
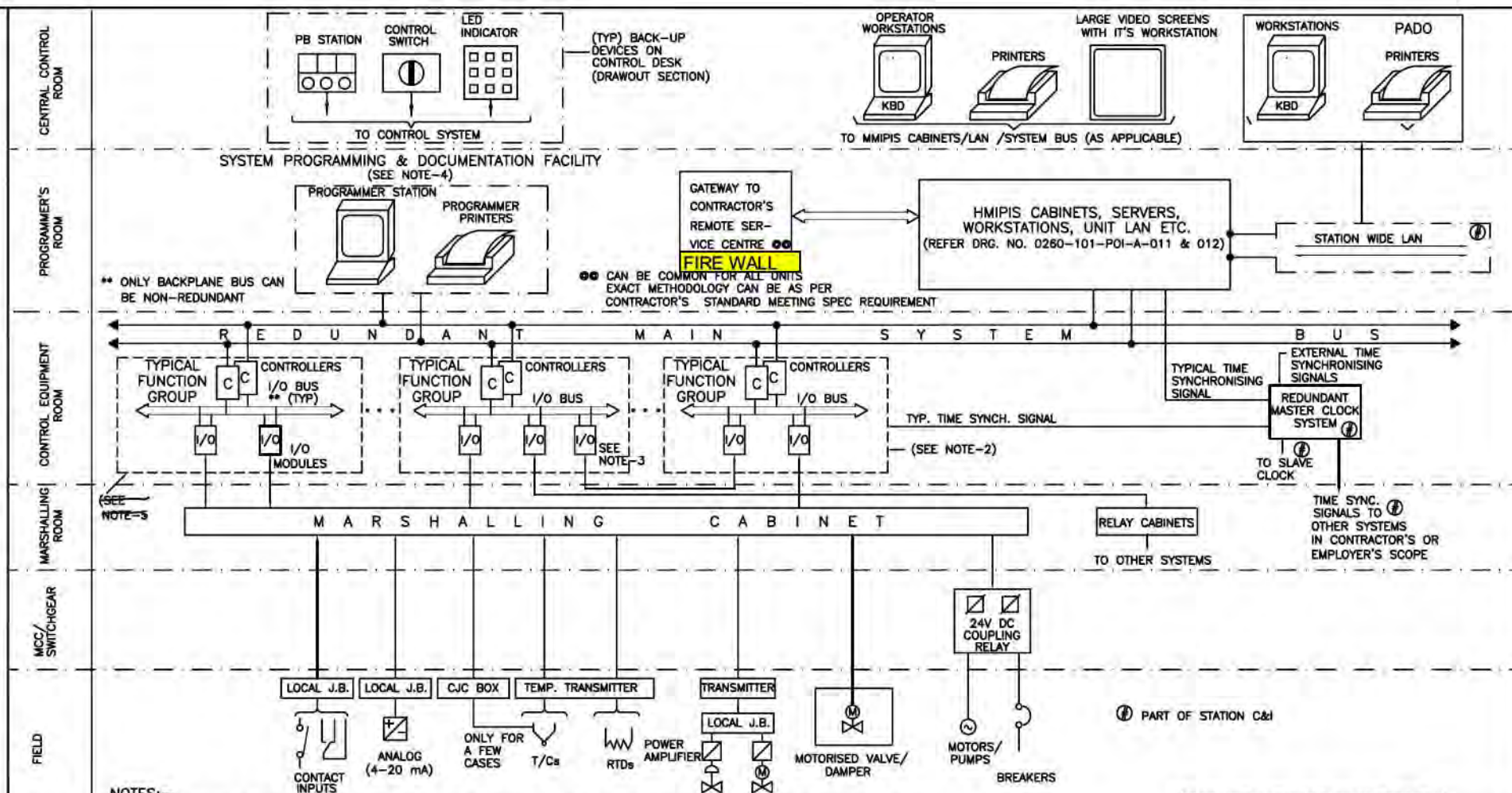


CLAUSE NO.	TECHNICAL REQUIREMENTS					<div>एनटीपीसी NTPC</div>
		Swedish Chimney Test	SEN 4241475	No	Yes	
		Noise interference	IEEE Transactions	No	Yes	
		Dimensional checks	IS 10810	No	Yes	
		Cross talk	VDE-0472	No	Yes	
		Mutual capacitance	VDE-0472	No	Yes	
		HV test	VDE-0815	No	Yes	
		Drain wire continuity		No	Yes	
	* For Drain wire only					
	**These tests shall be carried out as per VDE0207 Part 6 & ASTM-D-2116 for TEFLON insulated & outer sheathed cables					
	***Applicable for armoured cables only					
	7	DC Power Supply System The Type Test reports for offered rectifier module and the controller module irrespective of the rectifier bank shall be acceptable				
		Degree of Protection	IS-13947 or equivalent	No	Yes	
		Dry Heat Test	IEC-68-2-2 or equivalent	No	Yes	
		Damp Heat test	IEC-68-2-3 or equivalent	No	Yes	
		Vibration test	IEC68-2-6 or equivalent	No	Yes	
		Electromagnetic field immunity	EN 61000-4-3 or equivalent	No	Yes	
		Radio frequency immunity test	EN-61000-4-3 or equivalent	No	Yes	
	Electrostatic discharge test	EN 61000-4-2 or equivalent	No	Yes		
LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2		PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS	PAGE 5 OF 6	

CLAUSE NO.	TECHNICAL REQUIREMENTS					<div>एनटीपीसी NTPC</div>
		Surge Withstand Capability(SWC)	ANSI 37.90.1/ IEEE-472,EN 61000-4-12	No	Yes	
8	Battery	As per standard	IS-10918	No	Yes	
9	Voltage Stabiliser	Over Load Test	Approved procedure	No	Yes	
		Temp rise test without redundant fans	Approved procedure	No	Yes	
		Input voltage variation test	Approved procedure	No	Yes	
10	DDCMIS					
	BMS	Safety requirements	VDE0116 Sec 8.7	No	Yes	
11	Conductivity Type Level Switch	Degree of protection test	IS-2147	No	No	
12	Local Gauges	Degree of protection test	IS-2147	No	No	
13	Process actuated Switches	Degree of protection test	IS-2147	No	No	
14	Control Valves	CV test	ISA 75.02	No	Yes	
15	PLCs	As per standard	IEC 1131	No	No	
16	LIE / LIR	Degree of protection test	IS-2147	No	Yes	
17	Flue gas O2 analyser, other Flue Gas analysers	Degree of protection test	IS-2147	No	Yes	
18	Flow Nozzle Orifice plates	Calibration	ASME PTC BS 1042	No	Yes	
<p>Note:</p> <p>Type Tests are to be conducted only for the items, which are being supplied as a part of this Package.</p>						
LARA STPP (2x800MW) / DARLIPALI STPP-I (2 x 800MW) / GAJMARA STPP-I (2x 800MW) / KUDGI STPP-I (3 x 800MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9548/ 9549/ 9566/ 9573-102-2		PART - B SUB-SECTION-IV:19 TYPE TESTS REQUIREMENTS	PAGE 6 OF 6	

CLAUSE NO.	SCOPE OF SUPPLY & SERVICES			
9.00.00	CONTROL AND INSTRUMENTATION FOR PLANT AUXILIARY SYSTEMS			
9.01.00	Instrumentation and Control System with interlocks, protection and annunciation of the mechanical common auxiliary systems as mentioned below shall be provided. All necessary equipments/system for control, monitoring and operations of the plants as well as the incomers and bus couplers shall be provided.			
9.02.00	For certain plants, facility for control from DDCMIS shall be provided as mentioned below:			
	SI No	Auxiliary Plant	Control System	Connectivity/operation
	01	Auxiliary Boiler (if applicable)	Independent control system in SG-C&I hardware	Dual two way Ethernet connectivity to Station LAN for information
	02	Fuel Oil Pressurization/ Heating System (FOPH) & Fuel oil unloading system	Independent control system in SG-C&I based Hardware. I/O count for Fuel oil unloading system is 200 binary and 20 analogs.	Dual two way Ethernet connectivity to station LAN for information and control. Local operation of Fuel oil Handling System through GIU.
	03	Mill Reject System (Unitised System)	SG C&I Based Control System from Control Room	Graphical interface unit (GIU) based local operation apart from CCR.
	04	Air Compressor System including Air-Compressors of Mill Reject System	<p>If the controller is integral to compressor, then Microprocessor/ PLC based control system along with suitable operator interface as per vendor's practice for individual Air compressors control.</p> <p>If the controller for individual compressors is not integral to compressor then control shall be through SG-C&I</p> <p>For both the cases, over all Control shall be through SG-C&I</p>	Two way Ethernet Connectivity to SG-C&I for information and overall Control of Air Compressors. (Applicable only for compressors with integral controllers)
	05	LP Dosing and Oxy-genated treatment	Control from BOP-C&I under Station C&I package(in Employer's scope).	
	06	Equipment Cooling Water System	Control from BOP-C&I under Station C&I Package	
GAJMARA SUPER THERMAL POWER PROJECT STGAE-I (2X800MW) STEAM GENERATOR PAKAGE				
TECHNICAL SPECIFICATION SECTION-VI BID DOC. NO.: CS-9566-102-2				
PART-A SUB-SECTION-III:C CONTROL AND INST. SYSTEM				
PAGE 7 OF 8				

CLAUSE NO.	SCOPE OF SUPPLY & SERVICES					<div>एनटीपीसी NTPC</div>								
3.00.00	(i)	2 PB + 3 LED			10 nos.									
	(ii)	EMERGENCY TRIP PB			5 nos.									
	INDEPENDENT CONTROL SYSTEMS													
4.00.00	<table><tr><th>Sl No</th><th>DDCMIS SYSTEM</th><th>LOCATION</th></tr><tr><td>1.</td><td>Fuel oil Pressurization system</td><td>Fuel Oil pump house</td></tr><tr><td>2.</td><td>Auxilliary Boiler (if applicable)</td><td>Auxilliary Boiler Building</td></tr></table>					Sl No	DDCMIS SYSTEM	LOCATION	1.	Fuel oil Pressurization system	Fuel Oil pump house	2.	Auxilliary Boiler (if applicable)	Auxilliary Boiler Building
	Sl No	DDCMIS SYSTEM	LOCATION											
	1.	Fuel oil Pressurization system	Fuel Oil pump house											
2.	Auxilliary Boiler (if applicable)	Auxilliary Boiler Building												
LIST OF AREAS FOR WHICH SOFT SIGNALS ARE TO BE CONNECTED TO SG C&I OR BOP C&I														
5.00.00	SI No	Area	System to which Connected	Minimum Qty of links/ Location	Type	Qty of signals								
	1.	Steam Generator floor per Unit	SG C&I System of each unit	Two nos. per unit	Field bus / Profibus/other industry standard bus for temperature transmitter for metal temperature applications	On as required basis.								
	2.	SG Charger in each unit	SG C&I of respective unit		RS 485/ RS232	20 per charger								
Control Systems of the auxiliary systems shall be provided with connectivity to DDCMIS systems as follows:														
5.00.00	SI No.	Description of the system	System to which to be connected	Remarks										
	1.	Control system of Fuel Oil Pressurizing/Heating System	Station wide LAN under BOP C&I											
	2.	Air compressor system	SG-C&I for supervisory control of all compressors.	If any signals are required for control or monitoring and the same are not available through link, the same shall be hardwired to SG-C&I.										
	3.	Air compressors of Mill reject system	SG-C&I											
GAJMARA SUPER THERMAL POWER PROJECT STAGE-I (2X800 MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC.NO:CS-9566-102-2		PART-A SUB-SECTION-III:C APPENDIX - I		PAGE 5 OF 13								

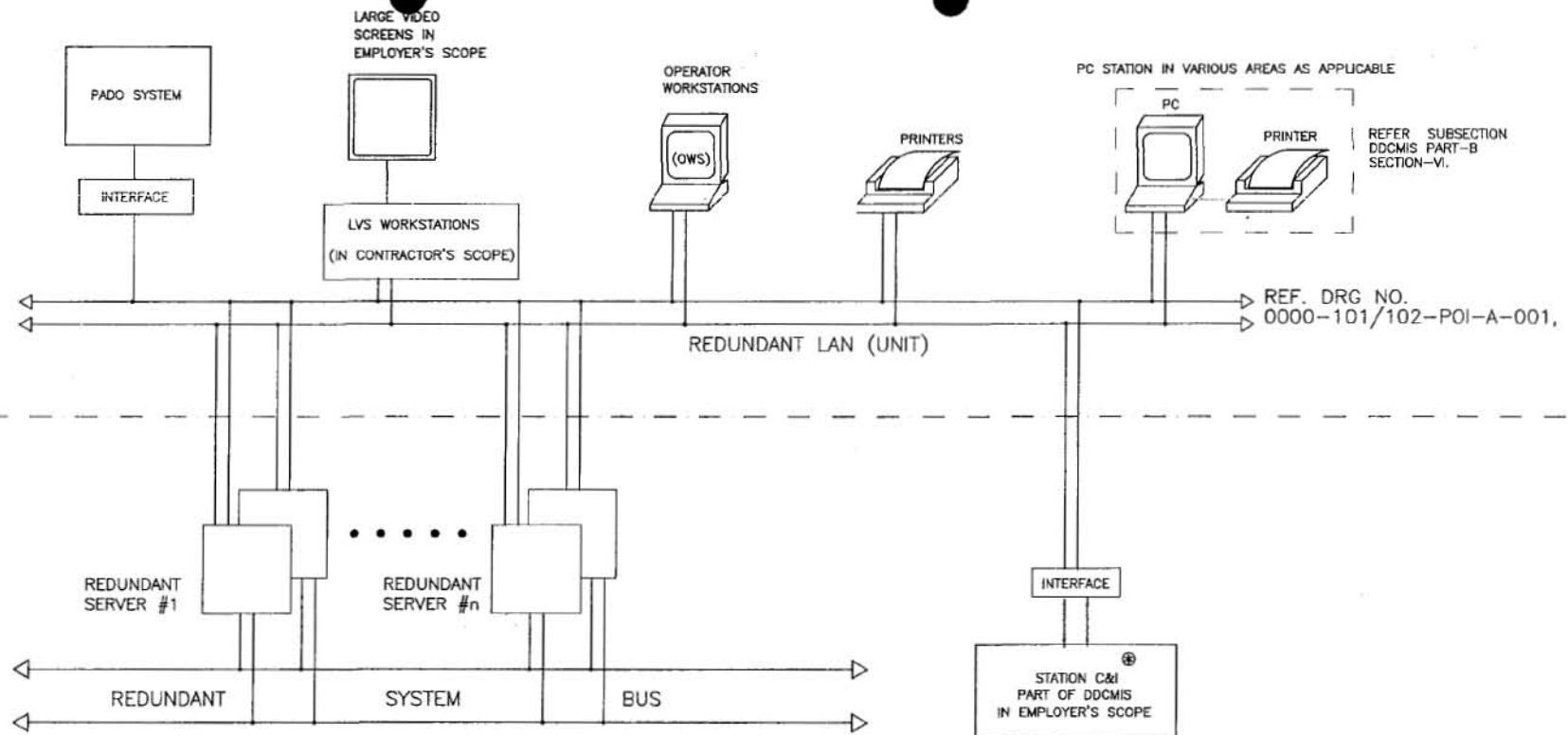


FOR TENDER PURPOSE ONLY

<div>2. CONTROL SYSTEM CABINETS REFER DRG. NO. 0260-102-POI-A-009 FOR FUNCTIONAL GROUPING.</div> <div>3. HARDWIRED SIGNAL EXCHANGE (TYP.).</div> <div>4. THE SKETCH IS ONLY INDICATIVE. FOR DETAILED PROGRAMMER STATION REQUIREMENT, REFER SUBSECTION DDCMIS.</div> <div>5. FULL FUNCTIONAL GROUPS SHALL ALSO BE PLACED IN REMOTE FOR AREAS MENTIONED IN APPENDIX TO BDR.</div>											NTPC LTD. (A GOVT. OF INDIA ENTERPRISE) ENGINEERING DIVISION					
											PROJECT		TYPICAL THERMAL POWER PROJECT SG / TG PACKAGE			
											TITLE		DISTRIBUTED DIGITAL CONTROL, MONITORING AND INFORMATION SYSTEM (DDCMIS) CONFIGURATION DIAGRAM			
A	FIRST ISSUE											23.05.05				
REV.NO.	DESCRIPTION		DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE N.T.S.	DRG. NO. 0000-101/102 -POI-A-001	REV. NO. B
CLEARED BY																

