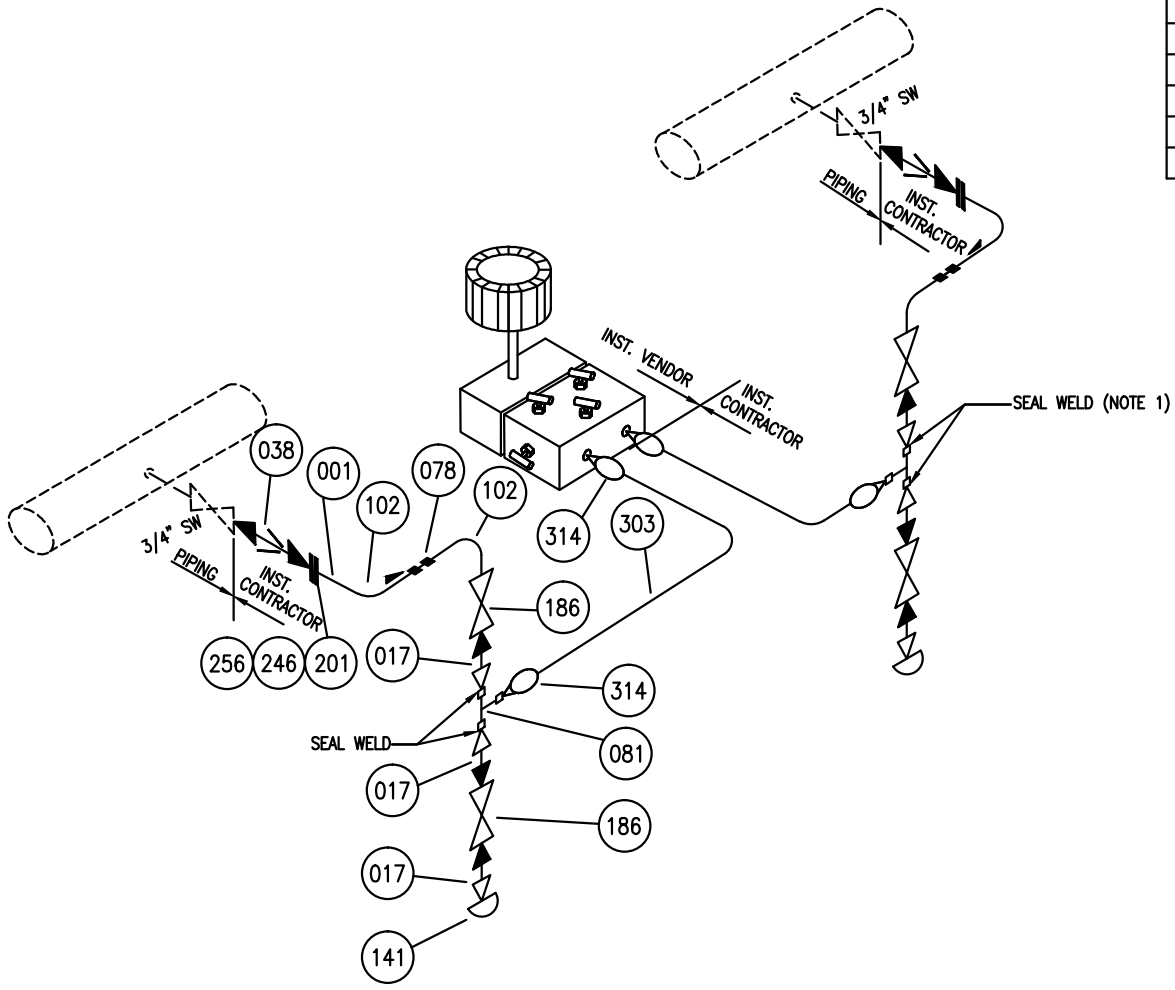
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**INSTRUMENT HOOK UP DRAWINGS
PRESSURE TRANSMITTER DIAPHRAGM
SEAL TYPE WITH DRIP RING
FOR FLUSHING / PURGING ON VESSEL**

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TAG NO.
1. PDT-332812
2. PDT-332813



NOTES:-

1. THREADED CONNECTIONS (AS MARKED) SHALL BE SEAL WELDED BY INSTRUMENT CONTRACTOR.
2. 5 VALVE MANIFOLD SHALL BE PROVIDED BY INSTRUMENT VENDOR.
3. ALL CS MATERIALS SHALL BE NACE MR0103 (HIC) AXEN-43 STD-IN-43 COMPLIANT

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
001	PIPE	1/2" PE	CS	12 M	24 M	256	STUD & BOLTS	1/2" FL	SS	2 SET	4 SET
017	NIPPLE	1/2" NPT(M) x 1/2" PE	CS	6	12	303	SEAMLESS TUBE	12 MM OD	SS	3 M	6 M
038	SWAGE NIPPLE	3/4" PE x 1/2" PE	CS	2	4	314	MALE CONNECTOR	1/2" NPT(M) x 12 MM OD	SS	4	8
078	COUPLING	1/2" SW	CS	2	4						
081	EQUAL TEE	1/2" NPT(F)	CS	2	4						
102	ELBOW 90°	1/2" SW	CS	4	8						
141	PIPE CAP	1/2" NPT(F)	CS	2	4						
186	GATE VALVE	1/2" SW	CS	4	8						
201	FLANGE	1/2" SW	CS	4	8						
246	GASKET	1/2"	SS	2 SET	4 SET						

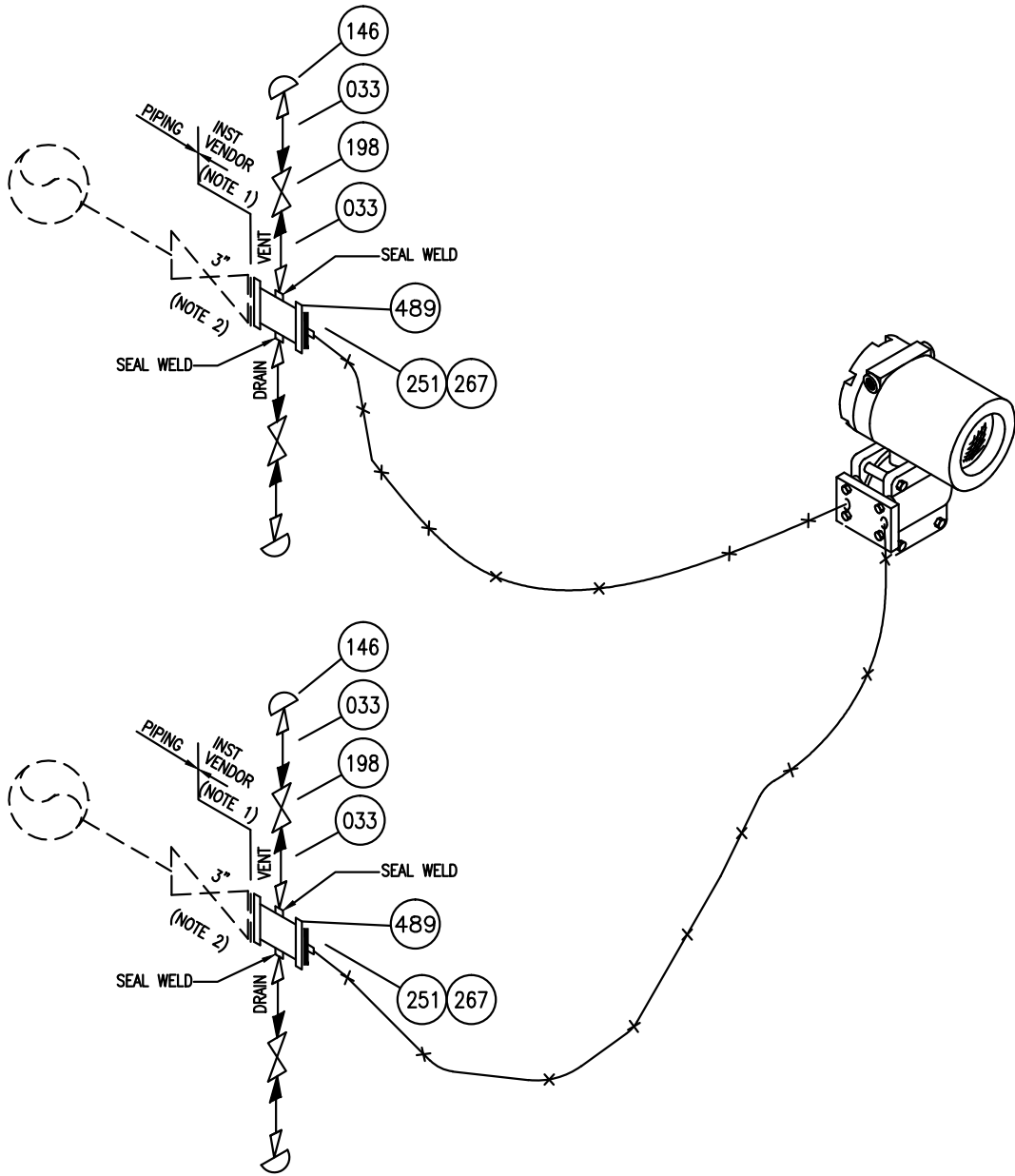
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**INSTRUMENT HOOK UP DRAWINGS
DIFFERENTIAL PRESSURE TRANSMITTER WITH
5 WAY MANIFOLD AND TUBING
FOR LIQUID SERVICE (METER BELOW)**

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TAG NO.
1. PDT-332829
2. PDT-332865
3. PDT-332866
4. PDT-332867



NOTES:-

1. FOLLOWING ITEMS PER TAG SHALL BE LOOSE SUPPLIED BY INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
 - a. REMOTE SEAL DIAPHRAGM WITH CAPILLARY
 - b. DRIP RING WELD WITH NIPPLE NPT(M) X PE, VENT & DRAIN BOTH SIDE. ALONG WITH GASKET, STUD & BOLTS.
 - c. SW GATE VALVE WITH SW NIPPLE PE NPT (M) AT OTHER END.
 - d. ELBOW SW

INSTALLATION BY INSTRUMENT SITE CONTRACTOR. (INCLUDING REQUIRED FIT-UP, WELDING TESTING)
2. 3" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
032	NIPPLE	1/2" PE x 1/2" PE	SS	4	16						
033	NIPPLE	1/2" NPT(M) x 1/2" PE	SS	8	32						
125	ELBOW	1/2" SW	SS	4	16						
146	PIPE CAP	1/2" NPT(F)	SS	4	16						
198	GATE VALVE	1/2" SW	SS	4	16						
251	GASKET	FOR 3" FLANGE	SS	4 SET	16 SET						
267	STUDS & BOLTS	FOR 3" FLANGE LONG	SS	4 SET	16 SET						
489	DRIP RING	3" FL (WITH 1/2" NPT (F) DRAIN & VENT)	SS	2	8						

