

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description : Instrument Hookup Drawing.**

**Document No. : PB609-000-I-HUD-0901** **Rev No.** 0

**Sheets** 33

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	26.09.17	VDS	HKV	DHK	FOR INFORMATION

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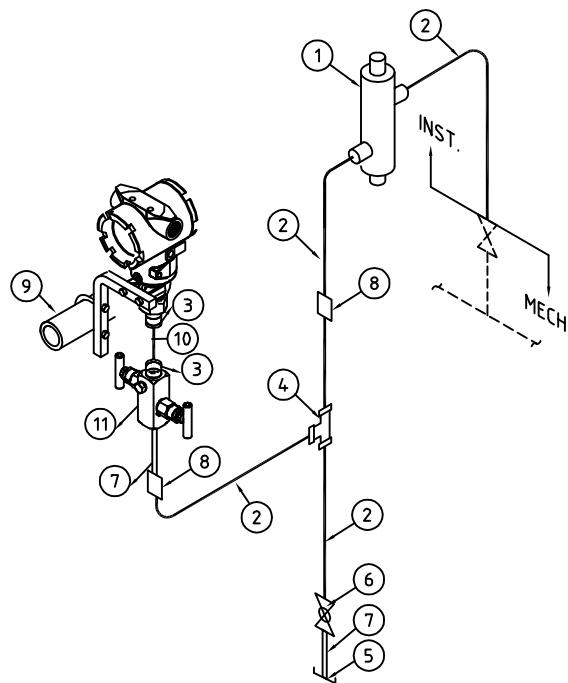
**Project:** 2x7.5MW Cogeneration Power Plant  
**Client:** PT.SURYA BORNEO INDUSTRI,  
Indonesia

**Doc No.:**  
**Rev No.:** 0

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**LIST OF ITEMS**

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0106	CONDENSATE POT, 3"NB, SCH-80(1BR)	SA-106, Gr-B (CS)	1 NO
2	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(1BR)	A-106, Gr-B (CS)	6 MTRS
3	UE0108	MALE CONNECTOR DOUBLE FERRULE 1/2"OD TUBE x 1/2"NPTM	316 (SS)	2 NOS
4	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(1BR)	A-105, 3000LBS (CS)	1 NO
5	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	1 NO
6	UE0111	GLOBE VALVE, 1/2"NB(SW)(1BR)	800LBS, (CS)	1 NO
7	UE0144	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, Gr-B (CS)	2 NOS
8	UE0113	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	2 NOS
9	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1 MTR
10	UE0115	TUBE, 1/2"OD x 1.65MM THK SEAMLESS	A-312, Gr-TP-316(SS)	1 NO
11	UE0178	2-WAY MANIFOLD(1/2"NPTF x 1/2"NPTF)	SS316	1 NO



SR. NO.	Tag No.	DESCRIPTION
1	10-PT-001	DE-AERATOR TANK PRESSURE.
2	11-PT-003	STEAM DRUM PRESSURE
3	12-PT-003	STEAM DRUM PRESSURE
4	11-PT-005	SOOT BLOWER DOWN STREAM PRESSURE
5	12-PT-005	SOOT BLOWER DOWN STREAM PRESSURE
6	15-PT-002	PROCESS CUM PEGGING PRDS DOWN STREAM PRESSURE
7	15-PT-003	GSS/EJECTOR PRDS DOWN STREAM PRESSURE
8	15-PT-004	PROCESS STEAM DISTRIBUTION HDR
9	16-PT-001	TURBINE - 1 EXTRACTION LINE PRESSURE AFTER DSH
10	17-PT-001	TURBINE - 2 EXTRACTION LINE PRESSURE AFTER DSH

NOTE:  
SLOPE OF IMPLASE LINE 1:6 (DOWN)

**Pressure transmitter Steam Service  
(CS) 800LBS**

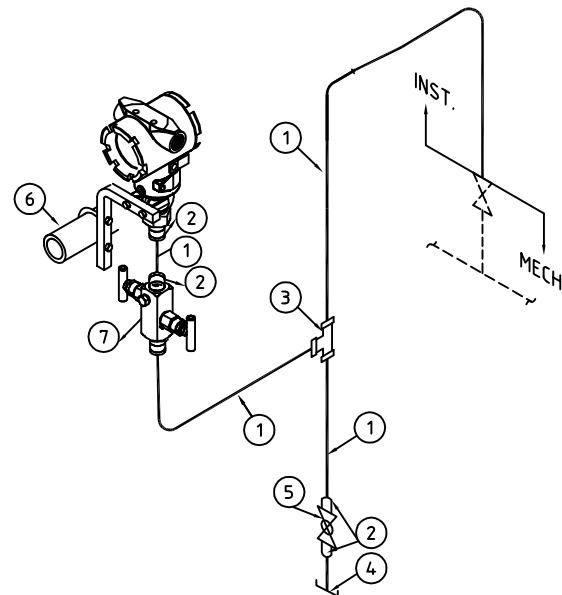
**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 01

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0115	TUBE, 1/2"OD x 1.65MM THK SEAMLESS	A-312, Gr-TP 316 (SS)	6 MTRS
2	UE0108	MALE CONNECTOR DOUBLE FERRULE 1/2"OD TUBE x 1/2"NPTM	316 (SS)	5 NOS
3	UE0116	EQUAL TEE, FORG, 1/2"NB(SW)	A-182, Gr. F-316 3000LBS(SS)	1 NO
4	UE0117	END CAP, 1/2"NPT(F)	A-182, Gr. F-316 3000LBS(SS)	1 NO
5	UE0118	GLOBE VALVE, 1/2"NB(SW)	800LBS, 316 (SS)	1 NO
6	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1 MTR
7	UE0178	2-WAY MANIFOLD(1/2"NPTFx1/2"NPTF)	SS316	1 NO



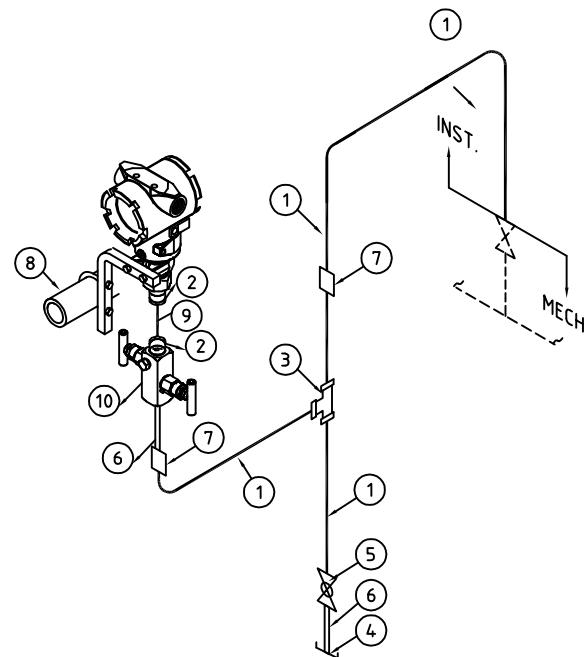
SR. NO.	Tag No.	DESCRIPTION
1	33-PT-001	DM WATER TRANSFER PUMP COMMON DISCHARGE

NOTE:  
SLOPE OF IMPLASE LINE 1:6 (DOWN)

Pressure transmitter Water Service (SS) 800LBS	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 02

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, Gr-B (CS)	6 MTRS
2	UE0108	MALE CONNECTOR DOUBLE FERRULE 1/2"OD TUBE x 1/2"NPTM	316 (SS)	2 NOS
3	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	A-105, 3000LBS (CS)	1 NO
4	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	1 NO
5	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (CS)	1 NO
6	UE0144	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8'LONG	A-106, Gr-B (CS)	2 NOS
7	UE0113	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	2 NOS
8	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
9	UE0115	TUBE, 1/2"OD x 1.65MM THK SEAMLESS	A-312, Gr-TP-316(SS)	1 NO
10	UE0178	2-WAY MANIFOLD(1/2"NPTF x 1/2"NPTF)	SS316	1 NO



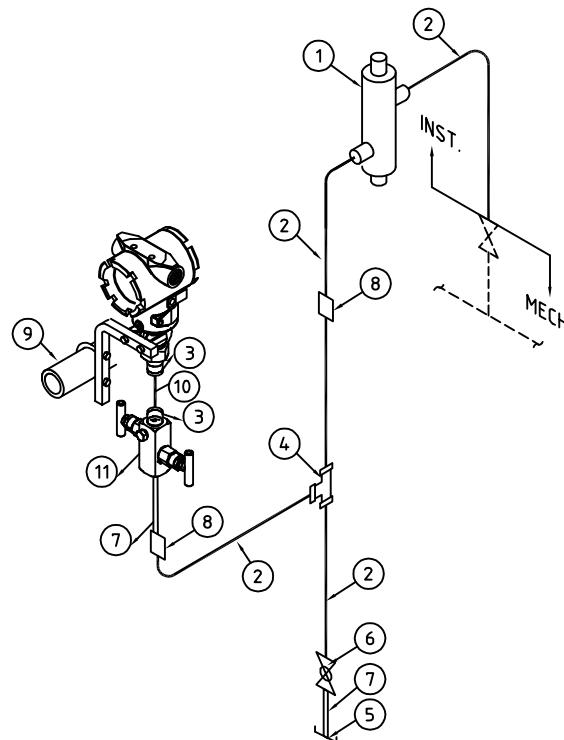
SR. NO.	Tag No.	DESCRIPTION
1	11-PT-001	BOILER FEED WATER COMMON DISCHARGE PRESSURE
2	12-PT-001	BOILER FEED WATER COMMON DISCHARGE PRESSURE
3	34-PT-002	ACW PUMPS COMMON DISCHARGE LINE
4	34-PT-001	MCW PUMP COMMON DISCHARGE HEADER PRESSURE
5	11-PT-002	ECONOMIZER INLET HDR PRESSURE.
6	12-PT-002	ECONOMIZER INLET HDR PRESSURE.

NOTE:  
SLOPE OF IMPLASE LINE 1:6 (DOWN)

Pressure transmitter water Service (CS) 800LBS	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 03

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0147	CONDENSATE POT,3"NB, SCH-160(ibr)	A-335, Gr-P11 (AS)	1 NO
2	UE0149A	PIPE, 1/2"NB, SCH-160, SEAMLESS.(ibr)	A-335, Gr-P11 (AS)	12 MTRS
3	UE0108	MALE CONNECTOR DOUBLE FERRULE 1/2"OD TUBE x 1/2"NPTM	316, (SS)	1 NO
4	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(ibr)	SA182,F22,3000LBS (AS)	1 NO
5	UE0110	END CAP, 1/2"NPT(F)	SA182,F22,3000LBS (AS)	1 NO
6	UE0146	GLOBE VALVE, 1/2"NB(SW)(ibr)	800LBS, (AS)	1 NO
7	UE0144	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-335, Gr-P11 (AS)	2 NOS
8	UE0113	COUPLING, 1/2"NB(SW)	SA182,F22,3000LBS (AS)	2 NOS
9	UE0105	PIPE, 2"NB(ibr)	ERW, LIGHT, MILD STEEL	1.5 MTRS
10	UE0115	TUBE, 1/2"OD x 1.65MM THK SEAMLESS	A-312, Gr-TP-316(SS)	1 NO
11	UE0178	2-WAY MANIFOLD(1/2"NPTF x 1/2"NPTF)	SS316	1 NO



SR. NO.	Tag No.	DESCRIPTION
1	11-PT-004A	MAIN STEAM LINE
2	11-PT-004B	MAIN STEAM LINE
3	12-PT-004A	MAIN STEAM LINE
4	12-PT-004B	MAIN STEAM LINE
5	15-PT-001	COMMON STEAM DISTRIBUTION HDR PRESSURE

NOTE:  
SLOPE OF IMPLASE LINE 1:6 (DOWN)

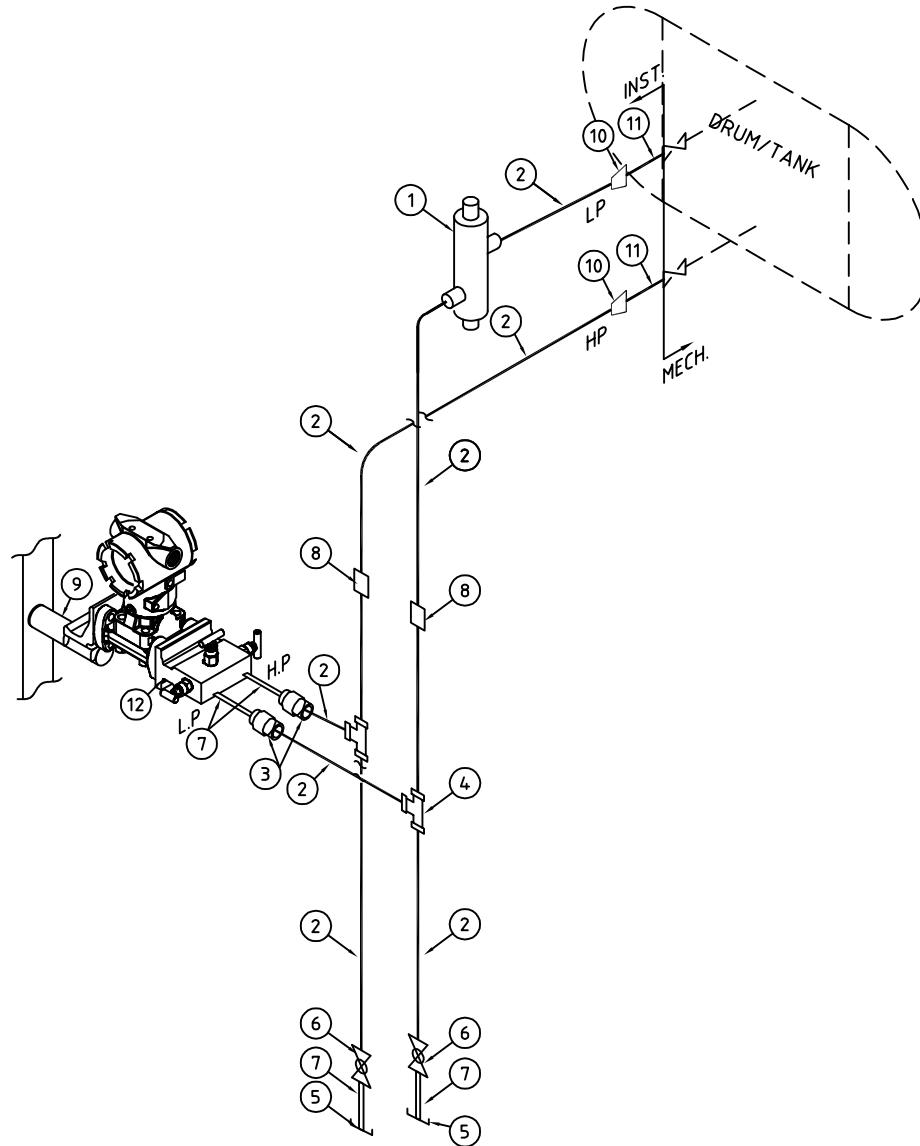
**Pressure transmitter Steam Service  
Main Line (AS) 800LBS**

**Uttam Energy System Ltd. Pune**

**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

DRG NO:-PB609-000-I-HUD-901

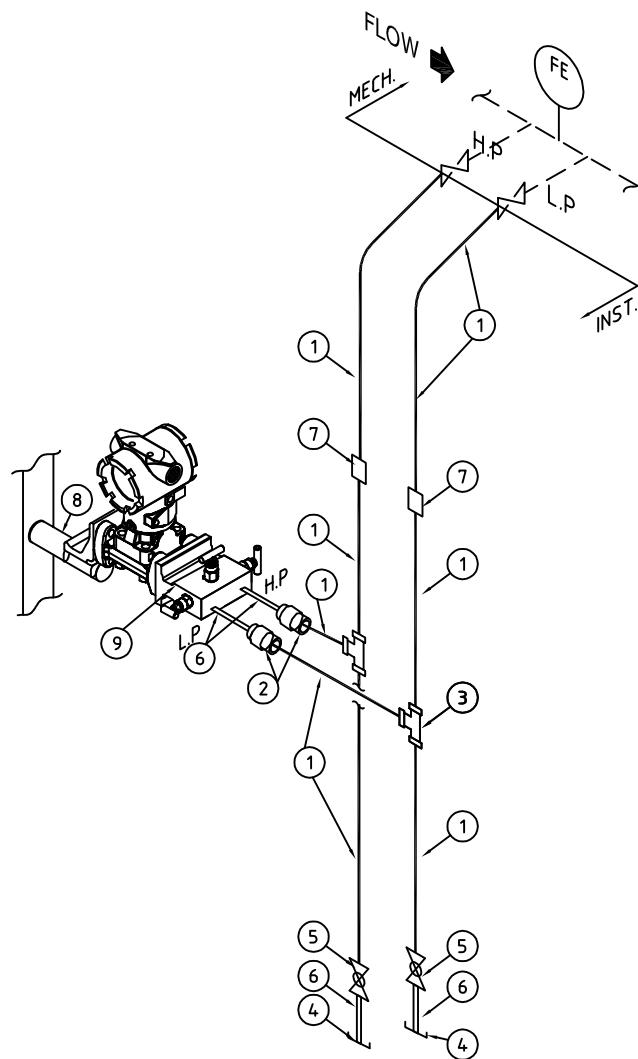
SHT.NO. 04



<u>LIST OF ITEMS</u>				
S.R. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0106	CONDENSATE POT, 3"NB, SCH-80(IBM)	A-106, Gr-B (CS)	1 NO
2	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBM)	A-106, Gr-B (CS)	12 MTRS
3	UE0108	UNION SCOKET,SIZE-1/2"(SW)	A-105, 800 LBS(CS)	2 NOS
4	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(IBM)	A-105, 3000LBS(CS)	2 NOS
5	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS(CS)	2 NOS
6	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBM)	800LBS (CS)	2 NOS
7	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, Gr-B (CS)	4 NOS
8	UE0113	COUPLING, 1/2"NB(SW)	A-105,3000LBS(CS)	2 NOS
9	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
10	UE0143	REDUCER 1 x 1/2"(SW)	A-106 ,Gr.-B(CS).	2 NOS
11	UE0145	PIPE, 1"NB, SCH-80 SEAMLESS(IBM)	A-106 ,Gr.-B(CS).	2 NOS
12	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

S.R. NO.	Tag No.	DESCRIPTION
1	11-LT-001A	STEAM DRUM WATER LEVEL
2	11-LT-001B	STEAM DRUM WATER LEVEL
3	11-LT-001C	STEAM DRUM WATER LEVEL
4	12-LT-001A	STEAM DRUM WATER LEVEL
5	12-LT-001B	STEAM DRUM WATER LEVEL
6	12-LT-001C	STEAM DRUM WATER LEVEL
7	10-LT-001	DEAREATOR WATER LEVEL
8	10-LT-002	CONTINOUS BLOW DOWN TANK WATER LEVEL

DP TYPE LEVEL TRANSMITTER - STEAM SERVICE (DRUM LEVEL)	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 05

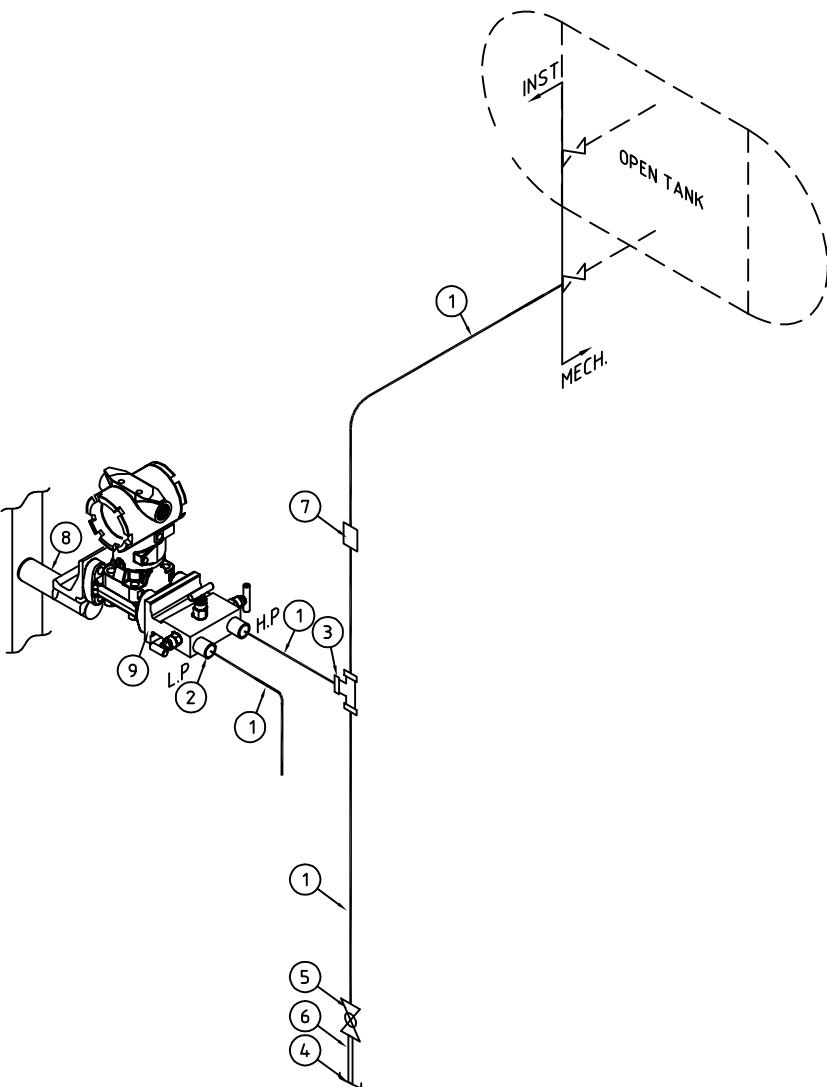


### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, Gr-B (CS)	12 MTR
2	UE0108	UNION SCOKET,SIZE-1/2"(SW)	A-105, 800 LBS(CS)	2 NOS
3	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	A-105, 3000LBS (CS)	2 NOS
4	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	2 NOS
5	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (CS)	2 NOS
6	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8'LONG	A-106, Gr-B (CS)	4 NOS
7	UE0113	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	2 NOS
8	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTR
9	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-FT-001	BOILER FEED WATER COMMON DISCHARGE FLOW
2	11-FT-002	BOILER FEED WATER SPRAY ATTEMPERATOR FLOW
3	12-FT-001	BOILER FEED WATER COMMON DISCHARGE FLOW
4	12-FT-002	BOILER FEED WATER SPRAY ATTEMPERATOR FLOW
5	34-FT-001	COOLING WATER RETURN LINE FLOW

DP TYPE FLOW TRANSMITTER, WATER FLOW SERVICE (CS)-800LBS.	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 06



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0115	TUBE, 1/2"OD x 1.65MM THK SEAMLESS	A-312, GR-TP-316(SS)	6 MTRS
2	UE0108	MALE CONNECTOR DOUBLE FERRULE 1/2"OD TUBE x 1/2"NPTM	316, (SS)	2 NOS
3	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)	A-182, GR.F-316,3000LBS(SS)	1 NO
4	UE0110	END CAP, 1/2"NPT(F)	A-182, GR.F-316,3000LBS(SS)	1 NO
5	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (SS)	1 NO
6	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-312, GR-TP-316(SS)	1 NO
7	UE0113	COUPLING, 1/2"NB(SW)	A-182, GR.F-316,3000LBS(SS)	1 NO
8	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
9	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	33-LT-001	DM TANK WATER LEVEL

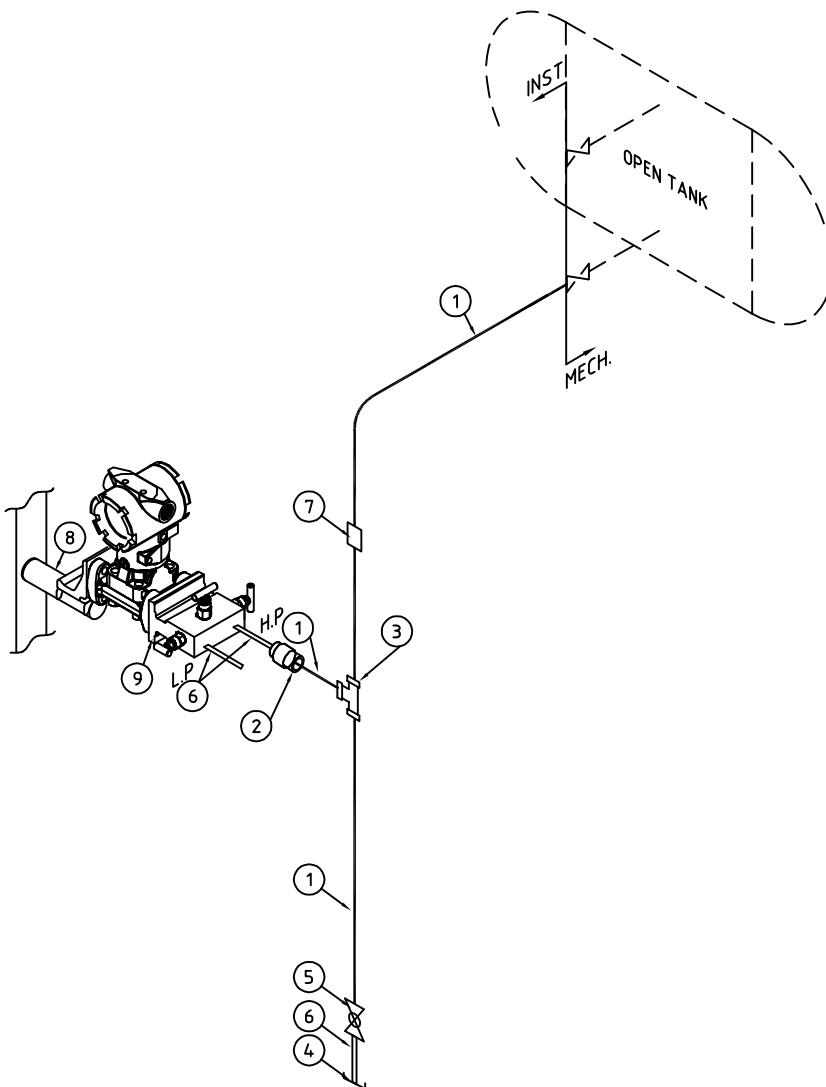
DP TYPE PRESSURE TRANSMITTER-  
ATMOSPHERIC TANK

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 07

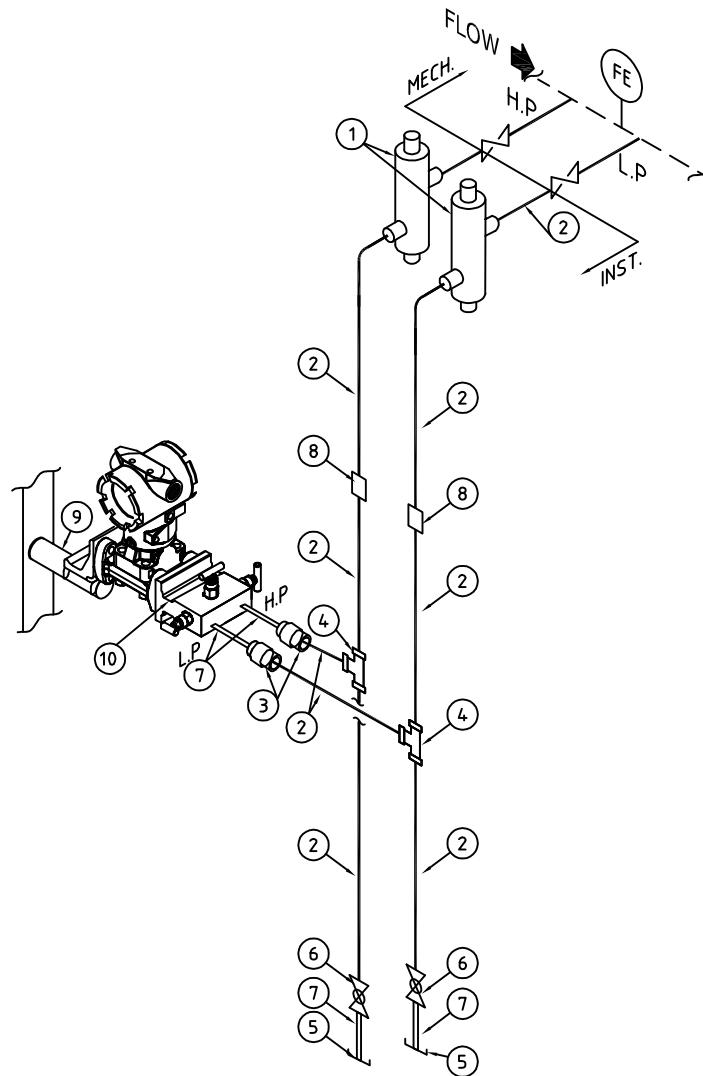


### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, Gr-B (CS)	6 MTRS
2	UE0108	UNION SCKET,SIZE-1/2"(SW)	A-105, 800 LBS(CS)	1 NO
3	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	A-105, 3000LBS (CS)	1 NO
4	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	1 NO
5	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (CS)	1 NO
6	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, Gr-B (CS)	3 NOS
7	UE0113	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	1 NOS
8	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
9	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	34-LT-001	COOLING TOWER WATER LEVEL

<b>DP TYPE PRESSURE TRANSMITTER- ATMOSPHERIC TANK</b>	<b>M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA</b>
<b>Uttam Energy System Ltd. Pune</b>	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 08

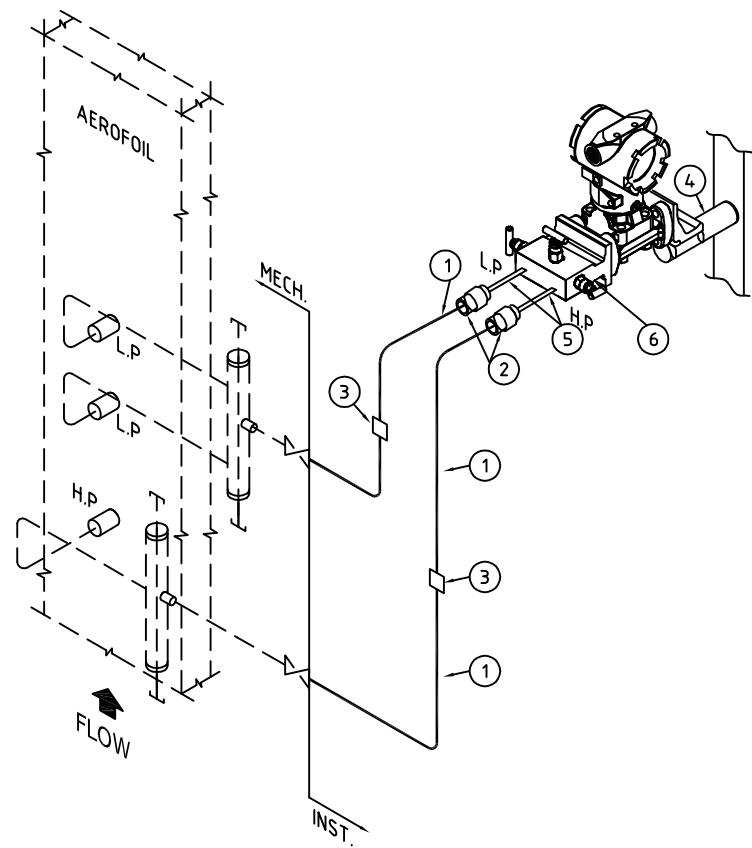


### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0147	CONDENSATE POT, 3"NB, SCH-80(IBM)	SA-335, Gr-P11 (AS)	2 NOS
2	UE0148	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBM)	A-335, Gr-P11 (AS)	12 MTRS
3	UE0108	UNION SCOKET, SIZE-1/2"(SW)	SA182,F22,3000 LBS(AS)	2 NOS
4	UE0161	EQUAL TEE, FORG., 1/2"NB(SW)(IBM)	SA182,F22,3000LBS (AS)	2 NOS
5	UE0162	END CAP, 1/2"NPT(F)	SA182,F22,3000LBS (AS)	2 NOS
6	UE0163	GLOBE VALVE, 1/2"NB(SW)(IBM)	800LBS, (AS)	2 NOS
7	UE0164	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	SA-335, Gr-P11 (AS)	4 NOS
8	UE0160	COUPLING, 1/2"NB(SW)	SA182,F22,3000LBS (AS)	2 NOS
9	UE0105	PIPE, 2"NB(IBM)	ERW, LIGHT, MILD STEEL	1.5 MTRS
10	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-FT-003	MAIN STEAM LINE FLOW
2	12-FT-003	MAIN STEAM LINE FLOW
3	16-FT-001	UNIT-1 TURBINE INLET STEAM FLOW
4	17-FT-001	UNIT-2 TURBINE INLET STEAM FLOW

DP TYPE FLOW TRANSMITTER STEAM FLOW SERVICE (AS) 800LBS	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 09



LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, Gr.-B (CS)	12 MTRS
2	UE0108	UNION SCOKET,SIZE-1/2"(SW)	A-105, 800 LBS(CS)	2 NOS
3	UE0113	COUPLING, 1/2"NB(SW)	A-105,3000LBS(CS)	2 NOS
4	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
5	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, Gr-B (CS)	2 NOS
6	UE0178	3-WAY MANIFOLD DIRECT MOUNTING TYPE 1/2"NPTF PROCESS CONNECTIONS	SS316	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-FT-005	FD FAN COMMON DISCHAGEE FLOW
2	11-FT-004	SA FAN COMMON DISCHAGEE FLOW
3	12-FT-005	FD FAN COMMON DISCHAGEE FLOW
4	12-FT-004	SA FAN COMMON DISCHAGEE FLOW

Notes:

- 1.Slope of impulse line 1:6 (Up)
- 2.Transmitter shall be installed above the elevation of flow element.