CENTRAL CONTROL ROOM/
OTHER CONTROL ROOMS AS APPLICABLE

PROGRAMMER ROOM



NOTE:- 1. FOR CONTRACT QUANTITIES, REFER SUBSECTION APPENDIX-1 TO SG C&I, PART-A, SECTION VI [FOR TENDER PURPOSE ONLY]
OF TECHNICAL SPECIFICATIONS.



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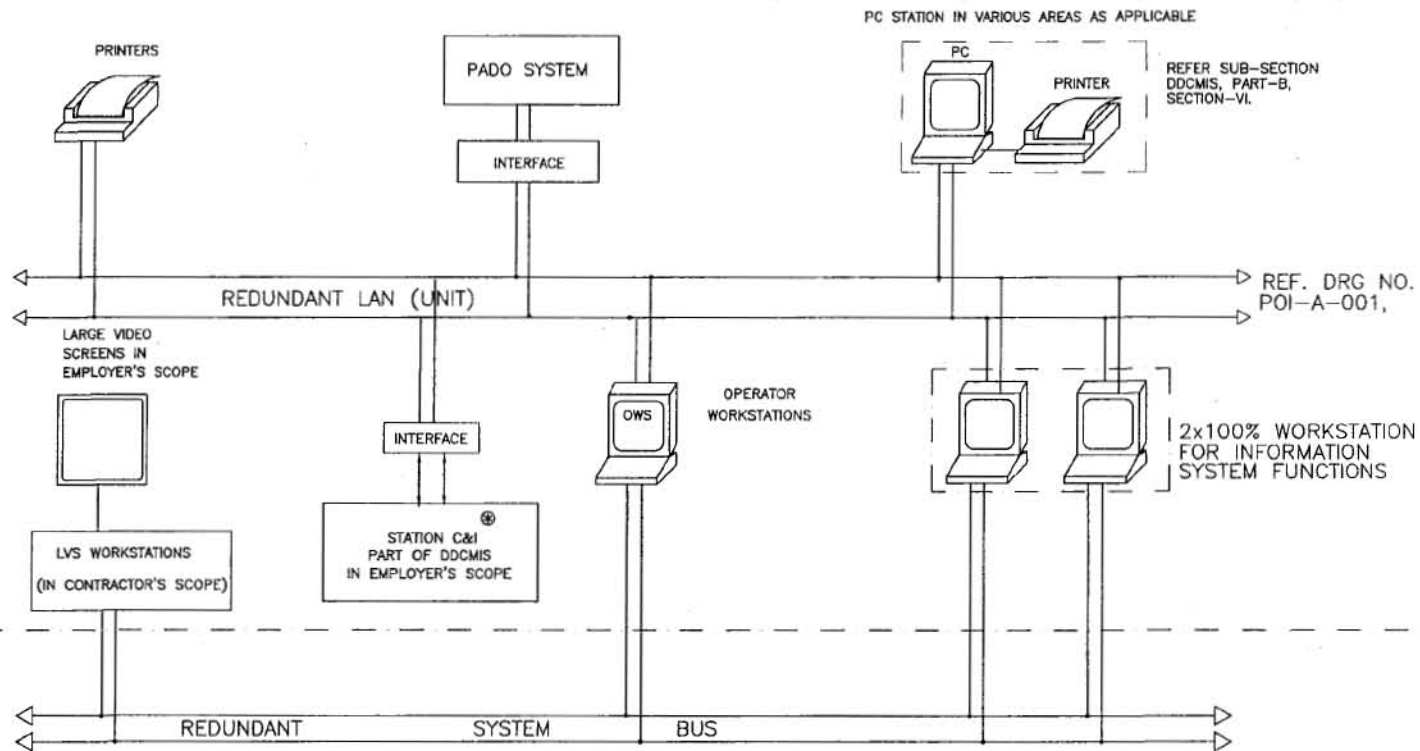
PROJECT TYPICAL THERMAL POWER PROJECT
SG PACKAGE

TITLE
HUMAN MACHINE INTERFACE & PLANT INFORMATION SYSTEM (HMIPIS)
CONFIGURATION DIAGRAM (ALTERNATE-I)

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
A													N.T.S.	0000-101/102-POI-A-011	A
Cleared By															

CENTRAL CONTROL ROOM/
OTHER CONTROL ROOMS AS APPLICABLE

CONTROL
EQUIPMENT
ROOM (CER)



NOTE:- 1. FOR CONTRACT QUANTITIES, REFER SUBSECTION APPENDIX-1 TO SG C&I, SECTION VI
PART A OF TECHNICAL SPECIFICATIONS.

FOR TENDER PURPOSE ONLY

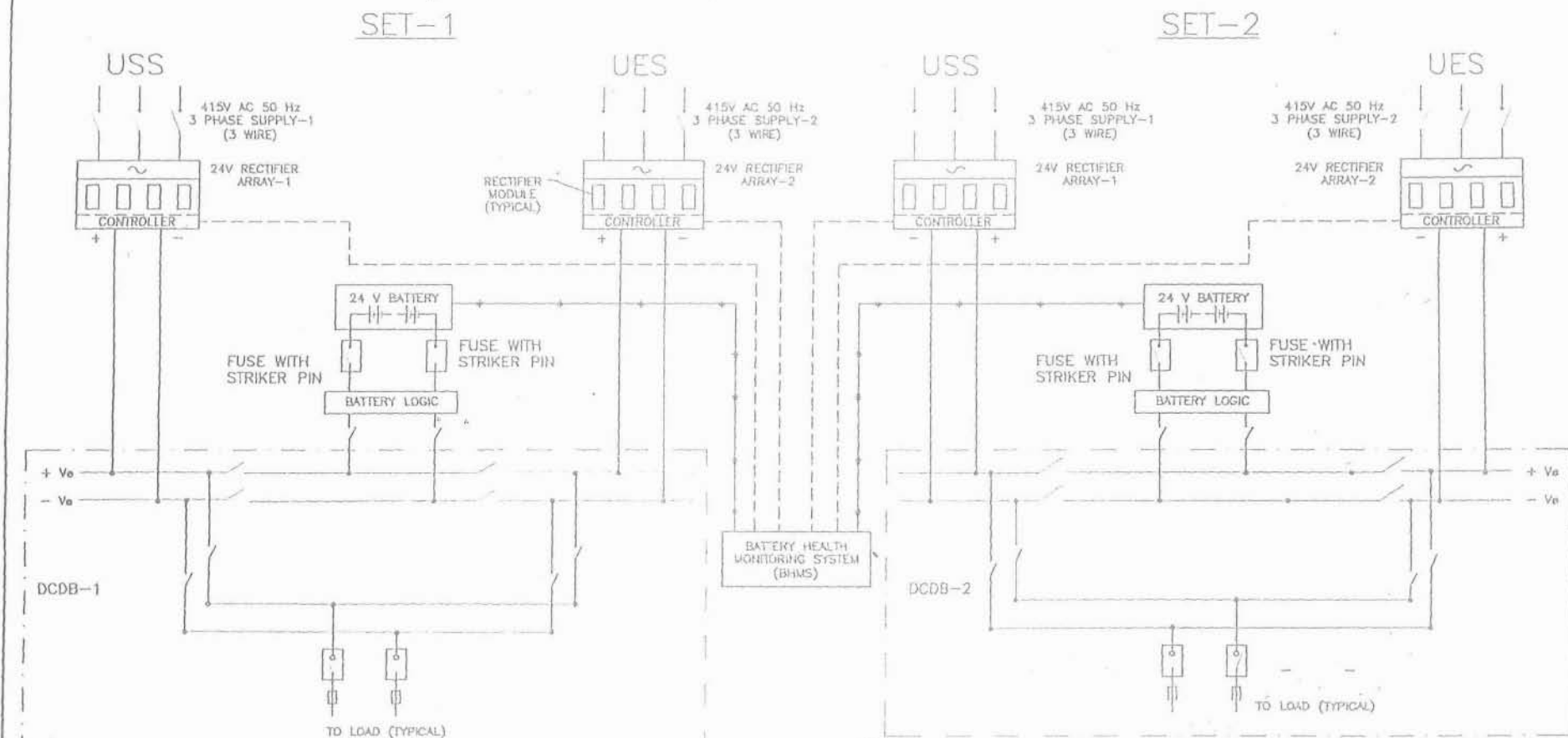


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PROJECT		TYPICAL THERMAL POWER PROJECT SG PACKAGE	
TITLE		HUMAN-MACHINE INTERFACE & PLANT INFORMATION SYSTEM (MMIPIS) CONFIGURATION DIAGRAM (ALTERNATE-II)	
SIZE	SCALE	DRG. NO.	REV. NO.
	N.T.S.	0000-101/102-POI-A-012	A

A	REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	Cleared By				APPD	DATE
						M	E	C	C&I		



NOTES:- 1. SUITABLE INTERLOCK SYSTEM SHALL BE PROVIDED IN FLOAT/BOOST CHARGING MODE.

LEGEND:

ISOLATOR
MCB
FUSE

FOR TENDER PURPOSE ONLY

TWO SET CONFIGURATION

NTPC. LIMITED

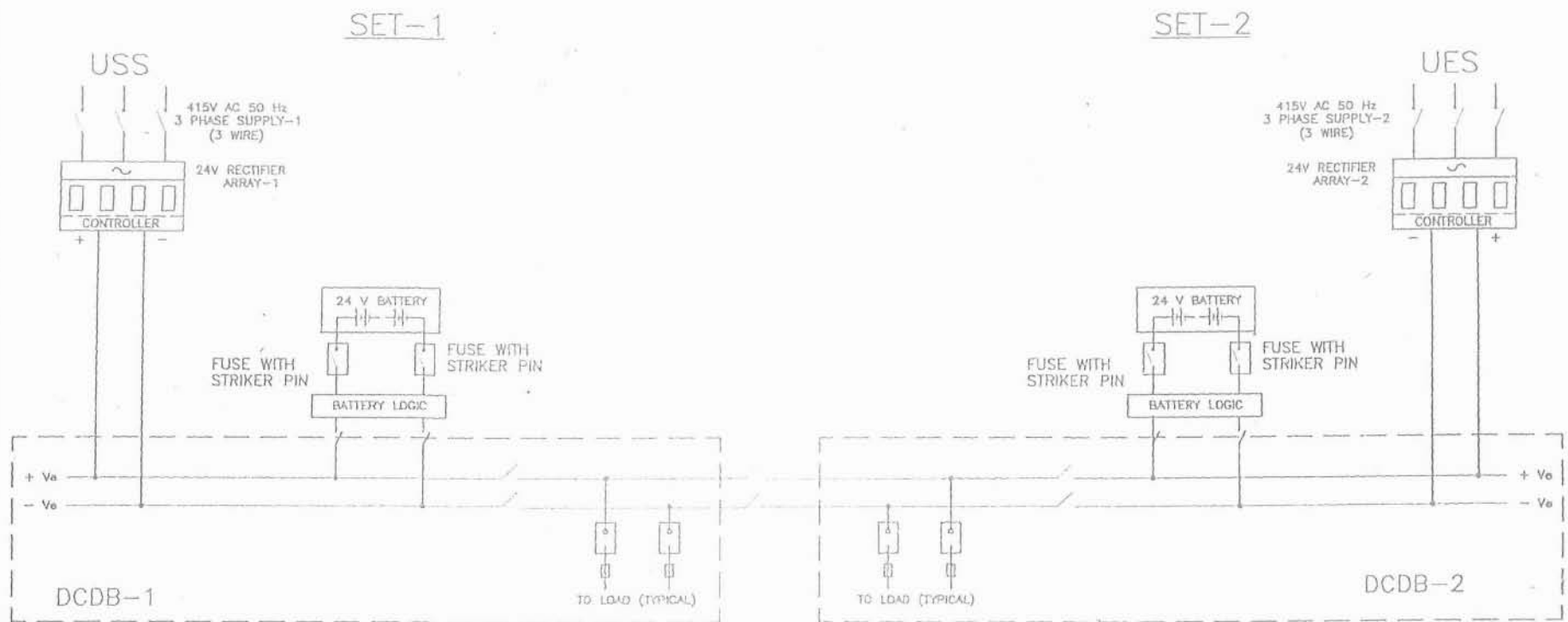
(A GOVT. OF INDIA ENTERPRISE)

PROJECT TYPICAL THERMAL POWER PROJECT
FOR SG-C&I PACKAGE
TITLE SCHEME FOR 24 V DC POWER SUPPLY SYSTEM

A	FIRST ISSUE									28.01.06					
REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD.	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
					CLEARED BY							A3	H.T.S.	0000-405-POI-A-019	A
SH-1 OF 2															

CLEARED BY

SH-1 OF 2



NOTES:-

1. SUITABLE INTERLOCK SYSTEM SHALL BE PROVIDED IN FLOAT/BOOST CHARGING MODE.

TWO SET CONFIGURATION

LEGEND:

- ISOLATOR
- MCB
- FUSE

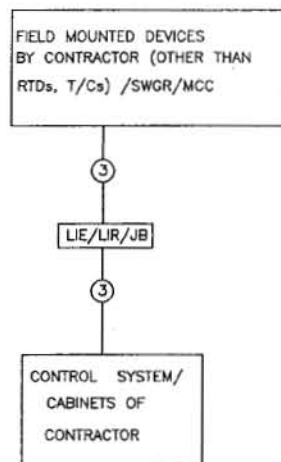
FOR TENDER PURPOSE ONLY

NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

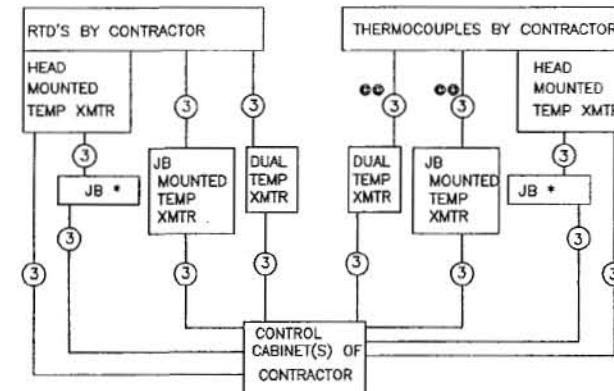
PROJECT: TYPICAL THERMAL POWER PROJECT
FOR DDCMIS OF OFFSITE PLANT
TITLE: SCHEME FOR 24 V DC POWER SUPPLY SYSTEM

A	FIRST ISSUE										28.04.06				
REV.NO.		DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
	DESCRIPTION											A3	N.T.S.	0000-405-POI-A-019	A
					CLEARED BY										

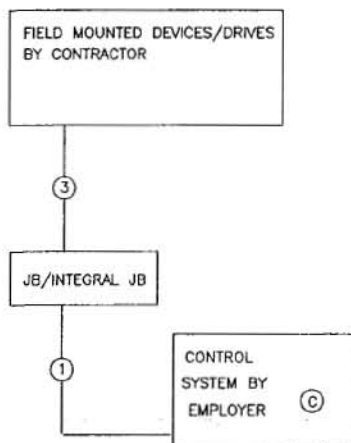
BOTH INSTRUMENTS/DEVICES AND CONTROLS IN CONTRACTOR SCOPE



CONTRACTOR'S RTD & THERMOCOUPLES AND TEMP TRANSMITTERS USED IN CONTRACTOR'S CONTROL SYSTEM



CONTRACTOR'S INSTRUMENTS/DEVICES USED IN EMPLOYER'S CONTROL SYSTEM

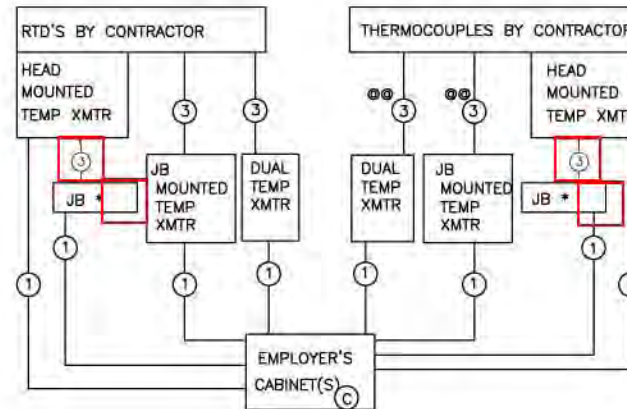


NOTES

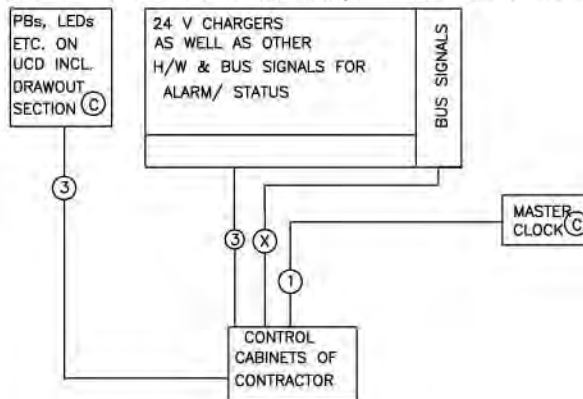
- (C) --- EMPLOYER'S SCOPE
- * --- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- oo- COMPENSATING CABLES
- ← (X) → - SOFT LINKS

A											
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CM	ARCH.	APPD.	DATE
Cleared By											
<div style="display: flex; justify-content: space-between; align-items: center;"> <div> <p>एन टी पी सी</p> <p>NTPC</p> </div> <div> <p>NTPC LIMITED</p> <p>(A GOVERNMENT OF INDIA ENTERPRISE)</p> <p>ENGINEERING DIVISION</p> </div> </div>											
PROJECT											
TYPICAL THERMAL POWER PROJECT											
SG PACKAGE											
TITLE											
INSTRUMENTATION CABLING DIAGRAM											
SIZE	SCALE	DRG. NO.						REV. NO.			
A4	NTS	0000-101/102-POI-A-021						A			
SH 1 OF 4											

CONTRACTOR'S RTD & THERMOCOUPLES AND TEMP TRANSMITTERS USED IN EMPLOYER'S CONTROL SYSTEM



CONTROL DESK MOUNTED DEVICES AND OTHER MISC SIGNALS INCLUDING ALARM/ STATUS SIGNALS ETC.

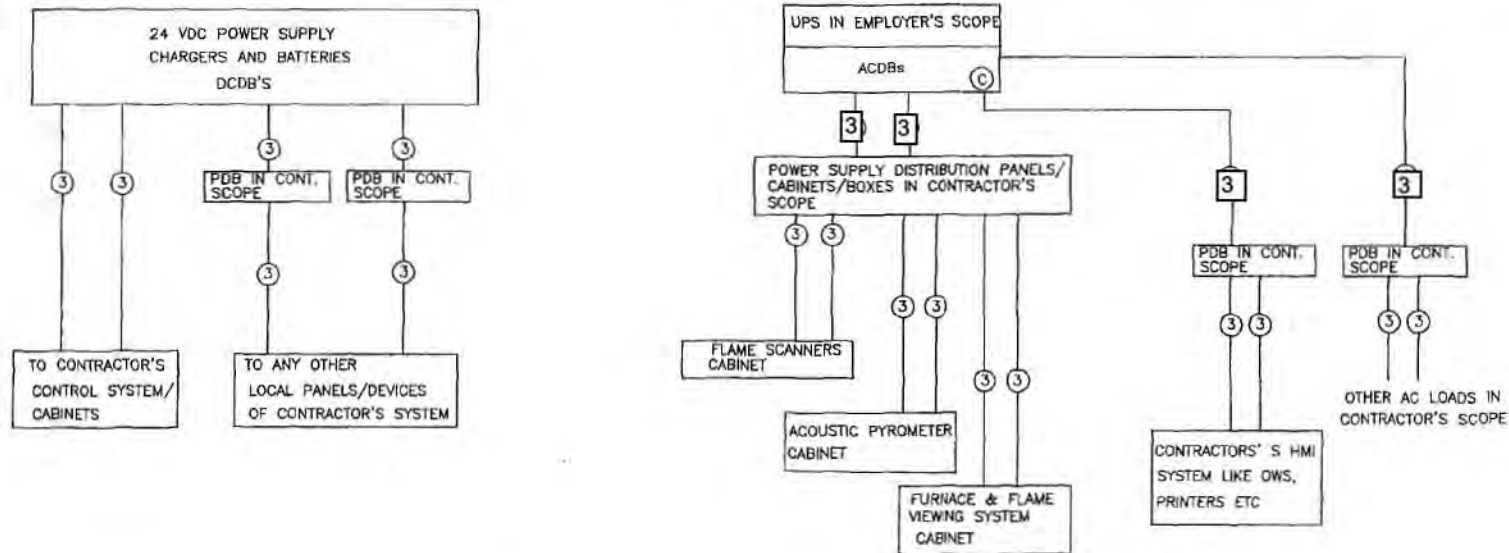


NOTES

- (C) -- EMPLOYER'S SCOPE
- * -- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- 3-3- COMPENSATING CABLES
- ← X → -- SOFT LINKS

A															
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CA	ARCH.	APPD.	DATE				
CLEARED BY															
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TYPICAL THERMAL POWER PROJECT SG PACKAGE INSTRUMENTATION CABLING DIAGRAM															
TITLE															
SIZE A4	SCALE NTS	DRG. NO. 0000-101/102-POI-A-021										REV. NO. A			
SH 2 OF 4															

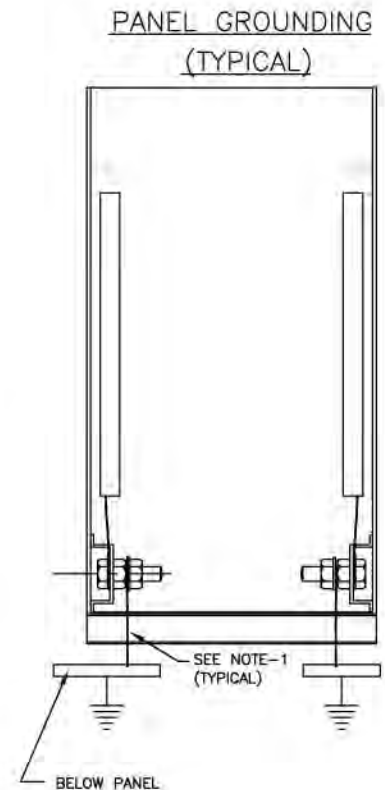
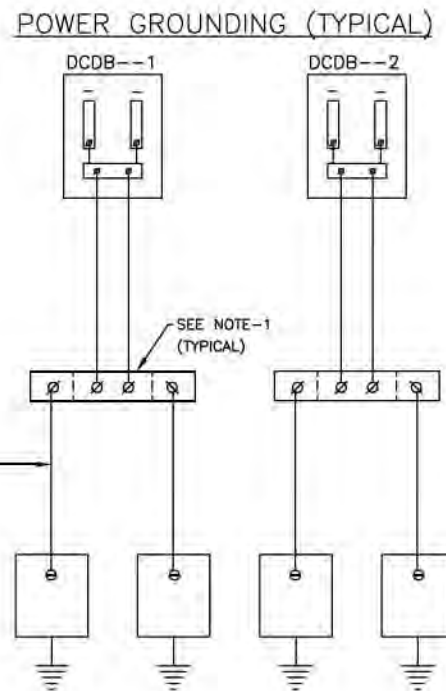
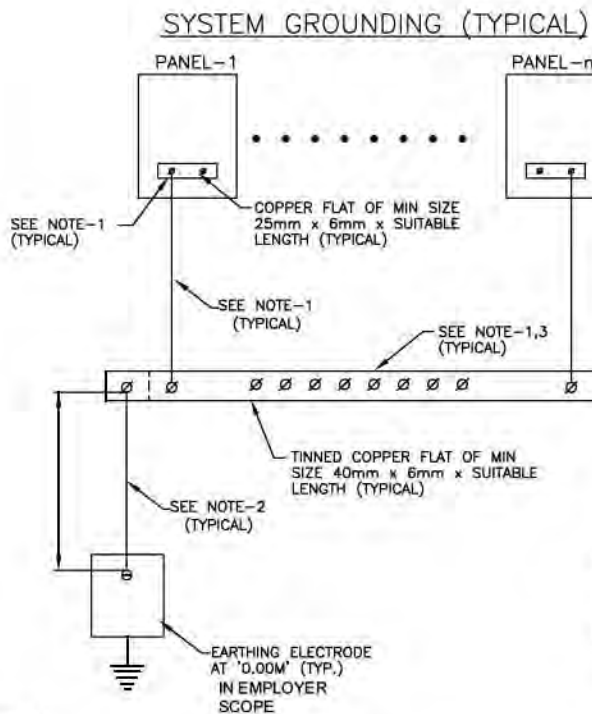
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NOTES

- ③ --- EMPLOYER'S SCOPE
- --- WHEREVER APPLICABLE
- 1- CABLES IN EMPLOYER'S SCOPE
- 3- CABLES IN CONTRACTOR'S SCOPE
- ③③- COMPENSATING CABLES
- ③③③- SOFT LINKS

A																			
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	W	E	C	CM	ARCH.	APPD.	DATE	CLEARED BY							
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TYPICAL THERMAL POWER PROJECT SG PACKAGE INSTRUMENTATION CABLING DIAGRAM																			
SIZE A4	SCALE NTS	DRG. NO. 0000-101/102-POI-A-021										REV. NO. A							
										SH 3 OF 4									



NOTES:-

1. SUPPLY, ERECTION, TERMINATION OF CABLES (OTHER THAN THOSE INDICATED IN EMPLOYER'S SCOPE), FLATS ETC. REQUIRED FOR PROPER GROUNDING OF CONTRACTOR'S CONTROL SYSTEM, SYSTEM CABINETS, POWER SUPPLY CABINETS ETC. ARE IN THE SCOPE OF CONTRACTOR.
2. - CABLE IN CONTRACTOR'S SCOPE
3. TO BE LOCATED IN DCDB.
4. EXACT LOCATION, ARRANGEMENTS OF FLATS ETC. SHALL BE AS FINALISED WITH CONTRACTOR. DURING DETAILED ENGINEERING.
5. CABINET BODY, CABINET BOTTOM PLATE, CABINET DOORS ARE TO BE CONNETED TO PANEL EARTH FLAT COPPER CABLE BY CONTRACTOR.