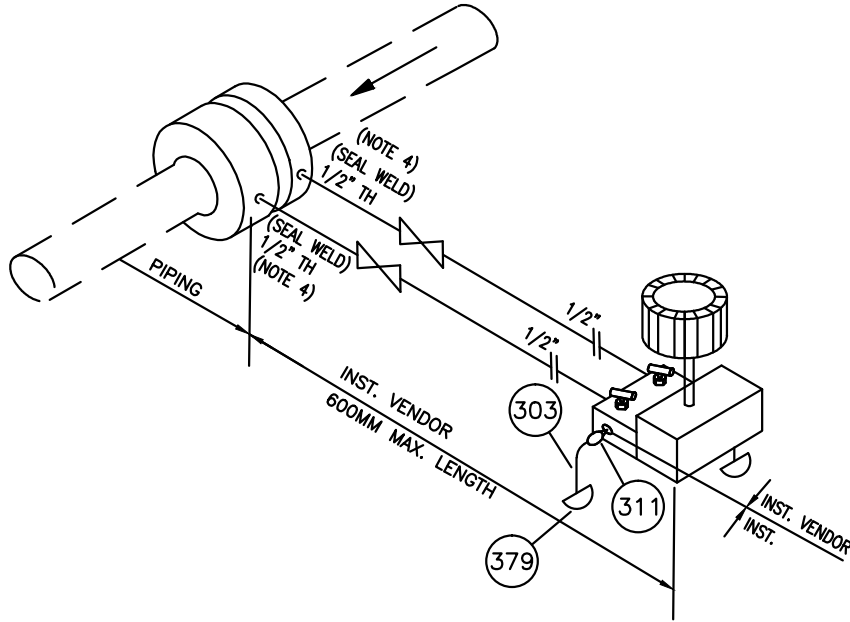
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**INSTRUMENT HOOK UP DRAWINGS
DIFFERENTIAL PRESSURE TRANSMITTER
DIAPHRAGM SEAL TYPE WITH DRIP RING
FOR FLUSHING / PURGING**

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TAG NO.
1. FT-332980
2. FT-332984
3. FT-332981



NOTES:-

1. ISOLATION VALVE, FLANGE, 5 WAY MANIFOLD WITH TRANSMITTER WILL BE IN SCOPE OF INSTRUMENT VENDOR.
2. WELDING OF DIFFERENT MATERIAL SHALL BE IN THE SCOPE OF INSTRUMENT VENDOR. ONLY TIG WELDING SHALL BE ADOPTED FOR PREFAB HOOKUP INSTALLATIONS.
3. MATERIAL OF CONSTRUCTION FOR PREFAB HOOKUP SHALL BE 316SS AS MINIMUM.
4. ALL THREADED CONNECTIONS SHALL BE TIG WELDING BY INSTRUMENT CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.
303	SEAMLESS TUBE	12 MM OD	SS	2 M	6 M					
311	MALE CONNECTOR	1/4" NPT(M) x 12 MM OD	SS	2	6					
379	TUBING CAP	12 MM OD	SS	2	6					

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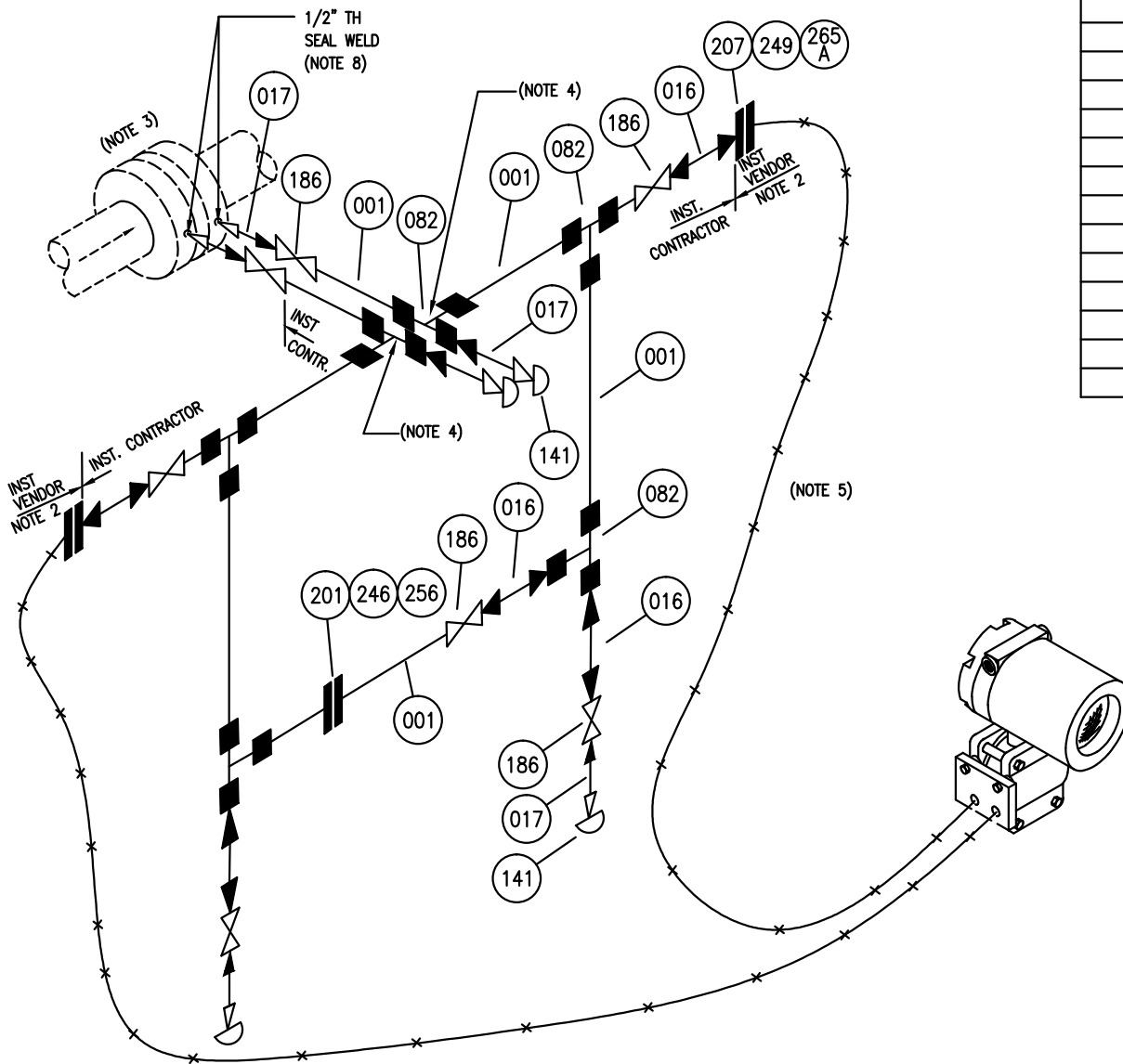


**INSTRUMENT HOOK UP DRAWINGS
FLOW TRANSMITTER DP TYPE
LIQUID SERVICE
DIRECT INSTALLATION (PRE FABRICATED)**

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TAG NO.

- | | |
|----|-----------|
| 1. | FT-332992 |
| 2. | FT-332983 |
| 3. | FT-332989 |
| 4. | FT-332990 |
| 5. | FT-332991 |
| 6. | FT-332993 |
| | |
| | |
| | |
| | |



NOTES:-

1. REMOTE SEAL DIAPHRAGM WITH CAPILLARY, GASKET, STUD & NUTS (FOR 1.5") SHALL BE IN THE SCOPE OF INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
2. 1-1/2" SW COUNTER FLANGE CS, GASKET, STUDS AND NUTS SHALL BE IN THE SCOPE OF INSTRUMENT VENDOR.
3. TAPPING SHOWN IS FOR REPRESENTATION ONLY,
4. BOTH TEE SHALL BE AT SAME ELEVATION.
5. CAPILLARY TO BE SUPPORTED USING 25MM ANGLE THROUGHOUT ITS LENGTH AND CLAMPED.
6. DISTANCE BETWEEN 1ST ISOLATION VALVE AND DIA. SEAL TO BE KEPT MINIMUM.
7. ALL CS MATERIALS SHALL BE NACE MR0103 (HIC) AXEN-43 STD-IN-43 COMPLIANT.
8. THREADED CONNECTIONS (AT ORIFICE FLANGE) SHALL BE SEAL WELDED BY CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.		QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
001	PIPE	1/2" PE	CS	6M	36M	249	GASKET	1-1/2" FL	SS	2 SET	12 SET
016	NIPPLE	1/2" PE X PE	CS	5	30	256	STUDS & BOLTS	1/2" FL	SS	1 SET	6 SET
017	NIPPLE	1/2" NPT(M) X PE	CS	6	36	265A	STUDS & BOLTS	1-1/2" FL	SS	2 SET	12 SET
082	EQUAL TEE	1/2" SW	CS	6	36						
078	COUPLING	1/2" SW	CS	2	12						
141	CAP	1/2" NPT(F)	CS	4	24						
186	GATE VALVE	1/2" SW	CS	7	42						
201	FLANGE	1/2" SW	CS	2	12						
207	FLANGE	1-1/2" SW	CS	2	12						
246	GASKET	1/2" FL	SS	1 SET	6 SET						

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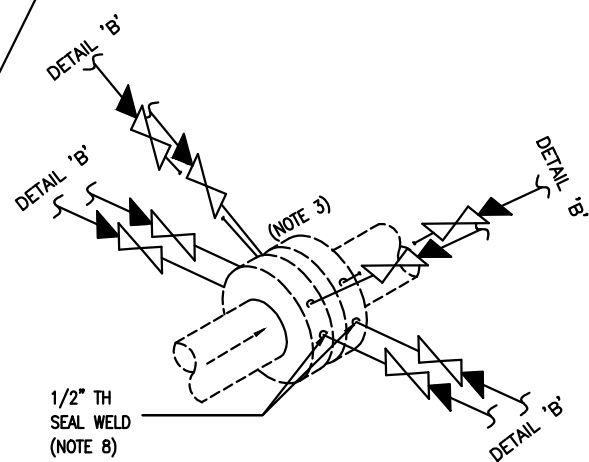
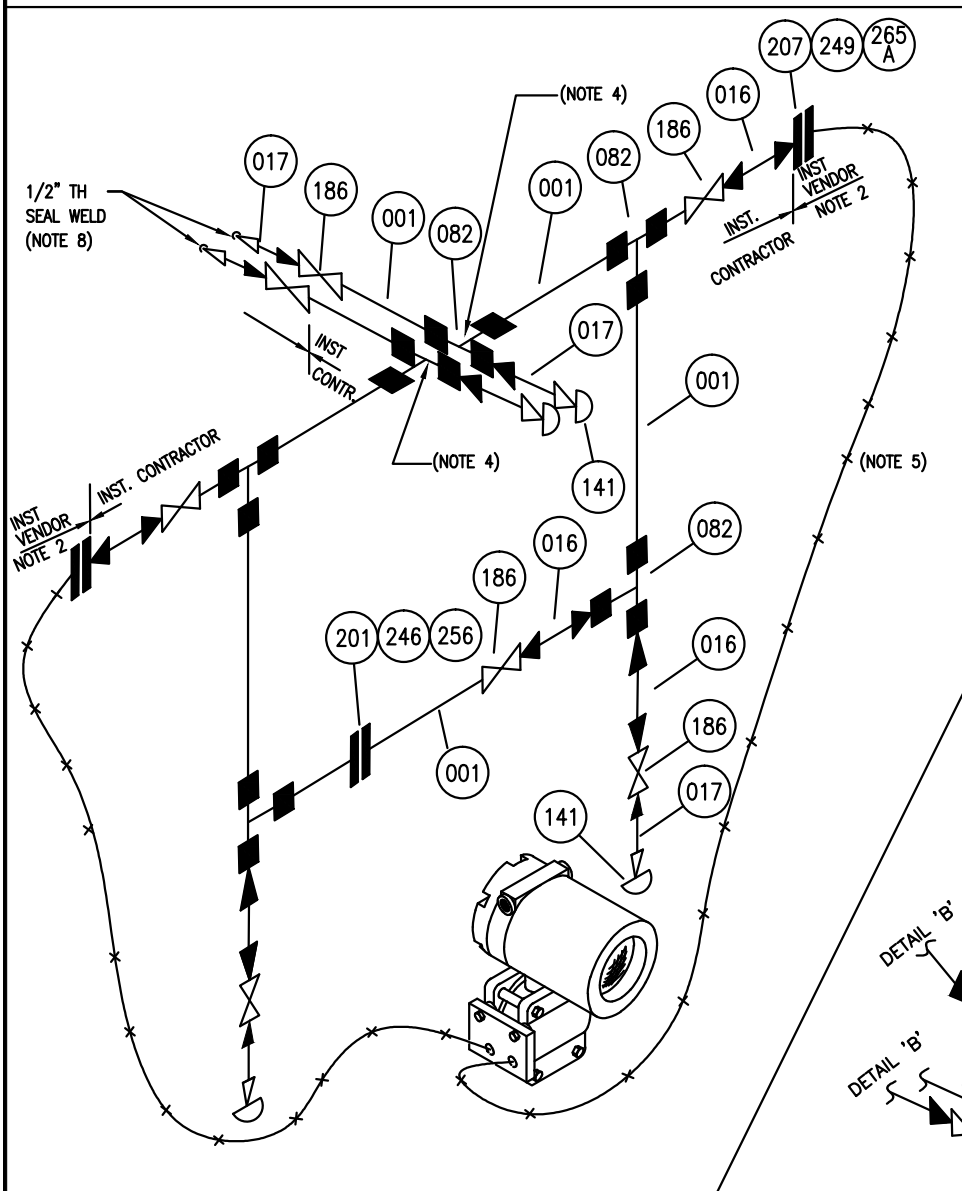