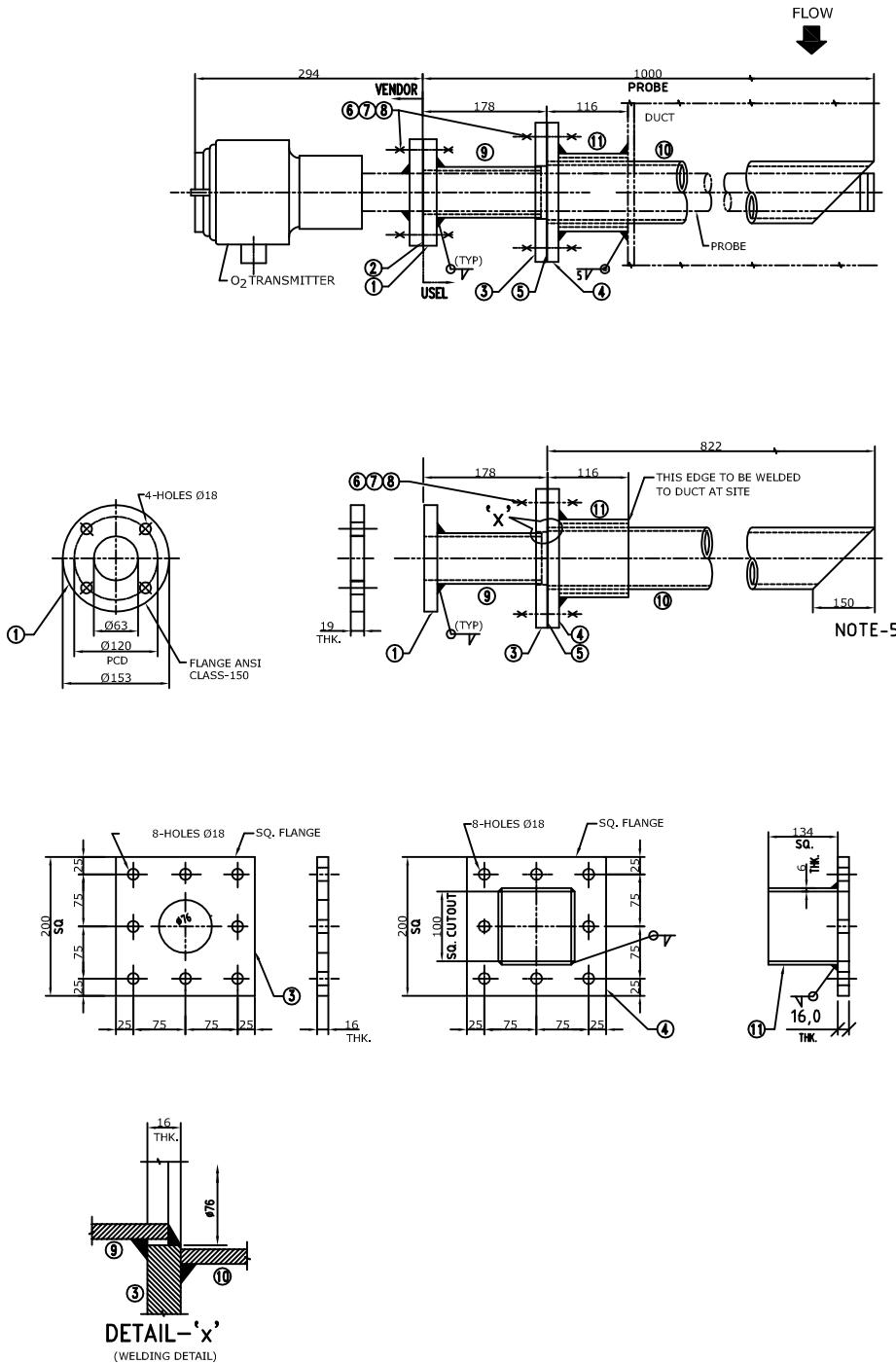
Differential pressure transmitter  
Air flow service with Aerofoil (CS)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 10



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1		FLANGE, ANSI, SA-105, 50 NB, CL-150 (RF)	---	1 NO
2		GASKET, CAF STYLE 54, OD 153 x ID 63 x 1.5 THK.	---	1 NO
3		SQUARE FLANGE, IS-2062, 200 SQ x ID 76, 65NB	---	1 NO
4		SQUARE FLANGE, IS-2062, 200 SQ x ID 100 SQ.	---	1 NO
5		GASKET, CAF STYLE 54, 200 SQ x ID 100 SQ. x 1.5 THK.	---	1 NO
6		HEX. HD. BOLT, IS 1363, M-16 x 75 Lg.	---	12 NOS
7		NUT, IS 1363, M-16	---	12 NOS
8		WASHER, IS 2016, M-16	---	12 NOS
9		PIPE, SA 106 Gr B, 65 NB, x SCH-40 x 150 Lg.	---	1 NO
10		PIPE, SA 106 Gr B, 80 NB, x SCH-40 x 922 Lg.	---	1 NO
11		PLATE, IS-2062, 100 SQ. x 6Thk.	---	4 NOS

NOTE:

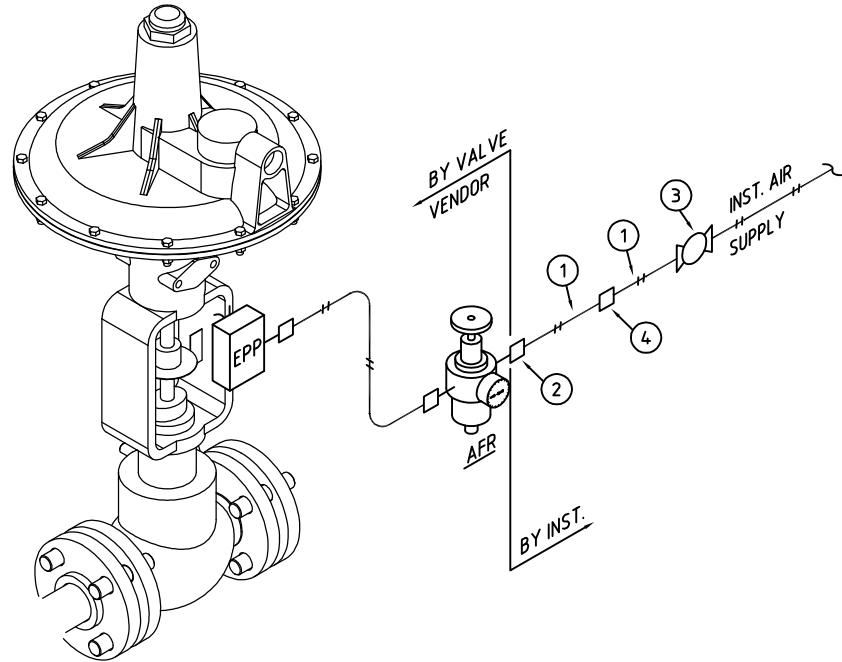
- 1) ARRANGEMENT IS MADE FOR PROTECTING PROBE OF O2 TRANSMITTER FROM FLY ASH
- 2) VENDOR SHALL SUBMIT DETAILED FAB. DRG. FOR APPROVAL
- 3) VENDOR SHALL SUPPLY THIS ITEM AS ONE ASSEMBLY
- 4) SHIELD SHALL BE PAINTED BY TWO COATS OF RED OXIDE & ALUMINIUM PAINT.
- 5) 150MM ANGULAR CUT TO BE KEPT GROUND ORIENTED WHILE ERECTION.
- 6) IF IN DOUBT PLEASE ASK.

**TAG NO. - 11-AIT-001 : Economizer Outlet Flue Gas &  
12-AIT-001Economizer Outlet Flue Gas**

<b>Abrasive shield for oxygen analyser</b>	<b>M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA</b>
<b>Uttam Energy System Ltd. Pune</b>	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 11

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	MATERIAL	QTY/TAG
1	UE170	TUBE 1/4", OD x 0.049" THK	COPPER MATERIAL	3 MTRS
2	UE171	CONN. 1/4"NPT(M) x 1/4" OD COMP.	BRASS MATERIAL	1 NO
3	UE172	BALL VALVE, 1/2" BSP (F) x 1/2" OD COMP.	BRASS MATERIAL	1 NO
4	UE173	UNION, 1/4" OD x 1/4" OD COMP.	BRASS MATERIAL	1 NO



SR. NO.	Tag No.	DESCRIPTION
1	10-PNV-GLV-200-2506	DE-AERATOR PRES.CONTROL VALVE
2	10-PNV-GLV-200-2517	DE-AERATOR PRES.CONTROL VALVE
3	10-PNV-GLV-100-2526	DE-AERATOR LEVEL CONTROL VALVE
4	10-PNV-GLV-100-2566	DE-AERATOR OVERFLOW DRAIN VALVE
5	10-W-LCV-2712/10-CV-142	CBD TANK WATER LEVEL CONTROL VALVE
6	11-W-FCV-3028 / 11-CV-106	BOILER FEED WATER 100% CONTROL VALVE
7	11-W-FCV-3035 / 11-CV-108	BOILER FEED WATER 30% CONTROL VALVE
8	11-CV-112 / 11-PNV-GLV-40-3213	ATTEMPERATOR FEED WATER CONTROL VALVE
9	11-CV-115 / 11-S-PCV-3303	SOOT BLOWER PRESSURE CONTROL VALVE
10	12-PNV-GLV-150-3528 / 12-CV-106	BOILER FEED WATER 100% CONTROL VALVE
11	12-PNV-GLV-80-3535 / 12-CV-108	BOILER FEED WATER 30% CONTROL VALVE
12	12-CV-115 / 12-PNV-GLV-50-3803	SOOT BLOWER PRESSURE CONTROL VALVE
13	10-PNV-GLV-100-2530A	DEAREATOR PEGGING STEAM PRESSURE REDUCING CONTROL VALVE
14	12-CV-112 /12-PNV-GLV-40-3713	ATTEMPERATOR FEED WATER CONTROL VALVE

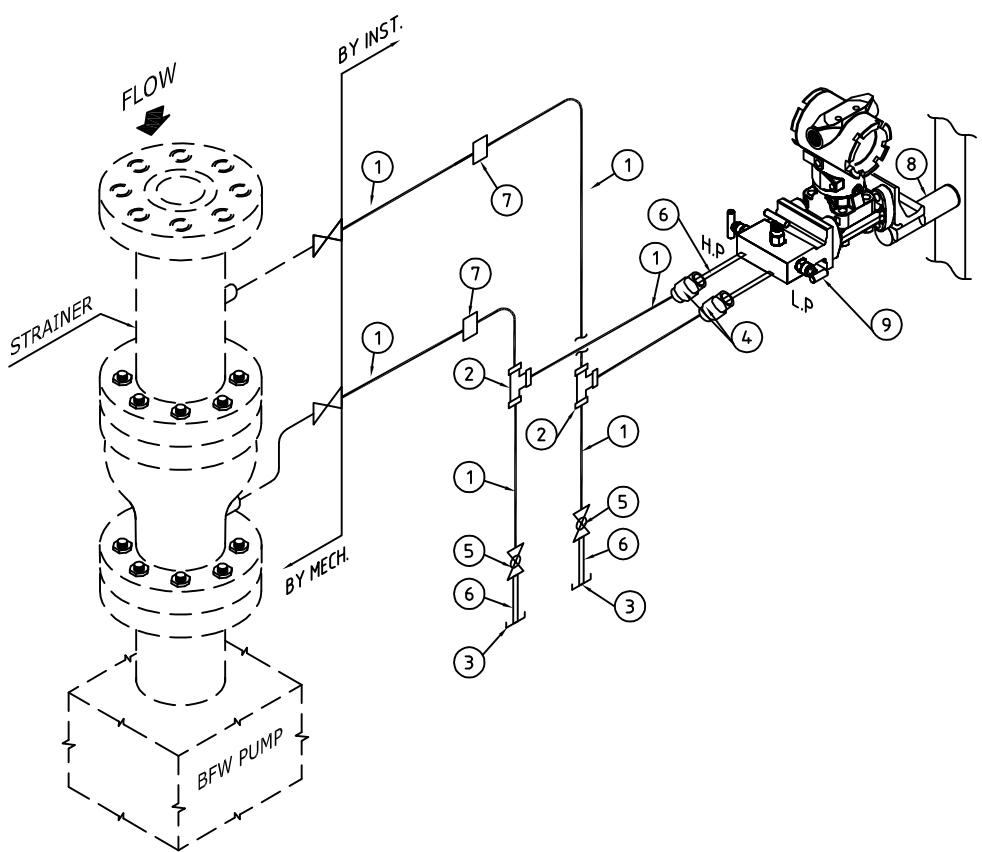
Regulating Control Valve

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 12



LIST OF ITEMS				
SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0107	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, Gr-B (CS)	12 MTR
2	UE0109	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	A-105, 3000LBS (CS)	2 NOS
3	UE0110	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	2 NOS
4	UE0108	UNION SCOKET SIZE-1/2" (SW)	A-105, 800 LBS (CS)	2 NOS
5	UE0111	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (CS)	2 NOS
6	UE0112	ONE SIDE THREADING NIPPLE, 1/2"NB(PL) x 1/2"NPT(M) x 10"LONG	A-106, Gr-B (CS)	4 NOS
7	UE0113	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	2 NOS
8	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTR
9	UE0178	3-WAY MANIFOLD	SS304	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-DPT-001	BOILER FEED WATER PUMP-1 SUCTION STRAINER DIFF.PRESSURE
2	11-DPT-002	BOILER FEED WATER PUMP-2 SUCTION STRAINER DIFF.PRESSURE
3	12-DPT-001	BOILER FEED WATER PUMP-1 SUCTION STRAINER DIFF.PRESSURE
4	12-DPT-002	BOILER FEED WATER PUMP-2 SUCTION STRAINER DIFF.PRESSURE

Notes:

- 1.Slope of impulse line 1:6 (Down)
- 2.Transmitter shall be installed above the elevation of flow element.

Differential pressure transmitter  
across BFWP inlet strainer

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

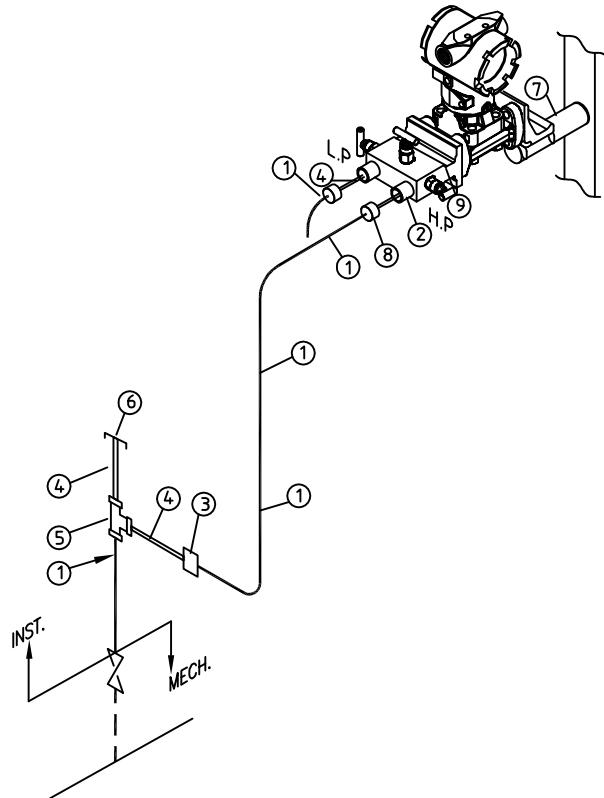
Uttam Energy System Ltd. Pune

SHT.NO. 13

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY
1	UE0150	GI PIPE, 1/2"NB, MEDIUM CLASS	IS:1239(PART-2)	6 MTRS
2	UE0151	GI UNION SOCKET ,1/2"NPT(M)	IS:1239(PART-2)	2 NOS
3	UE0152	COUPLING, 1/2"NPT(F)	IS:1239(PART-2)	1 NO
4	UE0153	NIPPLE, 1/2"(PL) x 1/2"NPT(M),8"	IS:1239(PART-2)	1 NO
5	UE0154	EQUAL TEE, ., 1/2"NB(F)	IS:1239(PART-2)	1 NO
6	UE0155	END CAP, 1/2"NPT(F)	IS:1239(PART-2)	1 NO
7	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS
8	UE0166	CONNECTOR,1/2" NPT(F)	IS:1239(PART-2)	2 NOS
9	UE0178	3-WAY MANIFOLD	SS304	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-PT-022	DRAFT PRESSURE AT ECONOMIZER INLET 6
2	11-PT-015	DRAFT PRESSURE AT APH INLET 1
3	11-PT-016	DRAFT PRESSURE AT ESP INLET
4	11-PT-017	DRAFT PRESSURE AT ESP OUTLET
5	11-PT-018	FD FAN COMMON DISCHAEGE DRAFT PRESSURE
6	11-PT-019	HOT APH OUTLET FD AIR DRAFT PRESSURE
7	11-PT-020	SA FAN COMMON DISCHARGE DRAFT PRESSURE
8	11-PT-021	HOT APH OUTLET SA AIR DRAFT PRESSURE
9	11-PT-023	DRAFT PRESSURE AT CHIMNEY INLET
10	12-PT-022	DRAFT PRESSURE AT ECONOMIZER INLET 6
11	12-PT-015	DRAFT PRESSURE AT APH INLET 1
12	12-PT-016	DRAFT PRESSURE AT ESP INLET
13	12-PT-017	DRAFT PRESSURE AT ESP OUTLET
14	12-PT-018	FD FAN COMMON DISCHAEGE DRAFT PRESSURE
15	12-PT-019	HOT APH OUTLET FD AIR DRAFT PRESSURE
16	12-PT-020	SA FAN COMMON DISCHARGE DRAFT PRESSURE
17	12-PT-021	HOT APH OUTLET SA AIR DRAFT PRESSURE
18	12-PT-023	DRAFT PRESSURE AT CHIMNEY INLET



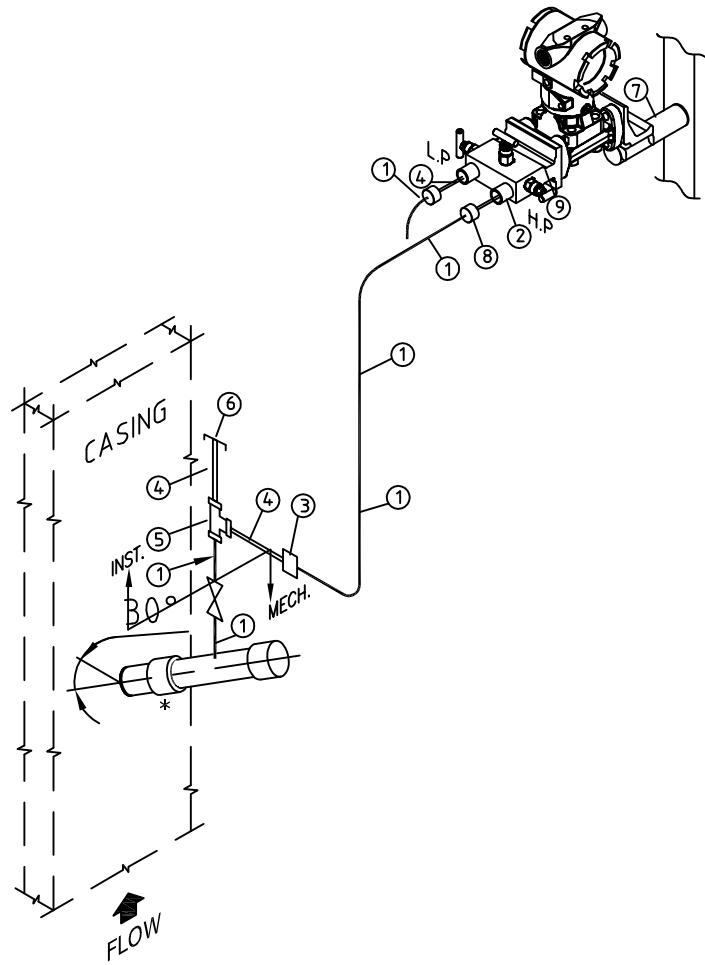
Pressure transmitter  
Gas service (GI)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 14

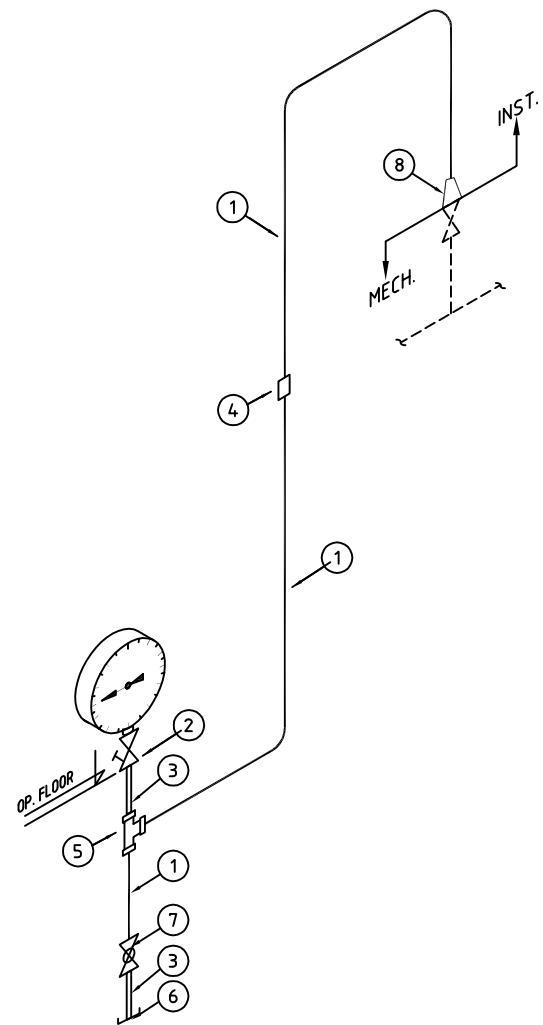


#### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY
1	UE0150	GI PIPE, 1/2"NB, MEDIUM CLASS	IS:1239(PART-2)	6 MTR
2	UE0151	GI UNION SOCKET ,1/2"NPT(M)	IS:1239(PART-2)	2 NOS
3	UE0152	COUPLING, 1/2"NPT(F)	IS:1239(PART-2)	1 NO
4	UE0153	NIPPLE, 1/2"(PL) x 1/2"NPT(M),8"	IS:1239(PART-2)	1 NO
5	UE0154	EQUAL TEE, ., 1/2"NB(F)	IS:1239(PART-2)	1 NO
6	UE0155	END CAP, 1/2"NPT(F)	IS:1239(PART-2)	1 NO
7	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTR
8	UE0166	CONNECTOR,1/2" NPT(F)	IS:1239(PART-2)	2 NOS
9	UE0178	3-WAY MANIFOLD	SS304	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-PT-006A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-1
2	11-PT-007A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-2
3	11-PT-008A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-3
4	11-PT-009A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-4
5	11-PT-006B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-1
6	11-PT-007B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-2
7	11-PT-008B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-3
8	11-PT-009B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-4
9	11-PT-010A	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL
10	11-PT-010B	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL
11	11-PT-011	DRAFT PRESSURE AT SECONDARY SH INLET
12	11-PT-012	DRAFT PRESSURE AT PRIMARY SH OUTLET
13	11-PT-013	DRAFT PRESSURE AT PRIMARY SH INLET
14	11-PT-014	DRAFT PRESSURE AT EVOPORATER
15	12-PT-006A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-1
16	12-PT-007A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-2
17	12-PT-008A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-3
18	12-PT-009A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-4
19	12-PT-006B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-1
20	12-PT-007B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-2
21	12-PT-008B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-3
22	12-PT-009B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-4
23	12-PT-010A	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL
24	12-PT-010B	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL
25	12-PT-011	DRAFT PRESSURE AT SECONDARY SH INLET
26	12-PT-012	DRAFT PRESSURE AT PRIMARY SH OUTLET
27	12-PT-013	DRAFT PRESSURE AT PRIMARY SH INLET
28	12-PT-014	DRAFT PRESSURE AT EVOPORATER

Pressure transmitter Gas service (GI)	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 15



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0122	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-106, GR-B(CS)	30 MTRS
2	UE0131	N. VALVE, 1/2"NPT(F)	SS 316	1 NO
3	UE0126	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, GR-B(CS)	2 NOS
4	UE0127	COUPLING, 1/2"NB(SW)	A-105, 3000LBS (CS)	1 NO
5	UE0123	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	A-105, 3000LBS (CS)	1 NO
6	UE0124	END CAP, 1/2"NPT(F)	A-105, 3000LBS (CS)	1 NO
7	UE0125	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (CS)	1 NO
8	UE0143	REDUCER 1 x 1/2"(SW)	A-106 ,Gr.-B(CS).	1 NO

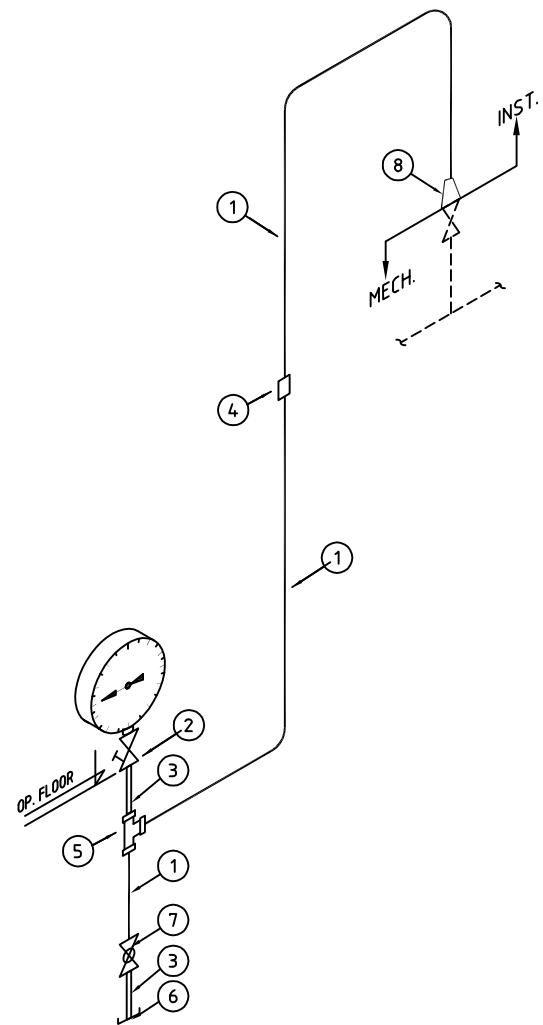
SR. NO.	Tag No.	DESCRIPTION
1	11-PG-014B	STEAM DRUM PRESSURE GAUGE FIRING FLOOR.
2	12-PG-014B	STEAM DRUM PRESSURE GAUGE FIRING FLOOR.

Pressure Gauge Steam at Op.  
Floor (CS) 800LBS

**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 16



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0122	PIPE, 1/2"NB, SCH-80, SEAMLESS.(IBR)	A-335, Gr-P11 (AS)	30 MTRS
2	UE0131	N. VALVE, 1/2"NPT(F),	SA182,F22,3000LBS(AS)	1 NO
3	UE0126	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8'LONG	SA-335, Gr-P11 (AS)	2 NOS
4	UE0127	COUPLING, 1/2"NB(SW)	SA182,F22,3000LBS(AS)	1 NO
5	UE0123	EQUAL TEE, FORG., 1/2"NB(SW)(IBR)	SA182,F22,3000LBS(AS)	1 NO
6	UE0124	END CAP, 1/2"NPT(F)	SA182,F22,3000LBS(AS)	1 NO
7	UE0125	GLOBE VALVE, 1/2"NB(SW)(IBR)	800LBS, (AS)	1 NO
8	UE0143	REDUCER 1 x 1/2"(SW)	SA182,F22,3000LBS(AS)	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-PG-017A	MAIN STEAM LINE PRESSURE -FIRING FLOOR
2	12-PG-017A	MAIN STEAM LINE PRESSURE -FIRING FLOOR

**Pressure gauge steam at Op. Floor  
(AS) 800LBS**

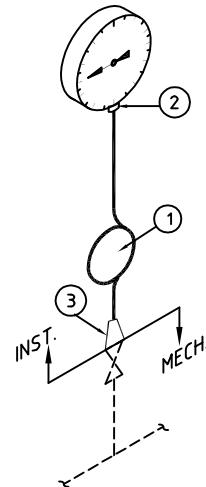
**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 17

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0170	SYPHON, SCH80, 1/2"NB(PL) x 1/2"NPT(M)	SA-335, Gr-P11(AS)	772mm
2	UE0171	SCOKET, 1/2" NPT(F)	SA-335, Gr-P11(AS)	1 NO
3	UE0143	REDUCER 1 x 1/2"(SW)	SA182,F22,3000LBS(AS)	1 NO



SR. NO.	Tag No.	DESCRIPTION
1	11-PG-017B	MAIN STEAM LINE
2	12-PG-017B	MAIN STEAM LINE
3	15-PG-001	COMMON STEAM DISTRIBUTION HDR PRESSURE
4	15-PG-002	PROCESS CUM PEGGING STEAM PRDS UPSTREAM PRESSURE
5	15-PG-003	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE
6	15-PG-005	GSS/EJECTOR PRDS UPSTREAM TEMP.