FOR TENDER PURPOSE ONLY



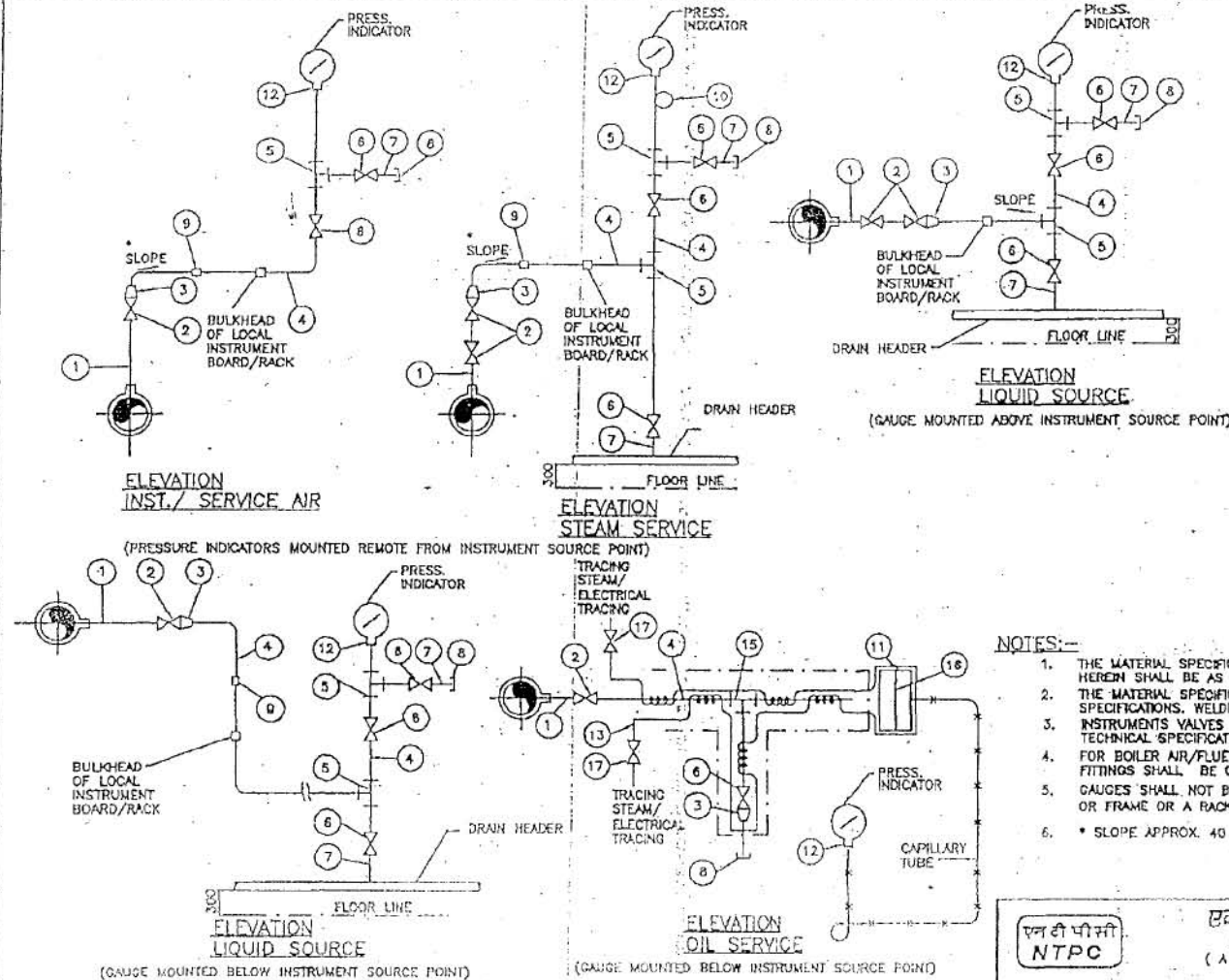
N T P C LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

ENGINEERING DIVISION

												PROJECT TYPICAL THERMAL POWER PROJECT			
												TITLE INSTRUMENTATION CABLING DIAGRAM GROUNDING SCHEME FOR CABINETS/ PANELS			
A															
REV.NO.		DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
	DESCRIPTION				Cleared By							A3	N.T.S.	0000-101/102-POI-A-021	A
SH-4 OF 4															

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LIST OF MATERIALS	
ITEM NO.	DESCRIPTION
1.	1/2" / 3/4" / 1" NPS SCH 40/80/160/XXS/PB1 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE.
2.	1/2"/3/4"/1" SW GLOBE VALVE/GATE VALVE
3.	3/4" / 1" x 1/2" SW REDUCING INSERT
4.	1/2" / 3/4" PIPE
5.	1/2" / 3/4" SW EQUAL TEE.
6.	1/2" / 3/4" SW GLOBE VALVE.
7.	1/2" / 3/4" NPS SW x 1/2" / 3/4" NPT(W) CARBON/ALLOY STEEL NIPPLE.
8.	1/2" / 3/4" NPT(F) CS CAP.
9.	1/2" / 3/4" PIPE UNION.
10.	6" SS SYPHON
11.	1/2" BUND 3000# RF ANSI FLANGE DRILLED AND TAPED FOR 1" NPT PIPE.
12.	SUITABLE ADAPTER.
13.	1/4" CHROME MOLY STEEL TUBE.
14.	
15.	1"3/4" SW EQUAL TEE.
16.	DIAPHRAGM(WAFER ELEMENT)
17.	ISOLATION VALVE 316 SS, 1/4"SW

NOTES:-

1. THE MATERIAL SPECIFICATION AND SCHEDULE NO. OF IMPULSE PIPE & NIPPLE AS LISTED HEREIN SHALL BE AS PER TECHNICAL SPECIFICATIONS.
2. THE MATERIAL SPECIFICATION AND RATING OF FITTINGS AS LISTED SHALL BE AS PER SPECIFICATIONS. WELDED/THREADED FITTINGS SHALL CONFORM TO ANSI-B.16-11.
3. INSTRUMENTS VALVES BODY STEM MATERIAL AND PRESSURE CLASS SHALL BE AS PER TECHNICAL SPECIFICATIONS.
4. FOR BOILER AIR/FLUE GAS SERVICES SOURCE CONNECTIONS IMPULSE PIPING AND ALL FITTINGS SHALL BE OF 3/4" NB SIZE.
5. GAUGES SHALL NOT BE MOUNTED ON THE PIPE. IT WILL BE MOUNTED ON A CHANNEL OR FRAME OR A RACK.
6. * SLOPE APPROX. 40 MM / METRE.

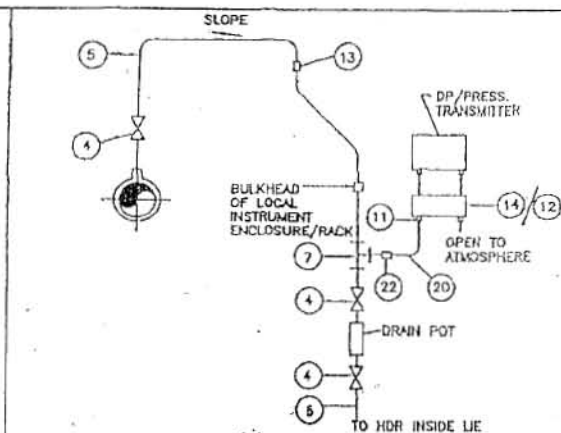
FOR TENDER PURPOSE ONLY

		एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (FOR PRESSURE GAUGE)	
SIZE	SCALE	DRG. NO.	REV. NO.
A3	N.T.S.	0000-101-POI-A-022	A

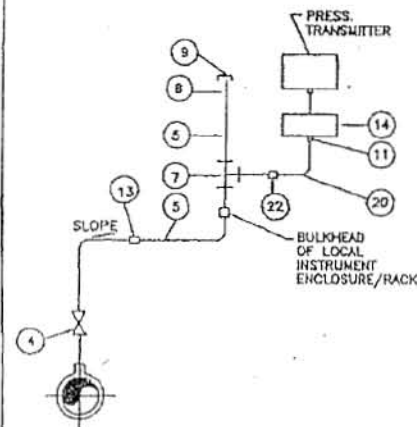
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A	FIRST ISSUE										25.04.06
CLEARED BY											

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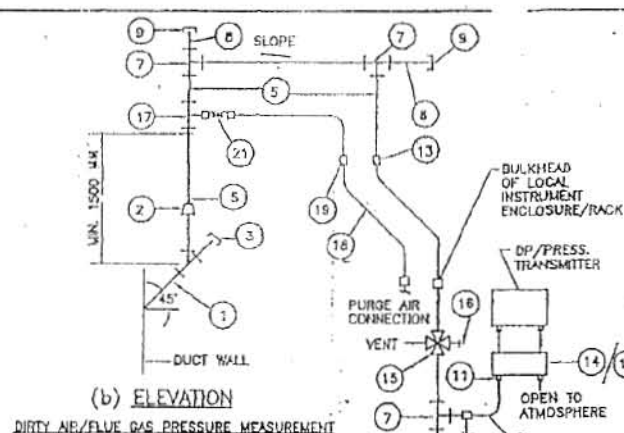
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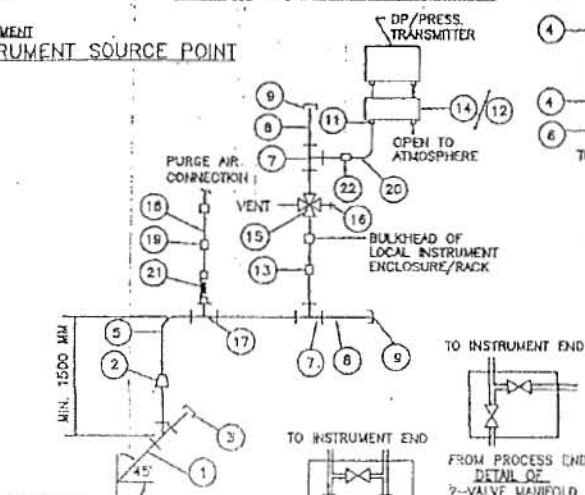
(a) ELEVATION
INST/SERVICE AIR PRESSURE MEASUREMENT
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



(g) ELEVATION
INST/SERVICE AIR PRESSURE MEASUREMENT
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT



(b) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT



(b) ELEVATION
DIRTY AIR/FLUE GAS PRESSURE MEASUREMENT
FROM PROCESS END
DETAIL OF
2-VALVE MANIFOLD

NOTES:-

- SEE NOTES UNDER DRG. NO.0000-101-POI-A-022.
- IMPULSE LINE DRAIN CONNECTIONS SHALL BE DONE AS PER TECHNICAL SPECIFICATIONS
- THE SLOPE IN THE HORIZONTAL OF THE IMPULSE PIPE SHALL BE APPROX. 50 mm/mtr.
- THE EXACT ORIENTATION OF THE TRANSMITTERS WITH RESPECT TO VALVE MANIFOLDS, ETC. WILL BE FINALISED DURING DETAILED ENGINEERING KEEPING IN VIEW THE MANUFACTURER'S RECOMMENDATIONS.
- COMMON INSTRUMENT AIR HEADER (1"NB) USING REDUNDANT AIR FILTER REGULATORS WILL BE MADE IN EACH TRANSMITTER ENCLOSURE REQUIRING PURGE AIR. PURGE AIR FOR EACH INSTRUMENT LINE SHALL BE TAPPED FROM THIS HEADER USING INDIVIDUAL PURGE ROTAMETERS AS SHOWN IN DRG. NO. 0000-101-POI-A-034 TYPICALLY.

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	42 X 405 MM U.S. BLACK PIPE
2.	M42x2 TO 3/4" REDUCING INSERT
3.	M42x2(F) U.S.CAP
4.	3/4" SW GLOBE VALVE/GATE VALVE
5.	3/4" NPS PIPE
6.	3/4" NPS SW 3/4" NPT(M) CS/AS NIPPLE
7.	3/4" SW EQUAL TEE
8.	3/4" NPS SCH 80 CARBON/ALLOY STEEL NIPPLE
9.	3/4" NPT(F) CS/AS CAP
10.	3/4" SW CS/AS EQUAL CROSS
11.	1/2" TUBE ADAPTER
12.	3 VALVE MANIFOLD
13.	3/4" PIPE UNION
14.	2 VALVE MANIFOLD
15.	3/4" SW 4 WAY VALVE
16.	QUICK DISCONNECT FITTING
17.	3/4"SWx1/2"SW BRANCH TEE
18.	1/2" NB SEAMLESS GI PIPE
19.	1/2" NPT (F) GI FITTING
20.	SS TUBE
21.	FLEXIBLE HOSE WITH ONE END SOCKET WELDED (PIPE SIDE) & OTHER END WITH SUITABLE FITTINGS.
22.	3/4" x 1/2" S.S. TUBE UNION

FOR TENDER PURPOSE ONLY

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NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (SG PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM (PRESSURE MEASUREMENT USING PRESS / DP TRANSMITTERS (INST./SERVICE, DIRTY AIR/FLUE GAS))		
SIZE	SCALE	DRG. NO.	REV. NO.
A3	N.T.S.	0000-101-POI-A-023	A

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	DATE
A	FIRST ISSUE									26.04.05
CLEARED BY										

CAD FILE NAME: D:\NORTH\KARANPURA_3x660MW\0000-102-POI-A-023RA.DWG

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TRACING
STEAM/
ELECTRICAL
TRACING

ELEVATION

HORIZONTAL PIPE RUN

TRACING :
STEAM/ :
ELECTRICAL
TRACING :

TRACING
STEAM/
ELECTRICAL
TRACING:

ELEVATION.

VERTICAL PIPE RUN

HEAVY FUEL PRESS. MEASUREMENT USING WAFER TYPE TRANSMITTER WITH REMOTE SEAL

NOTES:-

1. SAME NOTES AS UNDER DRG. NO.0000-101-PDI-A-023.

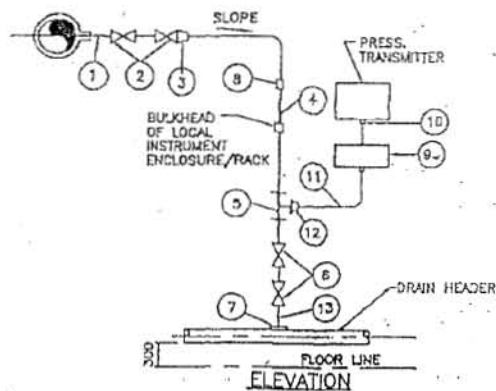
LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	1" NPS SCH 40/80 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE
2.	1" SW GLOBE VALVE
3.	1" x 1/2" SW REDUCING INSERT
4.	1" NPS SCH 40/80 CS PIPE
5.	1" SW EQUAL TEE
6.	1/2" SW GLOBE VALVE
7.	1/2" NPS SCH 40/80 SW x 1/2" NPT (M) CS NIPPLE
8.	1/2" NPT (F) CS CAP.
9.	-
10.	-
11.	1/2" PIPE UNION
12.	-
13.	2 1/2" BLIND 300lb _s RF ANSI FLANGE DRILLED & TAPPED FOR 1" NPT PIPE
14.	2 1/2" MATCHING BLIND FLANGE
15.	WAFFER ELEMENT FOR USE WITH 2 1/2" ANSI RF FLANGE
16.	SPECIAL LIQUID FILLED 300 SS POLYTHENE JACKETED CAPILLARY TUBE OF PRESSURE TRANSMITTER
17.	1/4" CHROME MOLY STEEL PIPE
18.	1/2" NPS SCH. 40/80 CS PIPE
19.	-
20.	-
21.	-
22.	1/4" SW 316 SS ISOLATION VALVE

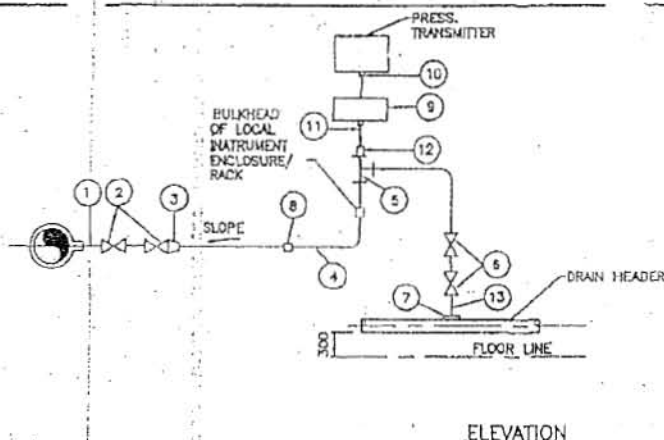
FOR TENDER PURPOSE ONLY.