**INSTRUMENT HOOK UP DRAWINGS
FLOW TRANSMITTER DP TYPE WITH
DIAPHRAGM SEAL & WITH DRIP RING**

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TAG NO.

- 1. FT-332982
- 2. FT-332982A
- 3. FT-332982B
- 4. FT-332982C



DETAIL 'B'

NOTES:-

1. REMOTE SEAL DIAPHRAGM WITH CAPILLARY, GASKET, STUD & NUTS (FOR 1.5") SHALL BE IN THE SCOPE OF INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
2. 1-1/2" SW COUNTER FLANGE CS, GASKET, STUDS AND NUTS SHALL BE IN THE SCOPE OF INSTRUMENT VENDOR.
3. TAPPING SHOWN IS FOR REPRESENTATION ONLY,
4. BOTH TEE SHALL BE AT SAME ELEVATION.
5. CAPILLARY TO BE SUPPORTED USING 25MM ANGLE THROUGHOUT ITS LENGTH AND CLAMPED.
6. DISTANCE BETWEEN 1ST ISOLATION VALVE AND DIA. SEAL TO BE KEPT MINIMUM.
7. ALL CS MATERIALS SHALL BE NACE MRO103 (HIC) AXEN-43 STD-IN-43 COMPLIANT.
8. ALL THREADED CONNECTIONS (AT ORIFICE FLANGE) SHALL BE SEAL WELDED BY CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
001	PIPE	1/2" PE	CS	6M	24M	249	GASKET	1-1/2" FL	SS	2 SET	8 SET
016	NIPPLE	1/2" PE X PE	CS	5	20	256	STUDS & BOLTS	1/2" FL	SS	1 SET	4 SET
017	NIPPLE	1/2" NPT(M) X PE	CS	6	24	265A	STUDS & BOLTS	1-1/2" FL	SS	2 SET	8 SET
078	COUPLING	1/2" SW	CS	2	8						
082	EQUAL TEE	1/2" SW	CS	6	24						
141	CAP	1/2" NPT(F)	CS	4	16						
186	GATE VALVE	1/2" SW	CS	7	28						
201	FLANGE	1/2" SW	CS	2	8						
207	FLANGE	1-1/2" SW	CS	2	8						
246	GASKET	1/2" FL	SS	1 SET	4 SET						

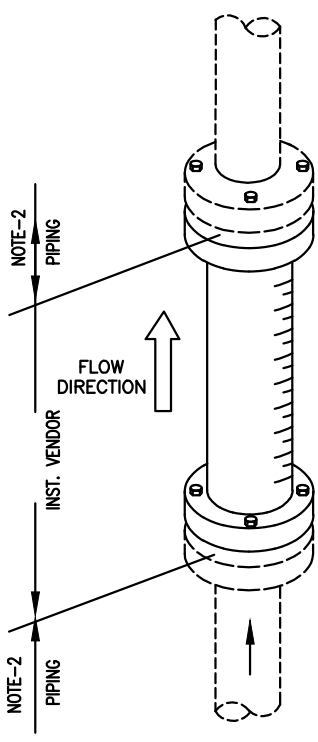
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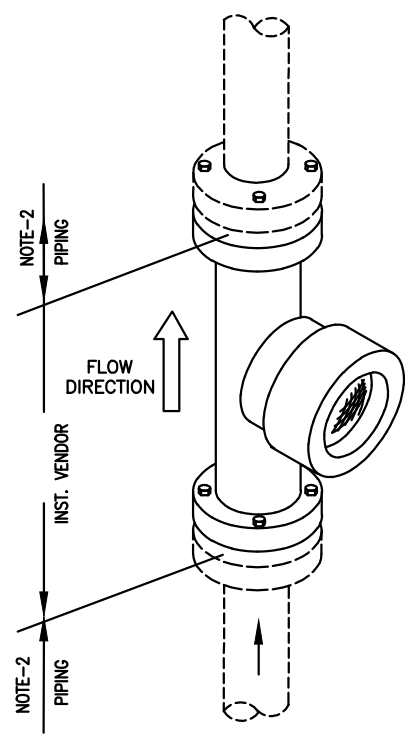
**INSTRUMENT HOOK UP DRAWINGS
 QUAD FLOW TRANSMITTER DP TYPE
 DIAPHRAGM SEAL & WITH DRIP RING
 FOR LIQUID SERVICE**

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Sheet 14 of 30	

TAG NO.
1. FT-332988
2. FI-332996
3. FI-332997



(SIGHT GLASS ROTAMETER)



(ROTAMETER WITH TRANSMITTER)

NOTES:-

- COUNTER FLANGES TO SUIT SPOOL PIECE FLANGES, GASKETS, NUTS & BOLTS SHALL BE UNDER PIPING SCOPE.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.

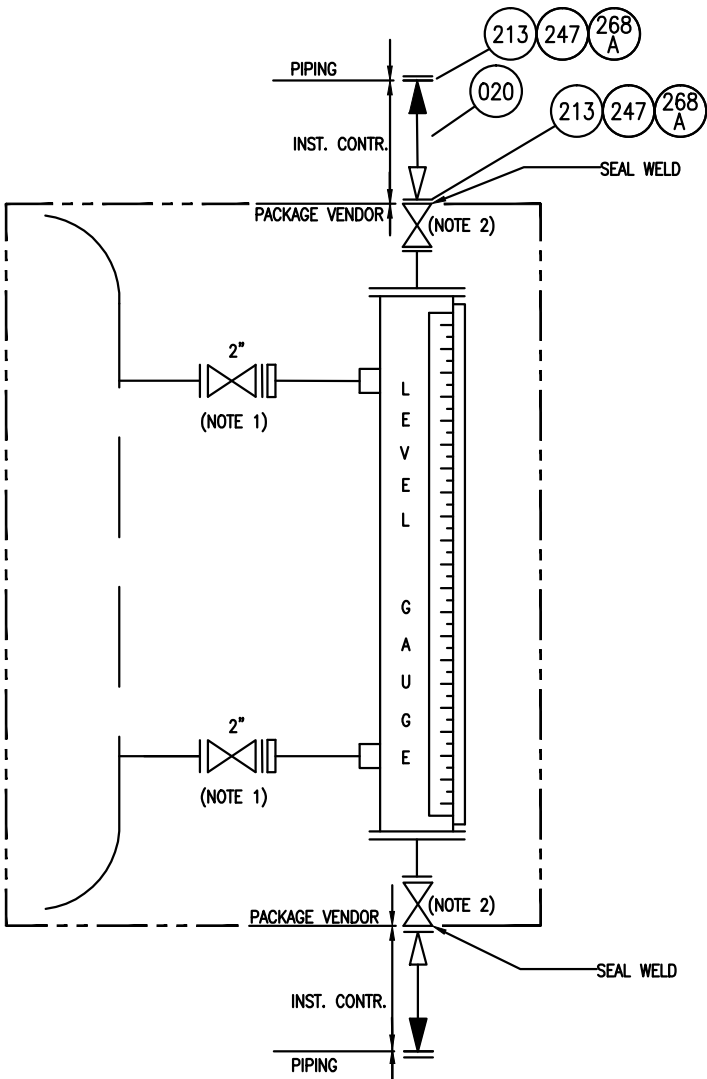
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INSTRUMENT HOOK UP DRAWINGS
ROTAMETER WITH OR WITHOUT TRANSMITTER

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TAG NO.
1. LG-3321171



NOTES:-

1. 2" FLANGED ISOLATION VALVE, GASKET, STUDS AND BOLTS SHALL BE IN PACKAGE VENDOR SCOPE OF SUPPLY.
2. VENT/DRAIN 3/4" NPT (F) TSO GATE VALVE 800# ARRANGEMENT TO BE SUPPLIED BY INST. VENDOR & SAME SHALL BE CONNECTED WITH FLARE & ABD NETWORK BY PIPING. PIPING SHOULD INCLUDE NIPPLE & FLANGE END CONNECTION FOR ISOLATING LEVEL CHAMBER

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
020	NIPPLE	3/4" PE X 3/4" NPT (M)	SS	2	2						
213	FLANGE	3/4" SW	SS	6	6						
247	GASKET	FOR 3/4" FLANGE	SS	4 SET	4 SET						
268A	STUDS & BOLTS	FOR 3/4" FLANGE LONG	SS	4 SET	4 SET						

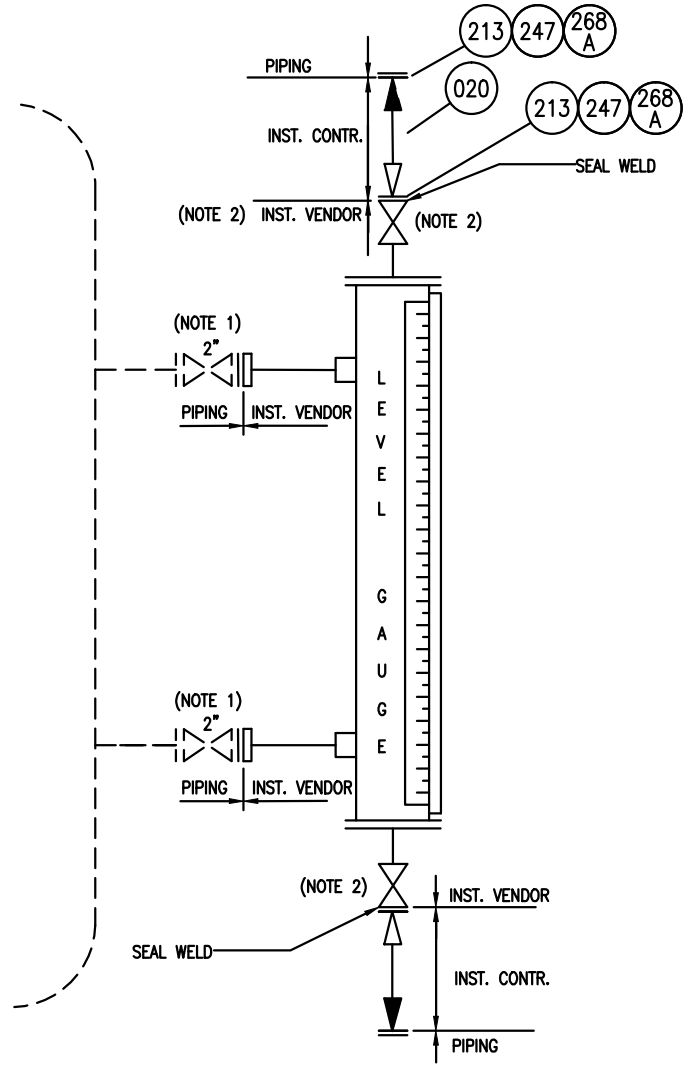
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**INSTRUMENT HOOK UP DRAWINGS
MAGNETIC LEVEL GAUGE
ON VESSEL 2INCH CONNECTION**