Pressure gauge steam  
(AS)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

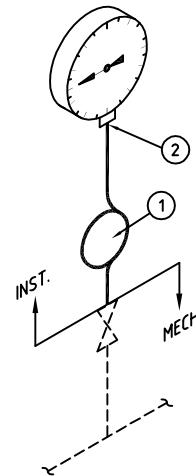
DRG NO:-PB609-000-I-HUD-901

SHT.NO. 18

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0136	SYPHON, SCH80, 1/2"NB(PL) x 1/2"NPT(M)	A-106, Gr-B, (CS)	1 NO
2	UE0141	SOCKET, 1/2" NPT(F)	SA-515, Gr-70, (CS)	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	10-PG-001	TURBINE-1 DEAREATOR BLEED STEAM PRS UPSTREAM PRESSURE
2	10-PG-002	TURBINE-1 DEAREATOR BLEED STEAM PRS DOENSTREAM PRESSURE
3	10-PG-003	TURBINE-2 DEAREATOR BLEED STEAM PRS UPSTREAM PRESSURE
4	10-PG-004	TURBINE-2 DEAREATOR BLEED STEAM PRS DOENSTREAM PRESSURE
5	10-PG-005	DEAREATOR MAKEUP WATER LCU UPSTREAM PRESSURE
6	15-PG-003	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE
7	16-PG-001	TURBINE-1 EXTRACTION LINE PRESSURE AFTER DSH
8	16-PG-002	UNIT-1 CE PUMP2 SUCTION PRESSURE
9	17-PG-001	TURBINE-2 EXTRACTION LINE PRESSURE AFTER DSH
10	17-PG-002	UNIT-2 CE PUMP2 SUCTION PRESSURE
11	11-PG-004	BOILER FEED WATER PUMP COMMON SUCTION PRESSURE
12	12-PG-004	BOILER FEED WATER PUMP COMMON SUCTION PRESSURE
13	15-PG-006	GSS/EJECTOR PRDS DOWNSTREAM PRESSURE

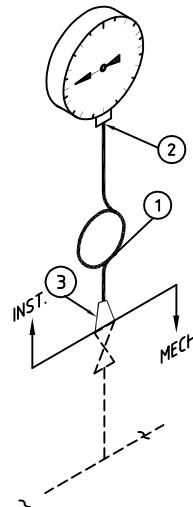


Pressure gauge steam/Water (CS)	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 19

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0136	SYPHON, SCH80, 1/2"NB(PL) x 1/2"NPT(M)	A-106, Gr-B, (CS)	1 NO
2	UE0141	SOCKET, 1/2" NPT(F)	SA-515, Gr-70, (CS)	1 NO
3	UE0143	REDUCER 1x 1/2"(SW)	A-106, Gr-B, (CS)	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	10-PG-006	DEAREATOR TANK STEAM PRESSURE
2	10-PG-008	INTERMITTENT BLOW DOWN TANK PRESSURE
3	10-PG-009	CONTINUOUS BLOW DOWN TANK PRESSURE
4	11-PG-014A	STEAM DRUM PRESSURE
5	11-PG-011	BOILER FEED WATER PUMP COMMON DISCHARGE PRESSURE
6	11-PG-012	BOILER FEED WATER PRESSURE AT AFTER CONTROL STATION
7	11-PG-013	ECONOMIZER-3 OUTLET HDR PRESSURE
8	11-PG-015	PRIMARY SUPER HEATER OUTLET HDR PRESSURE
9	11-PG-016	SECONDARY SUPER HEATER INLET HDR PRESSURE
10	11-PG-018	SOOT BLOWER PRS DOWNSTREAM PRESSURE
11	12-PG-011	BOILER FEED WATER PUMP COMMON DISCHARGE PRESSURE
12	12-PG-012	BOILER FEED WATER PRESSURE AT AFTER CONTROL STATION
13	12-PG-013	ECONOMIZER-3 OUTLET HDR PRESSURE
14	12-PG-015	PRIMARY SUPER HEATER OUTLET HDR PRESSURE
15	12-PG-016	SECONDARY SUPER HEATER INLET HDR PRESSURE
16	12-PG-018	SOOT BLOWER PRS DOWNSTREAM PRESSURE
17	11-PG-014A	STEAM DRUM PRESSURE
18	15-PG-007	GSS/EJECTOR PRDS SPRAY WATER PRESSURE
19	15-PG-008	TURBINE-1 EXTRACTION TO PROCESS HDR SPRAY WATER PRESSURE
20	15-PG-009	TURBINE-1 EXTRACTION TO PROCESS HDR SPRAY WATER PRESSURE
21	15-PG-010	PROCESS STEAM DISTRIBUTION HDR
22		



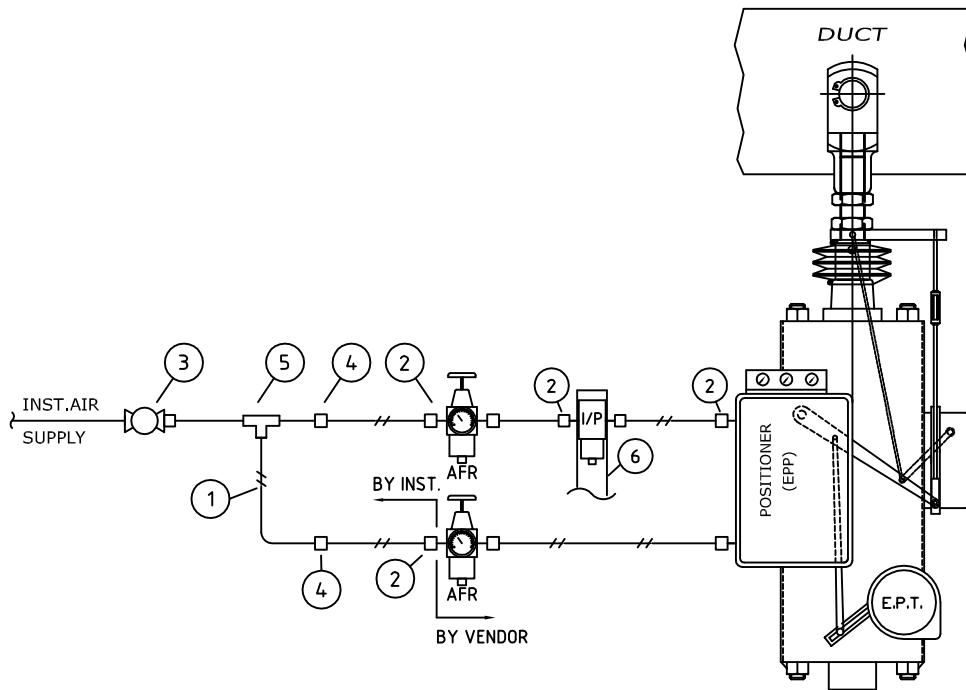
Pressure gauge steam/Water (CS)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 20



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	MATERIAL	QTY/TAG
1	UE0100	TUBE 1/4", OD x 0.049" THK	316, (SS)	6 MTRS
2	UE0101	CONN. 1/4"NPT(M) x 1/4" OD COMP.	316, (SS)	6 NOS
3	UE0102	BALL VALVE, 1/2" BSP (F) x 1/4" OD COMP.	316, (SS)	1 NO
4	UE0103	UNION, 1/4" OD x 1/4" OD COMP.	316, (SS)	2 NOS
5	UE0104	UNION TEE, 1/4", OD, DOUBLE COMP.	316, (SS)	1 NO
6	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTRS

SR. NO.	Tag No.	DESCRIPTION
1	11-FY-013	FD FAN TO APH INLET BYPASS DAMPER
2	12-FY-013	FD FAN TO APH INLET BYPASS DAMPER

Regulating Power Cylinder  
(1/4" OD SS Tubing)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

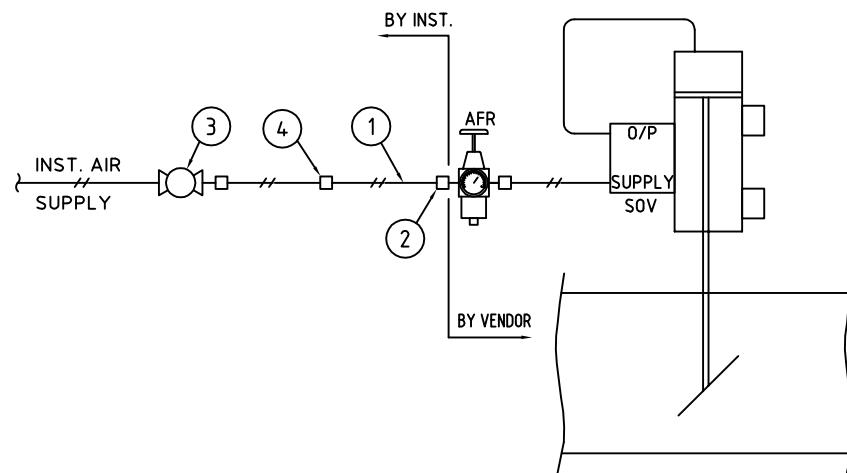
Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 21

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	MATERIAL	QTY/TAG
1	UE0100	TUBE 1/4", OD x 0.049" THK	316, (SS)	3 MTRS
2	UE0101	CONN. 1/4"NPT(M) x 1/4" OD COMP.	316, (SS)	1 NO
3	UE0102	BALL VALVE, 1/2" BSP (F) x 1/4" OD COMP.	316, (SS)	1 NO
4	UE0103	UNION, 1/4" OD x 1/4" OD COMP.	316, (SS)	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	11-FY-001	SA FAN-1 SUCTION DAMPER
2	11-FY-003	SA FAN-2 SUCTION DAMPER
3	11-FY-005	FD FAN-1 SUCTION DAMPER
4	11-FY-007	FD FAN-2 SUCTION DAMPER
5	11-FY-014	ID FAN-1 SUCTION DAMPER
6	11-FY-016	ID FAN-2 SUCTION DAMPER
7	12-FY-001	SA FAN-1 DISCHARGE DAMPER
8	12-FY-003	SA FAN-2 DISCHARGE DAMPER
9	12-FY-005	FD FAN-1 DISCHARGE DAMPER
10	12-FY-007	FD FAN-2 DISCHARGE DAMPER
11	12-FY-014	ID FAN-1 DISCHARGE DAMPER
12	12-FY-016	ID FAN-2 DISCHARGE DAMPER
13	11-FY-002	SA FAN-1 SUCTION DAMPER
14	11-FY-004	SA FAN-2 SUCTION DAMPER
15	11-FY-006	FD FAN-1 SUCTION DAMPER
16	11-FY-008	FD FAN-2 SUCTION DAMPER
17	11-FY-015	ID FAN-1 SUCTION DAMPER
18	11-FY-017	ID FAN-2 SUCTION DAMPER
19	12-FY-002	SA FAN-1 DISCHARGE DAMPER
20	12-FY-004	SA FAN-2 DISCHARGE DAMPER
21	12-FY-006	FD FAN-1 DISCHARGE DAMPER
22	12-FY-008	FD FAN-2 DISCHARGE DAMPER
23	12-FY-015	ID FAN-1 DISCHARGE DAMPER
24	12-FY-017	ID FAN-2 DISCHARGE DAMPER



On-Off Power Cylinder  
(1/4" OD SS Tubing)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

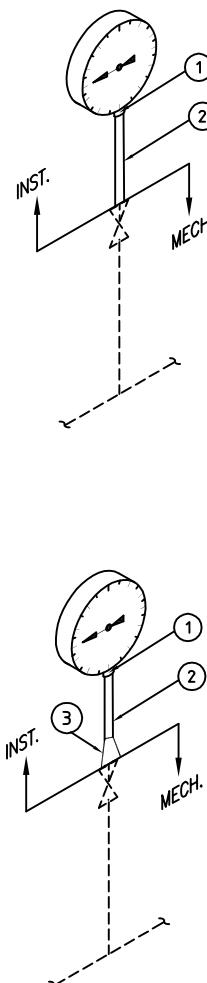
Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 22

**LIST OF ITEMS**

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0141	SOCKET, 1/2" NPT(F)	SA-515, Gr-70, (CS)	1 NO
2	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-106, Gr-B (CS)	1 NO
3	UE0143	REDUCER 1 x 1/2"(SW)	A-106, Gr-B, (CS)	1 NO



SR. NO.	Tag No.	DESCRIPTION	SR. NO.	Tag No.	DESCRIPTION
1	34-PG-001	MCW PUMP-1 SUCTION PRESSURE	23	34-PG-023	COOLING WATER OUTLET PRESSURE AT UNIT-2 LUBE OIL COOLER 2B
2	34-PG-002	MCW PUMP-1 DISCHARGE PRESSURE	24	34-PG-024	COOLING WATER INLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER COMMON INLET
3	34-PG-003	MCW PUMP-2 SUCTION PRESSURE	25	34-PG-025	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER
4	34-PG-004	MCW PUMP-2 DISCHARGE PRESSURE	26	34-PG-026	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER
5	34-PG-005	MCW PUMP-3 SUCTION PRESSURE	27	34-PG-027	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER
6	34-PG-006	MCW PUMP-3 DISCHARGE PRESSURE	28	34-PG-028	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER
7	34-PG-007	ACW PUMP-1 SUCTION PRESSURE	29	34-PG-029	BFW PUMP COMMON INLET COOLING WATER PRESSURE
8	34-PG-008	ACW PUMP-1 DISCHARGE PRESSURE	30	34-PG-030	BFW PUMP-2B OUTLET COOLING WATER PRESSURE
9	34-PG-009	ACW PUMP-2 SUCTION PRESSURE	31	34-PG-031	BFW PUMP-1B OUTLET COOLING WATER PRESSURE
10	34-PG-010	ACW PUMP-2 DISCHARGE PRESSURE	32	34-PG-032	ASH HOPPER COOLER INLET WATER PRESSURE
11	34-PG-011	ACW PUMP-3 SUCTION PRESSURE	33	34-PG-033	COOLING WATER AT INLET OF SWAS PANEL
12	34-PG-012	ACW PUMP-3 DISCHARGE PRESSURE	34	34-PG-034	COOLING WATER AT OUTLET OF SWAS PANEL
13	34-PG-013	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 INLET LINE	35	34-PG-035	COOLING WATER INLET PRESSURE AT COMMON UNIT-1 LUBE OIL SYSTEM
14	34-PG-014	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 INLET LINE	36	34-PG-036	COOLING WATER OUTLET PRESSURE AT UNIT-1 LUBE OIL COOLER 1A
15	34-PG-015	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 OUTLET LINE	37	34-PG-037	COOLING WATER OUTLET PRESSURE AT UNIT-1 LUBE OIL COOLER 1B
16	34-PG-016	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 OUTLET LINE	38	34-PG-038	COOLING WATER INLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER COMMON INLET
17	34-PG-017	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 INLET LINE	39	34-PG-039	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER
18	34-PG-018	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 INLET LINE	40	34-PG-040	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER
19	34-PG-019	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 OUTLET LINE	41	34-PG-041	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER
20	34-PG-020	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 OUTLET LINE	42	34-PG-042	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER
21	34-PG-021	COOLING WATER INLET PRESSURE AT COMMON UNIT-2 LUBE OIL SYSTEM			
22	34-PG-022	COOLING WATER OUTLET PRESSURE AT UNIT-2 LUBE OIL COOLER 2A			

Air/ Gas pressure  
Gauge/Switches (CS)

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

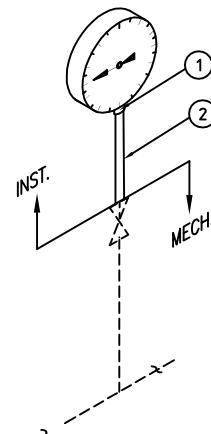
Uttam Energy System Ltd. Pune

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 23

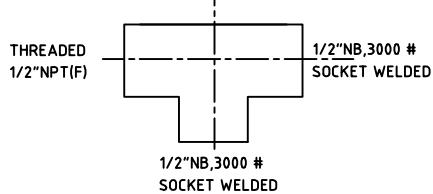
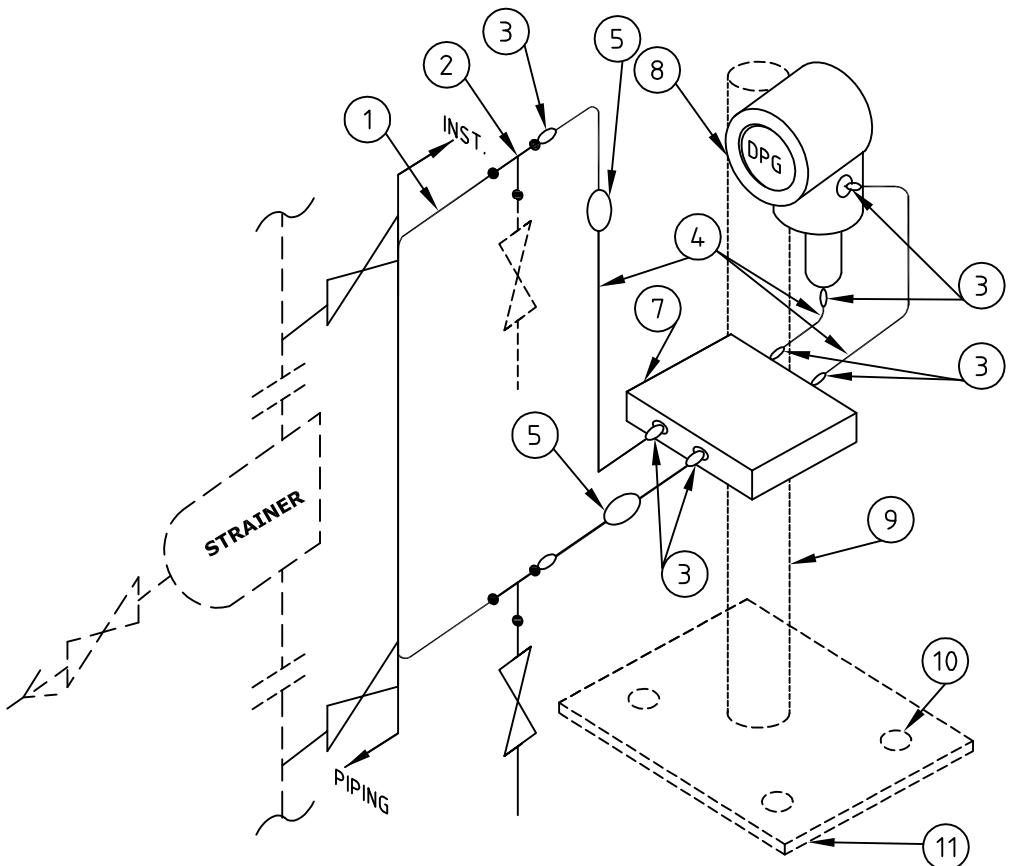
LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0141	SOCKET, 1/2" NPT(F)	A-182,Gr.F-316 3000LBS(SS)	1 NO
2	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2"NB(PL) x 1/2"NPT(M) x 8"LONG	A-312, Gr-TP 316 (SS)	1 NO

SR. NO.	Tag No.	DESCRIPTION
1	33-PG-001	DM TRANSFER PUMP-1 DISCHARGE PRESSURE
2	33-PG-002	DM TRANSFER PUMP-2 DISCHARGE PRESSURE
3	43-PG-001	COMPRESSOR COMMON DISCHARGE PRESSURE AT INSTRUMENT/SERVICE AIR
4	43-PG-002	COMPRESSOR COMMON DISCHARGE PRESSURE AT ASH CONVEYING INLET
5	43-PG-003	COMPRESSOR COMMON DISCHARGE PRESSURE AT INSTRUMENT/SERVICE AIR TANK

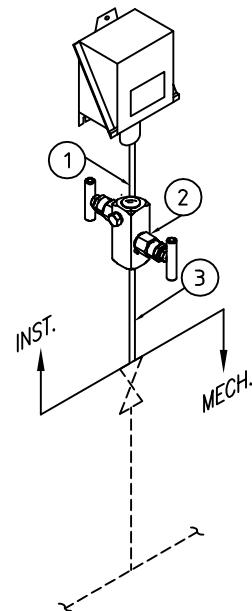


Air/ Gas pressure Gauge/Switches (SS)	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 24



LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0180	BOTH SIDE THREADING NIPPLE 1/2" NPT(M) X 1/2" NPT(M)	A-106,GR-B, (CS)	1 NO.
2	UE0178	2 WAY MANIFOLD ( 1/2" NPTF X 1/2" NPTF )	SS 316	1 NO.
3	UE0112	BARREL NIPPLE ONE SIDE THREADING 1/2" NB(PL) X 1/2" NPT(M) X 8" LONG	A-106,GR-B, (CS)	1 NO.



SR. NO.	Tag No.	DESCRIPTION
1	16-PSL-001	UNIT-1 CEP PUMP 1 DISCHARGE PRESSURE LOW
2	16-PSL-002	UNIT-1 CEP PUMP 2 DISCHARGE PRESSURE LOW
3	17-PSL-001	UNIT-2 CEP PUMP 1 DISCHARGE PRESSURE LOW
4	17-PSL-002	UNIT-2 CEP PUMP 2 DISCHARGE PRESSURE LOW
5	43-PSL-001	INSTRUMENT / SERVICE AIR RECIEVER TANK PRESSURE LOW
6	33-PSL-001	DM TRNSFER PUMP-1 SUCTION PRESSURE
7	33-PSL-002	DM TRNSFER PUMP-2 SUCTION PRESSURE

**Pressure gauge/switch water without syphon (CS)**

**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

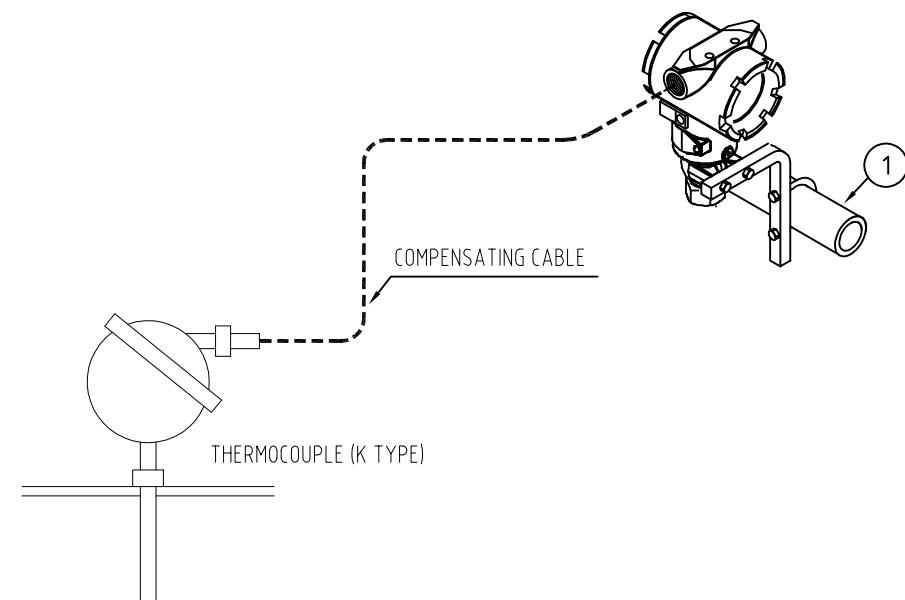
**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 26

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTR



SR. NO.	TAG NO.	DESCRIPTION
1	11-TT-005A	SUPER HEATER INLET HDR TEMPERATURE
2	11-TT-005B	SUPER HEATER INLET HDR TEMPERATURE
3	11-TT-006A	MAIN STEAM LINE TEMPERATURE
4	11-TT-006B	MAIN STEAM LINE TEMPERATURE
5	11-TT-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1
6	11-TT-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2
7	11-TT-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3
8	11-TT-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4
9	11-TT-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1
10	11-TT-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2
11	11-TT-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3
12	11-TT-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4
13	11-TT-011A	FURNACE TEMP AT ELE 11 MTRS
14	11-TT-011B	FURNACE TEMP AT ELE 11 MTRS
15	11-TT-012	FURNACE TEMP AT ELE 18 MTRS
16	11-TT-013	FLUE GAS TEMP AT SECONDARY SH INLET
17	11-TT-014	FLUE GAS TEMP AT PRIMARY SH OUTLET
18	11-TT-015	FLUE GAS TEMP AT PRIMARY SH INLET
19	11-TT-016	FLUE GAS TEMP AT EVOPORATER
20	11-TT-017	FLUE GAS TEMP AT ECONOMIZER INLET 6
21	11-TT-018	FLUE GAS TEMP AT APH INLET 1
22	12-TT-005A	SUPER HEATER INLET HDR TEMPERATURE
23	12-TT-005B	SUPER HEATER INLET HDR TEMPERATURE

SR. NO.	TAG NO.	DESCRIPTION
24	12-TT-006A	MAIN STEAM LINE TEMPERATURE
25	12-TT-006B	MAIN STEAM LINE TEMPERATURE
26	12-TT-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1
27	12-TT-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2
28	12-TT-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3
29	12-TT-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4
30	12-TT-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1
31	12-TT-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2
32	12-TT-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3
33	12-TT-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4
34	12-TT-011A	FURNACE TEMP AT ELE 11 MTRS
35	12-TT-011B	FURNACE TEMP AT ELE 11 MTRS
36	12-TT-012	FURNACE TEMP AT ELE 18 MTRS
37	12-TT-013	FLUE GAS TEMP AT SECONDARY SH INLET
38	12-TT-014	FLUE GAS TEMP AT PRIMARY SH OUTLET
39	12-TT-015	FLUE GAS TEMP AT PRIMARY SH INLET
40	12-TT-016	FLUE GAS TEMP AT EVOPORATER
41	12-TT-017	FLUE GAS TEMP AT ECONOMIZER INLET 6
42	12-TT-018	FLUE GAS TEMP AT APH INLET 1
43	15-TT-003	GSS/EJECTOR PRDS DOWNSTREAM TEMP.

Temperature transmitter

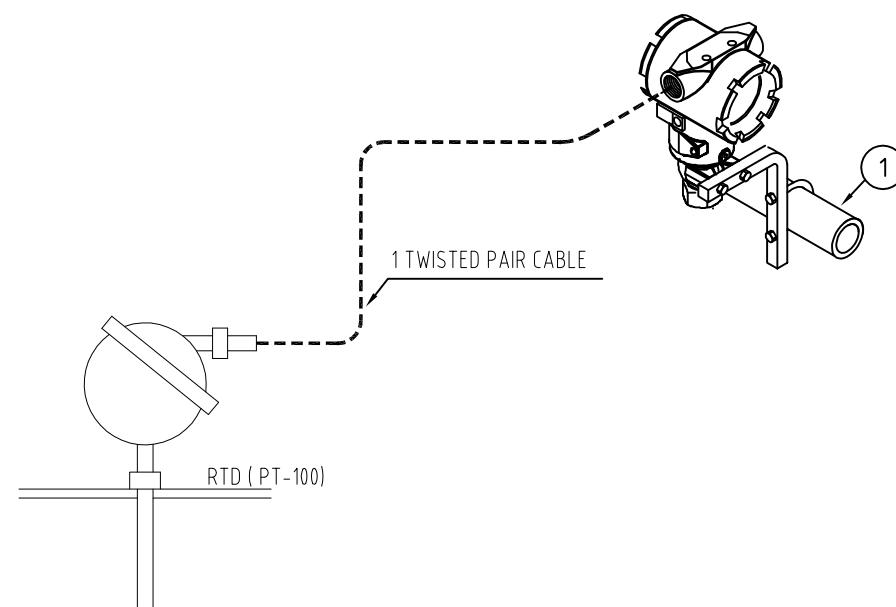
Uttam Energy System Ltd. Pune

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 27

LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0105	PIPE, 2"NB	ERW, LIGHT, MILD STEEL	1.5 MTR

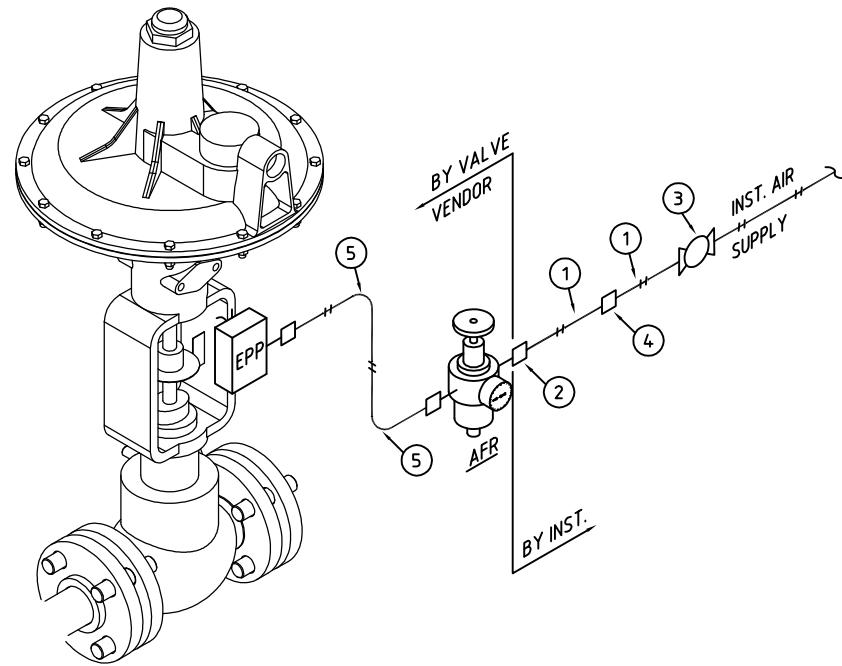


SR. NO.	TAG NO.	DESCRIPTION
1	11-TT-001	ECONOMIZER INLET HDR TEMPERATURE
2	11-TT-003	PRIMARY SH INLET HDR TEMPERATURE
3	11-TT-019	FLUE GAS TEMP AT ESP INLET
4	11-TT-020	FLUE GAS TEMP AT ESP OUTLET
5	11-TT-021	FD FAN COMMON DISCHAEGE TEMP
6	11-TT-022	HOT APH OUTLET FD AIR TEMPERATURE
7	11-TT-023	HOT APH OUTLET SA AIR TEMPERATURE
8	12-TT-001	ECONOMIZER INLET HDR TEMPERATURE
32	12-TT-003	PRIMARY SH INLET HDR TEMPERATURE
33	12-TT-019	FLUE GAS TEMP AT ESP INLET
34	12-TT-020	FLUE GAS TEMP AT ESP OUTLET
35	12-TT-021	FD FAN COMMON DISCHAEGE TEMP
36	12-TT-022	HOT APH OUTLET FD AIR TEMPERATURE
37	12-TT-023	HOT APH OUTLET SA AIR TEMPERATURE
38	15-TT-002	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE
39	16-TT-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH
40	17-TT-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH

M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA

**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901  
SHT.NO. 28

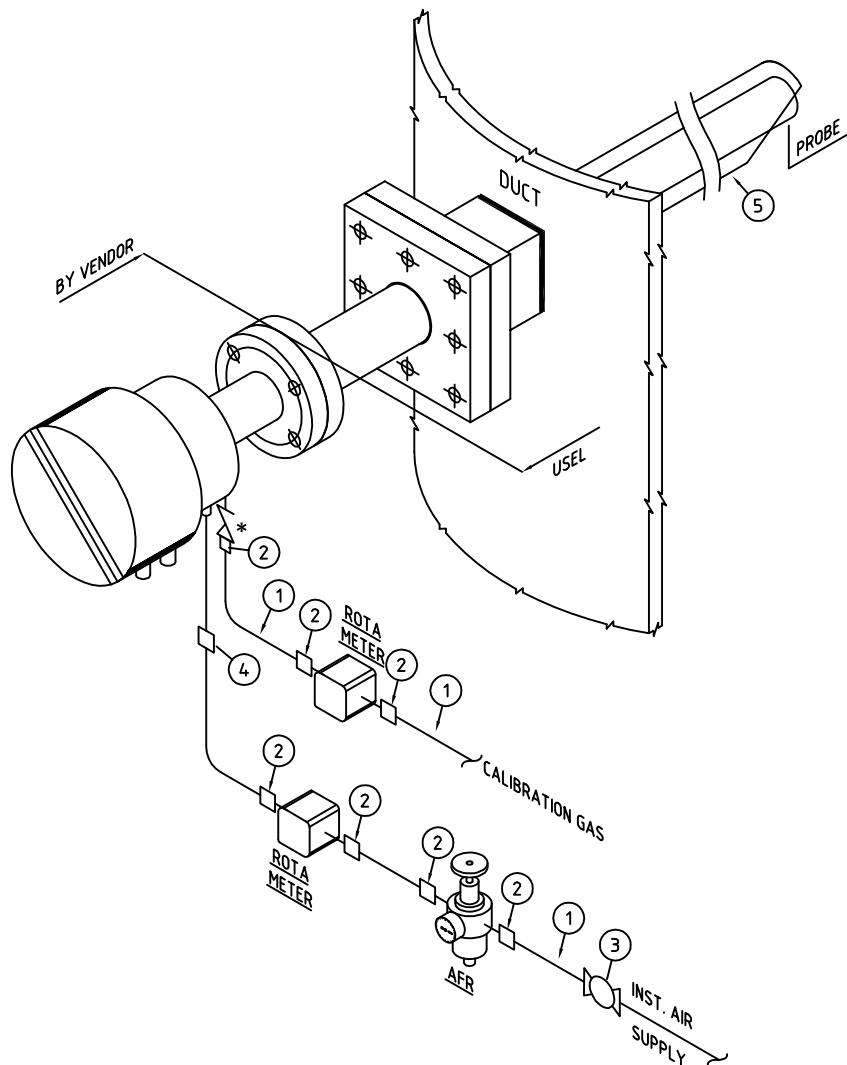


### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	MATERIAL	QTY/TAG
1	UE0100	TUBE 1/4", OD x 0.049" THK	SS316	3 MTS
2	UE0101	CONN. 1/4"NPT(M) x 1/4" OD COMP.	SS316	1 NO
3	UE0102	BALL VALVE, 1/2" BSP (F) x 1/4" OD COMP.	SS316	1 NO
4	UE0103	UNION, 1/4" OD x 1/4" OD COMP.	SS316	1 NO
5		BEND , 1/2"(SW)	A-182, Gr.F-316,3000LBS(SS)	2 NOS

SR. NO.	Tag No.	DESCRIPTION
01	15-TY-006	AS PER P & ID - PB609DCP0501
02	15-TY-005	
03	15-TY-002	AS PER P & ID - PB609DCP0501
04	15-PY-001	
05	15-TY-004	
06	15-PY-003	

Regulating Control Valve	M/s PT. SURYA BORNEO INDUSTRI PANGKALAN BUN KALIMANTAN TENGAH - INDONESIA
Uttam Energy System Ltd. Pune	DRG NO:-PB609-000-I-HUD-901 SHT.NO. 29



### LIST OF ITEMS

SR. NO.	ITEM CODE	DESCRIPTION	GRADE/CLASS/MATERIAL	QTY/TAG
1	UE0133	TUBE 1/4"OD x 1mm THK PVC COATED Cu TUBE	COPPER	15 MTR
2	UE0134	CONN. 1/4"NPT(M) x 1/4"OD COMP.	SS316 (SS)	8 NOS
3	UE0102	BALL VALVE, 1/2" BSP (F) x 1/4"OD COMP.	SS316 (SS)	1 NO
4	UE0103	UNION, 1/4" OD x 1/4"OD COMP.	SS316 (SS)	1 NO
5	UE0135	ABRASIVE SHIELD FOR OXYGEN ANALYSER	---	1 SET

SR. NO.	Tag No.	DESCRIPTION
1	11-AIT-001	ECONOMIZER OUTLET FLUE GAS.
2	12-AIT-001	ECONOMIZER OUTLET FLUE GAS.