		<p style="text-align: center;"> एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION </p>	
PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (PRESSURE TRANSMITTER FUEL OIL)	
SIZE	SCALE	DRG. NO.	REV. NO.
A3	N.T.S.	0000-101-POI-A-024	A

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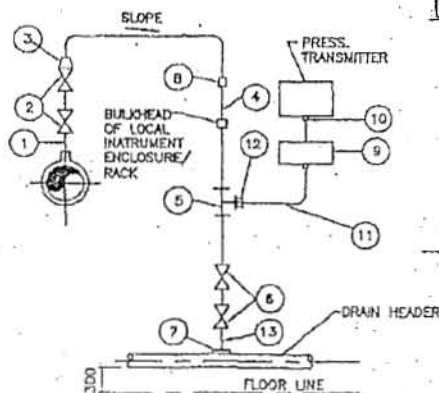


TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

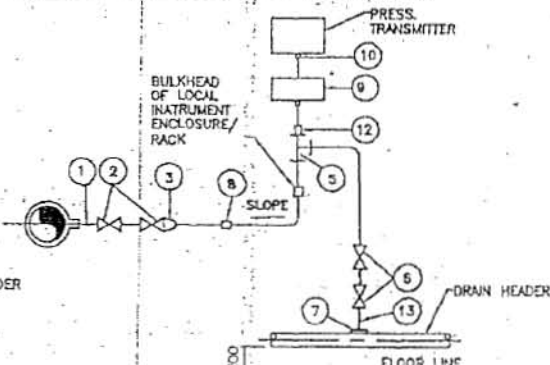


TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT

LIQUID PRESSURE MEASUREMENT

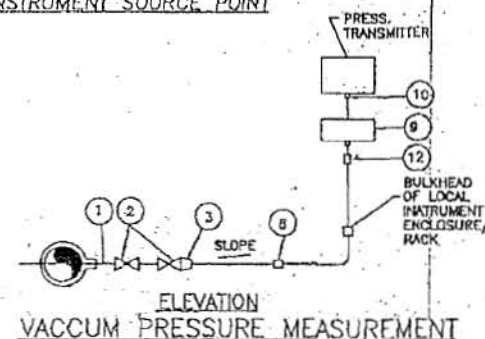


TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT

STEAM PRESSURE MEASUREMENT



VACUUM PRESSURE MEASUREMENT

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-101-POI-A-023.
2. FOR VACUUM APPLICATION OTHER PORT OF TRANSMITTER SHALL BE KEPT OPEN TO ATMOSPHERE.

FOR TENDER PURPOSE ONLY

LIST OF MATERIALS

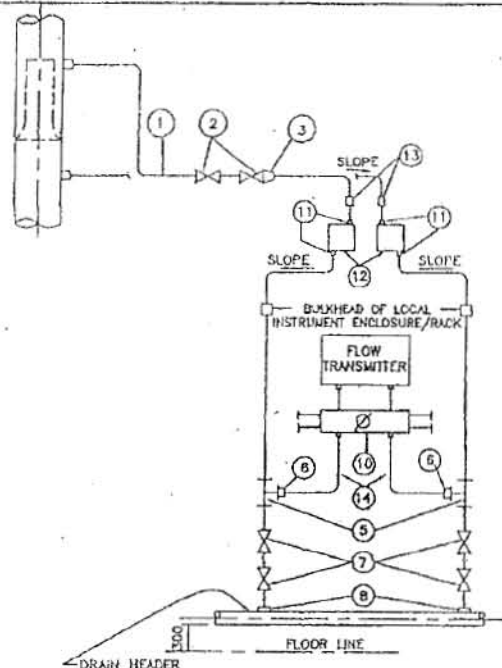
ITEM NO.	DESCRIPTION
1.	1/2" / 3/4" / 1" NPS SCH. 80/160/XKS/PWT NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE
2.	3/4" / 1" SW GLOBE VALVE
3.	3/4" / 1" TO 1/2" REDUCING INSERT
4.	1/2" NPS PIPE
5.	1/2" SW EQUAL TEE
6.	1/2" SW GLOBE VALVE
7.	1/2" NPS SCH. 80/160 SWx1/2" CS/AS COUPLER
8.	1/2" PIPE UNION
9.	2/3 VALVE MANIFOLD (FOR DETAIL SEE DRAWING NO.0000-102-POI-A-023)
10.	SUITABLE ADAPTER
11.	SS TUBE
12.	1/2" PIPE x 1/2" TUBE UNION
13.	1/2" NPS SCH. 80/160 SWx1/2" NPT(M) CS/AS NIPPLE

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<p>PROJECT: TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p>	
<p>TITLE: INSTRUMENT INSTALLATION DIAGRAM (PRESSURE MEASUREMENT USING PRESS /DP TRANSMITTERS STEAM/LIQUID VACUUM)</p>	
<p>SIZE: A3</p>	<p>SCALE: N.T.S.</p>
<p>DRG. NO. 0000-101-POI-A-025</p>	<p>REV. NO. A</p>

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	W	Z	C	C&I	ARCH.	APPD	DATE
A	FIRST ISSUE										26.04.00

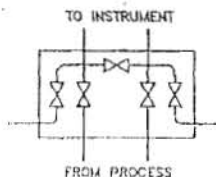
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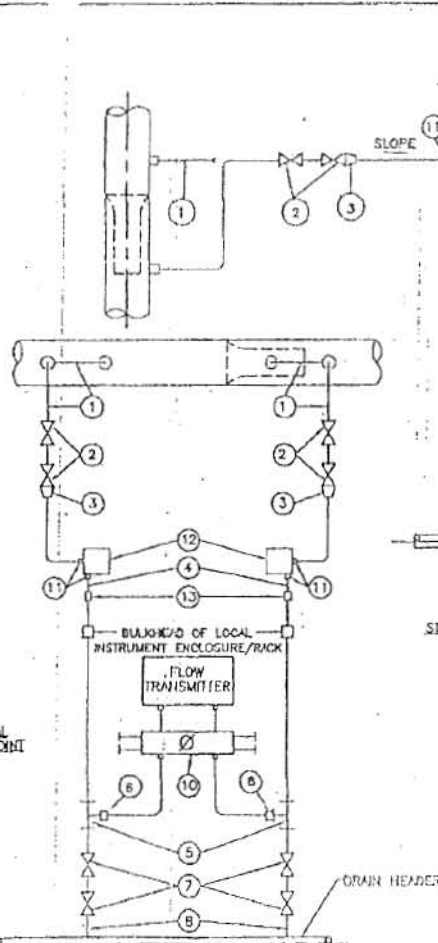


ELEVATION

FEED/ATTEMPERATION WATER FLOW MEASUREMENT IN VERTICAL PIPE-TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

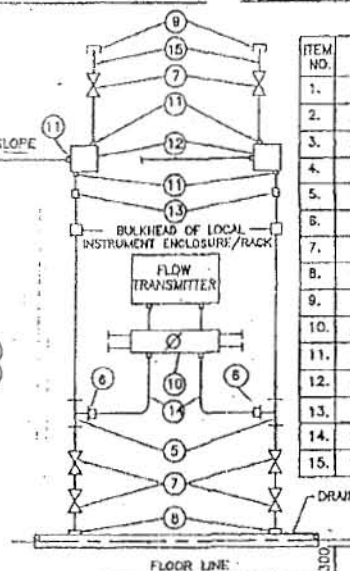


DETAIL OF 5 VALVE MANIFOLD
(ITEM NO. 10)



ELEVATION

FEED/ATTEMPERATION WATER FLOW MEASUREMENT IN HORIZONTAL PIPE-TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT



ELEVATION

STEAM FLOW MEASUREMENT IN VERTICAL PIPES

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	3/4" / 1" NPS SCH. 80/160/XXS/P51 (AS PER PROCESS REQUIREMENT) NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE.
2.	3/4" / 1" SW GLOBE VALVE.
3.	3/4" / 1" TO 1/2" REDUCING INSERT
4.	1/2" NPS PIPE
5.	1/2" SW EQUAL TEE
6.	1/2" PIPE x 1/2" TUBE UNION
7.	1/2" SW GLOBE VALVE.
8.	1/2" NPS SCH. 80/160 SWx1/2" SW CS/AS COUPLER
9.	1/2" NPT (F) CS CAP
10.	5 VALVE MANIFOLD
11.	SUITABLE ADAPTER
12.	CONDENSATE POT (RESERVOIR)
13.	1/2" PIPE UNION
14.	SS TUBE
15.	1/2" NPS SCH. 80/160 SWx1/2" NPT (M) CS/AS NIPPLE

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-101-POI-A-023.
2. CONDENSATE POTS SHALL BE PROVIDED FOR ALL STEAM SERVICES.
3. FOR WATER SERVICES CONDENSATE POTS SHALL BE PROVIDED ONLY IN THOSE CASES WHERE TEMP. > 120°C

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ENGINEERING DIVISION

PROJECT TYPICAL THERMAL POWER PROJECT
(SG PACKAGE)

TITLE INSTRUMENT INSTALLATION DIAGRAM
FLOW MEASUREMENT (USING FLOW NOZZLES)
STEAM & FEEDWATER

REV. NO. A FIRST ISSUE

DESCRIPTION

DRAWN/DESIGN CHKD.

M E C C.M ARCH.

CLEARED BY

APPRO. DATE 25.04.06

SIZE

A3

SCALE

N.T.S.

DRG. NO.

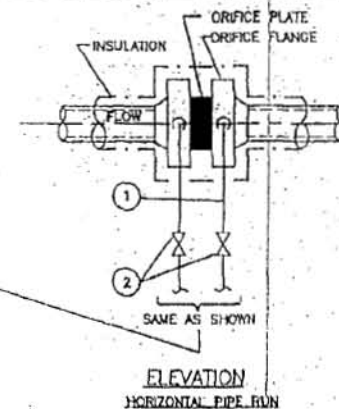
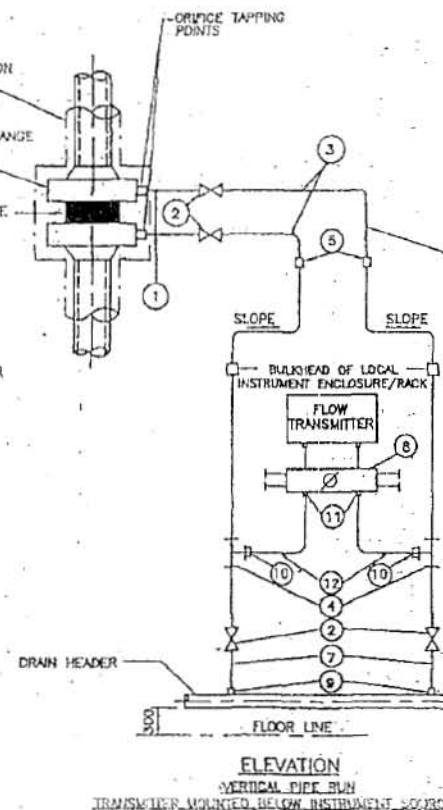
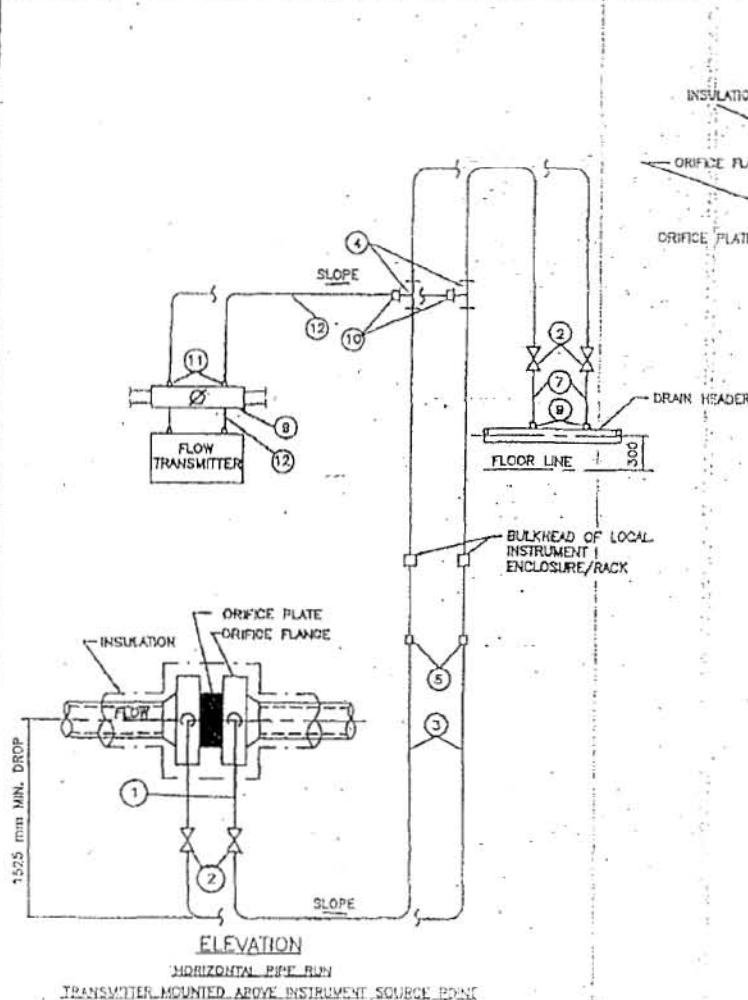
0000-101-POI-A-026

REV. NO.

A

CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-026A.DWG

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ITEM NO.	DESCRIPTION
1.	1/2" NPS SCH. 80 NIPPLE OF MATERIAL SAME AS THAT OF MAIN PIPE WITH NECESSARY ATTACHMENT TO FLANGE OF ORIFICE
2.	1/2" SW GLOBE VALVE
3.	1/2" NPS PIPE
4.	1/2" SW EQUAL TEE
5.	1/2" PIPE UNION
6.	-
7.	1/2" NPS SCH. 80 SW 1/2" NPT (M) S.S. NIPPLE
8.	5 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO. 0000-102-POI-A-026
9.	1/2" T SW HALF COUPLER CS
10.	1/2" PIPE x 1/2" TUBE UNION
11.	SUITABLE ADAPTER
12.	SS TUBE

NOTES:-
1. SAME NOTES AS UNDER DRG. NO. 0000-101-POI-A-023.