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TAG NO.
1. LG-3321172
2. LG-3321173



NOTES:-

- 2" FLANGED ISOLATION VALVE, GASKET, STUDS AND BOLTS SHALL BE IN PIPING SCOPE OF SUPPLY.
- VENT/DRAIN 3/4" NPT (F) TSO GATE VALVE 800# ARRANGEMENT TO BE SUPPLIED BY INST. VENDOR & SAME SHALL BE CONNECTED WITH FLARE & ABD NETWORK BY PIPING. PIPING SHOULD INCLUDE NIPPLE & FLANGE END CONNECTION FOR ISOLATING LEVEL CHAMBER

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
020	NIPPLE	3/4" PE X 3/4" NPT (M)	SS	2	4						
213	FLANGE	3/4" SW	SS	6	12						
247	GASKET	FOR 3/4" FLANGE	SS	4 SET	8 SET						
268A	STUDS & BOLTS	FOR 3/4" FLANGE LONG	SS	4 SET	8 SET						

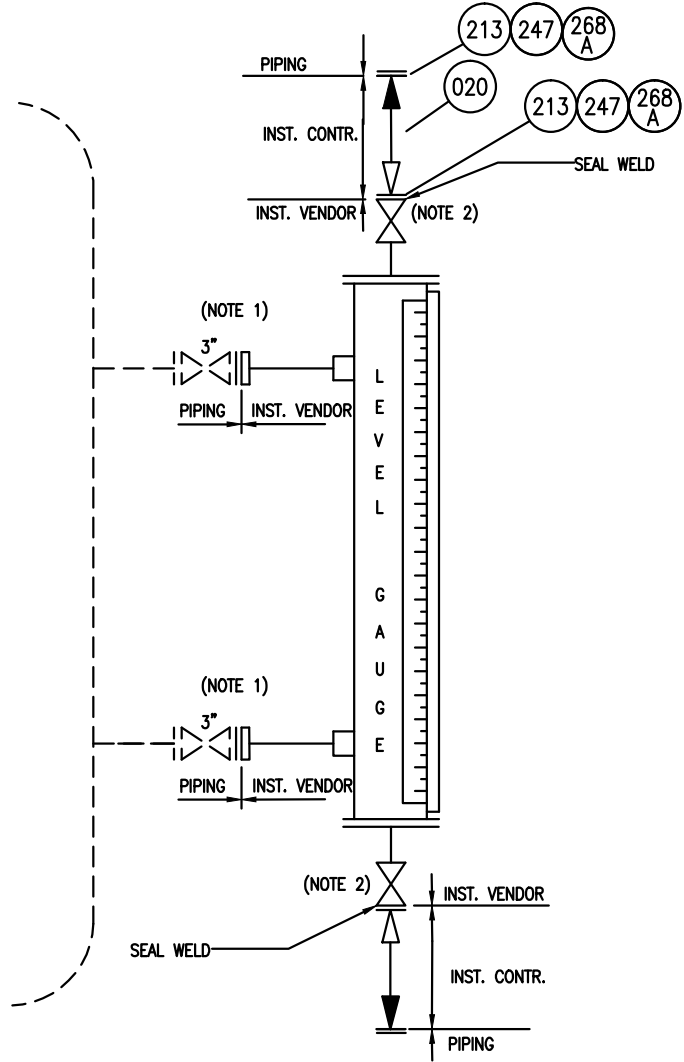
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INSTRUMENT HOOK UP DRAWINGS
MAGNETIC LEVEL GAUGE
ON VESSEL 2INCH CONNECTION

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TAG NO.
1. LG-3321170



NOTES:-

- 3" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.
- VENT/DRAIN 3/4" NPT (F) TSO GATE VALVE 800# ARRANGEMENT TO BE SUPPLIED BY INST. VENDOR & SAME SHALL BE CONNECTED WITH FLARE & ABD NETWORK BY PIPING. PIPING SHOULD INCLUDE NIPPLE & FLANGE END CONNECTION FOR ISOLATING LEVEL CHAMBER

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
020	NIPPLE	3/4" PE X 3/4" NPT (M)	SS	2	2						
213	FLANGE	3/4" SW	SS	6	6						
247	GASKET	FOR 3/4" FLANGE	SS	4 SET	4 SET						
268A	STUDS & BOLTS	FOR 3/4" FLANGE LONG	SS	4 SET	4 SET						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG

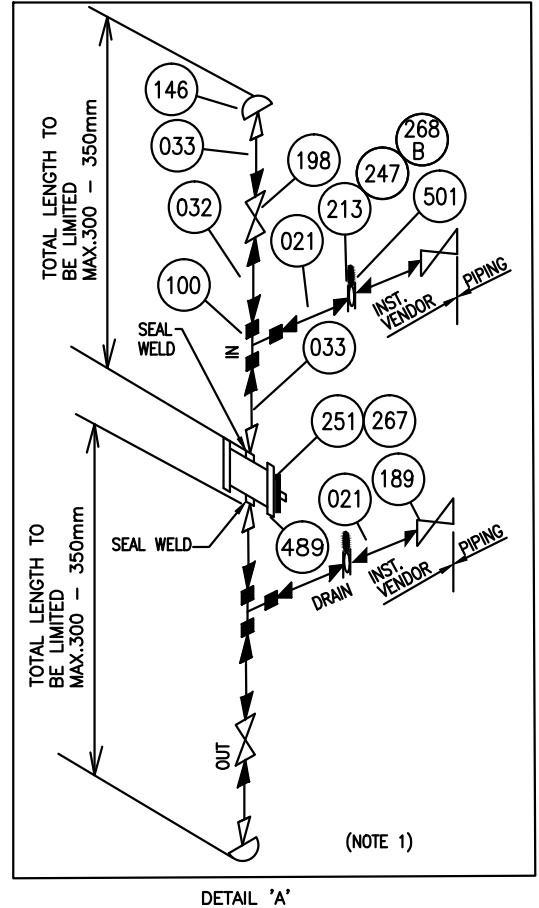
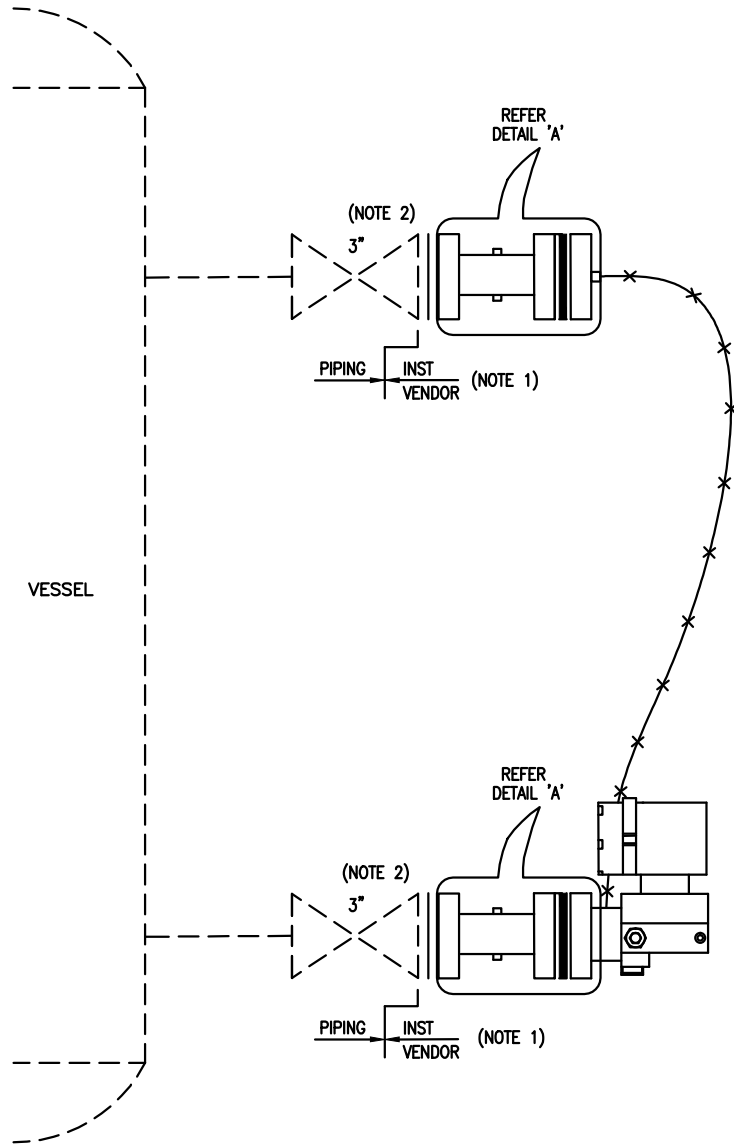


INSTRUMENT HOOK UP DRAWINGS
MAGNETIC LEVEL GAUGE
ON VESSEL 3INCH CONNECTION

Doc. Number	Rev.
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TAG NO.