'O2' Analyser (1/4" Copper Tubing)  
(Probe Length 1mtr)

**M/s PT. SURYA BORNEO INDUSTRI  
PANGKALAN BUN  
KALIMANTAN TENGAH - INDONESIA**

**Uttam Energy System Ltd. Pune**

DRG NO:-PB609-000-I-HUD-901

SHT.NO. 30

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Anubar at Cooling Water Return Flow**

<b>Document No.</b>	PB609-000-I-DOC-AFE02	<b>Rev No.</b>	0
		<b>Sheets</b>	1

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	30.08.17	HKV	DHK	DHK	FOR INFORMATION



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant  
CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia  
EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

ITEM:-ANUBAR (Flow Measurement)

GENERAL	1	Tag No.	34-FE-001	Qty-1No
	2	Description of Service	Cooling Water Return Flow	
	3	PID No.	PB609DSCP0502	
ELEMENT DATA	4	Manufacturer	To be desided by client	
	5	Element Type	Anubar Flow	
	6	Temp. Tappings	Flange, 1/2NPT(M) tappings for In and Out	
	7	Beta Ratio (d/D)	Between 0.4 to 0.7	
	8	Flow Accuracy	-/+ 1% of URV	
PIPING DATA	9	Flange	ANSI B16.5, CL150	
	10	Pipe Size and Schedule	1000 NB, Thikness- 10mm	
	11	Pipe OD	1016 mm	
	12	Flange Material	ASTM A105	
	13	Pipe Material	CS	
PROCESS DATA	14	Flow Rate	Operating- 4240 m3/Hr.	
	15	Pressure	Working Pressure-5 Bar(g)	
	16	Temperature	Working Temp.-41 Deg.C	
	17	Fluid Name	Cooling Water	
NOTES	18	As per ASME Standard		
	19	Scope :- Anubar With Counter Flanges		

1) Vendor to sumit GA drawing and calculation for approval.

2) Manfacturing shall be ASME standard.

DOCUMENT TITLE	DATA SHEET FOR ANUBAR	Prepared	HARI
	UTTAM ENERGY SYSTEMS LTD.	Checked	DHK
		Approved	---
		Rev	0
		Page	1 of 1

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description : Instrument Data sheets for Draft Gauges**

**Document No.** : PB609/612-000-I-DOC-ATG04 **Rev No.** 0  
**Sheets** 2

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	26.08.17	HKV	DHK	DHK	FOR INFORMATION

## Specifications for Draft Gauge

**PROJECT NAME :** 2 x 7.5MW – Cogeneration Power Plant

**CLIENT :** PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia.

**EPC :** PT. EUROASIATIC JAYA, Jakarta, Indonesia

**Model:** Vendor to Provide

Make: GIC /FORBES MARSHALL /SWITZER

### **Technical Specifications:**

Sensor: Silicon Elastomer Diaphragm

Case: Pressed sheet steel, IP-65

Movement: 304SS pivots

Range: Refer Table Below

Accuracy: ±2% of Span

Over Pressure: Min 150% of Operating Pressure

Max Process Temperature: 80°C

Process connection: 1/4" NPT (F), Back

Mounting: 2" Pipe Mounting

### **Other Technical Specifications:**

Scale: Linear

Input: Differential/Dual

Range Type: Compound Type

Accessory: 2" Pipe mounting bracket shall be supplied with each draft gauge/indicator.

### **Range Table:**

Sr. No.	Tag No.	Service	Range in mmH2O	Qty.
		BOILER-1		
1	11-DG-001	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	1
2	11-DG-002A	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	1
3	11-DG-002B	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	1
		BOILER-2		
4	12-DG-001	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	1
5	12-DG-002A	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	1
6	12-DG-002B	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	1

**Total Quantity      06 No's**

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

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**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

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**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Level Switch on Deareator**

**Document No.** : PB609-000-I-DOC-ASH00 **Rev No.** 1  
**Sheets** 1

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	30.08.17	HKV	DHK	DHK	FOR INFORMATION
1	19-09-17	HKV	DHK	DHK	REVISED TAG NUMBER



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

### MAGNETIC LIQUID LEVEL SWITCH

<b>GENERAL</b>	1	Tag No.	10-LS-001
	2	Description of Service	Deaerator Storage Tank Water Level
	3	PID No.	PB609DCP03
<b>SERVICE CONDITIONS</b>	4	Process Fluid	Hot Water
	5	Operating Pressure	1.76 kg/cm <sup>2</sup> (g)
	6	Operating Temperature	130.5 Deg.C
		Maximum Temperature	280 Deg.C
	7	Maximum Pressure	3.5 Bar(g)
	8	Over Pressure	130% of working pressure
	9	C to C Distance	2120 mm
	10	Type	Magnetic Liquid type
	11	Float Material	SS316
<b>LEVEL SWITCH</b>	12	Float	VTI
	13	Enclosure	Weatherproof IP65
	14	Output	1) Level High High- Set point _"-1990mm", 2) Level High- Set point _"-1890mm" and 3) Level Low Low- Set point _"-70mm" contacts
	15	End Connection	25 NB, ASME, B16.5 CI-150
	16	Mounting	Side mounted with Flange connection
	17	Body Material	CS ASTM A106Gr.B / A106
	18	Differential	12mm±2mm
	19	Flange Material	SA-105
	20	Internals	SS316
	21	Switch Type	3 x SPDT Action, 5A 230V AC / 24VDC for Three set points
<b>ELECTRICAL</b>	22	Contact Type	Snap Action
	23	Electrical Connection	VTI
<b>PURCHASE</b>	24	Manufacturer	LEVCON / CHEMTROLS
	25	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Manfacturing shall be ASME standard.

DOCUMENT TITLE

DATA SHEET FOR Level Switch

UTTAMENERGY LTD. PUNE

Prepared	HKV
Checked	DHK
Approved	DHK
Rev	1
Sheet	1 of 1

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

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**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

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**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

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**Description :** **Instrument Data sheets for Pressure Switches**

**Document No.** : PB609/612-000-I-DOC-AHS00 **Rev No.** 1  
**Sheets** 1

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	22.08.17	HKV	DHK	DHK	FOR INFORMATION
1	26.08.17	HKV	DHK	DHK	Added DM System Pressure Switches



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant  
 CLIENT : PT. SURYA BORNEO INDUSTRI,  
 Pangkalan Bun, Kalimantan Tengah, Indonesia  
 EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

PRESSURE SWITCH WITH VALVE MANIFOLD

GENERAL	1	Tag Number	Refer Table below	Qty = 07 no's
	2	Description Of Service	Refer Table below	
	3	PID No.	PB609DCP308 & PB609DCP22 & DM WATER SYSTEM	
ENCLOSURE AND BODY	4	Mounting configuration	Field Mounted	
	5	Body Material	Aluminium Pressure Die Cast	
	6	Protection Class	IP66	
	7	Wetted Parts	316 SS	
	8	Diff. Pressure Range	Refer Table below	
	9	Differential	Vendor to suggest	
	10	Scale Accuracy	+/- 5% of FSR	
	11	Repeatability	+/- 1% of FSR	
	12	Process Connection	1/2" NPT(F) Through Adapter	
	13	Ambient Temperature	-10 deg.C to +60 deg.C	
MAGNETIC SWITCH	14	Switching Element	1 Number, Instrument Quality Microswitch	
	15	Contact Rating	6A@24VDC	
	16	Contacts	Single pole, Double throw type	
	17	Cable Entry	1/2" NPT(F)	
MAKE	18	Manufacturer	GIC /YOKOGAWA /INDFOSS/ SWITZER	
	19	Model	Vendor to suggest	
NOTE	20	Accessories	1/4" to 1/2" NPT(F) Process Connection Adapter 3-Valve Manifold(Vendor shall be provided suitable manifold to switch)	
	21	Certificate	1) Material Compliance Certificate.	

S.NO	Tag No.	Service Description	Set Point(Barg)	Range	Unit	Qty
1	16-PSL-001	UNIT-1 CEP PUMP 1 DISCHARGE PRESSURE LOW	To be decided by Turbine Vendor	0 TO 15	Bar(g)	1
2	16-PSL-002	UNIT-1 CEP PUMP 2 DISCHARGE PRESSURE LOW	To be decided by Turbine Vendor	0 TO 15	Bar(g)	1
3	17-PSL-001	UNIT-2 CEP PUMP 1 DISCHARGE PRESSURE LOW	To be decided by Turbine Vendor	0 TO 15	Bar(g)	1
4	17-PSL-002	UNIT-2 CEP PUMP 2 DISCHARGE PRESSURE LOW	To be decided by Turbine Vendor	0 TO 15	Bar(g)	1
5	43-PSL-001	INSTRUMENT / SERVICE AIR RECIEVER TANK PRESSURE LOW	4	0 TO 10	Bar(g)	1
6	33-PSL-001	DM TRNSFER PUMP-1 SUCTION PRESSURE	Later	-1 TO 2	Bar(g)	1
7	33-PSL-002	DM TRNSFER PUMP-2 SUCTION PRESSURE	Later	-1 TO 2	Bar(g)	1
					Total	07 No's

Note: Pressure switches shall be suitable for site settable.

DOCUMENT TITLE	DATA SHEET FOR PRESSURE SWITCH	
	Prepared	HARI
	Checked	DHK
	Approved	---
	Rev	R1
	Page	1 of 1

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Rota Meter(Local Flow Indicator)**

<b>Document No.</b>	PB609-000-I-DOC-AFE01	<b>Rev No.</b>	0
		<b>Sheets</b>	2

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	26.08.17	HKV	DHK	DHK	FOR INFORMATION

	PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant		
	CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia		
	EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia		
<b>FLOW INDICATOR(ROTAMETER)</b>			
<b>GENERAL</b>	1	Tag No.	34-FI-001 Qty-1 No
	2	Description of Service	Cooling Tower Blow Down to N-Pit
	3	PID No.	PB609DSCP0502
	4	Process Fluid	Water
	5	Operating Pressure	4 Bar-g
	6	Design Pressure	7 Bar-g
	7	Operating Temperature	43 Deg.C
	8	Design Temperature	50 Deg.C
	9	Flow	15 m3/hr
<b>FLOW INDICATOR</b>	10	Type	Rotary type sight flow indicator
	11	Line Material	CS
	12	Line Size	50NB (60.8 x 3.6mm THK)
	13	Body Material	Brass / Stainless Steel
	14	Slight Window	Polycarbonate Tube
	15	Rotor	Delrin Plastic
<b>PURCHASE</b>	16	Manufacturer	Chemtrol / Levcon / Gic
	17	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The Customer's approval.

DOCUMENT TITLE	DATA SHEET FOR ROTAMETER	Prepared Checked Approved Rev Sheet	HKV DHK DHK 0 1 of 1
	UTTAMENERGY LTD. PUNE		

**Project title** : **2 x 7.5MW – Cogeneration Power Plant**

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**Client** :  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC** :  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

---

**Supplier** :  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description** : **Specifications for SWAS system**

**Document No.** : PB609-000-I-DOC-ASW00 **Rev No.** 0  
**Sheets** 11

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	30.08.17	HKV	DHK	DHK	First Submission

**Project:** 2 x 7.5MW – Cogeneration Power Plant  
**Client:** PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah,  
Indonesia

**Doc No.:** PB609-000-I-DOC-ASW00  
**Rev No.:** 00

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## 1. INTRODUCTION

M/s. PT. Euroasiatic Jaya, Jakarta – Indonesia. is set up a 2x7.5 MW Co-generation Power Plant in Indonesia as an EPC supplier to an end client P T Surya Borneo Indah in Indonesia. The power plant will generate power of 2 X 7.5 MW with the help of Two (2) nos. 65 TPH of Reciprocating servo grate fired Boilers and Two (2) nos. steam turbine generator unit. This document covers the design basis of SWAS system for the above co-generation power plant.

## 2. PROJECT INFORMATION AND DESIGN BASIS SITE DATA

i	Location	Jakarta , Indonesia	
ii	Height above mean sea level	25 m (approx)	
iii	Relative Humidity	Maximum :92% Minimum :84%	
iv	Maximum Annual Rainfall	487mm	
v	Max Wind Velocity	60 km/h	
vi	Seismic Data	Zone 6 of Indonesian code	

### DESIGN CONDITIONS

i	Design ambient temperature for plant equipment	°C	38
ii	Design temperature for electrical equipment	°C	50

## 3. GENERAL SPECIFICATIONS OF SWAS

Sr. No.	Description	Details
1.	Mounting of Analysers	All PH, Specific conductivity, Cation Conductivity,Silica and DO2 sensors and transmitters are mounted on self standing rack with canopy.
2.	Enclosure	IP54 (Analyzers front)
3.	Ambient temp limit	4 DEGC (Min)/ 40 DEGC (Max.) (Indoor Location)
4.	Output	4-20mA DC
5.	Tagging	Black engraved On SS 316 name plate
6.	Quantity	Mention Below.
7.	Power Supply	220V AC, 50HZ 1 phase( <b>Will be confirmed by Client</b> )

8.	Area Classification	Safe
9.	Automatic temperature compensation	Required
10.	Cable detail between sensor and transmitter	VTI

**Notes:**

- ☞ If there are any contradictions on points mentioned under Extra Features with the contents in the Standard specifications, the more stringent of the two will prevail. SWAS supplier shall accordingly submit the offer.
- ☞ VTI - Vendor to Inform.

#### 4. LIST OF SWAS MEASUREMENTS

The following samples shall be provided with necessary SWAS analyzers.

Sr. No.	Service	Parameters	Op. Value/Range	Press. (Oper. / Max.)	Temp. (Oper. / Max) °C
				Bar(g)	
1	<b>Feed water at Common suction of both boiler BFW pumps</b>	Silica	0.02ppm(Max)	1.70/3.5	130/140
		Dissolved Oxygen Analyser	0.007ppm (Max)	1.70/3.5	130/140
		pH	0-14	1.70/3.5	130/140
		Specific Conductivity	0.5 µSie/cm(max)	1.70/3.5	130/140
		Cation Conductivity	2.0 µSie/cm(max)	1.70/3.5	130/140
2	<b>Main Steam Outlet-Boiler 1</b>	Silica	0.02 ppm (max)	47/57.3	425/430
		pH	0-14	47/57.3	425/430
		Specific Conductivity	0.2 µSie/cm(max)	47/57.3	425/430
		Cation Conductivity	0.3 µSie/cm(max)	47/57.3	425/430
3	<b>Saturated Steam - Boiler 1</b>	pH	0-14	54/57.3	268/280
		Specific Conductivity	0.5 µSie/cm(max)	54/57.3	268/280
4	<b>Blow Down-Boiler 1</b>	Silica	5.5 ppm(max)	52/57.3	268/280
		pH	0-14	52/57.3	268/280
		Specific Conductivity	300 µSie/cm(max)	52/57.3	268/280
5	<b>Main Steam Outlet- Boiler 2</b>	Silica	0.02 ppm (max)	47/57.3	425/430
		pH	0-14	47/57.3	425/430

		Specific Conductivity	0.2 $\mu\text{Sie}/\text{cm}(\text{max})$	47/57.3	425/430
		Cation Conductivity	0.3 $\mu\text{Sie}/\text{cm}(\text{max})$	47/57.3	425/430
<b>6</b>	<b>Saturated Steam- Boiler 2</b>	pH	0-14	54/57.3	268/280
		Specific Conductivity	0.5 $\mu\text{Sie}/\text{cm}(\text{max})$	54/57.3	268/280
<b>7</b>	<b>Blow Down- Boiler 2</b>	Silica	5.5 ppm(max)	52/57.3	268/280
		pH	0-14	52/57.3	268/280
		Specific Conductivity	300 $\mu\text{Sie}/\text{cm}(\text{max})$	52/57.3	268/280

## 5. DETAIL SPECIFICATIONS OF SWAS

- ⊖ SWAS shall consist of continuous on-line analysis of steam and water media to establish their purity and suitability for durability of pressure parts. The system shall be generally designed in Accordance to the recommendation of ASME PTC 19.11 Part-II, water & steam in power cycle. The measurement shall be carried out at different cycle points of the plant to establish conductivity, pH, dissolved oxygen and silica content. The SWAS shall include all requisite microprocessor based analyzers. All data shall be made available in DCS. Continuous monitoring of various parameters using indicator with an isolated analog outputs of 4-20mA, DC for each parameter shall be provided for monitoring in DCS.
- ⊖ Components shall be completely assembled, piped, wired and tested at the factory and shall be ready for installation when received at the project site.
- ⊖ Vendor to submit P&ID, GA; Flow calculation.; Wiring Diagram; IO list ; Power consumption; BOM for approval / Information.
- ⊖ Steam and Water Analysis System shall be furnished for continuous monitoring of water (feed water) and steam purity in the plant.
- ⊖ The equipment shall be constructed to operate accurately and safely under the operating conditions described or implied in this specification, without undue heating, vibration, wear, corrosion or other operating troubles.
- ⊖ All piping, tubing, fittings and other wetted parts in the sampling and analyzing system shall of SS316. No plastics or rubber shall be permitted except within analyzers, which will be as furnished by the manufacturer.
- ⊖ Instrument air supply and Auxiliary cooling water supply shall be made available at one point.
- ⊖ The Vendor shall provide all the necessary piping, fittings, supports, etc., for supply and return line of cooling water line.

- ⊖ Sample conditioning system shall have the components as mentioned at beginning of this Specification, which shall be located in separate panel (Wet Panel) to condition the samples. 1/2" OD SS316 Tubing shall be used for Blow down line (up to header) including Isolation valve. Sample lines within SWAS shall be ½" or ¼" OD seamless tube. Tube & fitting make as per approved vendor.
- ⊖ The sample distribution should be properly done between both analyzers and grab sample line to avoid any sample starvation. Backpressure regulator may be used for this purpose.
- ⊖ Cable glands shall be double compression nickel plated brass and shall be provided for all the electrical entries on the system. Size of the outgoing cable gland shall be informed during detail engineering after details received from customer.
- ⊖ Cable routing on rack shall be using PVC ducts (vendor to provide min. 30% spare space in PVC duct) and shall be suitably clamped using PVC ties.
- ⊖ Layout and piping drawings along with BOM shall be submitted for approval.
- ⊖ Coolant shall be made available at one place; the distribution shall be done for sample cooler by vendor.
- ⊖ The metallurgy for the SWAS wet panel and components shall be selected according to the circulating water parameters maintained.
- ⊖ Vendor to furnish sizing calculation for sample coolers and cooling water requirements.
- ⊖ Vibration pads & lifting hooks are required for each panel / rack.
- ⊖ Vendor to submit instrument list and specifications for approval.
- ⊖ Panels shall have "Warning notes & Sensor preservation instructions" for Analyzers & arrow indication / markings shall be shown on the **WET** Section of Rack to indicate the flow directions as applicable..
- ⊖ Canopy shall be provided for all Panels/ Racks.
- ⊖ All outgoing cables shall be terminated in the Dry Panel.
- ⊖ Vendor to clearly list out all accessories required to complete system in all respect.
- ⊖ Separate Terminal Strips shall be used for Digital & Analog signals.
- ⊖ Vendor to provide all headers with both side openings and with blind flanges with gasket and fasteners.

- ⦿ Vendor to note that any process related or safety related issue raised by End User/ Purchaser inspector at inspection stage shall be taken care by vendor without any cost implications.
- ⦿ Due to limited shelf life of PH sensors & Reagents for the Analyzers, same to be sent to site, before commissioning of the SWAS System, Vendor will be given two weeks advance information for arranging the reagents & Sensors.
- ⦿ All samples with high inlet pressures shall be provided with variable pressure reducing element after the sample cooler. Variable pressure reducing element shall be rod in tube device. After the variable pressure reducing element sample shall be taken to analyzers. Variable pressure reducing element make shall be as per vendor standard.
- ⦿ Thermal shut off valve shall be provided to avoid analyzer damage due to high temperature of the sample. Thermal shut off valve wetted material as per vendor standard. If temperature reaches the set point, thermal shut off valve shall close automatically. Thermal shut off valve make as per vendor standard.
- ⦿ Backpressure regulator shall be used to maintain the pressure upstream and constant flow for analyzers. The excess pressure shall be relieved to sample grab or sink through pressure relief valve. Backpressure regulator make as per vendor standard. Back pressure regulating valves shall be provided such that variations in sample flow to individual analyzers shall not exceed 5% when total sample flow is increased or decreased due to change in number of individual analyzers or grab sample utilizing a particular sample.
- ⦿ Electrical Connection shall be ½" NPTF.
- ⦿ PVC conduit shall be provided by vendor for the prefab cable.
- ⦿ Primary cooling of all samples having temperature in excess of 450C shall be provided through an individual sample cooler (primary cooler) of submerged helical coil type of shell and tube design with removable shell, meeting the intent of ASTMD 1192-1977, to bring down the temperature to around 45°C.
- ⦿ A Steam and Water Analysis System (SWAS) Room shall be provided with separate Dry panel room and Wet panel room. The dry panel alone shall be air-conditioned. SWAS shall be complete with sample conditioning and necessary analyzers and indication in dry panel. Chiller unit as required to cool the samples after primary coolers shall also be provided. Primary coolers shall be kept near the sample tap-off point.
- ⦿ The main analyzers for steam and water shall be arranged in groups in such a way that excessively long process pipes are not envisaged.
- ⦿ All samples shall be adequately cooled and pressure reducing devices shall be provided where necessary. The sample coolers / chillers shall be designed to provide samples to various analyzers at 25°C or at temperatures as required by the analyzers. Wherever necessary two stage cooling/chiller units shall be provided. The sizing calculations for the

coolers / chillers shall be submitted for approval during engineering. The Primary coolers shall be located near the sampler tapping points. Each sample cooler shall be protected by a built-in shell relief valve.

- ☞ Sample cooler shall be tube in shell type. The material of sample cooler shall be SS316L or suitable for circulating water quality.
- ☞ The sampling system shall be designed to provide samples around 2 Kg/cm<sup>2</sup> or as required by the analyzers. Necessary pressure reducing valves shall be provided for this purpose. The sizing calculation and selection of these valves shall be subject to approval during engineering. Body material shall be of SS and rating shall suit the process requirement. At the outlet of the pressure reducing valves suitably sized pressure relief valves shall be provided to protect the sample lines in case of failure of pressure reducing valves. The sizing and selection of these pressure relief valves shall be subject to approval during engineering. Body and Internal material shall be of SS of suitable rating as per process requirement. Only in the case of very low pressure and temperatures, transmitters for measurements such as conductivity, pH, dissolved oxygen, SiO<sub>2</sub> content etc. be installed directly in the pipe. Suitable cartridge type filter with 316SS body shall be provided on the same.
- ☞ ple line to remove particulate of size 40 micron and above. The filter element shall be removable for cleaning. In order to provide samples at a constant flow rate to the analyzers, a constant head chamber (reservoir) shall be envisaged. The chamber shall be of 316 SS with toppings for pressure and temperature gauge.
- ☞ A protective device shall be incorporated in the sample cooler to isolate the analyzer in the event of excessive pressure & temperature. For this purpose a three way solenoid valve shall be envisaged to divert the sample to the drain header. Solenoid valve shall be of universal type, 3way with SS body and internals.
- ☞ In order to monitor the sample flow rate to individual analyzers, a rotameter type flow indicator with adjustable needle valve is envisaged. The graduations and the needle valve shall be accessible from the front plate of the wet section of SWAS panel. Body material shall be of carbon steel and rating shall be as per process requirement. As a minimum pressure and temperature gauges shall be provided at the sample outlet line of the sample coolers and at the inlet and return line of the cooling water. In addition a flow switch and flow rotameter shall be provided at the inlet of the cooling water line. Pressure and temperature gauges shall be with 150 mm. dials, stainless steel body, socket and movement. Each gauge shall have a dial engraving or separate phenolic nameplate to identify the service.
- ☞ For all analyzers, temperature compensation shall be provided, with the temperature sensor being an integral part of the probe.
- ☞ For cation conductivity measurements, wherever specified, suitable cation exchange columns shall be provided. Two (2) nos cation exchange columns for each stream shall be provided, one (1) working and one (1) standby. Necessary switching valves for switching to the standby column shall also be provided. The switch over shall be possible from the front of the panel. Also one (1) conductivity cell for each stream shall be provided after the cation exchange column.

- ⊗ The sampling system shall include all probes, valves, filters, coolers, drainage facilities, flow regulators, flow meters, piping and pumps as necessary, to give the analyzer a representative and suitably conditioned sample. Interconnecting pipe work and accessories shall be of stainless steel. The arrangement shall permit testing of the entire assembly before dispatch to site and shall be arranged for convenient removal from on-line operation to facilitate routine maintenance and calibration.
- ⊗ Each automatic analysis sampling point shall be provided with a manual sampling point to permit a sample to be easily taken. Manual sampling shall not interrupt automatic sampling. All sampling lines shall run to common sampling racks on which all the analysis associated equipment shall be fitted.
- ⊗ The **Vendor** shall be fully responsible for proper engineering, selection of hardware, manufacture, testing and installation, commissioning and satisfactory functioning of complete and fully operational Steam and Water Analysis System.
- ⊗ Bidder shall submit offer of chemical/reagents for one years of SWAS operation after commissioning of the SWAS.

## 6. CIRCULATING COOLING WATER PARAMETERS

Operating Pressure: 4 Bar-g

Operating Temperature: 35 Deg. Cel.

Chloride contents : 290 mg/lit

## 7. SENSOR/ANALYZERS SPECIFICATIONS

### a) pH Measurement

Solid state / micro processor based system with system accuracy of + 0.01 pH, auto span and zero calibration, manual zero and span calibration, integral indicator, automatic ultrasonic cleaner, iso-potential adjustment having flow type cells.

Output shall be isolated 4-20 mA DC linear signal. Accessories shall include preamplifier, screened junction box for electrode.

The pH shall have built-in reference chambers.

For pH measurement, reference calomel / silver, silver-chloride electrode shall be of rugged and sealed construction moulded in glass coupled polypropylene. Electrical connection shall be made directly on to the outer end of the element ensuring better electrical performance of the electrode.

Wherever, variations in sample temperature may occur, automatic temperature compensation device shall be provided.

### **b) Conductivity Measurement**

Solid state / micro-processor based system with an accuracy of + 0.5 %FSD, auto zero and span calibration, integral indicator having flow line (screwed) type cell. Housing for cell and analyzer shall be weather and water proof. Output shall be isolated 4-20 mA DC linear signal.

The conductivity sensors shall have built-in reference chambers.

The conductivity cell shall in general be of flow through type or insertion type depending upon the area of application.

Conductivity transmitter shall have local indication and provision for automatic temperature compensation up to 100 deg. C.

### **c) Silica Measurement**

Solid State/micro-processor based system with an accuracy of + 1% of span or 2ppb whichever is minimum, response time better than 5 min for 90% change, six numbers of sample streams having features like auto zero & span calibration with manual provision also, ambient temperature compensation and integral indicator.

Self diagnostic features shall include alarm for no reagent, calibration fault and silica concentration low/high. Analyzer housing shall be weather and water proof. Output shall be isolated 4-20 mA DC linear signal.

Liquid handling unit comprising of valves, manifolds, tanks (if required), power supply unit, pressure reducer etc.

Dedicated five channel stream selector shall be provided in Silica analyzer. Analyzer shall be independent isolated 4-20mA output for each stream.

### **d) DO<sub>2</sub> (Dissolved Oxygen) Measurement**

The dissolved oxygen analyzer shall be of continuous flow through solid State/micro-processor based system based on electro-chemical/**Amperometric** principle type with an accuracy of + 1% of span or 1ppb whichever is minimum, response time better than 30s for 90% change, ambient temperature compensation and integral indicator.

Self diagnostic features shall include alarm for transmitter fault, no reagent, calibration fault, high cell current as a minimum. Analyzer housing shall be weather and water proof. Output shall be isolated 4-20 mA DC linear signal.

The field mounted cabinets for DO<sub>2</sub> analyzer system shall have the following:

- a) Auto zeroing and calibration facility
- b) Manual overriding

**Project:** 2 x 7.5MW – Cogeneration Power Plant  
**Client:** PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah,  
Indonesia

**Doc No.:** PB609-000-I-DOC-ASW00  
**Rev No.:** 00

Liquid handling unit comprising of valves, manifolds, thermometers, power supply unit, pressure reducer etc.

### 8. MAKE OF MAJOR ACCESSORIES OF SAMPLING SYSTEM

Sr. No.	Description	Make
1.	Back Press. Regulator	VTC
2.	Thermal Shut off Valve ( with contact)	VTC
3.	Sample Cooler	VTC
4.	Press. Gauge	VTC
5.	Temp. Gauge	VTC
6.	Variable Pressure Regulating valve	VTC
7.	Temp. switch	VTC
8.	Flow gauge	VTC

**VTC- Vendor to Confirm.**

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Vortex Flow Meter At BFW**

**Document No.** : PB609/612-000-I-DOC-VFM00 **Rev No.** 0  
**Sheets** 1

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
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		PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia		
ITEM:-VORTEX FLOW METER				
GENERAL	1	Tag No.	11-FE-001 FOR BOILER-1 12-FE-001 FOR BOILER-2	Qty-2Nos
	2	Description of Service	Boiler Feed Water Flow	
	3	PID No.	PB609DCP01	
ELEMENT DATA	4	Manufacturer	To be desided by client	
	5	Element Type	VORTEX FLOW METER with Transmitter	
	6	Temp. Tappings	Flange	
	7	Beta Ratio (d/D)	Between 0.4 to 0.7	
	8	Flow Accuracy	-/+ 1% of URV	
Transmitter	9	Type	Electronic , Smart with HART Protocol	
	10	Power Supply	24V DC (2-Wire)	
	11	Output	4-20 mA DC	
	12	Conduit Entry Size	1/2" NPT	
	13	Meter	LCD Meter and Flow Totalizer	
	14	Zero and Span Adjust	By HART/Buttons	
PIPING DATA	15	Flange	ANSI B16.5, CL600	
	16	Pipe Size and Schedule	150NB, Sch-80	
	17	Pipe ID	146.36mm	
	18	Flange Material	ASTM A105	
	19	Pipe Material	SA 106 Gr-B	
PROCESS DATA	20	Flow Rate	Max-76650 Kg/hr, Nor-65000 Kg/hr, Min-19500 Kg/hr	
	21	Pressure	Working Pressure-65.2Bar(g), Design Pressure-79Bar(g)	
	22	Temperature	Working Temp.-130Deg.c, Design Temp.-140Deg.c	
	23	Fluid Name	Water	
NOTES	24	As per ASME Standard		
	25	Scope :- Vortex Flow Meter With Counter Flanges		
	26	Temperature sensor for Compensation		
	27	Flow Totalizer to be considered.		
	28	We have considered the length for Upstream 25D and Downstream 15D, so vendor have to calculate the beta ratio and upstream & downstream length shall be in that lengths which we have considered.		
DOCUMENT TITLE		DATA SHEET FOR ORIFICE PLATE		
			Prepared	HARI
			Checked	DHK
			Approved	---
			Rev	0
			Page	1 of 1

## **Project title** :

## **2 x 7.5MW – Cogeneration Power Plant**

## Client



**PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC



**PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

## **Supplier**



**M/s UTTAM ENERGY LIMITED,  
Pune, Maharashtra, India**

## **Description : Specifications for CEMS system for Boiler 1 & 2**

Document : PB609/612-000-I-DOC-CEM00

Rev No. 0

No.