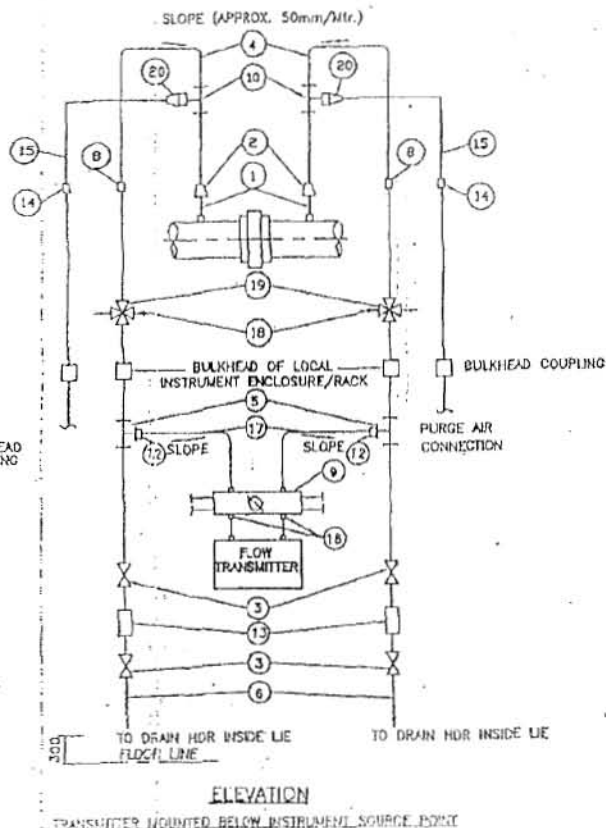
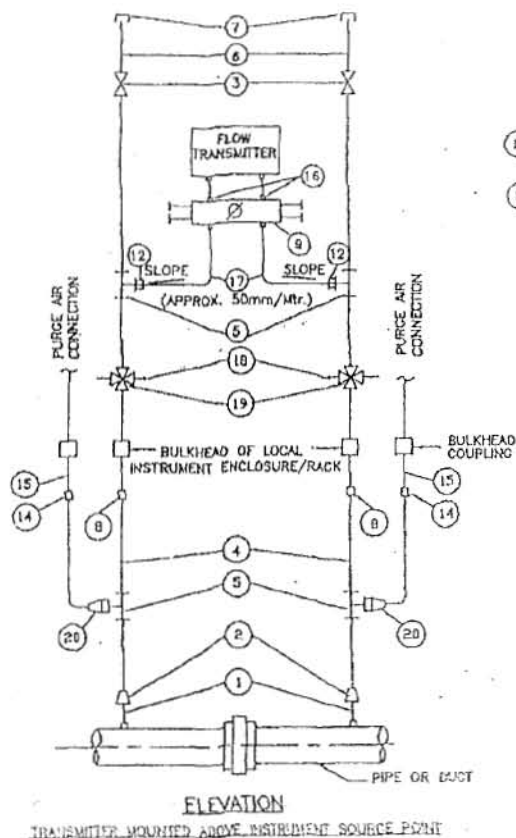
FOR TENDER PURPOSE ONLY

<p>एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION</p>	
<p>PROJECT: TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p>	
<p>TITLE: INSTRUMENT INSTALLATION DIAGRAM FLOW MEASUREMENT (USING ORIFICE PLATES) CONDENSATE & SERVICE WATER</p>	
<p>REV. NO. A</p>	<p>DATE: 28.04.06</p>
<p>SIZE: A3</p>	<p>SCALE: N.T.S.</p>
<p>DRG. NO. 0000-101-POI-A-027</p>	<p>REV. NO. A</p>

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CAD	ARCH.	PD	DATE
A	FIRST ISSUE										28.04.06

CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-027\RA.DWG

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LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	42x4.05mm M.S. BLACK PIPE.
2.	M 42x2 TO 3/4"SW REDUCING INSERT.
3.	3/4" SW GLOBE VALVE.
4.	3/4" PIPE.
5.	3/4" SW EQUAL TEE.
6.	3/4" SCH. 80 SWx3/4" NPT (M) CS/AS NIPPLE
7.	3/4" NPT (F) CS CAP.
8.	3/4" PIPE UNION.
9.	5 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO.0000-102-POI-A-026.
10.	3/4" SW EQUAL TEE.
11.	3/4" SW GATE VALVE.
12.	3/4" PIPE x 1/2" TUBE UNION
13.	DRAIN POT OF CS.
14.	1/2" GI FITTING
15.	1/2" NB GI PIPE
16.	SUITABLE ADAPTER
17.	SS TUBE
18.	QUICK DISCONNECT FITTINGS.
19.	3/4" SW 4 WAY VALVE.
20.	3/4" x 1/2" REDUCER.

NOTES:-

1. SAME NOTES AS UNDER DRG. NO. 0000-101-POI-A-023.

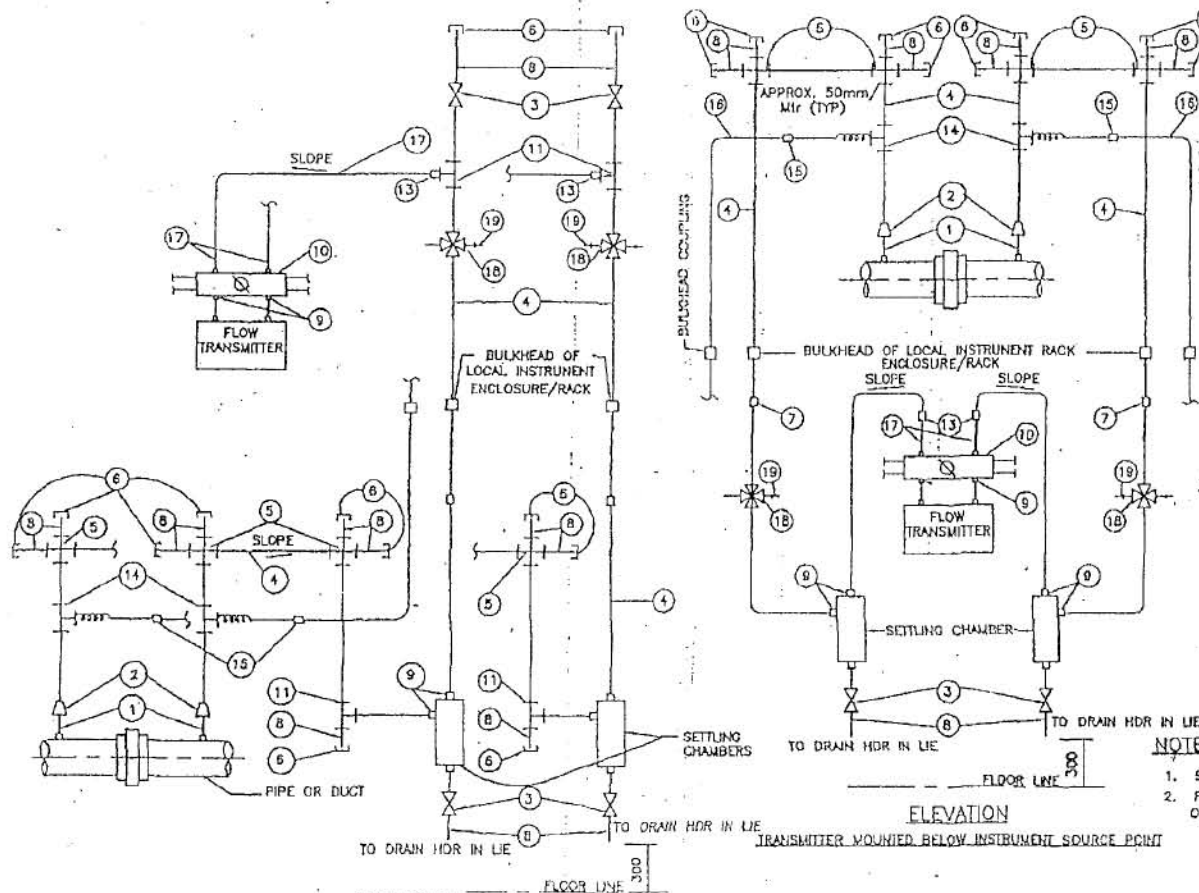
FOR TENDER PURPOSE ONLY

DIRTY AIR/FLUE GAS FLOW MEASUREMENT USING HEAD TYPE PRIMARY ELEMENT

<p>एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION</p>	
<p>PROJECT TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p>	
<p>TITLE INSTRUMENT INSTALLATION DIAGRAM (FLOW MEASUREMENT AIR/GAS)</p>	
<p>REV. NO. A</p>	<p>DESCRIPTION</p>
<p>DRAWN DESIGN CHKD.</p>	<p>APPROD DATE</p>
<p>SIZE A3</p>	<p>SCALE N.T.S.</p>
<p>DRG. NO. 0000-101-POI-A-028</p>	<p>REV. NO. A</p>

CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-027RA.DWG

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LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	42x4.05mm M.S. BLACK PIPE.
2.	M 42x2 TO 3/4" SW REDUCING INSERT.
3.	3/4" SW GLOBE VALVE.
4.	3/4" NPS PIPE.
5.	3/4" SW EQUAL CROSS.
6.	3/4" NPT (F) CS/AS CAP.
7.	3/4" PIPE UNION.
8.	3/4" NPS SWx3/4" NPT (M) CS/AS NIPPLE
9.	SUITABLE ADAPTER
10.	6 VALVE MANIFOLD FOR DETAIL REFER DRAWING NO.0000-102-POI-A-029.
11.	3/4" SW EQUAL TEE.
12.	3/4" SW GATE VALVE.
13.	3/4" PIPE x 1/2" TUBE UNION
14.	3/4" SW x 1/2" SW BRANCH TEE.
15.	1/2" GI FITTING
16.	1/2" NB GI PIPE.
17.	SS TUBE
18.	3/4" SW 4 WAY VALVE.
19.	QUICK DISCONNECT FITTINGS.

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-101-POI-A-023.
2. FOR VACUUM APPLICATION OTHER PORT OF TRANSMITTER SHALL BE KEPT OPEN TO ATMOSPHERE.

FOR TENDER PURPOSE ONLY

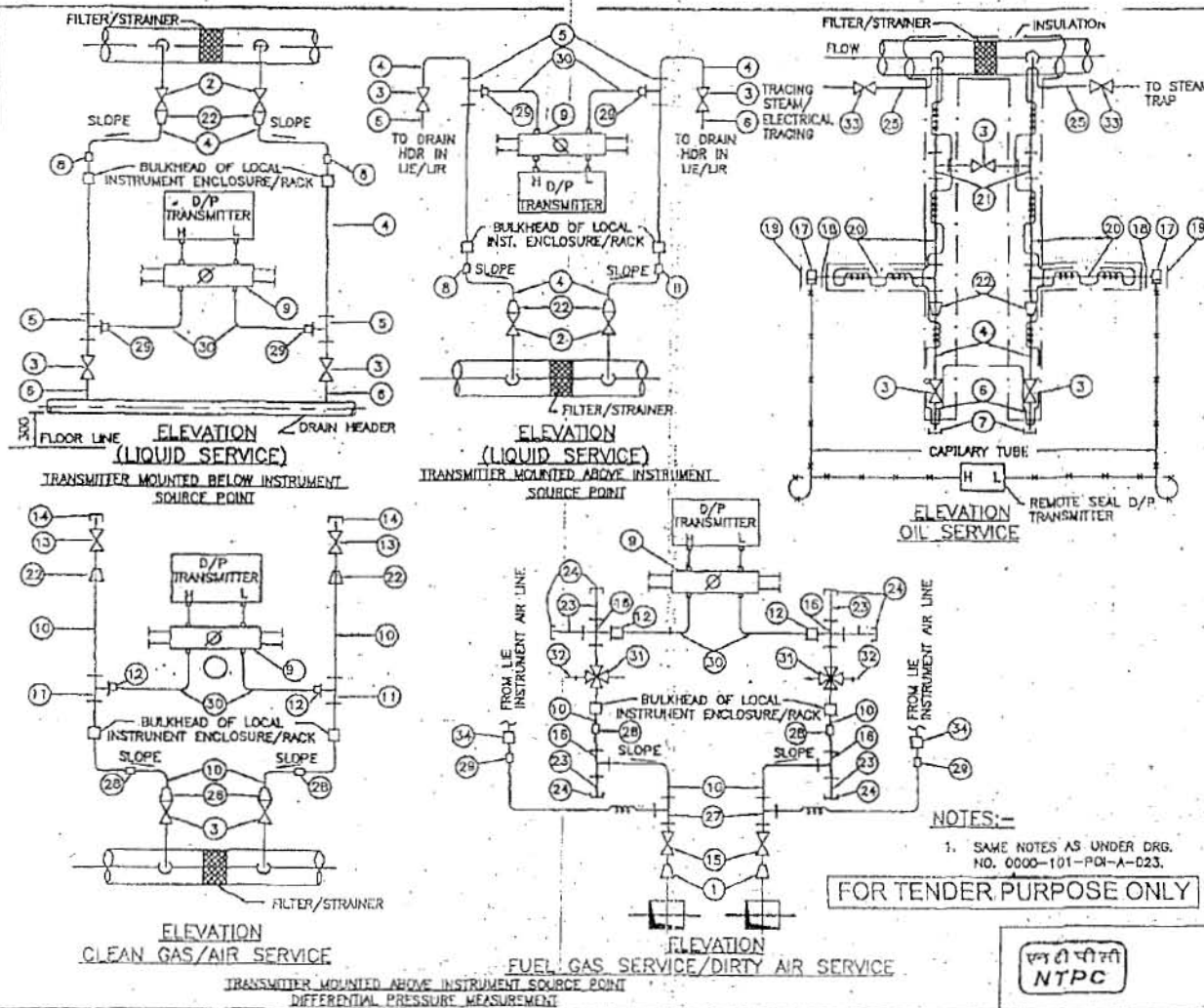
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT
DIRTY AIR/FLUE GAS FLOW MEASUREMENT USING HEAD TYPE PRIMARY ELEMENT

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHECKD.	W	E	C	CAI	ARCH.	DATE
A	FIRST ISSUE									26.04.06

<p>एन टी पी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION</p>	
<p>PROJECT: TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p>	
<p>TITLE: INSTRUMENT INSTALLATION DIAGRAM (FLOW MEASUREMENT DIRTY AIR/ FLUE GAS)</p>	
<p>SIZE: A3</p>	<p>SCALE: N.T.S.</p>
<p>DRG. NO. 0000-101-POI-A-029</p>	<p>REV. NO. A</p>