- 1. LT-332662
- 2. LT-332663A
- 3. LT-332663B
- 4. LT-332663C
- 5. LT-332664
- 6. LT-3321203A
- 7. LT-3321203B
- 8. LT-3321203C
- 9. LT-332651
- 10. LT-332650A
- 11. LT-332650B
- 12. LT-332650C



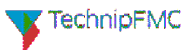
NOTES:-

1. FOLLOWING ITEMS PER TAG SHALL BE LOOSE SUPPLIED BY INSTRUMENT VENDOR. AS DESCRIBED BELOW IN BILL OF MATERIAL.
 - a. REMOTE SEAL DIAPHRAGM WITH CAPILLARY
 - b. DRIP RING WITH WELD NIPPLE 1/2" NPT(M) X PE, VENT & DRAIN BOTH SIDE. ALONG WITH GASKET, STUD & BOLTS. OF INST. FLANGE END.
 - c. 1/2' SW GATE VALVE WITH SW NIPPLE PE AT OTHER END.
 - d. 1/2" TO 3/4" UNEQUAL TEE SW, 3/4" SW NIPPLE , 3/4" SPECTACLE BLIND, 3/4" SW FLANGES, 3/4" SW GATE VALVE, 3/4" GASKETS STUDS AND NUTS
 INSTALLATION BY INSTRUMENT SITE CONTRACTOR. (INCLUDING REQUIRED FIT-UP, WELDING TESTING)
2. 3" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
021	NIPPLE	3/4" PE X 3/4" PE	SS	8	96	267	STUDS & BOLTS	FOR 3" FLANGE LONG	SS	4 SET	48 SET
032	NIPPLE	1/2" PE X 1/2" PE	SS	4	48	268B	STUDS & BOLTS	FOR 3/4" FLANGE LONG	SS	4 SET	48 SET
033	NIPPLE	1/2" NPT(M) X 1/2" PE	SS	8	96	489	DRIP RING	3" FL (WITH 1/2" NPT (F) DRAIN & VENT)	SS	2	24
100	UNEQUAL TEE	1/2" SW X 1/2" SW X 3/4" SW	SS	4	48	501	SPECTACLE BLIND	3/4"	SS	4	48
146	PIPE CAP	1/2" NPT(F)	SS	4	48						
189	GATE VALVE	3/4" SW	SS	4	48						
198	GATE VALVE	1/2" SW	SS	4	48						
213	FLANGE	3/4" SW	SS	8	96						
247	GASKET	FOR 3/4" FLANGE	SS	8 SET	96 SET						
251	GASKET	FOR 3" FLANGE	SS	4 SET	48 SET						

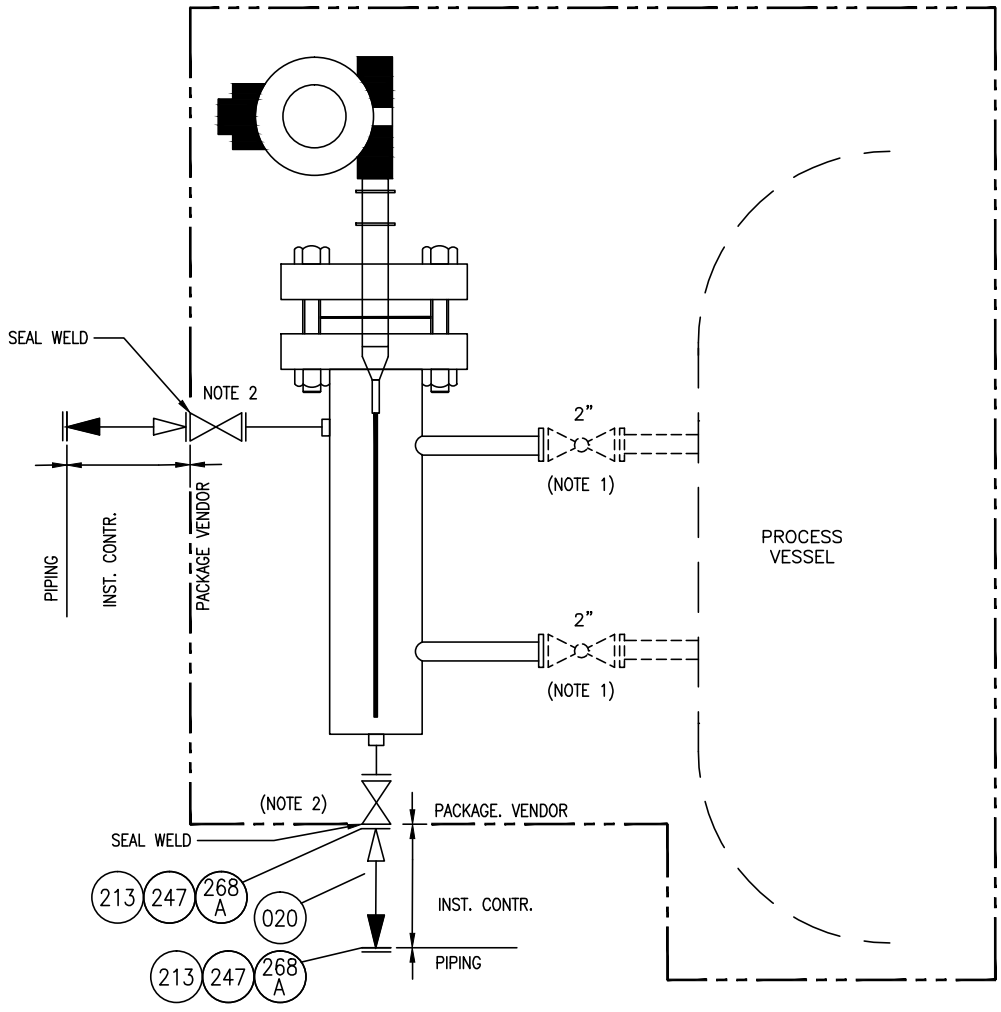
AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG



**INSTRUMENT HOOK UP DRAWINGS
LEVEL TRANSMITTER DP TYPE
WITH DIAPHRAGM SEAL & DRIP RING
FOR FLUSHING / PURGING**

Doc. Number	Rev.
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Sheet 19 of 30	

TAG NO.
1. LT-332652
2. LT-332653A
3. LT-332653B
4. LT-332653C



NOTES:-

- 2" FLANGED ISOLATION VALVE, GASKET, STUDS AND BOLTS SHALL BE IN PACKAGE VENDOR SCOPE OF SUPPLY.
- VENT/DRAIN 3/4" NPT (F) TSO GATE VALVE 800# ARRANGEMENT TO BE SUPPLIED BY INST. VENDOR & SAME SHALL BE CONNECTED WITH FLARE & ABD NETWORK BY PIPING. PIPING SHOULD INCLUDE NIPPLE & FLANGE END CONNECTION FOR ISOLATING LEVEL CHAMBER

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
020	NIPPLE	3/4" PE X 3/4" NPT (M)	SS	2	8						
213	FLANGE	3/4" SW	SS	6	24						
247	GASKET	FOR 3/4" FLANGE	SS	4 SET	16 SET						
268A	STUDS & BOLTS	FOR 3/4" FLANGE LONG	SS	4 SET	16 SET						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG

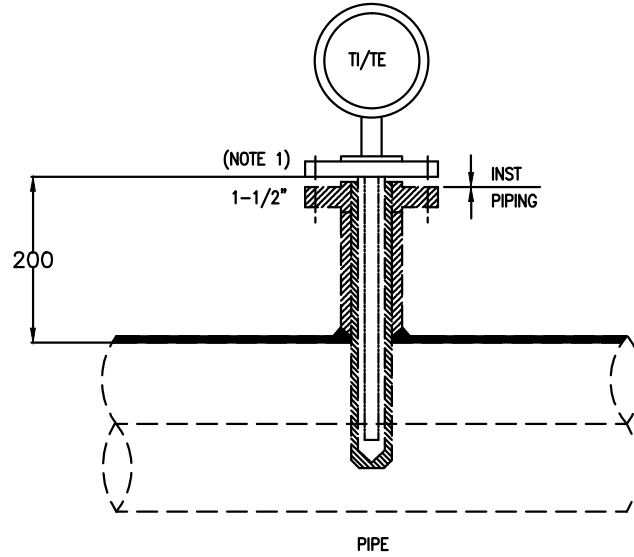


INSTRUMENT HOOK UP DRAWINGS
GWR & CAPACITANCE TYPE
LEVEL TRANSMITTER (WITH STILLING WELL)
2 INCH CONNECTION

Doc. Number		Rev.
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TAG NO.

- 1. TW/TE-3321180
- 2. TW/TE-3321181
- 3. TW/TE-3321182
- 4. TW/TE-3321183
- 5. TW/TE-3321184
- 6. TW/TE-3321185
- 7. TW/TE-332610
- 8. TW/TE-332611
- 9. TW/TE-332612
- 10. TW/TE-332613
- 11. TW/TE-332614
- 12. TW/TE-332615
- 13. TW/TE-332622
- 14. TW/TE-332623



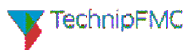
NOTES:-

- 1. 1-1/2" GASKET, STUDS AND NUTS SHALL BE IN PIPING SCOPE OF SUPPLY.
- 2. WHEREVER PROCESS LINES ARE BELOW 4", THE LINE SHALL BE BLOWN TO 4".

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.

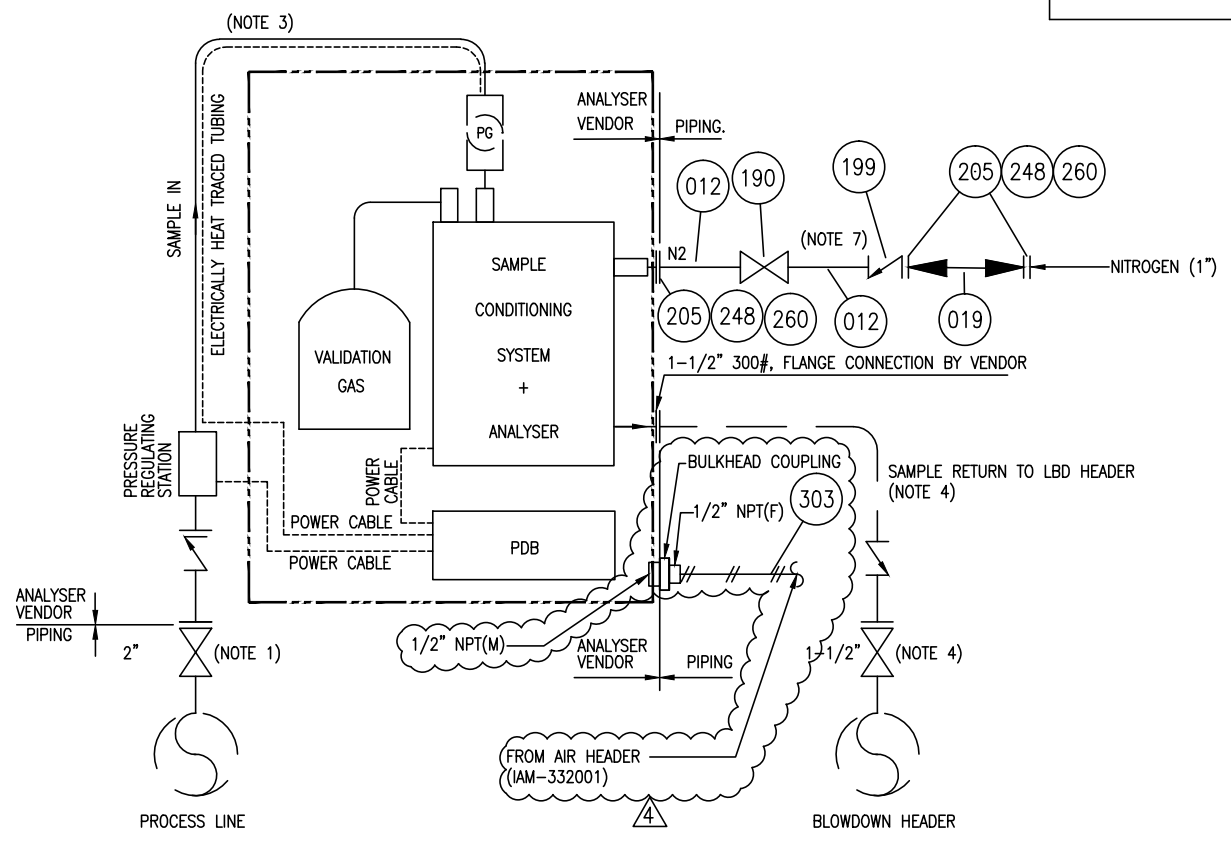
AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG



**INSTRUMENT HOOK UP DRAWINGS
TEMPERATURE GAUGE & TEMPERATURE
ELEMENT (1-1/2" FLANGED CONNECTION)**

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TAG NO.
1. AT-332090



HOLD:-

1. HOOKUP FOR H2S ANALYSER UNDER HOLD TILL VENDOR DATA & DESIGN FINALISED.

NOTES:-

1. 2" AND 300# FLANGED ISOLATION FULL BORE BALL VALVE(MOC: CS & INTERNAL MOC: SS) WITH GASKETS, NUTS, & BOLTS SHALL BE UNDER PIPING SCOPE.
2. 12 MM O.D. BULKHEAD UNION SHALL BE UNDER ANALYSER VENDOR SCOPE.
3. ELECTRIC HEAT TRACED TUBING IS SUPPLIED BY ANALYSER VENDOR. IF REQUIRED.
4. 1-1/2" FLANGED ISOLATION VALVE, GASKET, STUDS AND NUTS, CHECK VALVE AND ISOLATION VALVE FROM ANALYSER CABINET TO LBD HEADER SHALL BE IN PIPING SCOPE OF SUPPLY.
5. H2S SAMPLE TUBING, FLANGE AND OTHER FITTINGS UPTO ANALYSER TRANSMITTER SHALL BE IN ANALYSER VENDOR SCOPE OF SUPPLY.
6. VENDOR TO CONSIDER 20 METER (APPROX.) DISTANCE BETWEEN SAMPLE TAKE OFF AND ANALYSER CABINET.
7. NITROGEN LINE (1") INCLUDING NRV, ISOLATION GATE VALVE, COUNTER FLANGE, GASKET, STUD BOLT FLANGE BY PIPING (SUPPLY & INSTALLATION)

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
012	PIPE	1" PE	CS	2 M	2 M						
019	NIPPLE	1" PE X 1" PE	CS	1	1						
190	GATE VALVE	1" SW	CS	1	1						
199	CHECK VALVE	1" SW	CS	1	1						
205	FLANGE	1" SW	CS	5	5						
248	GASKET	1" FL	SS	3 SET	3 SET						
260	STUDS & BOLTS	1" FL	SS	3 SET	3 SET						
303	SEAMLESS TUBE	12mm QD	SS	20 M	20 M	4					

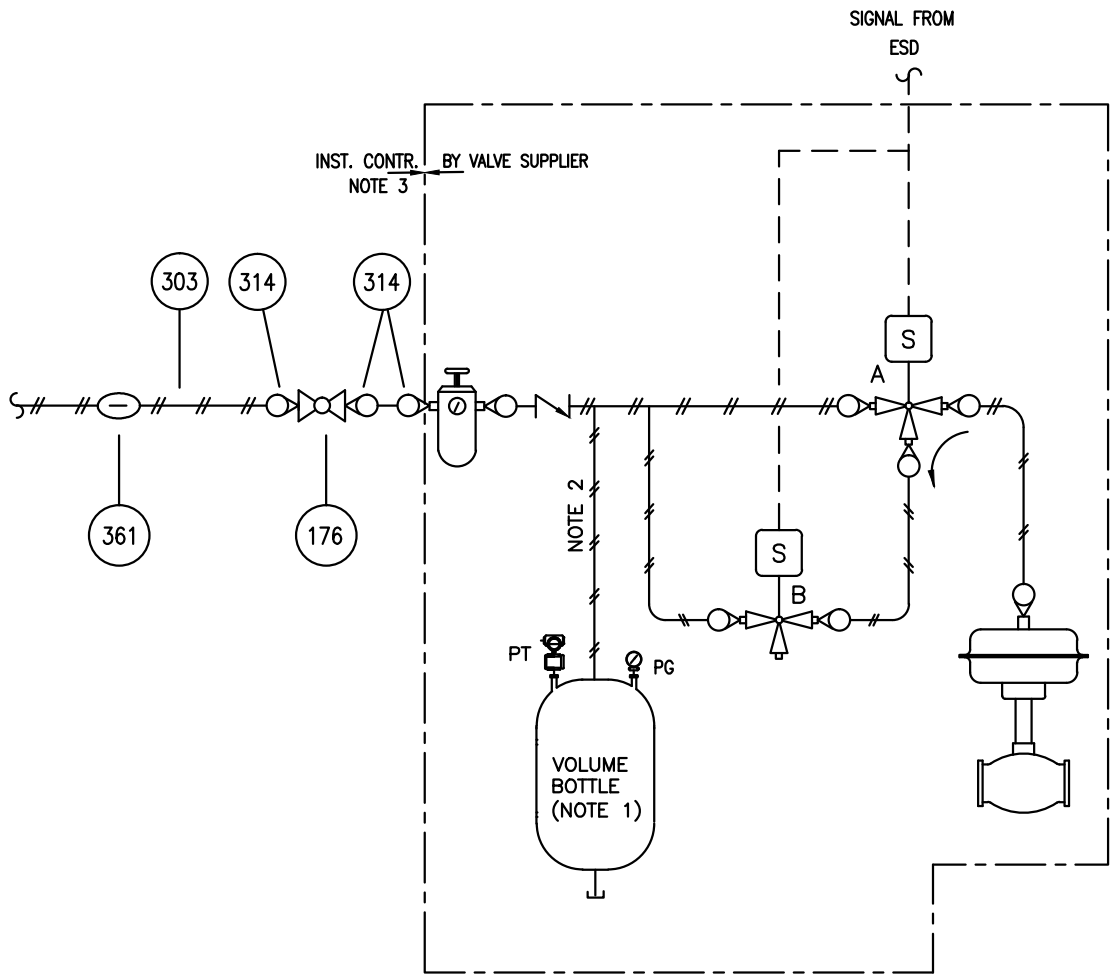
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**INSTRUMENT HOOK UP DRAWINGS
H2S ANALYSER
(TUBING CONNECTIVITY)**

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Sheet 22 of 30	

TAG NO.
1. UV-332090
2. UV-332091



NOTES:-

1. FOR VOLUME TANK HOOKUP REFER SHEET NO. 26 OF 30.
2. TUBING CONNECTION TO VOLUME TANK SHALL BE DONE AT SITE BY INSTRUMENT CONTRACTOR, AND TUBE AND TUBE FITTINGS WILL BE SUPPLIED BY VALVE SUPPLIER. IF VOLUME TANK IS LOOSE SUPPLIED.
3. TUBING, BALL VALVE AND FITTINGS UPTO AFR SHALL BE SUPPLIED AND INSTALLED BY INSTRUMENT SITE CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
176	BALL VALVE	1/2" NPT(F)	SS	1	2						
303	SEAMLESS TUBE	12mm OD	SS	20 M	40 M						
314	MALE CONNECTOR	1/2" NPT(M) X 12mm OD	SS	4	8						
361	TUBE UNION	12mm OD	SS	4	8						

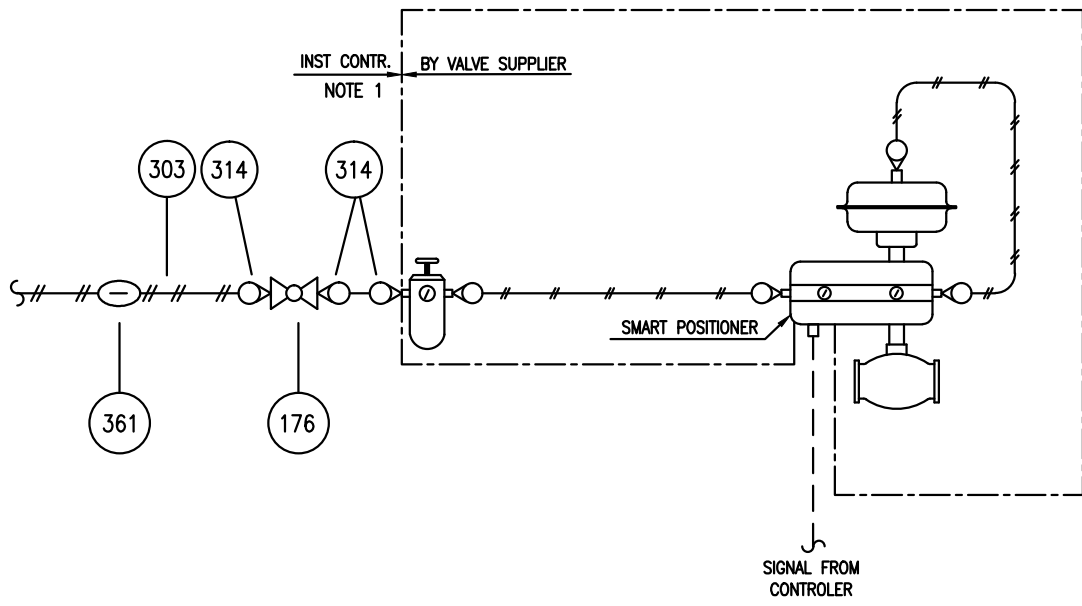
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INSTRUMENT HOOK UP DRAWINGS
ON-OFF VALVE WITH TWO SOLENOID VALVE
(12mm OD TUBING)

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TAG NO.
1. LV-332651
2. LV-332652
3. LV-332664
4. FV-332982
5. FV-332984
6. FV-332989
7. FV-332990
8. FV-332991
9. PV-332861A
10. PV-332861B
11. PV-332862A
12. PV-332862B
13. FV-332321
14. PV-33201N



NOTES:-

1. TUBING, BALL VALVE AND FITTINGS UPTO AFR SHALL BE SUPPLIED AND INSTALLED BY INSTRUMENT SITE CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
176	BALL VALVE	1/2" NPT(F)	SS	1	14						
303	SEAMLESS TUBE	12mm OD	SS	20 M	280 M						
314	MALE CONNECTOR	1/2" NPT(M) X 12mm OD	SS	4	56						
361	TUBE UNION	12mm OD	SS	4	56						