Sheets 8

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
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**Project:** 2 x 7.5MW – Cogeneration Power Plant

**Doc No.:** PB609/612-000-I-DOC-CEM00

**Client:** PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**Rev No.:** 00

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**Project:** 2 x 7.5MW – Cogeneration Power Plant

**Doc No.:** PB609/612-000-I-DOC-CEM00

**Client:** PT. SURYA BORNEO INDUSTRI,

**Rev No.:** 00

Pangkalan Bun, Kalimantan Tengah, Indonesia

- INTRODUCTION :** M/s. PT. Euroasiatic Jaya, Jakarta – Indonesia. is set up a 2x7.5 MW Co-generation Power Plant in Indonesia as an EPC supplier to an end client P T Surya Borneo Indah in Indonesia. The power plant will generate power of 2 X 7.5 MW with the help of Two (2) nos. 65 TPH of Reciprocating servo grate fired Boilers and Two (2) nos. steam turbine generator unit. This document covers the design basis of CEMS system for the above co-generation power plant.

## **PROJECT INFORMATION AND DESIGN BASIS SITE DATA**

Longitude & Latitude	111.40 BT & 02.42 LS
Height above mean sea level	25 m
Seismic Zone	Zone 6 of Indonesian code
Maximum Relative Humidity	92%
Minimum Relative Humidity	84%
Average Annual rainfall	187mm
Number of rainy days in a year	17.4
Wind Velocity For Design	60 Km/h
<b>Design ambient temperature for electrical equipment</b>	<b>50°C</b>
<b>AC UPS System Output Voltage</b>	<b>220V, 50 Hz, 1 Phase(Will be confirmed by Client)</b>

## **2. PURPOSE OF DOCUMENT:**

Purpose of this document is to define the technical requirements of Continuous Emission Monitoring System (CEMS) and related instrumentation system to be installed in 2x7.5MW power plant.

## **3. BASIS OF DESIGN :**

Basis of design for the CEMS package shall be the composition of flue gas and site conditions mentioned above.

**Project:** 2 x 7.5MW – Cogeneration Power Plant

**Doc No.:** PB609/612-000-I-DOC-CEM00

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#### **4. SCOPE OF SUPPLY:**

The scope of supply of the CEMS supplier shall include but not limited to the following.

- Chimney Gas Analyzers
- **Two Sets of CEMS System(Each boiler have one CEMS system).**

#### **5. SYSTEM REQUIREMENT**

Following specifications shall serve as guidelines to indicate the special requirement for the CEMS.

##### **a) Chimney Gas Analyzer**

1. Chimney Gas Analyzers shall be provided for monitoring the emission levels of various gases in flue gas exiting chimney. All the analyzers shall have facility of local display / indication apart from the indication on the analyzer cubicle. All analyzers should be provided with standard gas cylinders for calibration.
2. Gas analyzers shall be insitu probe type / sampling extraction type based on Infra red absorption type. Muti gas combined analyzer shall be provided.
3. In case of sampling extraction type, flue gas sampling lines shall be heated to prevent condensation and shall not form a siphon in the case where condensate may be collected during heater failure. Condensate drainage facilities shall be provided at the analyzer side.
4. The analyzers and the sampling probe equipment housed in the standard cubicle shall be installed in a room. Depending on the prevailing environmental conditions the aforesaid housings/room shall be air- conditioned.
5. Measured values and certain status signals shall be interfaced to DCS through hardwired interface from field. The emission data shall be calculated, converted, printed out and stored according to the governmental requirements.
6. Each analyzer to be provided with 2 sets of Calibration gases cylinders for span & zero checking. The cylinder capacity to suite 12 no calibrations.
7. The following Analyzers to be considered in chimney.

- SOx
- NOx
- CO2
- Suspended Particulate Matter (PM10)

**Project:** 2 x 7.5MW – Cogeneration Power Plant

**Doc No.:** PB609/612-000-I-DOC-CEM00

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## **6. TECHNICAL SPECIFICATIONS OF CEMS ANALYZERS**

### **a) Gas Analyzers- Nox, SOx, CO2**

Analyzers shall be Infra red absorption technique with a accuracy of  $\pm 2\%$  of measured value, precision of  $\pm 0.5\%$  of measured value or better, resolution of 1 ppm, response time of better than 5 sec for 90% and having features like auto zero & span calibration, IP 65 or equivalent degree of protection for enclosure. Output shall be isolated 4-20 mA DC linear HART signal. Accessories like purge System for cleaning the window, heat shield mounting plate, auto window cleaning device etc., shall be provided. Material for flue gas carrying parts shall be of SS. Protection tube shall be provided to prevent erosion of the probe. Maintenance requirement shall not be more than once a week. Local indicating meter for read out to be provided. Alarm on abnormalities and self diagnosis features shall be provided.

### **b) Particulate Emission Analyzer**

Particulate emission analyzer shall be of Light attenuation / photo transmissometry type with an accuracy of  $\pm 2\%$  of measuring range or better, resolution of  $\pm 0.1\%$  of opacity, response time of better than 5 sec for 90%, Drift shall not be more than 3% opacity per month and having features like auto zero & span calibration etc, IP 65 or equivalent degree of protection for enclosure. Output shall be isolated 4-20 mA DC linear HART signal. Accessories like back purge system etc., shall be provided. Material for flue gas carrying parts shall be of SS. Protection tube shall be provided to prevent erosion of the probe. Local indicating meter for read out to be provided. Alarm on abnormalities and self diagnosis features shall be provided.

#### **Notes :**

- 1) Vendor to submit their data sheet, GA Drawing and Manuals for The Customer's approval.
- 2) Vendor shall provide UPS & other Utility requirements.
- 3) Vendor to provide installation and mounting details.
- 4) Vendor to submit calibration Certificate.
- 5) All Instrument Shall SS Name plates display Tag No., Service, model & Make with black letters.

## **7. SAMPLE ACQUITION SYSTEM**

Sample acquisition shall consist of but not limited to the following items

- ⊟ Sample extraction
- ⊟ Blow back arrangement
- ⊟ Heat tracer line

**Project:** 2 x 7.5MW – Cogeneration Power Plant

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- ⊖ Sample cooler
- ⊖ Flow meters
- ⊖ Sample pumps
- ⊖ Filters

## **8. CEMS PANEL**

CEMS panel shall be used to house the analyzers and sample handling system. Panel shall be fabricated from CRCA sheet and shall be manufactured as per supplier's standard. CEMS panel shall have minimum of IP-54 protection and shall operate satisfactorily in the ambient conditions mentioned above. Purchaser shall provide canopy/sun shed for the panel. Colour shade of panel shall be RAL-7035.

## **9. INTERFACE TO DCS**

CEMS panel shall be interfaced with plant DCS through hard wired signals (4-20mA). Data logging, report generation and report printing shall be done in DCS.

## **10. TESTING/INSPECTION AND COMMISSIONING**

CEMS panel shall be duly tested and inspected at manufacturer's factory. Purchaser/end user shall witness the testing of CEMS at supplier's factory. Supplier shall fully responsible for the successful commissioning and handover of system.

## **11. TRAINING**

CEMS supplier shall include training to purchasers engineer/service engineer at his factory. Training shall also be conducted at site during commissioning of system.

**Project:** 2 x 7.5MW – Cogeneration Power Plant

**Doc No.:** PB609/612-000-I-DOC-CEM00

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## **12. MAINTENANCE SCHEDULE**

After commission of system supplier shall provide the schedule of routing maintenance.  
Supplier to also recommend the operation spares required for CEMS package.

**Notes:**

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The Customer's approval.
- 3) Vendor to submit calibration Certificate.
- 4) All Instrument Shall SS Name Plates display Tag No., Service, Model & Make With Black Letters.
- 5) Vendor to provide Protection Tube to prevent Erosion of the Probe.
- 6) Vendor shall provide total Two systems for two boilers.

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Electronic Drum Level Indicator.**

<b>Document No.</b>	PB609/612-000-I-DOC-ATG05	<b>Rev No.</b>	1
		<b>Sheets</b>	2

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	16.08.17	HKV	DHK	DHK	FOR INFORMATION
1	01.08.17	HKV	DHK	DHK	REVISED FOR SPECS

		PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant			
		CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia			
		EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia			
<b>ELECRTRONIC DRUM LEVEL INDICATOR(EDLI/RLG)</b>					
<b>GENERAL</b>	1	Tag No.	11-RLG-001 & 12-RLG-001		
	2	Description of Service	Steam Drum Level Indication and Alarm Contact		
	3	Quantity	2 Nos		
<b>SERVICE CONDITIONS</b>	4	Maximum Operating Pressure	57.3 Bar(g)		
	5	Maximum Operating Temperature	280 Deg.C		
<b>WATER COLUMN</b>	6	Type of Water Column	12 Port Water Column		
	7	No. Of Electrodes	12		
	8	Tapping Distance on Drum	800mm		
	9	Tapping Distance on Water Column	VTI		
	10	Visibility	VTI		
	11	Type of Connection	1" SW, Sch-80		
	12	Drain Connection	1/2" Sch 160 Pipe Suitable for Socket Weld valve		
<b>CONDUCTIVITY ELECTRODE</b>	13	Number of Electrodes	12 nos Electrodes at Position Idicated Below		
	14	Model of Electrodes	VTI		
	15	Material	SS With High Purity Ceramic Insulator		
	16	Connection	Screw in Type. Wadlock metal to metal fit		
	17	1st Electrode Position	VTI		
	18	12st Electrode Position	VTI		
	19	Electrode Position in mm	Later		
<b>ELECRTTRONIC DRUM LEVEL INDICATOR</b>	20	Model	VTI		
	21	Enclosure	IP65		
	22	Location	Within 30 mtrs from Steam Drum		
	23	Power Supply	Later		
	24	Output	4 - 20 mA Isolated Output		
	25	Load	30 VA		
	26	Trip & Alarm contacts	Required ( Mention in Electrode Position)		
<b>ACCESSORIES</b>	27	Display	2 Columns of Green and Red Indicator		
	28	Heat Resistant Cable	Electrodes to Enclosure 30 Meter Duly Crimped		
<b>PURCHASE</b>	29	Remote display Indicator in Control Room	Panel Mounted		
	30	Manufacturer	LEVCON / CHEMTROL		
	31	Model	VTI		
<p>Notes:</p> <ol style="list-style-type: none"> <li>1) VTI - Vendor to Inform.</li> <li>2) Vendor to Submit the Interconnection Drawing for Approval.</li> <li>3) Vendor to Provide Cable Glands and Wiring interface Drawings</li> <li>4) EDLI Manfacturing shall be as per ASME standard.</li> </ol>					
UTTAMENERGY LTD. PUNE		1	HKV	DHK	DHK
		0	HKV	DHK	DHK
		Rev. No.	Prepared	Checked	Approved

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Electrical Modulating Actuator For Hot Air Damper**

<b>Document No.</b>	PB609/612-000-I-DOC-AAC01	<b>Rev No.</b>	0
		<b>Sheets</b>	2

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	28.08.17	HKV	DHK	DHK	FOR INFORMATION

## **ELECTRICAL MODULATING ACTUATOR FOR HOT AIR DAMPER**

**PROJECT NAME :** 2 x 7.5MW – Cogeneration Power Plant

**CLIENT :** PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia.

**EPC :** PT. EUROASIATIC JAYA, Jakarta, Indonesia.

**QUANTITY :** 16 Nos-Refer Annexure (Boiler-1 & Boiler-2)

**ITEM:**

ELECTRICAL MODULATING ACTUATOR FOR HOT AIR DAMPER

**APPROVED MAKE :**

BELIMO /RK CONTROLS / PNEUCON / ROTEX.

**MODEL/ORDERING CODE :**

VTI (WITH POSITION FEEDBACKS).

VENDOR TO CONFIRM THE RESPECTED MODEL FOR HOT AIR DAMPER MOUNTING.

**TECHNICAL SPECIFICATIONS:**

1. NOMINAL VOLTAGE: AC 24V, 50Hz/DC 24V.
2. POWER CONSUMPTION: 4.5W @ RUNNING / 2W @ HOLDING.
3. TORQUE: REFER ANNEXURE
4. CONTROL SIGNAL: DC 2(0)..... 10V (INPUT IMPEDANCE 100 k-Ohm).
5. FEEDBACK SIGNAL: DC 2.....10V.
6. CONNECTION CABLE: 1m, 4×0.75sqmm (WITH FLYING LEADS).
7. POSITION ACCURACY: +/- 5%.
8. DIRECTION OF ROTATION: SELECTABLE BY SWITCH.
9. ANGLE OF ROTATION: 90 Deg., ADJUSTABLE BY MECHANICAL STOPS.
10. RUNNING TIME: 150s FOR 90 Deg.
11. POSITION INDICATION: MECHANICAL, REMOTE VISIBLE.
12. DEGREE OF PROTECTION: IP54 IN ANY DIRECTION.
13. AMBIENT TEMPERATURE: -30 TO +50 Deg. C.
14. OPERATING TEMP. : 150 TO 180 Deg. C.
15. SHAFT SIZE: ROUND DIA. 50 mm.
16. WEIGHT: 35Kg.

**SCOPE OF SUPPLY:**

1. ACTUATOR.
2. MOUNTING BRACKET.
3. HOT AIR DAMPER- VENDOR SHALL BE PROVIDED REQUIRED MOUNTING MATERIAL - TEMPERATURE IS 150 TO 180 DEG.C

**Note:** 1) Refer Annexure-1 for Tag nos with description.

2) Vendor to Provide GA drawing for mounting arrangement on Damper.

## Annexure-I

**Boiler-1**

S.no	Acuator Tag No.	Service	Position Transmitter Tag No.	Torque (kg-m)	Stroke Length (mm)	Quantity
1	11-FY-009A	DAMPER POSITION OF FD AIR FLOW RHS COMP 4	11-ZT-009A	30	250	1 No
2	11-FY-010A	DAMPER POSITION OF FD AIR FLOW RHS COMP 3	11-ZT-010A	30	250	1 No
3	11-FY-011A	DAMPER POSITION OF FD AIR FLOW RHS COMP 2	11-ZT-011A	30	250	1 No
4	11-FY-012A	DAMPER POSITION OF FD AIR FLOW RHS COMP 1	11-ZT-012A	30	250	1 No
5	11-FY-009B	DAMPER POSITION OF FD AIR FLOW LHS COMP 4	11-ZT-009B	30	250	1 No
6	11-FY-010B	DAMPER POSITION OF FD AIR FLOW LHS COMP 3	11-ZT-010B	30	250	1 No
7	11-FY-011B	DAMPER POSITION OF FD AIR FLOW LHS COMP 2	11-ZT-011B	30	250	1 No
8	11-FY-012B	DAMPER POSITION OF FD AIR FLOW LHS COMP 1	11-ZT-012B	30	250	1 No

**Boiler-2**

1	12-FY-009A	DAMPER POSITION OF FD AIR FLOW RHS COMP 4	12-ZT-009A	30	250	1 No
2	12-FY-010A	DAMPER POSITION OF FD AIR FLOW RHS COMP 3	12-ZT-010A	30	250	1 No
3	12-FY-011A	DAMPER POSITION OF FD AIR FLOW RHS COMP 2	12-ZT-011A	30	250	1 No
4	12-FY-012A	DAMPER POSITION OF FD AIR FLOW RHS COMP 1	12-ZT-012A	30	250	1 No
5	12-FY-009B	DAMPER POSITION OF FD AIR FLOW LHS COMP 4	12-ZT-009B	30	250	1 No
6	12-FY-010B	DAMPER POSITION OF FD AIR FLOW LHS COMP 3	12-ZT-010B	30	250	1 No
7	12-FY-011B	DAMPER POSITION OF FD AIR FLOW LHS COMP 2	12-ZT-011B	30	250	1 No
8	12-FY-012B	DAMPER POSITION OF FD AIR FLOW LHS COMP 1	12-ZT-012B	30	250	1 No

TOTAL QTY- 16 NOS

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

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**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

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**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

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**Description :** **Instrument Data sheets for Flow Elements**

**Document No.** : PB609-000-I-DOC-AFE00 **Rev No.** 0  
**Sheets** 4

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
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		PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia				
ITEM:- MAIN STEAM FLOW NOZZLE						
GENERAL	1	Tag No.	1) 11-FE-003 FOR BOILER-1 2) 12-FE-003 FOR BOILER-2	Qty-1 no Qty-1 no		
	2	Description of Service	Main Steam Flow to Steam Distribution Header			
	3	PID No.	PB609DCP01			
ELEMENT DATA	4	Manufacturer	STAR MECH / GIC / EQUI			
	5	Element Type	Long Radius Nozzle			
	6	Pressure Tappings	Upstream / Radius			
	7	Element Material	SS 316			
	8	Beta Ratio (d/D)	Between 0.4 to 0.7			
	9	Element Bore	Vendor to confirm			
	10	Element Thickness	Vendor to confirm			
	11	Flow Accuracy	-/+ 2% of URV			
	12	End Connection	Butt Weld			
	13	Pipe Size and Schedule	200NB, Sch-80			
	14	Pipe ID	193.7mm			
PIPING DATA	15	Flange Material	NA			
	16	Pipe Material	SA335-Gr.P11			
	17	Flow Rate	Max-71500 Kg/hr, Nor-65000 kg/hr, Min-19500 Kg/hr			
	18	Differential Pressure	5000 mmWC			
	19	Pressure	Working Pressure-47 Bar(g), Design Pressure-57.3 Bar(g)			
PROCESS DATA	20	Temperature	Working Temp.-425 Deg.C, Design Temp.-430 Deg.C			
	21	Fluid Name	Steam			
	22	As Per ASME Standard				
	23	Bore Sizing Shall Be As Per ISO-5167				
	24	One set of Pressure Tappings shall be provided with removable caps. One pair shall be plugged.				
NOTES	25	Calculations and GA drag shall be send for approval before manufacturing of Nozzle.				
	26	We have considered the length for Upstream 35D and Downstream 15D, so vendor have to calculate the beta ratio and upstream & downstream length shall be in that lengths which we have considered.				
DOCUMENT TITLE		DATA SHEET FOR FLOW ELEMENT (FLOW NOZZLE)				
Uttam Energy Systems Ltd. Pune		Prepared	HARI			
		Checked	DHK			
		Approved	---			
		Rev	0			
		Page	1 of 4			

		PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia	
ITEM:- TURBINE-1 INLET STEAM FLOW NOZZLE			
GENERAL	1	Tag No.	16-FE-001 Qty-1No
	2	Description of Service	Turbine-1 Inlet Steam Flow
	3	PID No.	PB609DCP0501
ELEMENT DATA	4	Manufacturer	STAR MECH / GIC / EQUI
	5	Element Type	Long Radius Nozzle
	6	Pressure Tappings	Upstream / Radius
	7	Element Material	SS 316
	8	Beta Ratio (d/D)	Between 0.4 to 0.7
	9	Element Bore	Vendor to confirm
	10	Element Thickness	Vendor to confirm
	11	Flow Accuracy	-/+ 2% of URV
PIPING DATA	12	End Connection	Butt Weld
	13	Pipe Size and Schedule	200NB, Sch-40
	14	Pipe ID	202.74mm
	15	Flange Material	NA
	16	Pipe Material	SA335-Gr.P11
PROCESS DATA	17	Flow Rate	Nor-65000 kg/hr.
	18	Differential Pressure	5000 mmWC
	19	Pressure	Working Pressure-47 Bar(g), Design Pressure-51 Bar(g)
	20	Temperature	Working Temp.-420 Deg.C, Design Temp.-425 Deg.C
	21	Fluid Name	Steam
NOTES	22	As Per ASME Standard	
	23	Bore Sizing Shall Be As Per ISO-5167	
	24	One set of Pressure Tappings shall be provided with removable caps. One pair shall be plugged.	
	25	Calculations and GA drag shall be send for approval before manufacturing of Nozzle.	
	26	We have considered the length for Upstream 25D and Downstream 15D, so vendor have to calculate the beta ratio and upstream & downstream length shall be in that lengths which we have considered.	
DOCUMENT TITLE		DATA SHEET FOR FLOW ELEMENT (FLOW NOZZLE)	
Uttam Energy Systems Ltd. Pune		Prepared	HARI
		Checked	DHK
		Approved	---
		Rev	0
		Page	2 OF 4

		PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia	
ITEM:- TURBINE-2 INLET STEAM FLOW NOZZLE			
GENERAL	1	Tag No.	17-FE-001 Qty-1No
	2	Description of Service	Turbine-2 Inlet Steam Flow
	3	PID No.	PB609DCP0501
ELEMENT DATA	4	Manufacturer	STAR MECH / GIC / EQUI
	5	Element Type	Long Radius Nozzle
	6	Pressure Tappings	Upstream / Radius
	7	Element Material	SS 316
	8	Beta Ratio (d/D)	Between 0.4 to 0.7
	9	Element Bore	Vendor to confirm
	10	Element Thickness	Vendor to confirm
	11	Flow Accuracy	-/+ 2% of URV
	12	End Connection	Butt Weld
	13	Pipe Size and Schedule	200NB, Sch-40
	14	Pipe ID	202.74mm
PIPING DATA	15	Flange Material	NA
	16	Pipe Material	SA335-Gr.P11
	17	Flow Rate	Nor-65000 kg/hr.
	18	Differential Pressure	5000 mmWC
	19	Pressure	Working Pressure-47 Bar(g), Design Pressure-51 Bar(g)
PROCESS DATA	20	Temperature	Working Temp.-420 Deg.C, Design Temp.-425 Deg.C
	21	Fluid Name	Steam
	22	As Per ASME Standard	
	23	Bore Sizing Shall Be As Per ISO-5167	
	24	One set of Pressure Tappings shall be provided with removable caps. One pair shall be plugged.	
NOTES	25	Calculations and GA drag shall be send for approval before manufacturing of Nozzle.	
	26	We have considered the length for Upstream 25D and Downstream 15D, so vendor have to calculate the beta ratio and upstream & downstream length shall be in that lengths which we have considered.	
DOCUMENT TITLE		DATA SHEET FOR FLOW ELEMENT (FLOW NOZZLE)	
Uttam Energy Systems Ltd. Pune		Prepared	HARI
		Checked	DHK
		Approved	---
		Rev	0
		Page	3 OF 4

		PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia EPC :PT. EUROASIATIC JAYA, Jakarta, Indonesia	
BFW SPRAY WATER FLOW NOZZLE			
GENERAL	1	Tag No.	11-FE-002 12-FE-002 Qty-1No Qty-1No
	2	Description of Service	BFW Spray water flow
	3	PID No.	PB609DCP01
ELEMENT DATA	4	Manufacturer	STAR MECH / GIC / EQUI
	5	Element Type	Long Radius Nozzle
	6	Pressure Tappings	Upstream / Radius
	7	Element Material	SS 316
	8	Beta Ratio (d/D)	Between 0.4 to 0.7
	9	Element Bore	Vendor to confirm
	10	Element Thickness	Vendor to confirm
	11	Flow Accuracy	-/+ 2% of URV
	12	End Connection	Butt Weld
	13	Pipe Size and Schedule	40NB, Sch-80
	14	Pipe ID	38.14mm
PIPING DATA	15	Flange Material	NA
	16	Pipe Material	SA 106 Gr-B
	17	Flow Rate	Nor-6500 Kg/hr, Max-8125 Kg/hr, Min-1950 Kg/hr.
	18	Differential Pressure	3000 mmWC
	19	Pressure	Working Pressure-65.2 Bar(g), Design Pressure-79 Bar(g)
PROCESS DATA	20	Temperature	Working Temp.-130 Deg.C, Design Temp.-140 Deg.C
	21	Fluid Name	Water
	22	As Per ASME Standard	
	23	Bore Sizing Shall Be As Per ISO-5167	
	24	One set of Pressure Tappings shall be provided with removable caps. One pair shall be plugged.	
NOTES	25	Calculations and GA drag shall be send for approval before manufacturing of Nozzle.	
	26	We have considered the length for Upstream and Downstream total length 24D, so vendor have to calculate the beta ratio and upstream & downstream length shall be in that lengths which we have considered.	
DOCUMENT TITLE	DATA SHEET FOR FLOW ELEMENT (FLOW NOZZLE)		
	Uttam Energy Systems Ltd. Pune		Prepared HARI
			Checked DHK
			Approved ---
			Rev 0
			Page 4 OF 4

## **Project title** :

## **2 x 7.5MW – Cogeneration Power Plant**

## Client



**PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC



**PT. EUROASIATIC JAYA,  
Jakarta, Indonesia**

## **Supplier**



**M/s UTTAM ENERGY LIMITED,  
Pune, Maharashtra, India**

## Description : Instrument Data sheets for water level gauges

Document : PB609-000-I-DOC-ATG03

Rev No. 1

No.

Sheets 5

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	08.03.17	HKV	DHK	DHK	First Submission
1	04.08.17	HKV	DHK	DHK	Tag Numbers Revised

Project Name: 2 x 7.5MW – Cogeneration Power Plant
Client: M/s PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia
Project Code : PB609 & PB612

### TRANSPARENT TYPE LEVEL GAUGE

GENERAL	1	Tag Number	Boiler-1:-11-W-LG-3032A(LHS) & 11-W-LG-3032B(RHS)	QTY-2NO' S
			Boiler-2:-12-W-LG-3032A(LHS) & 12-W-LG-3032B(RHS)	QTY-2NO' S
	2	Description Of Service	Steam Drum Water Level	
	3	PID No.	PB609DCP01 & PB612XXXXX	
GAUGE	4	Type	<b>Transparent</b>	
	5	Mounting configuration	Side - Side	
	6	Centre-centre distance	<b>800 mm</b>	
	7	Visible length	Vendor To Suggest	
	8	Chamber Material	IS2002/ASTM A105	
	9	Cover Material	Carbon steel	
	10	Gasket Material	Grafoil	
	11	Glass	Moulded borosilicate transparent glasses.	
	12	Process connection	25 NB, Rating - CLASS 600 ANSI B16.5-Flanged	
	13	Max working Press.	57.3 Bar(g)	
	14	Max working Temp.	280 Deg.C	
	15	Top & Bottom fittings	Auto shutoff ball check, Offset type bolted bonet	
	16	Drain	1/2" NPT, Integral needle valve.	
	17	Vent	1/2" NPT, Vent Plug.	
VALVES	18	Valve Packing Material	Graffoil	
	19	Model	Vendor To Suggest	
MODEL	20	Make	Levcon/ Equi. / Sharp	

Notes: 1) Painting Specification shall be as per OEM's standards suitable for seaside environment.  
 Details shall be furnished by supplier.

2) Packing shall be as per standard procedure for Seaworthy Packing with "Fumigation certificate" mandatory (Export Packing shall be considered).

3) Third party inspection (TUV) will be provided by UEL and Test certificate shall be provided by supplier.

4) Local service support in Indonesia required by client. Details shall be furnished by supplier.

5) QAP shall be provided by supplier.

Project Name: 2 x 7.5MW – Cogeneration Power Plant
Client: M/s PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia
Project Code : PB609 & PB612

### TUBULAR TYPE LEVEL GAUGE

GENERAL	1	Tag Number	10-LG-001A & 10-LG-001B	Qty-2Nos
	2	Description Of Service	Deareator Tank Water Level	
	3	PID No.	PB609DCP03	
GAUGE	4	Type	<b>Tubular</b>	
	5	Mounting configuration	Side - Side	
	6	Centre-centre distance	1200mm	
	7	Visible length	Vendor To Suggest	
	8	Chamber Material	IS2002/ASTM A105	
	9	Cover Material	Carbon steel	
	10	Gasket Material	Grafoil	
	11	Glass	Moulded borosilicate transparent glasses.	
	12	Process connection	25 NB, Rating - CLASS 150, Flanged	
	13	Max working Press.	3.5 Bar(g)	
	14	Max working Temp.	250 Deg.C	
	15	Top & Bottom fittings	Auto shutoff ball check, Offset type bolted bonet	
	16	Drain	1/2" NPT, Integral needle valve.	
	17	Vent	1/2" NPT, Vent Plug.	
VALVES	18	Valve Packing Material	Graffoil	
	19	Model	Vendor To Suggest	
	20	Make	Levcon/ Equi. / Sharp	

- Notes: 1) Painting Specification shall be as per OEM's standards suitable for seaside environment.  
 Details shall be furnished by supplier.  
 2) Packing shall be as per standard procedure for Seaworthy Packing with "Fumigation certificate" mandatory (Export Packing shall be considered).  
 3) Third party inspection (TUV) will be provided by UEL and Test certificate shall be provided by supplier.  
 4) Local service support in Indonesia required by client. Details shall be furnished by supplier.  
 5) QAP shall be provided by supplier.

Project Name: 2 x 7.5MW – Cogeneration Power Plant
Client: M/s PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia
Project Code : PB609 & PB612

### TUBULAR TYPE LEVEL GAUGE

GENERAL	1	Tag Number	10-LG-003	Qty-1 No
	2	Description Of Service	Continous Blow Down Tank Water Level	
	3	PID No.	PB609DCP30	
GAUGE	4	Type	<b>Tubular</b>	
	5	Mounting configuration	Side - Side	
	6	Centre-centre distance	800mm	
	7	Visible length	Vendor To Suggest	
	8	Chamber Material	IS2002/ASTM A105	
	9	Cover Material	Carbon steel	
	10	Gasket Material	Grafoil	
	11	Glass	Moulded borosilicate transparent glasses.	
	12	Process connection	25 NB, Rating - CLASS 150, Flanged	
	13	Max working Press.	7.0 Bar(g)	
	14	Max working Temp.	250 Deg.C	
	15	Top & Bottom fittings	Auto shutoff ball check, Offset type bolted bonet	
	16	Drain	1/2" NPT, Integral needle valve.	
	17	Vent	1/2" NPT, Vent Plug.	
VALVES	18	Valve Packing Material	Graffoil	
	19	Model	Vendor To Suggest	
	20	Make	Levcon/ Equi. / Sharp	

Notes: 1) Painting Specification shall be as per OEM's standards suitable for seaside environment.  
Details shall be furnished by supplier.

2) Packing shall be as per standard procedure for Seaworthy Packing with "Fumigation certificate" mandatory (Export Packing shall be considered).

3) Third party inspection (TUV) will be provided by UEL and Test certificate shall be provided by supplier.

4) Local service support in Indonesia required by client. Details shall be furnished by supplier.

5) QAP shall be provided by supplier.

Project Name: 2 x 7.5MW – Cogeneration Power Plant

Client: M/s PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia

Project Code : PB609 & PB612

### TUBULAR TYPE LEVEL GAUGE

GENERAL	1	Tag Number	10-LG-002	Qty-1 No
	2	Description Of Service	Intermittent Blow Down Tank Water Level.	
	3	PID No.	PB609DCP30	
GAUGE	4	Type	<b>Tubular</b>	
	5	Mounting configuration	Side - Side	
	6	Centre-centre distance	1000mm	
	7	Visible length	Vendor To Suggest	
	8	Chamber Material	IS2002/ASTM A105	
	9	Cover Material	Carbon steel	
	10	Gasket Material	Grafoil	
	11	Glass	Moulded borosilicate transparent glasses.	
	12	Process connection	25 NB, Rating - CLASS 150, Flanged	
	13	Max working Press.	7.0 Bar(g)	
	14	Max working Temp.	250 Deg.C	
	15	Top & Bottom fittings	Auto shutoff ball check, Offset type bolted bonet	
	16	Drain	1/2" NPT, Integral needle valve.	
	17	Vent	1/2" NPT, Vent Plug.	
VALVES	18	Valve Packing Material	Graffoil	
	19	Model	Vendor To Suggest	
MODEL	20	Make	Levcon/ Equi. / Sharp	

Notes: 1) Painting Specification shall be as per OEM's standards suitable for seaside environment.  
Details shall be furnished by supplier.