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NOTES:-

1. SAME NOTES AS UNDER DRG. NO. 0000-101-POI-A-023.

FOR TENDER PURPOSE ONLY

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	42x2 TO 3/4" SW REDUCING INSERT.
2.	3/4" SW GLOBE VALVE.
3.	1/2" SW GLOBE VALVE FOR LIQUID APPLICATION & 3/4"/1" IN GAS/AIR APPLICATION
4.	1/2" NPS 40/80/180 (AS PER PROCESS REQUIREMENT) CARBON/ALLOY STEEL PIPE.
5.	1/2" SW EQUAL TEE.
6.	1/2" NPS SW x 1/2" NPT (W) CS NIPPLE.
7.	1/2" NPT (F) CS CAP.
8.	1/2" PIPE x 1/2" PIPE UNION.
9.	5 VALVE MANIFOLD (FOR DETAIL REFER. DRAWING NO.0000-102-POI-A-028).
10.	3/4" SCH 80 CARBON/ALLOY STEEL PIPE.
11.	3/4"/1/2" SW EQUAL TEE.
12.	3/4"x1/2" TUBE UNION.
13.	1/2" SCREWED GLOBE VALVE.
14.	1/2" NPT (W) PLUG.
15.	3/4" SW GATE VALVE.
16.	3/4" SW EQUAL CROSS.
17.	WAFER ELEMENT FOR USE WITH 3" ANSI R.F. VALVE.
18.	3" BLIND 300LBS R.F. WELD NECK FLANGE DRILLED FOR 1" SCH. 40/80 PIPE
19.	3" BLIND FLANGE.
20.	1" NPS SCH. 40/80 (AS PER PROCESS REQUIREMENT) CS PIPE.
21.	1" SW EQUAL TEE.
22.	3/4" x 1/2" SW REDUCING INSERT.
23.	3/4" SW x 3/4" NPT (W) CS/AS NIPPLE
24.	3/4" NPT (F) CS/AS CAP.
25.	1/4" NPS ALLOY STEEL PIPE.
26.	1" x 3/4" SW REDUCING INSERT.
27.	3/4" SW x 1/2" PSW BRANCH TEE.
28.	3/4" PIPE UNION
29.	1/2" CLAMP UNION (THREADED) SUITABLE FOR FLEXIBLE CONNECTION OF NYLON REINFORCED PVC TUBE.
30.	SS TUBE
31.	3/4" SW 4 WAY VALVE.
32.	QUICK DISCONNECT FITTINGS.
33.	1/4" SW ISOLATION VALVE 316SS
34.	1/2" x 1/2" SS PIPE UNION.

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NTPC LIMITED

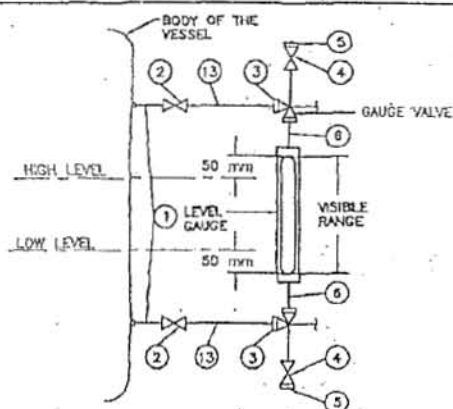
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (SG PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM DIFF. PRESS. MEASUREMENT (LIQUID, OIL, AIR/GAS SERVICE)		
DATE	28.04.06	SIZE	A3
SCALE	N.T.S.	DRG. NO.	0000-101-POI-A-030
REV. NO.	A		

A	FIRST ISSUE	DRAWN	DESIGN	CHKD.	M	E	G	C&I	ARCH.	APPD
REV. NO.	DESCRIPTION	CLEARED BY								

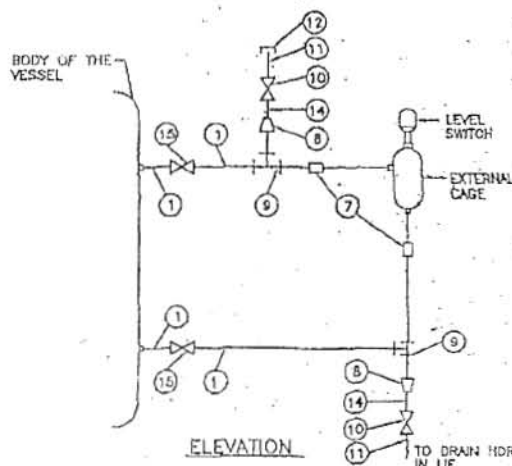
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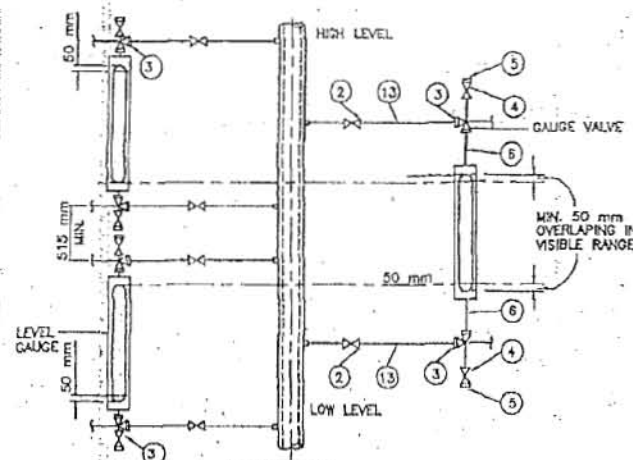
ELEVATION

LOCAL LEVEL INDICATION USING GAUGE GLASS



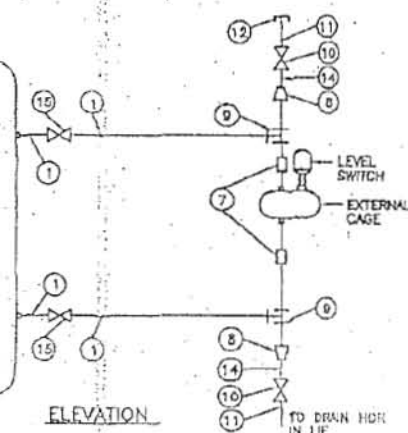
ELEVATION

FLOAT OR DISPLACER OPERATED EXTERNAL CAGE TYPE LEVEL SWITCH INSTALLATION



ELEVATION

LOCAL LEVEL INDICATION USING MULTIPLE GAUGES FOR INCREASED RANGE NOT COVERED IN A SINGLE UNIT



ELEVATION

NOTES:-

1. FOR LEVEL GAUGE 3/4" AND FOR LEVEL SWITCH 1" PROCESS CONNECTION SHALL BE PROVIDED.
2. NOTES UNDER DRG. NO. 0000-101-POI-A-023 (WHICHEVER ARE RELEVANT).

LIST OF MATERIALS

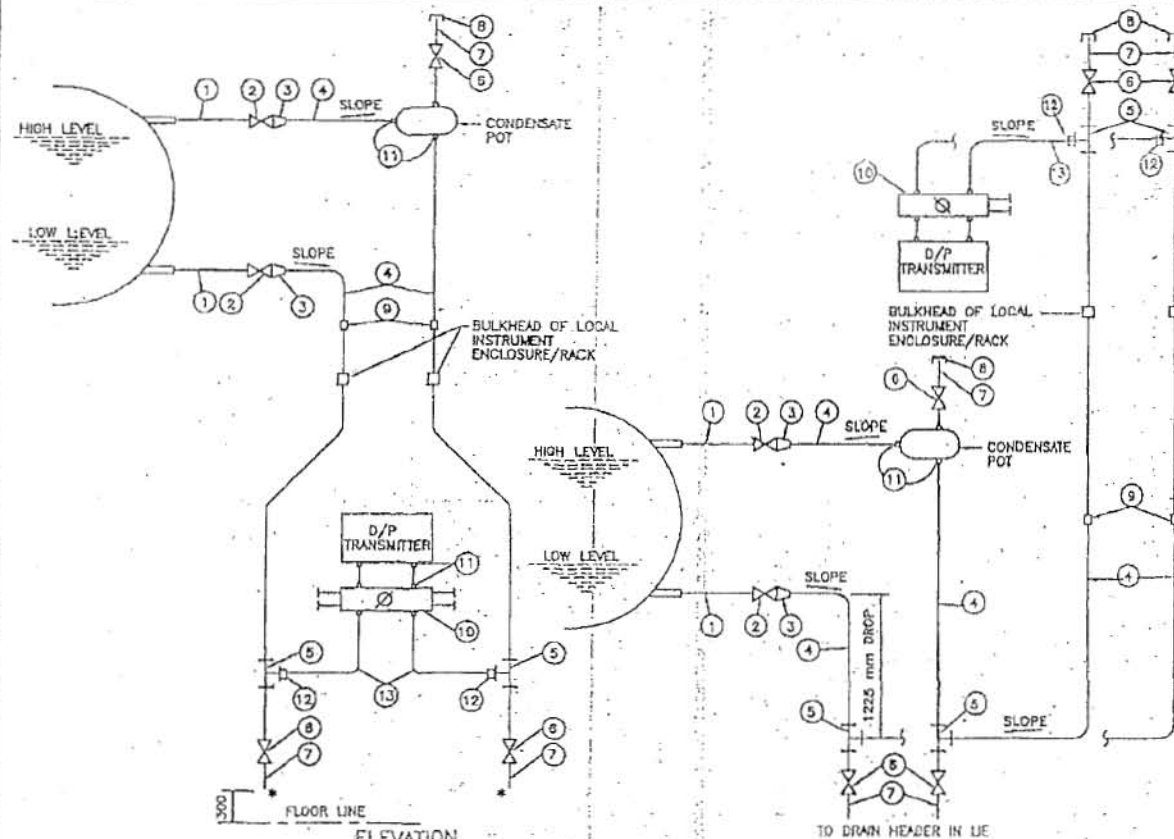
ITEM NO.	DESCRIPTION
1.	3/4" x 1" NPS SCH.40/80/160/PB1 (AS PER PROCESS REQUIREMENT) CARBON/ALLOY STEEL PIPE.
2.	3/4" SW GLOBE VALVE.
3.	3/4" SW UNION.
4.	3/4" NPT GLOBE VALVE.
5.	3/4" NPT (M) CAP.
6.	3/4" NPT (F) UNION CONNECTION.
7.	1" SW EQUAL UNION.
8.	1" x 1/2" SW REDUCING INSERT.
9.	1" SW EQUAL TEE.
10.	1/2" SW GLOBE VALVE.
11.	1/2" NPS SW x 1/2" NPT (M) CS/AS NIPPLE.
12.	1/2" NPT (F) CS CAP.
13.	3/4" x 1/2" NPS SCH.40/80 CS/AS PIPE.
14.	1/2" NPS SCH.80/160 CS/AS NIPPLE.
15.	1" SW GLOBE VALVE.

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PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT INSTALLATION DIAGRAM (LEVEL GAUGE & SWITCHES)	
REV. NO.	DESCRIPTION	DATE	25.04.06
A	FIRST ISSUE	SIZE	A3
		SCALE	N.T.S.
		DRG. NO.	0000-101-POI-A-031
		REV. NO.	A

CAD FILE NAME: D:\NORTH_KARANPURA_3x660MW\0000-102-POI-A-031A.DWG

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ELEVATION
TRANSMITTER MOUNTED BELOW INSTRUMENT SOURCE POINT

ELEVATION
TRANSMITTER MOUNTED ABOVE INSTRUMENT SOURCE POINT

LEVEL MEASUREMENT OF CLEAR NON-VISCOUS OR NON-CORROSIVE LIQUID IN CLOSED VESSEL
WITH CONDENSABLE ATMOSPHERE USING D/P TRANSMITTER

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	1" NPS SCH.40/80/160/XXS/PP1 (AS PER PROCESS REQUIREMENT) CARBON /ALLOY STEEL PIPE.
2.	1" SW GLOBE VALVE.
3.	3/4"/1" TO 1/2" REDUCING INSERT.
4.	1/2" NPS SCH.80/160/XXS(AS PER PROCESS REQ.)CS/AS PIPE.
5.	1/2" SW EQUAL TEE.
6.	1/2" SW GLOBE VALVE.
7.	1/2" NPS SWx1/2" NPT(M) CS/AS NIPPLE.
8.	1/2" NPT. (F) CS CAP.
9.	1/2" PIPE UNION.
10.	5-VALVE MANIFOLD (FOR DETAILS REF. DRG. NO.0000-102-POI-A-026.
11.	SUITABLE ADAPTER.
12.	1/2" PIPE x 1/2" TUBE UNION.
13.	S.S. TUBE.

NOTES:-

1. SAME NOTES AS UNDER DRG. NO.0000-101-POI-A-023. (WHICHEVER ARE RELEVANT).
- * TO DRAIN HEADER IN LIE/UR.

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PROJECT	TYPICAL THERMAL POWER PROJECT (SG PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM (LEVEL MEASUREMENT USING D/P TRANSMITTERS)		
SIZE	AS	SCALE	N.T.S.
DRG. NO.	0000-101-POI-A-032		REV. NO. A
DATE	25.04.06	SH	1 OF 2

REV. NO.	A	FIRST ISSUE	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD.	DATE	25.04.06
DESCRIPTION												Cleared By	

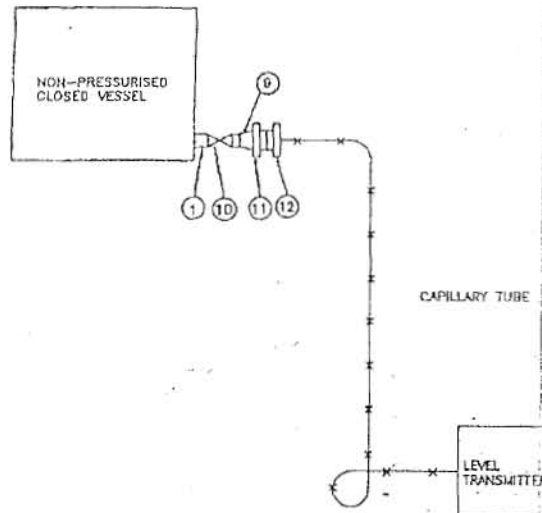
CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-032SH1A.DWG

Diagram illustrating a liquid level control system for a vessel. The system includes a vessel body, a vertical column, and a displacer-type level transmitter.