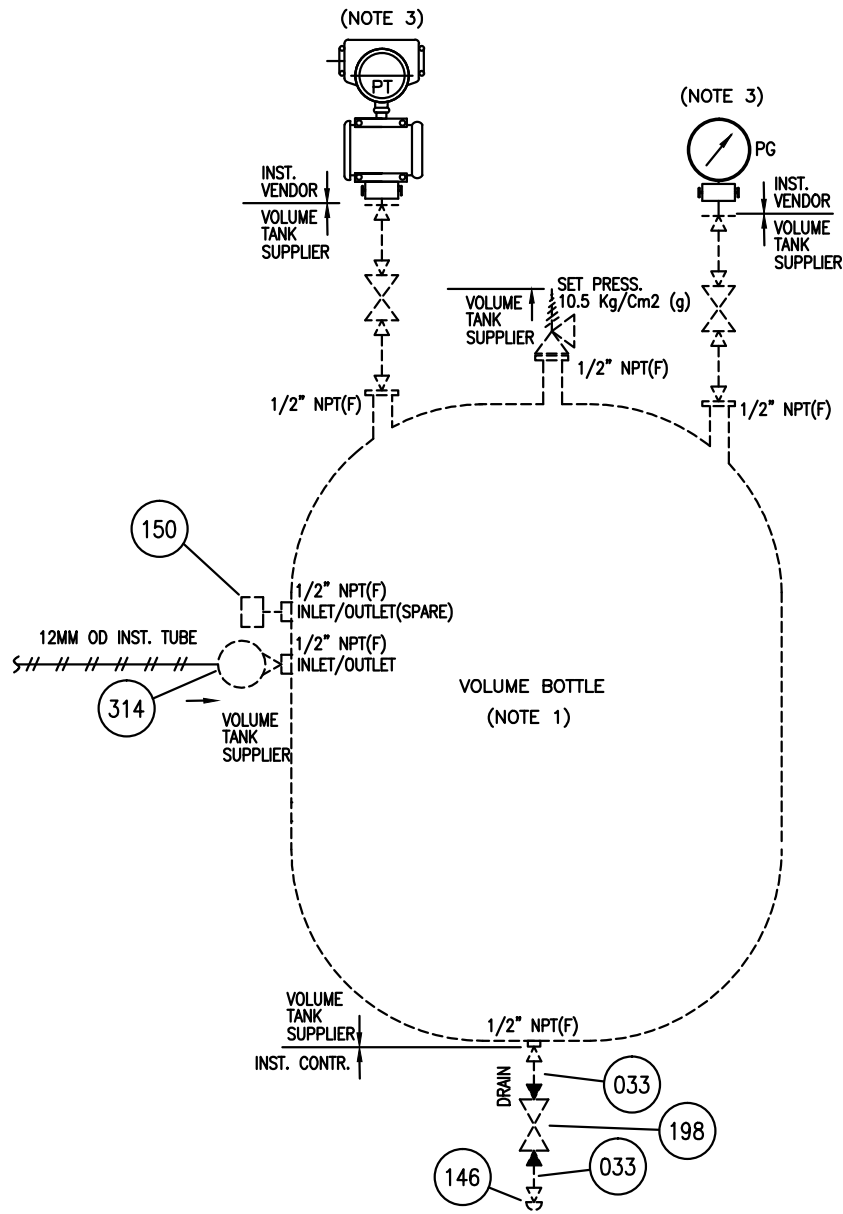
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INSTRUMENT HOOK UP DRAWINGS
CONTROL VALVE WITH SMART POSITIONER
(12mm OD TUBING)

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Sheet 24 of 30	

TAG NO.
1. PI-3321173
2. PI-3321174
3. PT-332090
4. PT-332091



NOTES:-

1. VOLUME TANK WITH ISOLATION VALVE, NIPPLE, 2 VALVE MANIFOLD, CONNECTOR, GATE VALVE, END CAP ETC AS LISTED BELOW SHALL BE SUPPLIED BY VALVE SUPPLIER.
2. VOLUME TANK SUPPORT SHALL BE PROVIDED BY VALVE SUPPLIER.
3. PRESSURE GAUGE & PRESSURE TRANSMITTER SHALL BE INSTALLED AT SITE AS PER INSTRUMENT HOOK UP BY SITE CONTRACTOR.
4. IF ANCHORING NEED TO BE DONE AT SITE, SAME SHALL BE DONE BY SITE CONTRACTOR.
5. ANY FIT-UPS, WELDING, THREADING & TESTING SHALL BE DONE BY INSTRUMENT SITE CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
033	NIPPLE	1/2" NPT(M) X PE	SS 316L	2	4						
146	PIPE CAP	1/2" NPT(F)	SS 316L	1	2						
150	PLUG	1/2" NPT(M)	SS 316L	1	2						
198	GATE VALVE	1/2" SW	SS 316L	1	2						
314	MALE CONNECTOR	1/2" NPT(M) x 12mm OD	SS 316L	1	2						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG



**INSTRUMENT HOOK UP DRAWINGS
VOLUME BOTTLE TANK WITH
PRESSURE GAUGE & PRESSURE TRANSMITTER**

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MANIFOLD GROUPING

IAM-332001

1. FV-332982

2. UV-332090

3. UV-332091

4. LV-332651

5. LV-332652

6. AT-332090

IAM-332002

1. FV-332989

2. PV-332861A

3. PV-332861B

4. PV-332862A

5. PV-332862B

6. FV-332990

7. FV-332991

IAM-332003

1. FV-332321

2. PV-332001N

3. LV-332664

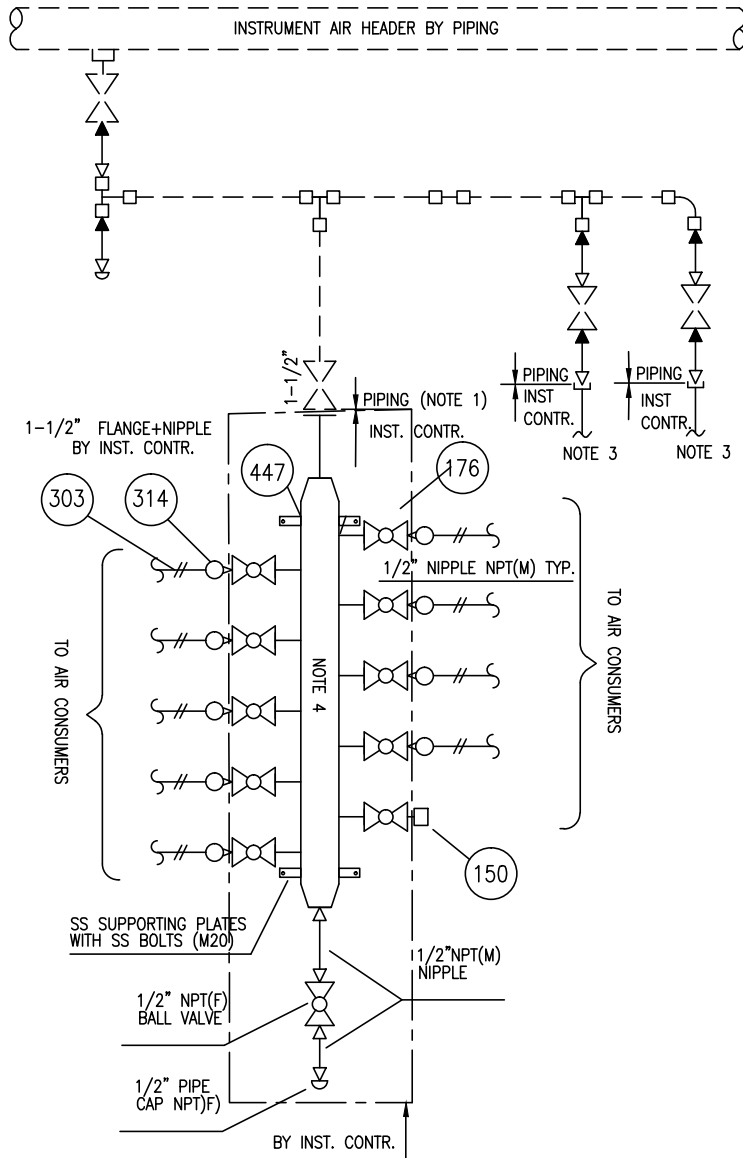
4. FV-332984

5. UV-332093A

6. UV-332093B

IAM-332004

1. UV-332092



NOTES:-

1. GASKET, STUDS & BOLTS 1-1/2" FLANGED ISOLATION VALVE SHALL BE IN PIPING SCOPE OF SUPPLY.
2. ALL SPARE CONNECTIONS SHALL BE PLUGGED WITH 316SS PLUG.
3. THE TAPPING SHALL BE USED FOR CONNECTING SPECIAL VALVES AND OTHER EQUIPMENTS ETC. WHERE EVER REQUIRED.
4. PREFABRICATED INSTRUMENT AIR MANIFOLD OF 316SS MATERIAL SHALL BE CONSIDERED WITH 1-1/2" INLET 1/2" DISTRIBUTION & 1/2" DRAIN OF BOTTOM HAVING 1 1/2" FLANGED END INLET AT TOP & 10 POINT DISTRIBUTION WITH 1/2" NPT (F) SS BALL VALVE FROM SIDE WITH DRAIN. HAVING 1/2" NPT (F) BALL VALVE WITH NIPPLE & CAP AT BOTTEM.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
150	PLUG	1/2" NPT(M)	SS	4	16						
303	SEAMLESS TUBE	12 MM OD	SS	A/R	A/R						
314	MALE CONNECTOR	1/2" NPT(M) X 12 MM OD	SS	7	21						
447	AIR MANIFOLD (10 POINTS)	1-1/2" (1-1/2" INLET, 1/2" DRAIN & 10 NOS. 1/2" NPT(M) OUTLET WITH COMPLETE BALL VALVE & FLANGE)	SS	1	4						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG



INSTRUMENT HOOK UP DRAWINGS
INSTRUMENT AIR MANIFOLD
WITH 10 TAKE OFF POINT

Doc. Number

9680-332-09-A4-9001

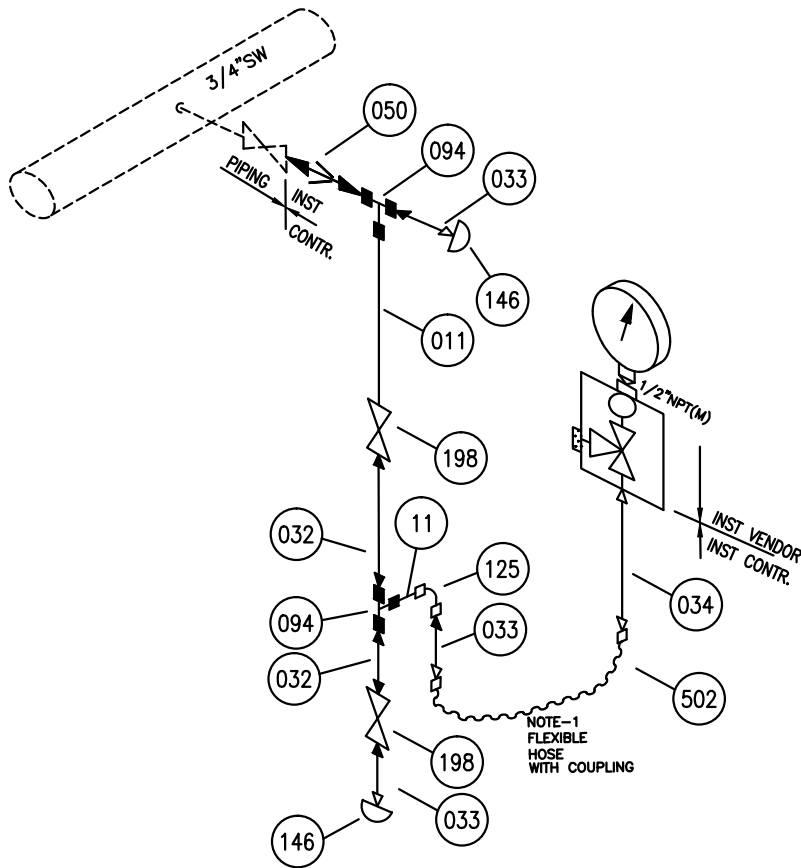
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TAG NO.