2) Packing shall be as per standard procedure for Seaworthy Packing with "Fumigation certificate" mandatory (Export Packing shall be considered).

3) Third party inspection (TUV) will be provided by UEL and Test certificate shall be provided by supplier.

4) Local service support in Indonesia required by client. Details shall be furnished by supplier.

5) QAP shall be provided by supplier.

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheet For Oxygen Analyzer**

**Document No.** : PB609/612-000-I-DOC-ANA00 **Rev No.** 0  
**Sheets** 2

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	16.08.17	HKV	DHK	DHK	FOR INFORMATION

	PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant			
	CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia			
	EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia			
	ITEM:- OXYGEN ANALYZER for BOILER 1 & 2			
GENERAL	1 Tag No.	11-AIT-001 & 12-AIT-001	Qty - 2 Nos	
	2 Description of Service	Economizer Outlet Flue Gas		
TRANSMITTER (ANALYZER)	3 Make	YOKOGAWA / EQUI.		
	4 Model No.	Supplier To Specify		
	5 Type	Online		
	6 Function	Transmit		
	7 Measurement Range	Vendor To Specify		
	8 Calibrated Range	0 to 25		
	9 Accuracy	Minimum 0.25 % O2		
	10 Power Supply	85 to 220 VAC, 50 Hz		
	11 Output	4-20 mA DC		
	12 Sensor Type	Zirconia Based		
	13 Probe Material	SS316		
	14 Mounting	Flange Type- 2", Class-150.		
	15 Process Temperature	20 to 600 °C		
	16 Probe Length	700 mm		
NOTES	17	Analyzer shall be supplied with counter flange.		
	18	Any special cables,if any, shall be supplied with analyzer. Buyer will provide		
	19	cables for power supply and 4-20mA output signal.		
	20	Calibration Certificate shall be provided.		
	21	Operation & Installation Manual shall be provided.		
DOCUMENT TITLE		DATA SHEET FOR ONLINE OXYGEN ANALYZER		
		UTTAMENERGY LTD. PUNE		Prepared HARI
				Checked DHK
				Approved DHK
				Rev 0
				Page 1 of 1

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description :** **Instrument Data sheets for Pneumatic Actuators**

<b>Document No.</b>	PB609/612-000-I-DOC-AAC00	<b>Rev No.</b>	1
		<b>Sheets</b>	7

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	16.08.17	HKV	DHK	DHK	FOR INFORMATION
1	04.09.17	HKV	DHK	DHK	Revised Due to Suction Dampers at Fan



**PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant**

**CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia**

**EPC :PT. EUROASIATIC JAYA,  
Jakarta, Indonesia**

**PNEUMATIC DAMPER ACTUATORS (REGULATING)**

<b>GENERAL</b>	1	Tag No.	Refer Annexure-I
	2	Position Transmitter Tag No.	Refer Annexure-I
	3	Service	Refer Annexure-I
	4	Make	RK CONTROLS / PNEUCON / IL / ROTEX
	5	Stroke Length(mm)	Refer Annexure-I
	6	Force Available (kg-f)	VTI
	7	Bore x Stroke (Inch)	VTI
	8	Torque Required(kg-m)	Refer Annexure-II
	9	Torque Available(kg-m)	VTI
<b>ACTUATOR</b>	10	Actuator Type	Piston, Modulating Type
	11	Mounting	Trunnion Mounted
	12	Action	Throttling, Direct and Reverse Acting
	13	Cylinder MOC	Anodized Aluminum
	14	Piston Rod MOC	SS410/ Hard Chrome-Plated, High Strength Steel
	15	Gasket	Nitrile
	16	Seal & Packing	Teflon/Vitron
	17	Stroke Time	15 Sec Max.
	18	Cam	Linear (Later)
	19	Enclosure Class	IP 65
	20	Air Fail	<b>Fail Lock (Stay Put)- Client to be desided</b>
	22	Model	VTI
<b>POSITIONER</b>	23	Positioner	Electro Pneumatic Positioner
	24	Make	AS per Manufactured standard(VTI)
	25	Model	VTI
	26	Air Supply	3 - 7 kg/cm <sup>2</sup>
	27	Input Signal	4 - 20mA
	28	Air Connection	1/4" NPT(F)
	29	Electrical Connection	1/2" NPT(F)
	30	Enclosure	IP67
	31	Pressure Gauge	Required
	32	Tubing/ Fittings	SS Tubing-1/4"OD, MOC SS304, Double Ferrule type
	33	Area Classification	Safe Zone
	34	Limit switch	Required, Limit Switches for Close & Open Position
<b>LIMIT SWITCHES</b>	35	Contacts	2 No. SPDT(With 1 NO + 1 NC Contacts)
	36	Switch Rating	24V DC 1A
	37	Enclosure Class	IP 67
	38	Area Classification	Safe Zone
	39	Cable Entry	1/2" NPT (F)
<b>ACCESSORIES</b>	40	Tagging	SS Tag With Black Letters
	41	Air Lock	Air Lock Relay With Double Acting, for Stay put on Air Fail
	42	AFR	Required, 1/4" End Connection, 5 Microns Sintered Bronze
	43	Position Transmitter	Required, 4-20mA DC,24VDC loop powered, Linear
	44	Tube & Fittings	SS304 for all Item

**Notes:**

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The purchasers's information.
- 3) Positioner shall be suitable for change of action (Air to open / Air to Close).
- 4) Bore Selected to be Confirmed by Vendor for Required Force.
- 5) Actuators shall be provided with mounting pins (for swivel), and pins for fixing the linkages with the actuator.

DOCUMENT TITLE	DATA SHEET FOR REGULATING PNEUMATIC DAMPER ACTUATORS		
	UTTAMENERGY LTD. PUNE	Prepared	HARI
		Checked	DHK
		Approved	DHK
		Rev	1
		Page	1 of 1

Annexure-I						
<b>Boiler-1</b>						
S.no	Acuator Tag No.	Service	Position Transmitter Tag No.	Torque (kg-m)	Stroke Length (mm)	Quantity
1	11-FY-013	FD FAN TO APH INLET BYPASS DAMPER	11-ZT-013	60	304	1 No
<b>Boiler-2</b>						
S.no	Acuator Tag No.	Service	Position Transmitter Tag No.	Torque (kg-m)	Stroke Length (mm)	Quantity
1	12-FY-013	FD FAN TO APH INLET BYPASS DAMPER	12-ZT-013	60	304	1 No

TOTAL QTY - 02 NOS



**PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant**  
**CLIENT : PT. SURYA BORNEO INDUSTRI,**  
**Pangkalan Bun, Kalimantan Tengah, Indonesia**  
**EPC :PT. EUROASIATIC JAYA,**  
**Jakarta, Indonesia**

### **DAMPER ACTUATORS (On-Off)**

<b>GENERAL</b>	1	Tag No.	Refer Annexure-II
	2	Service	Refer Annexure-II
	3	Make	RK CONTROLS / PNEUCON / IL / ROTEX
	4	Stroke Length(mm)	Refer Annexure-II
	5	Force Available (kg-f)	VTI
	6	Bore x Stroke (Inch)	VTI
	7	Torque Required(kg-m)	Refer Annexure-II
	8	Torque Available(kg-m)	VTI
<b>ACTUATOR</b>	9	Type	On/Off
	10	Action	Direct and Reverse Acting
	11	Material	Anodized Aluminum
	12	Seal & Packing	Teflon/Vitron
	13	Gasket	Nitrile
	14	Air Supply	3 -7 kg/cm2
	15	Air Connection	1/4" NPT(F)
	16	Enclosure Class	IP 65
	17	Area Classification	Safe Zone
	18	Air Fail Action	<b>Fail Lock (Stay Put)- Client to be desised.</b>
	19	Mechanical Stopper	The Storke shall be restricted using Mechancal stopper
	20	Mounting	Trunnion Mounted
	21	Model	VTI
	22	Type	5 Port, 2-Position
	23	Size	1/4"
	24	End Connection	1/4" NPT(F)
	25	Fluid	Air
	26	Coil Voltage	24VDC
	27	Coil Insulation	Class F Insulated
	28	Cable Entry	1/2" NPT (F)
	29	Enclosure Class	IP 65
	30	Area Classification	Safe Zone
	31	Make	AS per Manufactured standard(VTI)
<b>LIMIT SWITCHES</b>	32	Limit switch	Required, Limit Switches for Close & Open Position
	33	Actuators shall be provided wi	2 No. SPDT(With 1 NO + 1 NC Contacts)
	34	Switch Rating	24V DC 1A
	35	Enclosure Class	IP 67
	36	Area Classification	Safe Zone
	37	Cable Entry	1/2" NPT (F)
	38	Tagging	SS Tag With Black Letters
	39	AFR	Required, 1/4" NPT(F) Air Conn. With 2" Pressure Gauge, 5 Microns Sintered Bronze
<b>ACCESSORIES</b>	40	Solenoid Valve	IP65, 230 VAC 50Hz with 1/2"NPT(F) Electrical Connection
	41	Tube & Fittings	SS Tubing, 1/4" OD, MOC SS304, Double ferrule Type.

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The purchasers's information.
- 3) Bore Selected to be Confirmed by Vendor for Required Force.
- 4) Solenoid Valve Required Power supply shall be confirmed by Client.**
- 5) Actuators shall be provided with mounting pins (for swivel), and pins for fixing the linkages with the actuator.

DOCUMENT TITLE	DATA SHEET FOR ON-OFF PNEUMATIC DAMPER ACTUATORS		
	UTTAMENERGY LTD. PUNE	Prepared	HARI
		Checked	DHK
		Approved	DHK
		Rev	1
		Page	1 of 1

Annexure-II					
Boiler-1					
S.no	Acuator Tag No.	Service	Torque (kg-m)	Stroke Length (mm)	Quantity
1	11-FY-001	SA FAN-1 SUCTION DAMPER	To be Confirmed by Client		
2	11-FY-002	SA FAN-1 DISCHARGE DAMPER	60	304	1 No
3	11-FY-003	SA FAN-2 SUCTION DAMPER	To be Confirmed by Client		
4	11-FY-004	SA FAN-2 DISCHARGE DAMPER	60	304	1 No
5	11-FY-005	FD FAN-1 SUCTION DAMPER	To be Confirmed by Client		
6	11-FY-006	FD FAN-1 DISCHARGE DAMPER	60	304	1 No
7	11-FY-007	FD FAN-2 SUCTION DAMPER	To be Confirmed by Client		
8	11-FY-008	FD FAN-2 DISCHARGE DAMPER	60	304	1 No
9	11-FY-014	ID FAN-1 SUCTION DAMPER	To be Confirmed by Client		
10	11-FY-015	ID FAN-1 DISCHARGE DAMPER	50	304	1 No

11	11-FY-016	ID FAN-2 SUCTION DAMPER	To be Confirmed by Client		
12	11-FY-017	ID FAN-2 DISCHARGE DAMPER	50	304	1 No
Boiler-2					
S.no	Acuator Tag No.	Service	Torque (kg-m)	Stroke Length (mm)	Quantity
1	12-FY-001	SA FAN-1 SUCTION DAMPER	To be Confirmed by Client		
2	12-FY-002	SA FAN-1 DISCHARGE DAMPER	60	304	1 No
3	12-FY-003	SA FAN-2 SUCTION DAMPER	To be Confirmed by Client		
4	12-FY-004	SA FAN-2 DISCHARGE DAMPER	60	304	1 No
5	12-FY-005	FD FAN-1 SUCTION DAMPER	To be Confirmed by Client		
6	12-FY-006	FD FAN-1 DISCHARGE DAMPER	60	304	1 No
7	12-FY-007	FD FAN-2 SUCTION DAMPER	To be Confirmed by Client		
8	12-FY-008	FD FAN-2 DISCHARGE DAMPER	60	304	1 No

9	12-FY-014	ID FAN-1 SUCTION DAMPER	To be Confirmed by Client		
10	12-FY-015	ID FAN-1 DISCHARGE DAMPER	50	304	1 No
11	12-FY-016	ID FAN-2 SUCTION DAMPER	To be Confirmed by Client		
12	12-FY-017	ID FAN-2 DISCHARGE DAMPER	50	304	1 No
TOTAL QTY - 24 NOS					

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

**Description : Instrument Data sheets for Pressure Gauges**

**Document No.** : PB609/612-000-I-DOC-ATG00 **Rev No.** 0  
**Sheets** 6

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	26.08.17	HKV	DHK	DHK	FOR INFORMATION



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

## PRESSURE GAUGE

GENERAL	1	Tag No.	Refer Annexure
	2	Description of Service	Refer Annexure
	3	PID No.	PB609DCP01, PB609DCP0501, PB609DCP03, PB609DCP0502, PB609DCP38 & PB609DCP22
SERVICE CONDITIONS	4	Process Fluid	Refer Annexure
	5	Pressure	Refer Annexure
	6	Temperature	Refer Annexure
PRESSURE GAUGE	7	Measurement	Pressure Gauge
	8	Dial Size	Refer Annexure
	9	Sensing Element	SS 316 Bourdon
	10	Block and Movement	SS316 / SS304
	11	Blow-Out Protection	Required
	12	Case Material	& Blowout Disc.
	13	Connection	1/2" NPT (M)
	14	Connection Location	Bottom
	15	Mounting	Direct mounting without flange
	16	Location	Field Mounted
	17	Dial	Externally adjustable Dial, Phenolic With Alminium Ring
	18	Accuracy	(+/-) 0.5% of Full Scale
	19	Over Range protection	150% Required
	20	Blow-Out Disc	Required at Back Side of Pressure Gauge
	21	Enclosure Class	IP 65
	22	Window Material	Shatter Proof Glass
	23	Zero Adjustment	Internal Micrometer Type
	24	Socket Material	SS316
	25	Dial Color	Black Marking on White Background
	26	Case Clour	Black
	27	Tag Plate	SS Tag With Black Letters
	28	Measuring Range	Refer Annexure
	29	IBR	Refer Annexure
PURCHASE	30	Manufacturer	GIC / WAREE
	31	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The Customer's approval.
- 3) Vendor to submit calibration and Hydro test certificate.
- 4) Certificathee of test house evaluation for Accuracy, Repeatability & Reliability.

DOCUMENT TITLE	DATA SHEET FOR PRESSURE GAUGE	Prepared	HKV
	UTTAMENERGY LTD. PUNE	Checked	DHK
		Approved	DHK
		Rev	0
		Sheet	1 of 6

SL.no	Tag no	Description	Process fluid	Preassure		TEMP Deg C	Range	Unit	Dial size in mm	IBR certification
				Normal	Design					
1	10-PG-001	TURBINE-1 DEAREATOR BLEED STEAM PRS UPSTREAM PRESSURE	STEAM	2.59	8	195.8	0 TO 12	Bar(g)	Ø 150	Required
2	10-PG-002	TURBINE-1 DEAREATOR BLEED STEAM PRS DOENSTREAM PRESSURE	STEAM	2	8	60	0 TO 12	Bar(g)	Ø 150	Required
3	10-PG-003	TURBINE-2 DEAREATOR BLEED STEAM PRS UPSTREAM PRESSURE	STEAM	2.59	8	195.8	0 TO 12	Bar(g)	Ø 150	Required
4	10-PG-004	TURBINE-2 DEAREATOR BLEED STEAM PRS DOENSTREAM PRESSURE	STEAM	2	8	60	0 TO 12	Bar(g)	Ø 150	Required
5	10-PG-005	DEAREATOR MAKEUP WATER LCU UPSTREAM PRESSURE	WATER	9	13	32	0 TO 25	Bar(g)	Ø 150	Required
6	10-PG-006	DEAREATOR TANK STEAM PRESSURE	STEAM	1.7	3.73	130	0 TO 6	Bar(g)	Ø 150	Required
7	10-PG-008	INTERMITTENT BLOW DOWN TANK PRESSURE	STEAM	3	7	250	0 TO 15	Bar(g)	Ø 150	Required
8	10-PG-009	CONTINUOUS BLOW DOWN TANK PRESSURE	STEAM	3	7	250	0 TO 15	Bar(g)	Ø 150	Required
9	11-PG-004	BOILER FEED WATER PUMP COMMON SUCTION PRESSURE	WATER	1.7	3.5	130	0 TO 7	Bar(g)	Ø 150	Required
10	11-PG-011	BOILER FEED WATER PUMP COMMON DISCHARGE PRESSURE	WATER	65.2	79	130	0 TO 120	Bar(g)	Ø 150	Required
11	11-PG-012	BOILER FEED WATER PRESSURE AT AFTER CONTROL STATION	WATER	55	79	130	0 TO 100	Bar(g)	Ø 150	Required
12	11-PG-013	ECONOMIZER-3 OUTLET HDR PRESSURE	WATER	54	57.3	235	0 TO 100	Bar(g)	Ø 150	Required
13	11-PG-014A	STEAM DRUM PRESSURE	STEAM	54	57.3	235	0 TO 100	Bar(g)	Ø 250	Required
14	11-PG-014B	STEAM DRUM PRESSURE-FIRING FLOOR	STEAM	54	57.3	235	0 TO 100	Bar(g)	Ø 250	Required
15	11-PG-015	PRIMARY SUPER HEATER OUTLET HDR PRESSURE	STEAM	50	57.3	360	0 TO 100	Bar(g)	Ø 150	Required
16	11-PG-016	SECONDARY SUPER HEATER INLET HDR PRESSURE	STEAM	50	57.3	360	0 TO 100	Bar(g)	Ø 150	Required
17	11-PG-017A	MAIN STEAM LINE PRESSURE-FIRING FLOOR	STEAM	48	57.3	425	0 TO 80	Bar(g)	Ø 250	Required
18	11-PG-017B	MAIN STEAM LINE PRESSURE	STEAM	48	57.3	425	0 TO 80	Bar(g)	Ø 250	Required
19	11-PG-018	SOOT BLOWER PRS DOWNSTREAM PRESSURE	STEAM	21	24	333	0 TO 45	Bar(g)	Ø 150	Required
20	12-PG-004	BOILER FEED WATER PUMP COMMON SUCTION PRESSURE	WATER	1.7	3.5	130	0 TO 7	Bar(g)	Ø 150	Required
21	12-PG-011	BOILER FEED WATER PUMP COMMON DISCHARGE PRESSURE	WATER	65.2	79	130	0 TO 120	Bar(g)	Ø 150	Required
22	12-PG-012	BOILER FEED WATER PRESSURE AT AFTER CONTROL STATION	WATER	55	79	130	0 TO 100	Bar(g)	Ø 150	Required
23	12-PG-013	ECONOMIZER-3 OUTLET HDR PRESSURE	WATER	54	57.3	235	0 TO 100	Bar(g)	Ø 150	Required
24	12-PG-014A	STEAM DRUM PRESSURE	STEAM	54	57.3	235	0 TO 100	Bar(g)	Ø 250	Required
25	12-PG-014B	STEAM DRUM PRESSURE-FIRING FLOOR	STEAM	54	57.3	235	0 TO 100	Bar(g)	Ø 250	Required
26	12-PG-015	PRIMARY SUPER HEATER OUTLET HDR PRESSURE	STEAM	50	57.3	360	0 TO 100	Bar(g)	Ø 150	Required
27	12-PG-016	SECONDARY SUPER HEATER INLET HDR PRESSURE	STEAM	50	57.3	360	0 TO 100	Bar(g)	Ø 150	Required
28	12-PG-017A	MAIN STEAM LINE PRESSURE-FIRING FLOOR	STEAM	48	57.3	425	0 TO 80	Bar(g)	Ø 250	Required
29	12-PG-017B	MAIN STEAM LINE PRESSURE	STEAM	48	57.3	425	0 TO 80	Bar(g)	Ø 250	Required
30	12-PG-018	SOOT BLOWER PRS DOWNSTREAM PRESSURE	STEAM	21	24	333	0 TO 45	Bar(g)	Ø 150	Required

31	15-PG-001	COMMON STEAM DISTRIBUTION HDR PRESSURE	STEAM	47	51	420	0 TO 90	Bar(g)	Ø 150	Required
32	15-PG-002	PROCESS CUM PEGGING STEAM PRDS UPSTREAM PRESSURE	STEAM	47	51	420	0 TO 90	Bar(g)	Ø 150	Required
33	15-PG-003	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	STEAM	16	19.9	205	0 TO 40	Bar(g)	Ø 150	Required
34	15-PG-004	PROCESS CUM PEGGING STEAM PRDS SPRAY WATER PRESSURE	WATER	69	79	130	0 TO 115	Bar(g)	Ø 150	Required
35	15-PG-005	GSS/EJECTOR PRDS UPSTREAM TEMP.	STEAM	47	51	420	0 TO 90	Bar(g)	Ø 150	Required
36	15-PG-006	GSS/EJECTOR PRDS DOWNSTREAM PRESSURE	STEAM	13.7	18.6	300	0 TO 30	Bar(g)	Ø 150	Required
37	15-PG-007	GSS/EJECTOR PRDS SPRAY WATER PRESSURE	WATER	69	79	130	0 TO 115	Bar(g)	Ø 150	Required
38	15-PG-008	TURBINE-1 EXTRACTION TO PROCESS HDR SPRAY WATER PRESSURE	WATER	69	79	130	0 TO 115	Bar(g)	Ø 150	Required
39	15-PG-009	TURBINE-1 EXTRACTION TO PROCESS HDR SPRAY WATER PRESSURE	WATER	69	79	130	0 TO 115	Bar(g)	Ø 150	Required
40	15-PG-010	PROCESS STEAM DISTRIBUTION HDR	STEAM	16	19.9	205	0 TO 30	Bar(g)	Ø 150	Required
41	16-PG-001	TURBINE-1 EXTRACTION LINE PRESSURE AFTER DSH	STEAM	16.9	19.9	207	0 TO 30	Bar(g)	Ø 150	Required
42	16-PG-002	UNIT-1 CE PUMP2 SUCTION PRESSURE	COND. WATER	- 0.92	0.88	44.42	-1 TO 2	Bar(g)	Ø 150	Required
43	17-PG-001	TURBINE-2 EXTRACTION LINE PRESSURE AFTER DSH	STEAM	16.9	19.9	207	0 TO 30	Bar(g)	Ø 150	Required
44	17-PG-002	UNIT-2 CE PUMP2 SUCTION PRESSURE	COND. WATER	- 0.92	0.88	44.42	-1 TO 2	Bar(g)	Ø 150	Required
45	34-PG-001	MCW PUMP-1 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	Required
46	34-PG-002	MCW PUMP-1 DISCHARGE PRESSURE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
47	34-PG-003	MCW PUMP-2 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	N/A
48	34-PG-004	MCW PUMP-2 DISCHARGE PRESSURE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
49	34-PG-005	MCW PUMP-3 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	N/A
50	34-PG-006	MCW PUMP-3 DISCHARGE PRESSURE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
51	34-PG-007	ACW PUMP-1 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	N/A
52	34-PG-008	ACW PUMP-1 DISCHARGE PRESSURE	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
53	34-PG-009	ACW PUMP-2 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	N/A
54	34-PG-010	ACW PUMP-2 DISCHARGE PRESSURE	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
55	34-PG-011	ACW PUMP-3 SUCTION PRESSURE	WATER	ATOM	-	33	-1 TO 2	Bar(g)	Ø 150	N/A
56	34-PG-012	ACW PUMP-3 DISCHARGE PRESSURE	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A

57	34-PG-013	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 INLET LINE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
58	34-PG-014	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 INLET LINE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
59	34-PG-015	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 OUTLET LINE	WATER	2.44	4	41	0 TO 6	Bar(g)	Ø 150	N/A
60	34-PG-016	COOLING WATER PRESSURE AT SURFACE CONDENSOR-2 OUTLET LINE	WATER	2.44	4	41	0 TO 6	Bar(g)	Ø 150	N/A
61	34-PG-017	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 INLET LINE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
62	34-PG-018	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 INLET LINE	WATER	2.44	4	33	0 TO 6	Bar(g)	Ø 150	N/A
63	34-PG-019	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 OUTLET LINE	WATER	2.44	4	41	0 TO 6	Bar(g)	Ø 150	N/A
64	34-PG-020	COOLING WATER PRESSURE AT SURFACE CONDENSOR-1 OUTLET LINE	WATER	2.44	4	41	0 TO 6	Bar(g)	Ø 150	N/A
65	34-PG-021	COOLING WATER INLET PRESSURE AT COMMON UNIT-2 LUBE OIL SYSTEM	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
66	34-PG-022	COOLING WATER OUTLET PRESSURE AT UNIT-2 LUBE OIL COOLER 2A	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
67	34-PG-023	COOLING WATER OUTLET PRESSURE AT UNIT-2 LUBE OIL COOLER 2B	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
68	34-PG-024	COOLING WATER INLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER COMMON INLET	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
69	34-PG-025	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
70	34-PG-026	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
71	34-PG-027	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
72	34-PG-028	COOLING WATER OUTLET PRESSURE AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
73	34-PG-029	BFW PUMP COMMON INLET COOLING WATER PRESSURE	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
74	34-PG-030	BFW PUMP-2B OUTLET COOLING WATER PRESSURE	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
75	34-PG-031	BFW PUMP-1B OUTLET COOLING WATER PRESSURE	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
76	34-PG-044	BFW PUMP-2A OUTLET COOLING WATER PRESSURE	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
77	34-PG-045	BFW PUMP-1A OUTLET COOLING WATER PRESSURE	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
78	34-PG-032	ASH HOPPER COOLER INLET WATER PRESSURE	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
79	34-PG-033	COOLING WATER AT INLET OF SWAS PANEL	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
80	34-PG-034	COOLING WATER AT OUTLET OF SWAS PANEL	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
81	34-PG-035	COOLING WATER INLET PRESSURE AT COMMON UNIT-1 LUBE OIL SYSTEM	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
82	34-PG-036	COOLING WATER OUTLET PRESSURE AT UNIT-1 LUBE OIL COOLER 1A	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
83	34-PG-037	COOLING WATER OUTLET PRESSURE AT UNIT-1 LUBE OIL COOLER 1B	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
84	34-PG-038	COOLING WATER INLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER COMMON INLET	WATER	3.9	5	33	0 TO 8	Bar(g)	Ø 150	N/A
85	34-PG-039	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
86	34-PG-040	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
87	34-PG-041	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
88	34-PG-042	COOLING WATER OUTLET PRESSURE AT UNIT-1 GENERATOR AIR COOLER	WATER	3.9	5	41	0 TO 8	Bar(g)	Ø 150	N/A
89	43-PG-001	COMPRESSOR COMMON DISCHARGE PRESSURE AT INSTRUMENT/SERVICE AIR	WATER	7	-	35	0 TO 14	Bar(g)	Ø 150	N/A
90	43-PG-002	COMPRESSOR COMMON DISCHARGE PRESSURE AT ASH CONVEYING INLET	WATER	7	-	35	0 TO 14	Bar(g)	Ø 150	N/A
91	43-PG-003	COMPRESSOR COMMON DISCHARGE PRESSURE AT INSTRUMENT/SERVICE AIR TANK	WATER	7	-	35	0 TO 14	Bar(g)	Ø 150	N/A
92	33-PG-001	DM TRANSFER PUMP-1 DISCHARGE PRESSURE	WATER	10.77	11	35	0 TO 20	Bar(g)	Ø 150	N/A
93	33-PG-002	DM TRANSFER PUMP-2 DISCHARGE PRESSURE	WATER	10.77	11	35	0 TO 20	Bar(g)	Ø 150	N/A



PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia

### DIFFERENTIAL PRESSURE GAUGE

<b>GENERAL</b>	1	Tag No.	Refer Annexure
	2	Description of Service	Refer Annexure
	3	PID No.	PB609DCP01, PB609DCP0501,PB609DCP03, PB609DCP0502, PB609DCP38&PB609DCP22
<b>SERVICE CONDITIONS</b>	4	Process Fluid	Refer Annexure
	5	Pressure	Refer Annexure
	6	Temperature	Refer Annexure
<b>PRESSURE GAUGE</b>	7	Measurement	Differential Pressure Gauge
	8	Dial Size	Refer Annexure
	9	Sensing Element	SS 316 Capsule
	10	Block and Movement	SS316 / SS304
	11	Blow-Out Protection	Required
	12	Case Material	Stainless Steel With Shatterproof glass, Screwed Ring
	13	Joints	Argon Arc Welded
	14	Connection	1/2" NPT (M)
	15	Connection Location	Bottom
	16	Mounting	Field Mounted
	17	Dial	Phenolic With Alminium Ring
	18	Accuracy	(+/-) 0.5% of Full Scale
	19	Over Range protection	150% Required
	20	Blow-Out Disc	Required at Back side of Gauge
	21	Enclosure Class	IP 65
	22	Window Material	Shatter Proof Glass
	23	Zero Adjustment	Internal Micrometer Type
	24	Socket Material	SS316
	25	Dial Color	Black Marking on White Background
	26	Case Clour	Black
	27	Tag Plate	SS Tag With Black Letters
	28	Measuring Range	Refer Annexure
	29	IBR	NA
<b>PURCHASE</b>	30	Manufacturer	GIC/WAAREE
	31	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor to submit their data sheet, GA Drawing and Manuals for The Customer's approval.
- 3) Vendor to submit calibration and Hydro test certificate.
- 4) Certifiacatee of test house evaluation for Accuracy, Repeatability & Reliability.