- 1. PI-3321153
- 2. PI-3321154
- 3. PI-3321162
- 4. PI-3321163



NOTES:-

- 1. FLEXIBLE SS316L HOSE WITH SS BRAIDING END CONNECTION 1/2"NPTF (2M LENGTH) BY INSTRUMENT SITE CONTRACTOR.
- 2. 2 WAY VALVE MANIFOLD SHALL BE PROVIDED BY INSTRUMENT VENDOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
011	PIPE	1/2" PE	SS	2 M	8 M	502	FLEXIBLE HOSE	1/2" NPT(F)	SS	1	4
032	NIPPLE	1/2" PE X PE	SS	2	8						
033	NIPPLE	1/2" NPT(M) X PE	SS	3	12						
034	NIPPLE	1/2" NPT(M)	SS	1	4						
050	SWAGE NIPPLE	3/4"PE X 1/2"PE	SS	1	4						
077	COUPLING	1/2" SW	SS	1	4						
094	EQUAL TEE	1/2" SW	SS	2	8						
125	ELBOW	1/2" SW	SS	1	4						
146	CAP	1/2" NPT(F)	SS	2	8						
198	GATE VALVE	1/2" SW	SS	2	8						

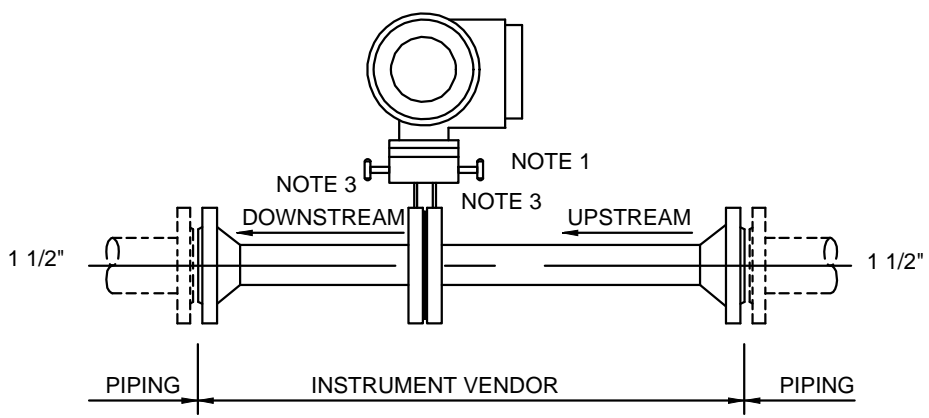
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**INSTRUMENT HOOK UP DRAWINGS
PRESSURE GAUGE LIQUID/GAS SERVICE
WITH STRAIGHT 3 WAY VALVE MANIFOLD
DIRECT INSTALLATION**

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TAG NO.
1. FT-332995



NOTES:-

1. TRANSMITTER MANIFOLD SHALL BE IN INSTRUMENT VENDOR SCOPE OF SUPPLY.
2. MATERIAL OF CONSTRUCTION FOR PREFAB HOOKUP SHALL BE SS316 AS MINIMUM.
3. PREFAB HOOKUP ASSEMBLY SHALL BE TIG WELDED TO THE INTEGRAL ORIFICE ASSEMBLY (AT SITE) BY CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.

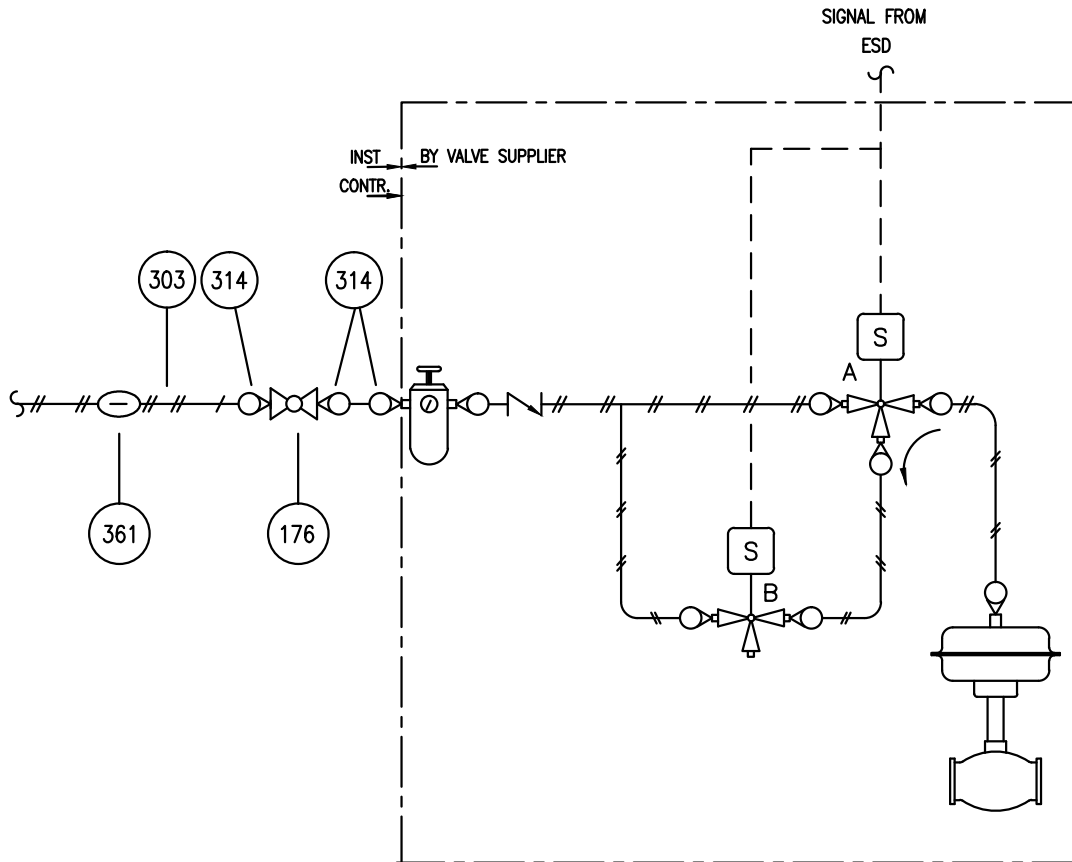
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**INSTRUMENT HOOK UP DRAWINGS
 FLOW TRANSMITTER INTEGRAL DP TYPE
 LIQUID SERVICE
 DIRECT INSTALLATION (PRE FABRICATED)**

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TAG NO.
1. UV-332092
2. UV-332093A
3. UV-332093B



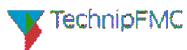
NOTES:-

1. TUBING, BALL VALVE AND FITTINGS UPTO AFR SHALL BE SUPPLIED AND INSTALLED BY INSTRUMENT SITE CONTRACTOR.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
176	BALL VALVE	1/2" NPT(F)	SS	1	3						
303	SEAMLESS TUBE	12mm OD	SS	20 M	60 M						
314	MALE CONNECTOR	1/2" NPT(M) X 12mm OD	SS	4	12						
361	TUBE UNION	12mm OD	SS	4	12						

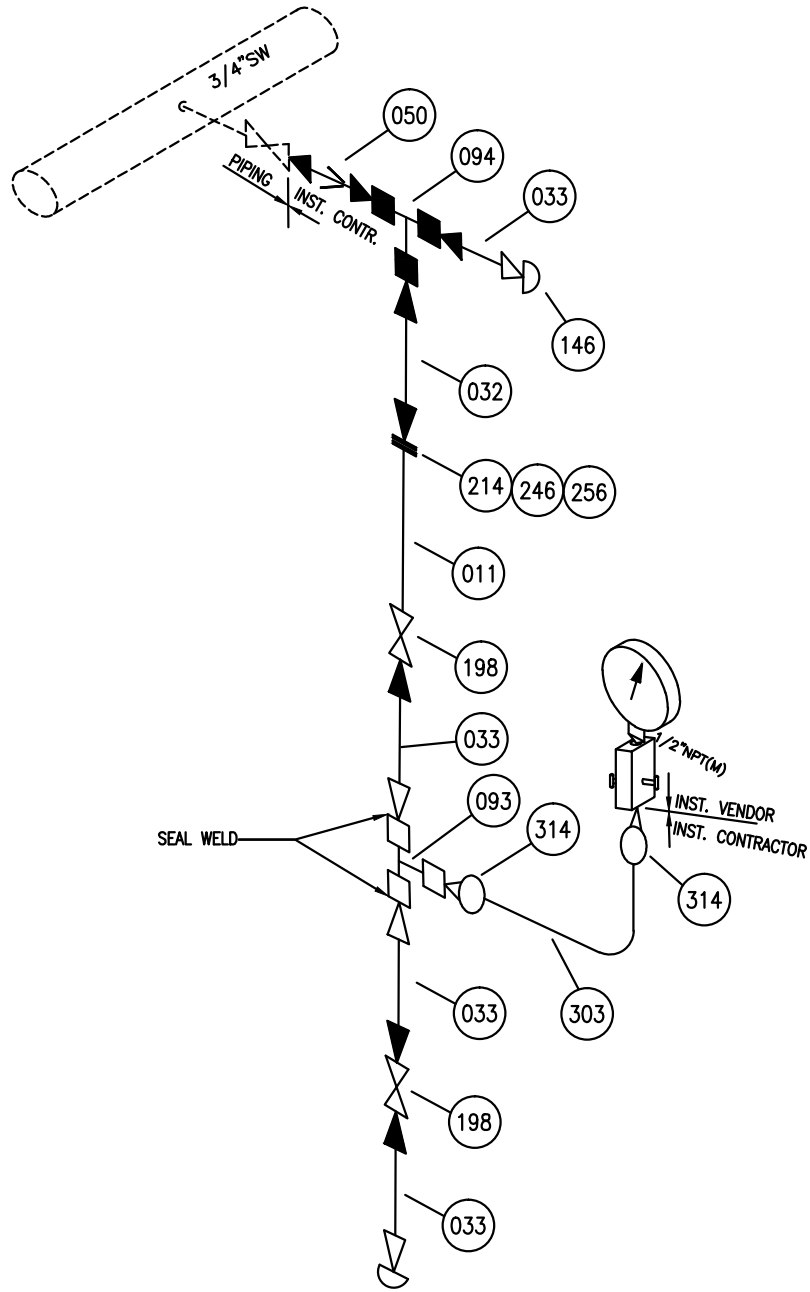
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INSTRUMENT HOOK UP DRAWINGS
ON-OFF VALVE WITH TWO SOLENOID VALVE
(12mm OD TUBING)

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TAG NO.
1. PI-3321164



NOTES:-

1. 3 WAY 2 VALVE MANIFOLD WITH ISOLATION VALVE SHALL BE IN SCOPE OF INSTRUMENT VENDOR.
2. PRESSURE GAUGE SHALL BE PROVIDED WITH DAMPENER BY INSTRUMENT VENDOR AS APPLICABLE.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.	ITEM NO.	DESCRIPTION	SIZE & END CONN.	MATERIAL	QTY.	TOTAL QTY.
011	PIPE	1/2" PE	SS	2 M	2 M	256	STUD & NUTS	1/2" FL	SS	1 SET	1 SET
032	NIPPLE	1/2" PE X PE	SS	1	1	303	SEAMLESS TUBE	12MM OD	SS	1.5 M	2 M
033	NIPPLE	1/2" NPT(M) X PE	SS	4	4	314	MALE CONNECTOR	1/2" NPT(M) X 12MM OD	SS	2	2
050	SWAGE NIPPLE	3/4"PE X 1/2"PE	SS	1	1						
093	EQUAL TEE	1/2" NPT(F)	SS	1	1						
094	EQUAL TEE	1/2" SW	SS	1	1						
146	CAP	1/2" NPT(F)	SS	2	2						
198	GATE VALVE	1/2" SW	SS	2	2						
214	FLANGE	1/2" SW	SS	2	2						
246	GASKET	1/2" FL	SS	1 SET	1 SET						

AutoCAD : C:\STANDARDS\CS\9680-332-09-A4-9001.DWG



**INSTRUMENT HOOK UP DRAWINGS
PRESSURE GAUGE LIQUID SERVICE
GAUGE BELOW**

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