DOCUMENT TITLE	DATA SHEET FOR DIFFERENTIAL PRESSURE GAUGE		
UTTAMENERGY LTD. PUNE	Prepared Checked Approved Rev Sheet	HKV DHK DHK 0 5 of 6	

S No	TAG No	SERVICE	FLUID	PRESSURE		TEMP Deg C	ELEMENT	RANGE	UNIT	DIAL SIZE	LOCATION	CONNECTION SIZE	MATERIAL		ALARM			Q'TY	NOTE & REMARKS
				NORMAL	DESIGN								ELEMENT	SOCKET	L / H	ON / OFF	SETTING		
1	16-PDI-001	UNIT-1 COND.EXTRACTION PUMP 1 SUCTION STRAINER DIFFERENTIAL	COND.WATER	50 mbar	200 mbar	45	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
2	16-PDI-002	UNIT-1 COND.EXTRACTION PUMP 2 SUCTION STRAINER DIFFERENTIAL	COND.WATER	50 mbar	200 mbar	45	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
3	17-PDI-001	UNIT-2 COND.EXTRACTION PUMP 1 SUCTION STRAINER DIFFERENTIAL	COND.WATER	50 mbar	200 mbar	45	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
4	17-PDI-002	UNIT-2 COND.EXTRACTION PUMP 2 SUCTION STRAINER DIFFERENTIAL	COND.WATER	50 mbar	200 mbar	45	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
5	34-PDI-001	MCW PUMP-1 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
6	34-PDI-002	MCW PUMP-2 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
7	34-PDI-003	MCW PUMP-3 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
8	34-PDI-004	ACW PUMP-1 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
9	34-PDI-005	ACW PUMP-2 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-
10	34-PDI-006	ACW PUMP-3 SUCTION STRAINER DIFFERENTIAL	COOLING WATER	50 mbar	200 mbar	33	CAPSULE	0-200	mbar	Ø 150	FIELD	NPT ½	SS316	SS	H	OFF	150 - RISING	1	-

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

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**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

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**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

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**Description : Instrument Data sheets for Temperature Elements**

**Document No.** : PB609-000-I-DOC-ATE00 **Rev No.** 0  
**Sheets** 5

Rev No.	Date	Prepared By	Checked by	Approved by	Reason for Revision
0	26.08.17	HKV	DHK	DHK	FOR INFORMATION

DOCUMENT TITLE	DATA SHEET FOR RTD		
UTTAMENERGY LTD.	Prepared	HARI	
	Checked	DHK	
	Approved	DHK	
	Rev	0	
	Page	2 of 5	



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

TAG LIST FOR TEMPERATURE ELEMENTS (RTD)

Sr. No.	Tag. No.	Service Description	Fluid	Temp.(Deg.C)		Element Insertion Length(mm) Below Head	Element OD (mm)	Process Connection	Qty
				Normal	Design				
BOILER-1									
1	11-TE-001	ECONOMIZER-1 INLET HDR TEMPERATURE	WATER	130	140	320	8	1/2 " NPT (M)	1
2	11-TE-002	ECONOMIZER-3 OUTLET HDR TEMPERATURE	WATER	235	275	320	8	1/2 " NPT (M)	1
3	11-TE-003	PRIMARY SH INLET HDR	STEAM	268	274	380	8	1/2 " NPT (M)	1
4	11-TE-019	FLUE GAS TEMP AT ESP INLET	GAS	150	-	1000	12	1/2 " NPT (M)	1
5	11-TE-020	FLUE GAS TEMP AT ESP OUTLET	GAS	150	-	1000	12	1/2 " NPT (M)	1
6	11-TE-021	FD FAN COMMON DISCHAEGE TEMP	AIR	40	-	1000	12	1/2 " NPT (M)	1
7	11-TE-022	HOT APH OUTLET FD AIR	HOT AIR	150	-	750	12	1/2 " NPT (M)	1
8	11-TE-023	HOT APH OUTLET SA AIR	GAS	150	-	750	12	1/2 " NPT (M)	1
BOILER-2									
9	12-TE-001	ECONOMIZER INLET-1 HDR TEMPERATURE	WATER	130	140	320	8	1/2 " NPT (M)	1
10	12-TE-002	ECONOMIZER-3 OUTLET HDR TEMPERATURE	WATER	235	275	320	8	1/2 " NPT (M)	1
11	12-TE-003	PRIMARY SH INLET HDR	STEAM	268	274	380	8	1/2 " NPT (M)	1
12	12-TE-019	FLUE GAS TEMP AT ESP INLET	GAS	150	-	1000	12	1/2 " NPT (M)	1
13	12-TE-020	FLUE GAS TEMP AT ESP OUTLET	GAS	150	-	1000	12	1/2 " NPT (M)	1
14	12-TE-021	FD FAN COMMON DISCHAEGE TEMP	AIR	40	-	1000	12	1/2 " NPT (M)	1
15	12-TE-022	HOT APH OUTLET FD AIR	HOT AIR	150	-	750	12	1/2 " NPT (M)	1
16	12-TE-023	HOT APH OUTLET SA AIR	GAS	150	-	750	12	1/2 " NPT (M)	1
MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM & TURBINE STEAM DIST. SYSTEM									
17	15-TE-002	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	STEAM	205	215	310	8	1/2 " NPT (M)	1
18	15-TE-004	PROCESS STEAM DIST. HDR TEMPERATURE	STEAM	205	215	410	8	1/2 " NPT (M)	1
19	16-TE-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	STEAM	207	215	310	8	1/2 " NPT (M)	1
20	17-TE-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	STEAM	207	215	310	8	1/2 " NPT (M)	1
COOLING WATER SYSTEM									
21	34-TE-001	COOLING WATER RETURN LINE TEMP.	WATER	41	-	720	8	1/2 " NPT (M)	1
22	34-TE-002	MCW PUMP COMMON DISCHARGE	WATER	33	-	720	8	1/2 " NPT (M)	1

	PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant
	CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia
	EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia

**ITEM : THERMOCOUPLE**

1	Element Type	K-Type Thermocouple, Duplex
2	Element OD	12 mm
3	Sheath Material	SS316
4	Insulation	Mineral, Compact MgO
5	Standard	IEC-584
6	Junction	Grounded
7	Head	Die cast Aluminium Head with Screwed Chain
8	Cable Entry	1/2" NPT(F) Double Entry
9	Process Connection	1/2" NPT (M), Adjustable Three Piece Compression Fitting
10	Element Length	Refer Tag List
11	Protection	Weatherproof, IP-67
12	CERTIFICATE	1) Calibration Test Certificate 2) Material Compliance Certificate

DOCUMENT TITLE	DATA SHEET FOR THERMOCOUPLE	
	Prepared	HARI
	Checked	DHK
	Approved	DHK
	Rev	0
	Page	4 of 5



PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC :PT. EUROASIATIC JAYA, Jakarta, Indonesia

TAG LIST FOR TEMPERATURE ELEMENTS (THERMOCOUPLE)

Sr. No.	Tag. No.	Service Description	Fluid	Temp.(Deg.C)		Element Insertion Length (mm) Below Head	Element OD (mm)	Process Connection	Qty
				Normal	Design				
BOILER-1									
1	11-TE-004	PRIMARY SH OUTLET HDR TEMPERATURE	STEAM	360	400	380	8	1/2 " NPT (M)	1
2	11-TE-005A	SUPER HEATER INLET HDR TEMPERATURE	STEAM	360	400	380	8	1/2 " NPT (M)	1
3	11-TE-005B	SUPER HEATER INLET HDR TEMPERATURE	STEAM	360	400	380	8	1/2 " NPT (M)	1
4	11-TE-006A	MAIN STEAM LINE TEMPERATURE	STEAM	425	430	420	8	1/2 " NPT (M)	1
5	11-TE-006B	MAIN STEAM LINE TEMPERATURE	STEAM	425	430	420	8	1/2 " NPT (M)	1
6	11-TE-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1	GAS	950	-	2000	12	1/2 " NPT (M)	1
7	11-TE-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2	GAS	950	-	2000	12	1/2 " NPT (M)	1
8	11-TE-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3	GAS	950	-	2000	12	1/2 " NPT (M)	1
9	11-TE-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4	GAS	950	-	2000	12	1/2 " NPT (M)	1
10	11-TE-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1	GAS	950	-	2000	12	1/2 " NPT (M)	1
11	11-TE-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2	GAS	950	-	2000	12	1/2 " NPT (M)	1
12	11-TE-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3	GAS	950	-	2000	12	1/2 " NPT (M)	1
13	11-TE-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4	GAS	950	-	2000	12	1/2 " NPT (M)	1
14	11-TE-011A	FURNACE TEMP AT ELE 11 MTRS	GAS	900	-	2000	12	1/2 " NPT (M)	1
15	11-TE-011B	FURNACE TEMP AT ELE 11 MTRS	GAS	900	-	2000	12	1/2 " NPT (M)	1
16	11-TE-012	FURNACE TEMP AT ELE 18 MTRS	GAS	850	-	2000	12	1/2 " NPT (M)	1
17	11-TE-013	FLUE GAS TEMP AT SECONDARY SH	GAS	740	-	2000	12	1/2 " NPT (M)	1
18	11-TE-014	FLUE GAS TEMP AT PRIMARY SH	GAS	710	-	2000	12	1/2 " NPT (M)	1
19	11-TE-015	FLUE GAS TEMP AT PRIMARY SH INLET	GAS	650	-	2000	12	1/2 " NPT (M)	1
20	11-TE-016	FLUE GAS TEMP AT EVOPORATER	GAS	620	-	2000	12	1/2 " NPT (M)	1
21	11-TE-017	FLUE GAS TEMP AT ECONOMIZER INLET	GAS	380	-	750	12	1/2 " NPT (M)	1
22	11-TE-018	FLUE GAS TEMP AT APH INLET 1	GAS	-	-	1000	12	1/2 " NPT (M)	1
BOILER-2									
23	12-TE-004	PRIMARY SH OUTLET HDR	STEAM	360	400	380	8	1/2 " NPT (M)	1
24	12-TE-005A	SUPER HEATER INLET HDR TEMPERATURE	STEAM	360	400	380	8	1/2 " NPT (M)	1
25	12-TE-005B	SUPER HEATER INLET HDR TEMPERATURE	STEAM	360	400	380	8	1/2 " NPT (M)	1
26	12-TE-006A	MAIN STEAM LINE TEMPERATURE	STEAM	425	430	420	8	1/2 " NPT (M)	1
27	12-TE-006B	MAIN STEAM LINE TEMPERATURE	STEAM	425	430	420	8	1/2 " NPT (M)	1
28	12-TE-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1	GAS	950	-	2000	12	1/2 " NPT (M)	1
29	12-TE-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2	GAS	950	-	2000	12	1/2 " NPT (M)	1
30	12-TE-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3	GAS	950	-	2000	12	1/2 " NPT (M)	1
31	12-TE-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4	GAS	950	-	2000	12	1/2 " NPT (M)	1
32	12-TE-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1	GAS	950	-	2000	12	1/2 " NPT (M)	1
33	12-TE-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2	GAS	950	-	2000	12	1/2 " NPT (M)	1
34	12-TE-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3	GAS	950	-	2000	12	1/2 " NPT (M)	1
35	12-TE-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4	GAS	950	-	2000	12	1/2 " NPT (M)	1
36	12-TE-011A	FURNACE TEMP AT ELE 11 MTRS	GAS	900	-	2000	12	1/2 " NPT (M)	1
37	12-TE-011B	FURNACE TEMP AT ELE 11 MTRS	GAS	900	-	2000	12	1/2 " NPT (M)	1
38	12-TE-012	FURNACE TEMP AT ELE 18 MTRS	GAS	850	-	2000	12	1/2 " NPT (M)	1

39	12-TE-013	FLUE GAS TEMP AT SECONDARY SH	GAS	740	-	2000	12	1/2 " NPT (M)	1
40	12-TE-014	FLUE GAS TEMP AT PRIMARY SH	GAS	710	-	2000	12	1/2 " NPT (M)	1
41	12-TE-015	FLUE GAS TEMP AT PRIMARY SH INLET	GAS	650	-	2000	12	1/2 " NPT (M)	1
42	12-TE-016	FLUE GAS TEMP AT EVOPORATER	GAS	620	-	2000	12	1/2 " NPT (M)	1
43	12-TE-017	FLUE GAS TEMP AT ECONOMIZER INLET	GAS	380	-	750	12	1/2 " NPT (M)	1
44	12-TE-018	FLUE GAS TEMP AT APH INLET 1	GAS	240	-	1000	12	1/2 " NPT (M)	1
MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM & TURBINE STEAM DIST. SYSTEM									
45	15-TE-001	COMMON STEAM DIST. HDR TEMPERATURE	STEAM	420	425	420	8	1/2 " NPT (M)	1
46	15-TE-003	GSS/EJECTOR PRDS DOWNSTREAM TEMP.	STEAM	300	320	260	8	1/2 " NPT (M)	1

**Project title : 2 x 7.5MW – Cogeneration Power Plant**

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**Client :**  **PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

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**EPC :**  **PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

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**Supplier :**  **M/s UTTAM ENERGY LIMITED,**  
Pune, Maharashtra, India

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**Description :** **Instrument Data sheets for Temperature Gauges**

**Document No.** : PB609-000-I-DOC-ATG01 **Rev No.** 0  
**Sheets** 2

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	22.08.17	HKV	DHK	DHK	FOR INFORMATION



PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant
CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia
EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

### TEMPERATURE GAUGE

GENERAL	1	Tag No.	Refer Annexure
	2	Description of Service	Refer Annexure
	3	PID No.	PB609DCP01, PB609DCP0501,PB609DCP03 & PB609DCP0502
SERVICE CONDITIONS	4	Process Fluid	Refer Annexure
	5	Pressure	Bar(g)
	6	Temperature	Deg.C
	7	Mounting	Local Mounting
	8	Dial	150 mm
	9	Stem Diameter	Refer Annexure
	10	Accuracy	(+/-) 1% of Full Scale
	11	Case Material	Weatherproof Stainless Steel , Shatterproof glass
	12	Dial Color	Black Marking on White Background
	13	Compensation	Case Compensation is Required
	14	Over Range protection	130% of FSD
	15	Connection Location	Bottom Entry, Local Mounting
	16	Zero Adjustment	Micrometer Pointer Type
	17	Connection Location	1/2" NPT (M), Bottom on Thermowell
	18	Enclosure Class	IP 65
	19	Tag Plate	SS Tag With Black Letters
	20	Measuring Range	Refer Annexure
	21	Manufacturer	Later
	22	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor to Submit GA drawing along with Datasheet for Approval.
- 3) Vendor to Submit following documents
- 4) Accuracy test, Calibration test and material test Certificate.
- 5) Linear Calibration curve for the specified range.

DOCUMENT TITLE	DATA SHEET FOR PRESSURE TEMPERATURE GAUGE UTTAMENERGY LTD. PUNE	Prepared Checked Approved Rev Sheet	HKV DHK DHK 0 1 of 2
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S.no	Tag no	Description	Process fluid	Pressure(Barg)		Temperature		Range	Type	Stem length below head in mm	Stem OD in mm
				Operating	Normal	Design					
1	10-TG-001	TURBINE-1 BLEED STEAM TO DEAREATOR INLET TEMPERATURE	STEAM	2	194.3	250	0 TO 300	BIMETAL	310	8	
2	10-TG-002	TURBINE-2 BLEED STEAM TO DEAREATOR INLET TEMPERATURE	STEAM	2	194.3	250	0 TO 300	BIMETAL	310	8	
3	11-TG-003	ECONOMIZER-1 INLET HDR TEMP.	WATER	55	130	140	0 TO 250	BIMETAL	320	8	
4	11-TG-001	ECONOMIZER -3 INLET HDR TEMP.	WATER	54	235	274	0 TO 400	BIMETAL	320	8	
5	11-TG-002	ECONOMIZER-3 OUTLET HDR TEMP.	WATER	54	235	275	0 TO 350	BIMETAL	320	8	
6	11-TG-004	PRIMARY SH OUTLET HDR TEMPERATURE	STEAM	50	360	400	0 TO 550	GASFILLED	380	8	
7	11-TG-005	SUPER HEATER INLET HDR TEMPERATURE	STEAM	50	360	400	0 TO 550	GASFILLED	380	8	
8	11-TG-006	SOOT BLOWER PRS DOWNSTREAM TEMP.	STEAM	21	333	400	0 TO 550	GASFILLED	260	8	
9	12-TG-003	ECONOMIZER-1 INLET HDR TEMP.	WATER	55	130	140	0 TO 250	BIMETAL	320	8	
10	12-TG-001	ECONOMIZER -3 INLET HDR TEMP.	WATER	54	235	274	0 TO 400	BIMETAL	320	8	
11	12-TG-002	ECONOMIZER-3 OUTLET HDR TEMP.	WATER	54	235	275	0 TO 350	BIMETAL	320	8	
12	12-TG-004	PRIMARY SH OUTLET HDR TEMPERATURE	STEAM	50	360	400	0 TO 550	GASFILLED	380	8	
13	12-TG-005	SUPER HEATER INLET HDR TEMPERATURE	STEAM	50	360	400	0 TO 550	GASFILLED	380	8	
14	12-TG-006	SOOT BLOWER PRS DOWNSTREAM TEMP.	STEAM	21	333	400	0 TO 550	GASFILLED	260	8	
15	15-TG-001	COMMON STEAM DIST. HDR TEMPERATURE	STEAM	47	420	425	0 TO 700	GASFILLED	420	8	
16	15-TG-002	PROCESS CUM PEGGING STEAM PRDS UPSTREAM TEMP.	STEAM	47	420	425	0 TO 700	GASFILLED	420	8	
17	15-TG-003	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	STEAM	16	205	215	0 TO 300	GASFILLED	310	8	
18	15-TG-004	GSS/EJECTOR PRDS UPSTREAM TEMP.	STEAM	47	420	425	0 TO 700	GASFILLED	310	8	
19	15-TG-005	GSS/EJECTOR PRDS DOWNSTREAM TEMP.	STEAM	13.7	300	320	0 TO 450	BIMETAL	260	8	
20	15-TG-006	PROCESS STEAM DIST. HDR TEMPERATURE	STEAM	16	205	215	0 TO 300	BIMETAL	410	8	
21	16-TG-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	STEAM	16.9	207	215	0 TO 300	BIMETAL	310	8	
22	17-TG-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	STEAM	16.9	207	215	0 TO 300	BIMETAL	310	8	
23	34-TG-001	COOLING WATER RETURN LINE TEMP.	WATER	-	41	-	0 TO 80	BIMETAL	720	8	
24	34-TG-002	MCW PUMP COMMON DISCHARGE TEMP.	WATER	2.44	33	-	0 TO 70	BIMETAL	720	8	
25	34-TG-003	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-2 OUT LINE	WATER	2.44	41	-	0 TO 80	BIMETAL	310	8	
26	34-TG-004	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-2 OUT LINE	WATER	2.44	41	-	0 TO 80	BIMETAL	310	8	
27	34-TG-005	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-1 OUT LINE	WATER	2.44	41	-	0 TO 80	BIMETAL	310	8	
28	34-TG-006	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-1 OUT LINE	WATER	2.44	41	-	0 TO 80	BIMETAL	310	8	
29	34-TG-007	COOLING WATER OUTLET TEMP. AT UNIT-2 LUBE OIL SYSTEM	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
30	34-TG-008	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
31	34-TG-009	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
32	34-TG-010	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
33	34-TG-011	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
34	34-TG-012	BFW PUMP COMMON OUTLET COOLING WATER TEMP.	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
35	34-TG-013	COOLING WATER OUTLET TEMP AT UNIT-1 ASH HOPPER COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
36	34-TG-021	COOLING WATER OUTLET TEMP AT UNIT-2 ASH HOPPER COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
37	34-TG-014	COOLING WATER OUTLET TEMP AT SWAS PANEL OUTLET	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
38	34-TG-015	COOLING WATER OUTLET TEMP. AT UNIT-2 LUBE OIL SYSTEM	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
39	34-TG-016	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
40	34-TG-017	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
41	34-TG-018	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	
42	34-TG-019	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	WATER	3.9	41	-	0 TO 80	BIMETAL	260	8	

## **Project title** :

## **2 x 7.5MW – Cogeneration Power Plant**

## **Client** :



**PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC :



**PT. EUROASIATIC JAYA,  
Jakarta, Indonesia**

### **Supplier**



**M/s UTTAM ENERGY LIMITED,  
Pune, Maharashtra, India**

#### Description : Thermowell Pocket Length And Details.

Document : PB609/612-000-I-DOC-TWP00

Rev No. 0

No.

Sheets 11

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	21.08.17	HKV	DHK	DHK	FOR INFORMATION

<p style="text-align: center;">PROJECT NAME :2 x 7.5MW – Cogeneration Power Plant      CLIENT : PT. SURYA BORNEO INDUSTRI,Pangkalan Bun, Kalimantan Tengah, Indonesia      EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia</p>							
S.no	Tag No	Description	Thermowell Length in mm	Thermowell ID in mm	Thermowell OD in mm	Thermowell Material	Drawing No
BOILER COMMON							
1	10-TG-001	TURBINE-1 BLEED STEAM TO DEAREATOR INLET TEMPERATURE	250	12	32	SA105	PBSDTPC012
2	10-TG-002	TURBINE-2 BLEED STEAM TO DEAREATOR INLET TEMPERATURE	250	12	32	SA105	PBSDTPC012
BOILER-1							
3	11-TG-003	ECONOMIZER-1 INLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
4	11-TG-001	ECONOMIZER -3 INLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
5	11-TG-002	ECONOMIZER-3 OUTLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
6	11-TG-004	PRIMARY SH OUTLET HDR TEMPERATURE	320	10	19	SA105	TPH03
7	11-TG-005	SECONDARY SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
8	11-TG-006	SOOT BLOWER PRS DOWNSTREAM TEMP.	200	12	32	SA105	PBSDTPC009
9	11-TE-001	ECONOMIZER-1 INLET HDR TEMPERATURE	255	10	19	SA105	PBSDTPC013
10	11-TE-002	ECONOMIZER-2 OUTLET HDR TEMPERATURE	255	10	19	SA105	PBSDTPC013
11	11-TE-003	PRIMARY SH INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
12	11-TE-004	PRIMARY SH OUTLET HDR TEMPERATURE	320	10	19	SA105	TPH03
13	11-TE-005A	SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
14	11-TE-005B	SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
15	11-TE-006A	MAIN STEAM LINE TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
16	11-TE-006B	MAIN STEAM LINE TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
BOILER-2							
17	12-TE-001	ECONOMIZER INLET HDR TEMPERATURE	255	10	19	SA105	PBSDTPC013
18	12-TE-002	ECONOMIZER OUTLET HDR TEMPERATURE	255	10	19	SA105	PBSDTPC013
19	12-TE-003	PRIMARY SH INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
20	12-TE-004	PRIMARY SH OUTLET HDR TEMPERATURE	320	10	19	SA105	TPH03
21	12-TE-005A	SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
22	12-TE-005B	SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
23	12-TE-006A	MAIN STEAM LINE TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008

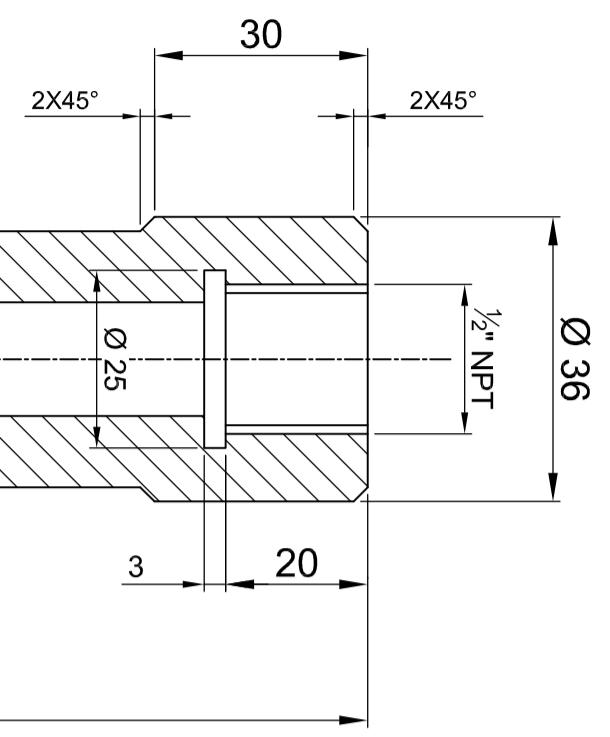
24	12-TE-006B	MAIN STEAM LINE TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
25	12-TG-003	ECONOMIZER-1 INLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
26	12-TG-001	ECONOMIZER -3 INLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
27	12-TG-002	ECONOMIZER-3 OUTLET HDR TEMP.	255	10	19	SA105	PBSDTPC013
28	12-TG-004	PRIMARY SH OUTLET HDR TEMPERATURE	320	10	19	SA105	TPH03
29	12-TG-005	SUPER HEATER INLET HDR TEMPERATURE	320	10	19	SA105	TPH03
30	12-TG-006	SOOT BLOWER PRS DOWNSTREAM TEMP.	200	12	32	SA105	PBSDTPC009
MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM & TURBINE STEAM DIST. SYSTEM							
31	15-TG-001	COMMON STEAM DIST. HDR TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
32	15-TG-002	PROCESS CUM PEGGING STEAM PRDS UPSTREAM TEMP.	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
33	15-TG-003	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	250	12	32	SA105	PBSDTPC012
34	15-TG-004	GSS/EJECTOR PRDS UPSTREAM TEMP.	250	12	32	SA.182.Gr.F11.CL-3	PBSDTPA007
35	15-TG-005	GSS/EJECTOR PRDS DOWNSTREAM TEMP.	200	12	32	SA105	PBSDTPC009
36	15-TG-006	PROCESS STEAM DIST. HDR TEMPERATURE	350	12	32	SA105	PBSDTPC010
37	15-TE-001	COMMON STEAM DIST. HDR TEMPERATURE	360	12	32	SA.182.Gr.F11.CL-3	PBSDTPA008
38	15-TE-002	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	250	12	32	SA105	PBSDTPC012
39	15-TE-003	GSS/EJECTOR PRDS DOWNSTREAM TEMP.	200	12	32	SA105	PBSDTPC009
40	15-TE-004	PROCESS STEAM DIST. HDR TEMPERATURE	350	12	32	SA105	PBSDTPC010
41	16-TE-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	250	12	32	SA105	PBSDTPC012
42	16-TG-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	250	12	32	SA105	PBSDTPC012
43	17-TE-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	250	12	32	SA105	PBSDTPC012
44	17-TG-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	250	12	32	SA105	PBSDTPC012
COOLING WATER SYSTEM							
45	34-TG-001	COOLING WATER RETURN LINE TEMP.	660	12	32	SA105	TPH04
46	34-TG-002	MCW PUMP COMMON DISCHARGE TEMP.	660	12	32	SA105	TPH04
47	34-TG-003	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-2 OUT LINE	350	12	32	SA105	PBSDTPC010
48	34-TG-004	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-2 OUT LINE	350	12	32	SA105	PBSDTPC010
49	34-TG-005	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-1 OUT LINE	350	12	32	SA105	PBSDTPC010
50	34-TG-006	COOLING WATER OUTLET TEMP. AT SURFACE CONDENSOR-1 OUT LINE	350	12	32	SA105	PBSDTPC010

51	34-TG-007	COOLING WATER OUTLET TEMP. AT UNIT-2 LUBE OIL SYSTEM	200	12	32	SA105	PBSDTPC009
52	34-TG-008	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
53	34-TG-009	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
54	34-TG-010	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
55	34-TG-011	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
56	34-TG-012	BFW PUMP COMMON OUTLET COOLING WATER TEMP.	200	12	32	SA105	PBSDTPC009
57	34-TG-013	COOLING WATER OUTLET TEMP AT UNIT-1 ASH HOPPER COOLER	200	12	32	SA105	PBSDTPC009
58	34-TG-021	COOLING WATER OUTLET TEMP AT UNIT-2 ASH HOPPER COOLER	200	12	32	SA105	PBSDTPC009
59	34-TG-014	COOLING WATER OUTLET TEMP AT SWAS PANEL OUTLET	200	12	32	SA105	PBSDTPC009
60	34-TG-015	COOLING WATER OUTLET TEMP. AT UNIT-2 LUBE OIL SYSTEM	200	12	32	SA105	PBSDTPC009
61	34-TG-016	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
62	34-TG-017	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
63	34-TG-018	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
64	34-TG-019	COOLING WATER OUTLET TEMP AT UNIT-2 GENERATOR AIR COOLER	200	12	32	SA105	PBSDTPC009
65	34-TE-001	COOLING WATER RETURN LINE TEMP.	660	12	32	SA105	TPH04
66	34-TE-002	MCW PUMP COMMON DISCHARGE TEMP.	660	12	32	SA105	TPH04

**DO NOT SCALE**      **JOB.NO:** PB.- STD.      **Q.TY.**

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



DESIGN DATA					
MAX. WORKING PRESSURE			150 Kg/cm <sup>2</sup> (g)		
MAX. WORKING TEMP.			426 °C		

PT NO	DESCRIPTION	QUALITY						REMARKS	
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	DRG.NO. CODE NO.	
		CHECKED	HARI	30.10.15					TOTAL WEIGHT -

APPROVED ARM

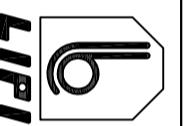
SCALE NTS

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**THERMOMETER POCKET**

NO.	REVISION	DATE	BY	CHD.	APPD.

NO.	REVISION	DATE	BY	CHD.	APPD.	DRG.NO.	PBSDTPC009	REV	R0	SIZE	A4

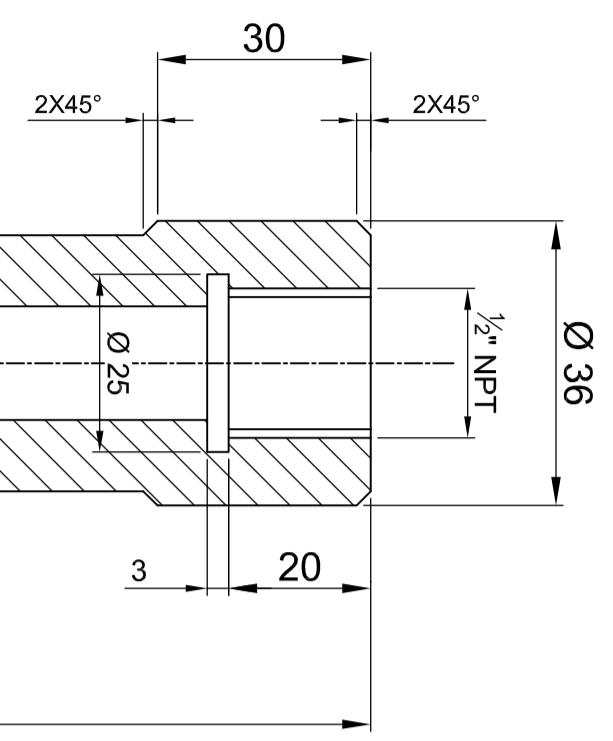


LIPI BOILERS LTD. PUNE

**DO NOT SCALE**      **JOB.NO:** PB.- STD.      **Q.TY.**

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



DESIGN DATA					
MAX. WORKING PRESSURE					150 Kg/cm <sup>2</sup> (g)
MAX. WORKING TEMP.					500 °C

PT NO	DESCRIPTION	QUALITY						REMARKS	
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	DRG.NO. CODE NO.	
01.	BAR			30.10.15					
<b>POCKET</b>									
NO.	REVISION	DATE	BY CHD.	APPD.	LIPPI	DRG.NO. PBSDTPA007	REV R0	SIZE A4	

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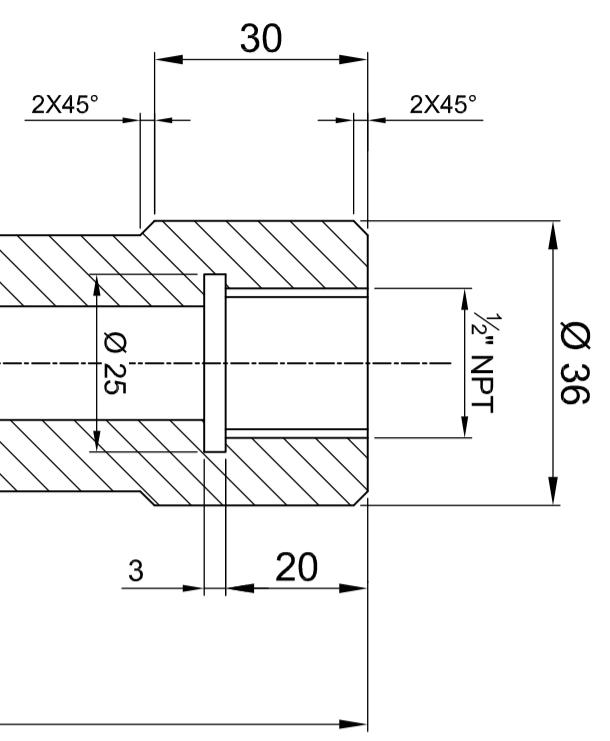
**THERMOMETER**

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**DO NOT SCALE**      **JOB.NO:** PB.- STD.      **Q.TY.**

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



DESIGN DATA					
MAX. WORKING PRESSURE			150 Kg/cm <sup>2</sup> (g)		
MAX. WORKING TEMP.			426 °C		

PT NO	DESCRIPTION	QUALITY						REMARKS	
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	DRG.NO. CODE NO.	
01.	BAR			30.10.15					

DRAWN	VDS	DATE	SCALE	NTS
CHECKED	HARI			

APPROVED

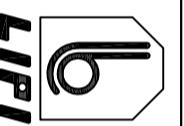
ARM

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**POCKET**  
**POCKET**

NO.	REVISION	DATE	BY	CHD.	APPD.

NO.	REVISION	DATE	BY	CHD.	APPD.	DRG.NO.	PBSDTPC012	REV	R0	SIZE	A4



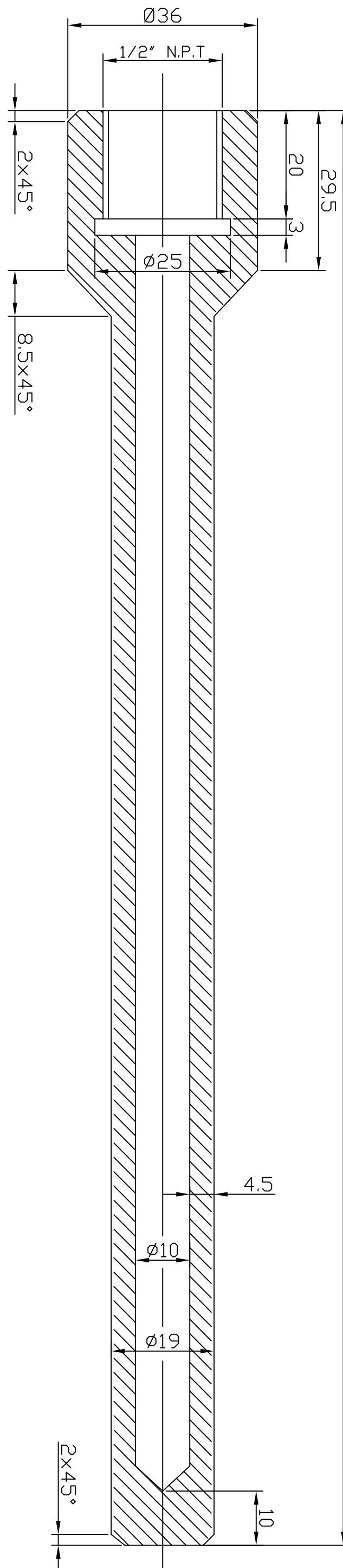
LIPI BOILERS LTD. PUNE

**DO NOT SCALE**

**JOB.NO : PB.- STD.**

**QTY.1X**

255



**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.

DESIGN DATA	
MAX. WORKING PRESSURE	90 Kg/cm <sup>2</sup> (g)
MAX. WORKING TEMP.	420 °C

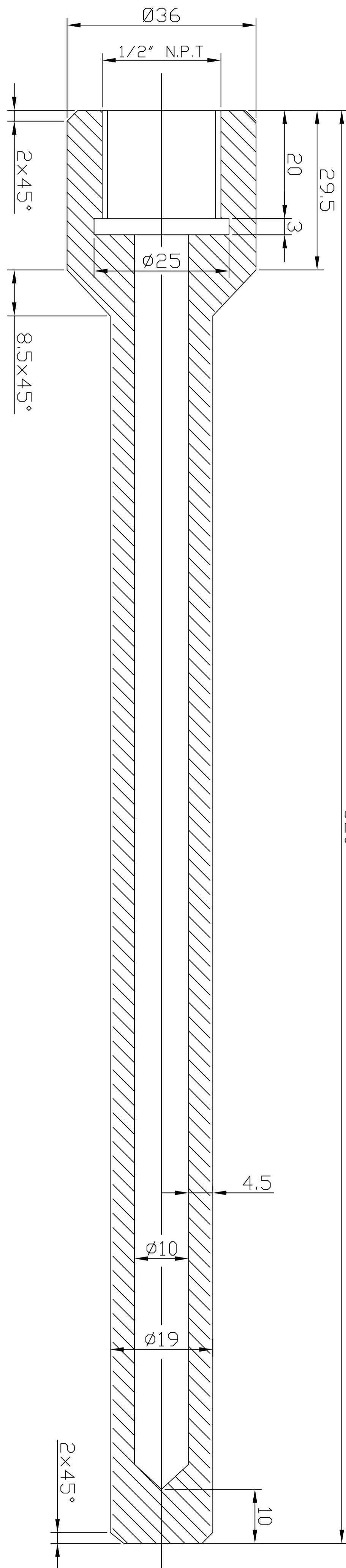
PT NO	DESCRIPTION	QUALITY				DRG.NO.	CODE NO.	REMARKS	
		DRAWN	VDS	DATE	TOTAL WEIGHT				
APPROVED	ARM					THERMOWELL POCKET			

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NO.	REVISION	DATE	BY	CHD.	APPD.	DRG.NO.	PBSDETPC013	CADFILE	UESL STD.	SIZE	A4
						UTTAM ENERGY SYSTEMS LTD.					

**DO NOT SCALE** | **JOB.NO : PB.- STD.** | **QTY.1x**

320



**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.

DESIGN DATA	
MAX. WORKING PRESSURE	90 Kg/cm <sup>2</sup> (g)
MAX. WORKING TEMP.	420 °C

PT NO	DESCRIPTION	QUALITY						REMARKS
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	
		CHECKED	HARI					SCALE NTS
		APPROVED	ARM					

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**POCKET**

NO.	REVISION	DATE	BY	CHD.	APPD.	DRG.NO.	TPH03	UESL STD.	SIZE
						DRG.NO.	TPH03	UESL STD.	A4



UTTAM ENERGY SYSTEMS LTD.  
PUNE.

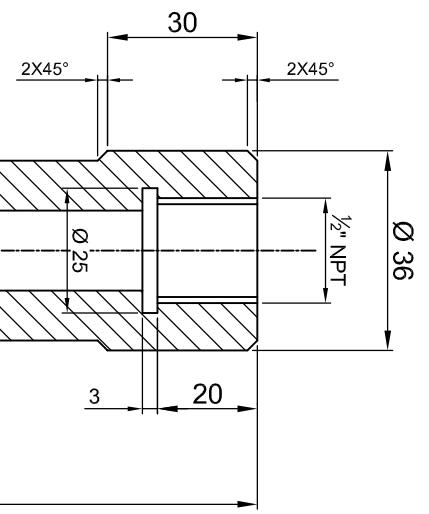
**DO NOT SCALE**

JOB.NO: PB.- STD.

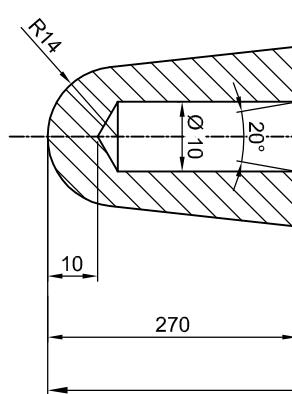
QTY.

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



DESIGN DATA					
MAX. WORKING PRESSURE			150 Kg/cm <sup>2</sup> (g)		
MAX. WORKING TEMP.			426 °C		



PT NO	DESCRIPTION	QUALITY						REMARKS	
		DRAWN	VDS	DATE	UW KG	QTY	TW KG	DRG.NO. CODE NO.	
01.	BAR			30.10.15				-	

CHECKED	HARI	APPROVED	ARM	SCALE	NTS

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**POCKET  
THERMOMETER**

NO.	REVISION	DATE	BY	CHD.	APPD.

DRG.NO.	PBSDTPC010	REV	R0	SIZE
			A4	

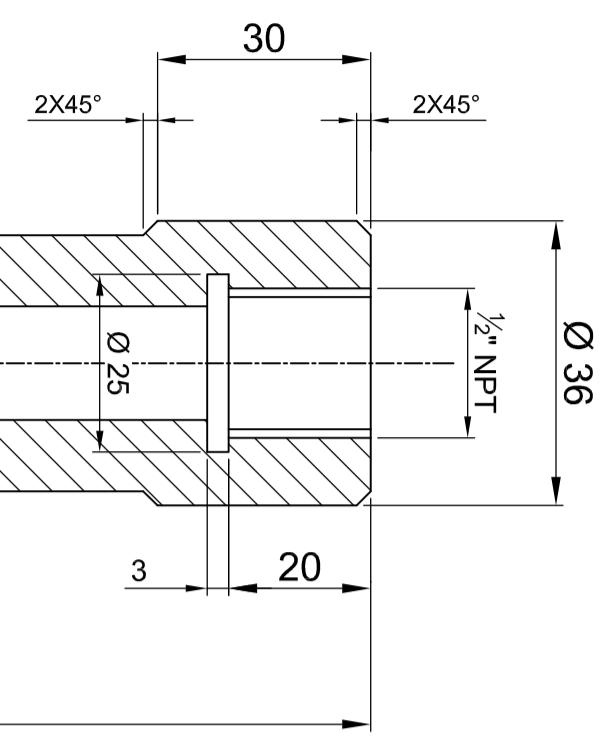


LIPIL BOILERS LTD. PUNE

**DO NOT SCALE**      **JOB.NO:** PB.- STD.      **Q.TY.**

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



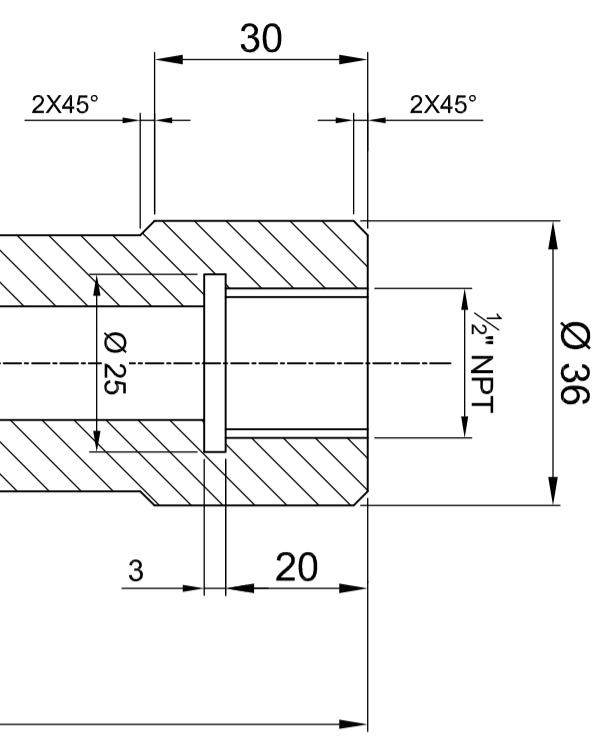
DESIGN DATA					
MAX. WORKING PRESSURE					150 Kg/cm <sup>2</sup> (g)
MAX. WORKING TEMP.					500 °C

PT NO	DESCRIPTION	QUALITY						REMARKS	
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	DRG.NO. CODE NO.	
01.	BAR			30.10.15					
<b>POCKET</b>									
		CHECKED	HARI		SCALE	NTS			
		APPROVED	ARM						
<b>THERMOMETER POCKET</b>									
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NO.	REVISION	DATE	CHD.	APPD.	LIP <sup>I</sup>	DRG.NO. PBSDTPA008	REV R0	SIZE A4	

**DO NOT SCALE**      **JOB.NO: PB.- STD.**      **Q.TY.**

**NOTES :-**

- 1) REMOVE ALL BURRS.
- 2) MACHINED ALL OVER.



DESIGN DATA					
MAX. WORKING PRESSURE					150 Kg/cm <sup>2</sup> (g)
MAX. WORKING TEMP.					426 °C

PT NO	DESCRIPTION	QUALITY						REMARKS
		DRAWN	VDS	DATE	UW KG	QTY.	TW KG	DRG.NO. CODE NO.
CHECKED	HARI				SCALE	NTS		
APPROVED	ARM							

**THERMOMETER**

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**POCKET**

NO.	REVISION	DATE	BY	CHD.	APPD.
	LIPSI				

DRG.NO.	TPH04
REV	R0

SIZE	A4
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## **Project title** :

## **2 x 7.5MW – Cogeneration Power Plant**

## **Client** :



**PT. SURYA BORNEO INDUSTRI,**  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC



**PT. EUROASIATIC JAYA,**  
Jakarta, Indonesia

## **Supplier**



**M/s UTTAM ENERGY LIMITED,  
Pune, Maharashtra, India**

## Description : Instrument Data sheets for Transmitters

Document : PB609/612-000-I-DOC-ATR00

Rev No. 0

No.

Sheets 11

<b>Rev No.</b>	<b>Date</b>	<b>Prepared By</b>	<b>Checked by</b>	<b>Approved by</b>	<b>Reason for Revision</b>
0	16.08.17	HKV	DHK	DHK	FOR INFORMATION

	PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant		
	CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia		
	EPC : PT. EUROASIATIC JAYA,		
ITEM:- PRESSURE TRANSMITTER			
GENERAL	1	Tag No.	Refer Table
	2	Description of Service	Steam, Water
TRANSMITTER	3	Make	YOKOGAWA / HONEYWELL / ABB / SIEMENS
	4	Model No.	As Per Manufacturer
	5	Type	Electronic , Smart with HART Protocol
	6	Function	Transmit, Indicate
	7	Service	Gauge Pressure
	8	Calibrated Span	Refer Table Below
	9	Adjustable Range	As Per Manufacturer
	10	Over pressure	As Per Manufacturer
	11	Accuracy	0.075% Of Span
	12	Power Supply	24V DC (2-Wire)
	13	Output	4-20 mA DC
	14	Process connection	1/2" NPT-14 (F)
	15	Housing	IP66
BODY	16	Body Material	Polyurethane Covered Aluminium
	17	Mounting	Bracket for 2-in. Pipe Mounting
	18	Conduit Entry Size	Thread NPT 1/2"
	19	Isolating Diaphragm	SS 316L
	20	Fill Fluid	Silicon
OPTIONS	21	Cert/Approval Type	Non-Hazardous Area
	22	Meter	LCD Meter
	23	Zero and Span Adjust	By HART/Buttons
NOTES	24	Scope :- Transmitter + Mounting Bracket + 2-Way Manifold	
	25	The installation is outdoor.	
	26	Certificate :- Calibration certificate,	
	27	Operation & Maintenance manual shall be supplied with Transmitter	
	28	Digital communication shall be possible with Hand Held Communicator	
	29	For steam service condensate pot shall be supplied.	
	30	Output 4-20 mA DC shall be superimposed on Digital Signal.	
DOCUMENT TITLE		DATA SHEET FOR PRESSURE TRANSMITTER	
UTTAMENERGY LTD. PUNE			Prepared
			Checked
			Approved
			Rev 0
			Sheet 1 of 6



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant

CLIENT : PT. SURYA BORNEO INDUSTRI,  
Pangkalan Bun, Kalimantan Tengah, Indonesia

EPC :PT. EUROASIATIC JAYA,Jakarta, Indonesia

#### TAG LIST FOR PRESSURE TRANSMITTER

Sr. No.	Tag. No.	Service Description	Calibration Range	Unit	Qty
<b>BOILER COMMON</b>					
1	10-PT-001	DEAREATOR TANK STEAM PRESSURE	0 to 4	bar(g)	1
BOILER-1					
2	11-PT-001	BOILER FEED WATER COMMON DISCHARGE PRESSURE	0 to 100	bar(g)	1
3	11-PT-002	ECONOMIZER INLET HDR PRESSURE	0 to 90	bar(g)	1
4	11-PT-003	STEAM DRUM PRESSURE	0 to 90	bar(g)	1
5	11-PT-004A	MAIN STEAM LINE PRESSURE	0 to 90	bar(g)	1
6	11-PT-004B	MAIN STEAM LINE PRESSURE	0 to 90	bar(g)	1
7	11-PT-005	SOOT BLOWER PRS DOWNSTREAM PRESSURE	0 to 40	bar(g)	1
BOILER-2					
8	12-PT-001	BOILER FEED WATER COMMON DISCHARGE PRESSURE	0 to 100	bar(g)	1
9	12-PT-002	ECONOMIZER INLET HDR PRESSURE	0 to 90	bar(g)	1
10	12-PT-003	STEAM DRUM PRESSURE	0 to 90	bar(g)	1
11	12-PT-004A	MAIN STEAM LINE PRESSURE	0 to 90	bar(g)	1
12	12-PT-004B	MAIN STEAM LINE PRESSURE	0 to 90	bar(g)	1
13	12-PT-005	SOOT BLOWER PRS DOWNSTREAM PRESSURE	0 to 40	bar(g)	1
<b>MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM &amp; TURBINE STEAM DIST. SYSTEM</b>					
14	15-PT-001	COMMON STEAM DISTRIBUTION HDR PRESSURE	0 to 90	bar(g)	1
15	15-PT-002	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	0 to 25	bar(g)	1
16	15-PT-003	GSS/EJECTOR PRDS DOENSTREAM PRESSURE	0 to 25	bar(g)	1
17	15-PT-004	PROCESS STEAM DISTRIBUTION HDR	0 T0 25	bar(g)	1
18	16-PT-001	TURBINE-1 EXTRACTION LINE PRESSURE AFTER DSH	0 to 25	bar(g)	1
19	17-PT-001	TURBINE-2 EXTRACTION LINE PRESSURE AFTER DSH	0 to 25	bar(g)	1
<b>DM WATER SYSTEM</b>					
20	33-PT-001	DM TRANSFER PUMP COMMON DISCHARGE PRESSURE	0 to 15	bar(g)	1
<b>COOLING WATER SYSTEM</b>					
21	34-PT-001	MCW PUMP COMMON DISCHARGE HEADER PRESSURE	0 to 5	bar(g)	1
22	34-PT-002	ACW PUMP COMMON DISCHARGE HEADER PRESSURE	0 to 6	bar(g)	1

	PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant	
	CLIENT : PT. SURYA BORNEO INDUSTRI, Pangkalan Bun, Kalimantan Tengah, Indonesia	
	EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia	
ITEM:- DIFF. PRESSUR TRANSMITTER		
GENERAL	1	Tag No.
	2	Description of Service
TRANSMITTER	3	Make
	4	Model No.
	5	Type
	6	Function
	7	Service
	8	Calibrated Span
	9	Adjustable Range
	10	Over Pressure
	11	Accuracy
	12	Power Supply
	13	Output
	14	Process connection
	15	Housing
BODY	16	Body Material
	17	Mounting
	18	Conduit Entry Size
	19	Isolating Diaphragm
ELEMENT	20	Fill Fluid
	21	Cert/Approval Type
OPTIONS	22	Meter
	23	Zero and Span Adjust
	24	Scope :- Transmitter + Mounting Bracket + 3-Way Manifold
NOTES	25	The installation is outdoor.
	26	Certificate :- Calibration certificate,
	27	Operation & Maintenance manual shall be supplied with Transmitter
	28	Output 4-20 mA DC shall be superimposed on Digital Signal.
	29	Digital communication shall be possible with Hand Held Communicator
DOCUMENT TITLE	DATA SHEET FOR DIFF. PRESSURE TRANSMITTER	
	UTTAMENERGY LTD. PUNE	
	Prepared	HKV
	Checked	DHK
	Approved	DHK
	Rev	0
	Sheet	3 of 6



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant  
 CLIENT : PT. SURYA BORNEO INDUSTRI,  
 Pangkalan Bun, Kalimantan Tengah, Indonesia  
 EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

**TAG LIST FOR DIFFERENTIAL PRESSURE TRANSMITTER**

Sr.no	Tag No	Service Description	Calibration Range	Unit	Qty
<b>BOILER COMMON</b>					
1	10-LT-001	DEAREATOR WATER LEVEL	-2100 to 0	mmWc	1
2	10-LT-002	CONTINOUS BLOW DOWN TANK WATER LEVEL	-800 to 0	mmWc	1
<b>BOILER-1</b>					
3	11-DPT-001	BOILER FEED WATER PUMP-1 SUCTION STRAINER DIFF.PRESSURE	0 to 200	mbar	1
4	11-DPT-002	BOILER FEED WATER PUMP-2 SUCTION STRAINER DIFF.PRESSURE	0 to 200	mbar	1
5	11-FT-001	BOILER FEED WATER COMMON DISCHARGE FLOW	0 to 3000	mmWc	1
6	11-LT-001A	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
7	11-LT-001B	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
8	11-LT-001C	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
9	11-FT-002	BOILER FEED WATER SPRAY ATTEMPERATOR FLOW	0 to 3000	mmWc	1
10	11-FT-003	MAIN STEAM LINE FLOW	0 to 5000	mmWc	1
11	11-PT-006A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-1	0 to 150	mmWc	1
12	11-PT-007A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-2	0 to 150	mmWc	1
13	11-PT-008A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-3	0 to 150	mmWc	1
14	11-PT-009A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-4	0 to 150	mmWc	1
15	11-PT-006B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-1	0 to 150	mmWc	1
16	11-PT-007B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-2	0 to 150	mmWc	1
17	11-PT-008B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-3	0 to 150	mmWc	1
18	11-PT-009B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-4	0 to 150	mmWc	1
19	11-PT-010A	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	mmWc	1
20	11-PT-010B	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	mmWc	1
21	11-PT-011	DRAFT PRESSURE AT SECONDARY SH INLET	-140 to 0	mmWc	1
22	11-PT-012	DRAFT PRESSURE AT PRIMARY SH OUTLET	-150 to 0	mmWc	1
23	11-PT-013	DRAFT PRESSURE AT PRIMARY SH INLET	-160 to 0	mmWc	1
24	11-PT-014	DRAFT PRESSURE AT EVOPORATER	-170 to 0	mmWc	1
25	11-PT-022	DRAFT PRESSURE AT ECONOMIZER INLET 6	-200 to 0	mmWc	1

26	11-PT-015	DRAFT PRESSURE AT APH INLET 1	-220 to 0	mmWc	1
27	11-PT-016	DRAFT PRESSURE AT ESP INLET	-270 to 0	mmWc	1
28	11-PT-017	DRAFT PRESSURE AT ESP OUTLET	-300 to 0	mmWc	1
29	11-PT-018	FD FAN COMMON DISCHAEGE DRAFT PRESSURE	0 to 300	mmWc	1
30	11-FT-005	FD FAN COMMON DISCHAEGE FLOW	0 to 100	mmWc	1
31	11-PT-019	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	mmWc	1
32	11-PT-020	SA FAN COMMON DISCHARGE DRAFT PRESSURE	0 to 800	mmWc	1
33	11-FT-004	SA FAN COMMON DISCHAEGE FLOW	0 to 100	mmWc	1
34	11-PT-021	HOT APH OUTLET SA AIR DRAFT PRESSURE	0 to 700	mmWc	1
35	11-PT-023	DRAFT PRESSURE AT CHIMNEY INLET	-50 to +50	mmWc	1
<b>BOILER-2</b>					
36	12-DPT-001	BOILER FEED WATER PUMP-1 SUCTION STRAINER DIFF.PRESSURE	0 to 200	mbar	1
37	12-DPT-002	BOILER FEED WATER PUMP-2 SUCTION STRAINER DIFF.PRESSURE	0 to 200	mbar	1
38	12-FT-001	BOILER FEED WATER COMMON DISCHARGE FLOW	0 to 3000	mmWc	1
39	12-LT-001A	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
40	12-LT-001B	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
41	12-LT-001C	STEAM DRUM WATER LEVEL	-800 to 0	mmWc	1
42	12-FT-002	BOILER FEED WATER SPRAY ATTEMPERATOR FLOW	0 to 3000	mmWc	1
43	12-FT-003	MAIN STEAM LINE FLOW	0 to 5000	mmWc	1
44	12-PT-006A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-1	0 to 150	mmWc	1
45	12-PT-007A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-2	0 to 150	mmWc	1
46	12-PT-008A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-3	0 to 150	mmWc	1
47	12-PT-009A	FD UNDER GRATE AIR PRESSURE OF LHS COMP-4	0 to 150	mmWc	1
48	12-PT-006B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-1	0 to 150	mmWc	1
49	12-PT-007B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-2	0 to 150	mmWc	1
50	12-PT-008B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-3	0 to 150	mmWc	1
51	12-PT-009B	FD UNDER GRATE AIR PRESSURE OF RHS COMP-4	0 to 150	mmWc	1
52	12-PT-010A	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	mmWc	1
53	12-PT-010B	DRAFT PRESSURE AT FURNACE ELE 18MTR LEVEL	-50 to +50	mmWc	1
54	12-PT-011	DRAFT PRESSURE AT SECONDARY SH INLET	-140 to 0	mmWc	1
55	12-PT-012	DRAFT PRESSURE AT PRIMARY SH OUTLET	-150 to 0	mmWc	1
56	12-PT-013	DRAFT PRESSURE AT PRIMARY SH INLET	-160 to 0	mmWc	1
57	12-PT-014	DRAFT PRESSURE AT EVOPORATER	-170 to 0	mmWc	1
58	12-PT-022	DRAFT PRESSURE AT ECONOMIZER INLET 6	-200 to 0	mmWc	1
59	12-PT-015	DRAFT PRESSURE AT APH INLET 1	-220 to 0	mmWc	1
60	12-PT-016	DRAFT PRESSURE AT ESP INLET	-270 to 0	mmWc	1

61	12-PT-017	DRAFT PRESSURE AT ESP OUTLET	-300 to 0	mmWc	1
62	12-PT-018	FD FAN COMMON DISCHAEGE DRAFT PRESSURE	0 to 300	mmWc	1
63	12-FT-005	FD FAN COMMON DISCHAEGE FLOW	<b>Will be confirmed by client</b>	mmWc	1
64	12-PT-019	HOT APH OUTLET FD AIR DRAFT PRESSURE	0 to 250	mmWc	1
65	12-PT-020	SA FAN COMMON DISCHARGE DRAFT PRESSURE	0 to 800	mmWc	1
66	12-FT-004	SA FAN COMMON DISCHAEGE FLOW	<b>Will be confirmed by client</b>	mmWc	1
67	12-PT-021	HOT APH OUTLET SA AIR DRAFT PRESSURE	0 to 700	mmWc	1
68	12-PT-023	DRAFT PRESSURE AT CHIMNEY INLET	-50 to +50	mmWc	1

**MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM & TURBINE STEAM DIST. SYSTEM**

69	16-FT-001	UNIT-1 TURBINE INLET STEAM FLOW	0 to 5000	mmWc	1
70	17-FT-001	UNIT-2 TURBINE INLET STEAM FLOW	0 to 5000	mmWc	1

**DM WATER SYSTEM**

71	33-LT-001	DM TANL WATER LEVEL	<b>Will be confirmed by client</b>	mmWc	1
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**COOLING WATER SYSTEM**

72	34-LT-001	COOLING TOWER WATER LEVEL	0 to 2800	mmWc	1
73	34-FT-001	COOLING WATER RETURN LINE FLOW	0 to 3000	mmWc	1



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant  
 CLIENT : PT. SURYA BORNEO INDUSTRI,  
 Pangkalan Bun, Kalimantan Tengah, Indonesia  
 EPC : PT. EUROASIATIC JAYA,

### Temperature Transmitter

GENERAL	1	Tag No.	Refer table below
	2	Description of Service	Refer table below
SENSOR	4	Measurement	Temperature
	5	Type	Refer table
	6	Wire Configuration	Refer table
	7	Element Configuration	Simplex
	8	Response Time	30 Sec
	9	Process Connection	NA
	10	Transmitter Type	SMART (HART)
	11	Calibration Range	Refer table
TRANSMITTER	12	Transmitter range	VTI
	13	Output Signal	4 - 20 mA DC With HART
	14	Power Supply	24V DC
	15	Enclosure Class	Minimum IP65
	16	Accuracy	(+/-) 0.5% or better
	17	Cable Entry	1/2" NPT(F)
	18	Area Classification	Safe Zone
	19	Mounting Bracket	Required - 2" Pipe Mount (CS)
OPTIONS	20	LCD Indicator on Transmitter	LCD 4 - Digit
	21	Make	YOKOGAWA / HONEYWELL / ABB / SIEMENS
PURCHASE	22	Model	VTI

Notes:

- 1) VTI - Vendor to Inform.
- 2) Vendor Have to submit test and calibration certificate.

DOCUMENT TITLE	DATA SHEET FOR TEMPERATURE TRANSMITTER		
	UTTAMENERGY LTD. PUNE	Prepared Checked Approved Rev Sheet	HKV DHK DHK 0 5 of 6



PROJECT NAME : 2 x 7.5MW – Cogeneration Power Plant  
 CLIENT : PT. SURYA BORNEO INDUSTRI,  
 Pangkalan Bun, Kalimantan Tengah, Indonesia  
 EPC : PT. EUROASIATIC JAYA, Jakarta, Indonesia

TAG LIST FOR TEMPERATURE TRANSMITTER

Sr.no	Tag No	Service Description	Calibration Range	Unit	Wire configuration and Type	Qty
<b>BOILER-1</b>						
1	11-TT-001	ECONOMIZER INLET HDR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
2	11-TT-003	PRIMARY SH INLET HDR TEMPERATURE	0 TO 400	DEG.C	3-WIRE AND RTD Pt100	1
3	11-TT-005A	SUPER HEATER INLET HDR TEMPERATURE	0 TO 550	DEG.C	2-WIRE AND TC K-Type	1
4	11-TT-005B	SUPER HEATER INLET HDR TEMPERATURE	0 TO 550	DEG.C	2-WIRE AND TC K-Type	1
5	11-TT-006A	MAIN STEAM LINE TEMPERATURE	0 TO 600	DEG.C	2-WIRE AND TC K-Type	1
6	11-TT-006B	MAIN STEAM LINE TEMPERATURE	0 TO 600	DEG.C	2-WIRE AND TC K-Type	1
7	11-TT-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
8	11-TT-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
9	11-TT-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
10	11-TT-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
11	11-TT-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
12	11-TT-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
13	11-TT-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
14	11-TT-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
15	11-TT-011A	FURNACE TEMP AT ELE 11 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
16	11-TT-011B	FURNACE TEMP AT ELE 11 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
17	11-TT-012	FURNACE TEMP AT ELE 18 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
18	11-TT-013	FLUE GAS TEMP AT SECONDARY SH INLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
19	11-TT-014	FLUE GAS TEMP AT PRIMARY SH OUTLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
20	11-TT-015	FLUE GAS TEMP AT PRIMARY SH INLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
21	11-TT-016	FLUE GAS TEMP AT EVOPORATER	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
22	11-TT-017	FLUE GAS TEMP AT ECONOMIZER INLET 6	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
23	11-TT-018	FLUE GAS TEMP AT APH INLET 1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
24	11-TT-019	FLUE GAS TEMP AT ESP INLET	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
25	11-TT-020	FLUE GAS TEMP AT ESP OUTLET	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1

26	11-TT-021	FD FAN COMMON DISCHAEGE TEMP	0 TO 100	DEG.C	3-WIRE AND RTD Pt100	1
27	11-TT-022	HOT APH OUTLET FD AIR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
28	11-TT-023	HOT APH OUTLET SA AIR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
<b>BOILER-2</b>						
29	12-TT-001	ECONOMIZER INLET HDR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
30	12-TT-003	PRIMARY SH INLET HDR TEMPERATURE	0 TO 400	DEG.C	3-WIRE AND RTD Pt100	1
31	12-TT-005A	SUPER HEATER INLET HDR TEMPERATURE	0 TO 550	DEG.C	2-WIRE AND TC K-Type	1
32	12-TT-005B	SUPER HEATER INLET HDR TEMPERATURE	0 TO 550	DEG.C	2-WIRE AND TC K-Type	1
33	12-TT-006A	MAIN STEAM LINE TEMPERATURE	0 TO 600	DEG.C	2-WIRE AND TC K-Type	1
34	12-TT-006B	MAIN STEAM LINE TEMPERATURE	0 TO 600	DEG.C	2-WIRE AND TC K-Type	1
35	12-TT-007A	FURNACE TEMP ON RSG GRATE LHS COMP-1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
36	12-TT-008A	FURNACE TEMP ON RSG GRATE LHS COMP-2	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
37	12-TT-009A	FURNACE TEMP ON RSG GRATE LHS COMP-3	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
38	12-TT-010A	FURNACE TEMP ON RSG GRATE LHS COMP-4	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
39	12-TT-007B	FURNACE TEMP ON RSG GRATE RHS COMP-1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
40	12-TT-008B	FURNACE TEMP ON RSG GRATE RHS COMP-2	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
41	12-TT-009B	FURNACE TEMP ON RSG GRATE RHS COMP-3	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
42	12-TT-010B	FURNACE TEMP ON RSG GRATE RHS COMP-4	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
43	12-TT-011A	FURNACE TEMP AT ELE 11 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
44	12-TT-011B	FURNACE TEMP AT ELE 11 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
45	12-TT-012	FURNACE TEMP AT ELE 18 MTRS	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
46	12-TT-013	FLUE GAS TEMP AT SECONDARY SH INLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
47	12-TT-014	FLUE GAS TEMP AT PRIMARY SH OUTLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
48	12-TT-015	FLUE GAS TEMP AT PRIMARY SH INLET	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
49	12-TT-016	FLUE GAS TEMP AT EVOPORATER	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
50	12-TT-017	FLUE GAS TEMP AT ECONOMIZER INLET 6	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
51	12-TT-018	FLUE GAS TEMP AT APH INLET 1	0 TO 1200	DEG.C	2-WIRE AND TC K-Type	1
52	12-TT-019	FLUE GAS TEMP AT ESP INLET	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
53	12-TT-020	FLUE GAS TEMP AT ESP OUTLET	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
54	12-TT-021	FD FAN COMMON DISCHAEGE TEMP	0 TO 100	DEG.C	3-WIRE AND RTD Pt100	1
55	12-TT-022	HOT APH OUTLET FD AIR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1

56	12-TT-023	HOT APH OUTLET SA AIR TEMPERATURE	0 TO 250	DEG.C	3-WIRE AND RTD Pt100	1
<b>MAIN STEAM DISTRIBUTION SYSTEM, PROCESS STEAM SYSTEM &amp; TURBINE STEAM DIST. SYSTEM</b>						
57	15-TT-002	PROCESS CUM PEGGING PRDS DOWNSTREAM PRESSURE	0 TO 300	DEG.C	3-WIRE AND RTD Pt100	1
58	15-TT-003	GSS/EJECTOR PRDS DOWNSTREAM TEMP.	0 TO 450	DEG.C	2-WIRE AND TC K-Type	1
59	16-TT-001	TURBINE-1 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	0 TO 300	DEG.C	3-WIRE AND RTD Pt100	1
60	17-TT-001	TURBINE-2 1ST EXTRACTION LINE TEMPERATURE AFTER DSH	0 TO 300	DEG.C	3-WIRE AND RTD Pt100	1