Key components and connections:

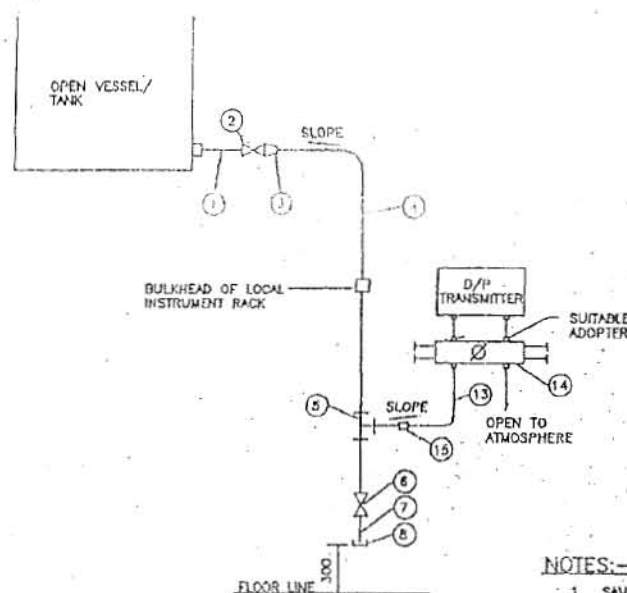
- Body of the Vessel:** The main storage tank on the left.
- Vertical Column:** A narrow vertical vessel connected to the main body.
- Displacer Type Level Transmitter (21):** A device mounted on the column to measure liquid level. It includes a displacer (18) and a transmitter (19).
- Control System (24):** Receives signals from the transmitter and controls the valves (15) and pumps (16).
- Flow Indicators (16):** Indicate the direction of flow in the lines connecting the vessel to the column.
- Valves (15):** Control the flow of liquid between the vessel and the column.
- Nozzles (22):** Located at different heights on the column, likely for sampling or measurement.

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ELEVATION

LEVEL MEASUREMENT OF VISCOUS OR CORROSIVE LIQUID
IN CLOSED VESSEL USING FLUSH DIAPHRAGM/WAFER TYPE
LEVEL TRANSMITTER WITH REMOTE SEAL



ELEVATION

LEVEL MEASUREMENT OF CLEAN LIQUID IN AN OPEN VESSEL
USING D/P TRANSMITTER

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	3/4" / 1" NPS 40/80 CARBON STEEL PIPE.
2.	3/4" SW GLOBE VALVE.
3.	3/4" / 1/2" SW REDUCING INSERT.
4.	1/2" NPS SCHL 40/80 CS PIPE.
5.	1/2" SW EQUAL TEE.
6.	1/2" SW GLOBE VALVE.
7.	1/2" NPS SW 1/2" NPT(M) CS NIPPLE.
8.	1/2" NPT (F) CS CAP.
9.	3/4" TO 4" EXPANDER.
10.	3/4" BUTT WELDED GATE VALVE.
11.	4" ANSI 300 B.S. R.F. WELD NECK FLANGE.
12.	1" ANSI MATCHING FLANGE WITH FLUSH DIAPHRAGM OF LEVEL TRANSMITTER.
13.	SS TUBE.
14.	3-WAY MANIFOLD (FOR DETAIL REF. DRG. NO. 0000-102-POI-A-023).
15.	1/2" PIPE x 1/2" TUBE UNION.

NOTES:-

1. SAME NOTES UNDER DRG. NO. 0000-101-POI-A-023.
2. FOR VACUUM APPLICATION OTHER PORT OF TRANSMITTER SHALL BE KEPT OPEN TO ATMOSPHERE.

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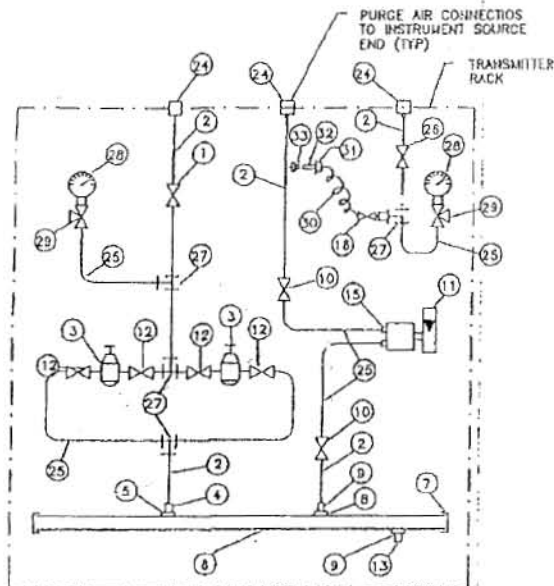
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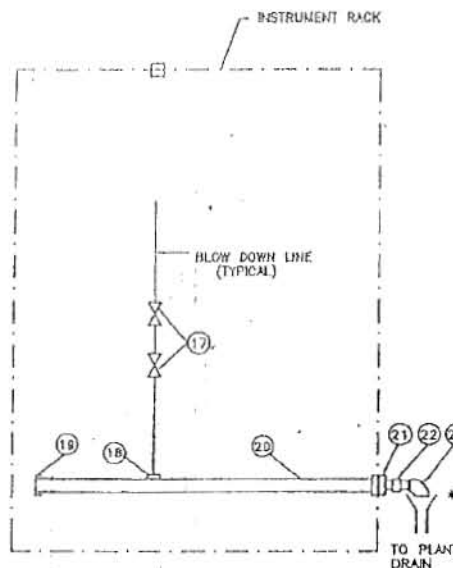
PROJECT	TYPICAL THERMAL POWER PROJECT (SG PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM (LEVEL MEASUREMENT-OPEN VESSEL)		
REV. NO.	A	DATE	28.04.06
DESCRIPTION	FIRST ISSUE		
DRAWN	DESIGN	CHKD.	
M	E	C	C&I
ARCH.	APPD	DATE	28.04.06
CLEARED BY	SIZE	SCALE	DRG. NO.
	A3	N.T.S.	0000-101-POI-A-033
			REV. NO. A

CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-033R.DWG

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TYPICAL PURGE AIR CONNECTION INSIDE THE INST. ENCLOSURE
(APPLICABLE FOR AIR & FLUE GAS SERVICE INSTRUMENTS REQUIRING PURGE AIR)



TYPICAL BLOW DOWN HEADER CONNECTION INSIDE THE INSTRUMENT RACK/ENCLOSURE

NOTE:-

- * 1. DRAIN SHALL BE CONNECTED BY THE BIDDER TO THE NEAREST PLANT DRAIN THROUGH OPEN FUNNEL (1/2").
- **2. FOR AIR/FLUE GAS LIE: FOR DRAINING THE IMPULSE LINE BETWEEN ITEM 17 DRAIN POT TO BE PROVIDED ALONGWITH DRAIN HEADER, 3/4" SW HALF COUPLER, ITEM 19, 20, 22, 23 & FUNNEL ALONGWITH 1/2" PIPING TO PLANT DRAIN HEADER SHALL BE PROVIDED FOR STM/WATER. ALL ITEMS EXCEPT DRAIN POT TO BE PROVIDED.
3. GI PIPES SHALL BE PROVIDED FOR PURGE AIR CONNECTION OUTSIDE LIE/LIR.

LIST OF MATERIALS

ITEM NO.	DESCRIPTION
1.	ISOLATION VALVE(gate/globe), SS.
2.	1/2" O.D. SEAMLESS SS PIPE.
3.	1/2" NPT (F) AIR FILTER REGULATOR.
4.	1/2" NPT x 1/2" O.D. (M) CONNECTOR SS.
5.	1/2" NPT (F) COUPLER SS.
6.	1" NB INST. AIR HEADER SS.
7.	1" PSB END CAP SS.
8.	1/2" NPT (F) COUPLER SS.
9.	1/2" NPT x 1/2" O.D. (M) CONNECTOR SS.
10.	1/2" COMP. NEEDLE VALVE SS.
11.	1/2" NPT (F) AIR PURGE SET.
12.	1/2" NPT (M) x 1/2" COMP VALVE SS.
13.	1/2" NPT PLUG SS.
14.	
15.	1/2" TUBE SS CONNECTOR.
16.	1/2" TUBE COMP. EQUAL TEE UNION.
17.	DRAIN VALVE 1/2" SW FOR WTR/STM/COND & 3/4" FOR AIR/FLUE GAS.
18.	1/2" SW HALF COUPLER
19.	2" SW CAP SS.
20.	2" NB ASTM 105 GR. B SCH80 BLOWDOWN HEADER
21.	2" PSW x 1" NPT (F) COUPLING.
22.	1" NPT x 1" BSP HEX NIPPLE.
23.	1" BSP ELBOW.
24.	BULKHEAD-SS 1/2" SWx1/2" NB THREADED, SUITABLE FOR GI PIPE CONNECTION
25.	1/2" O.D. SEAMLESS TUBE SS.
26.	1/2" SW PRESS. GAUGE ISOLATION VALVE SS.
27.	1/2" TUBE x 1/2" NPT (F) BRANCH TEE SS.
28.	4" DIA. x 1/2" NPT PR. GAUGE.
29.	1/2" SW x 1/2" NPT (F) PR. GAUGE VALVE SS.
30.	1/2" I.D. NYLON FLEX. HOSE BRAIDED WITH SS WIRE.
31.	1/2" NPT (M) x 1/2" HOSE BARBED CONN. SS.
32.	1/2" NPT (F) QUICK DISCONNECT SS.
33.	1/2" NPT (M) QUICKDISCONNECT SS.

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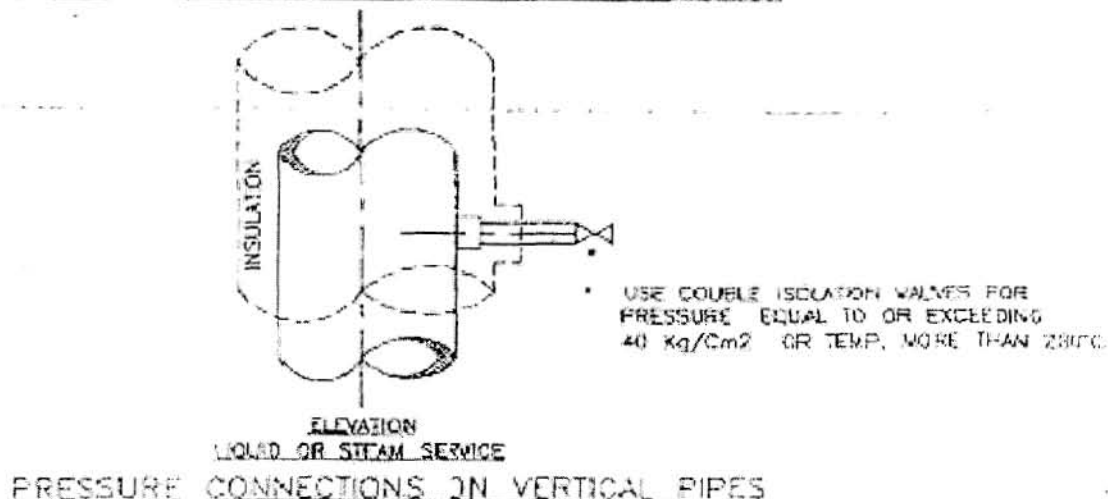
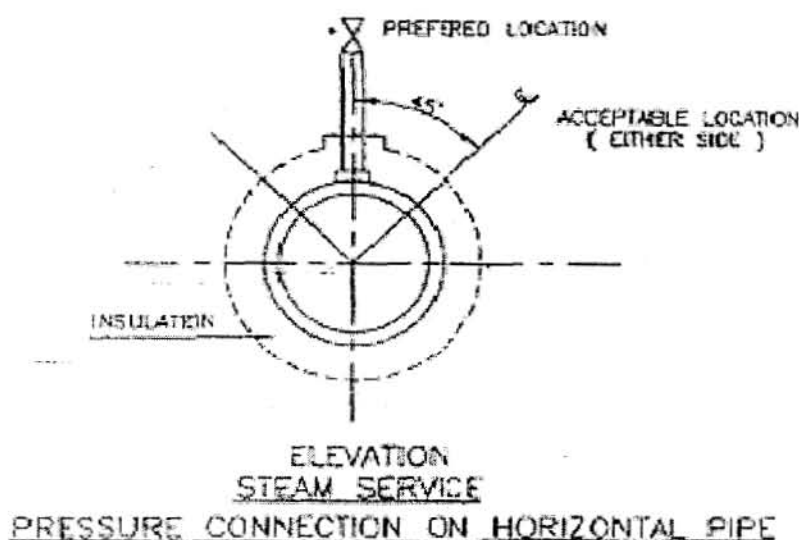
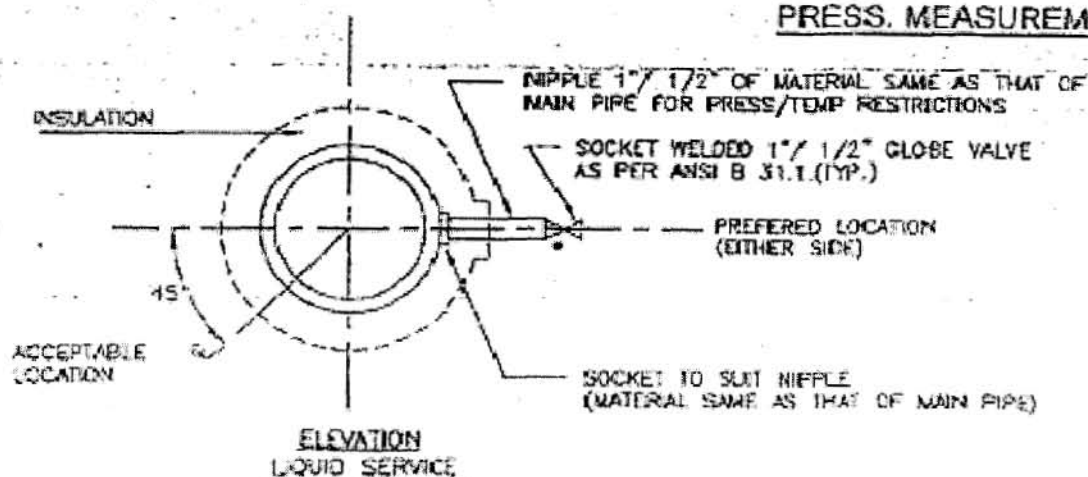
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ENGINEERING DIVISION

PROJECT	TYPICAL THERMAL POWER PROJECT (SG PACKAGE)		
TITLE	INSTRUMENT INSTALLATION DIAGRAM TYPICAL PURGE AIR CONNECTION & BLOWDOWN HEADER CONNECTION INSIDE INSTRUMENT RACK		
DATE	16.04.06	SHEET	A3
SCALE	N.T.S.	DRG. NO.	0000-101-POI-A-034
REV. NO.	A		

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	G	CM	APCH.	DATE	CLEARED BY
A	FIRST ISSUE										

CAD FILE NAME: D:\NORTH KARANPURA_3x660MW\0000-102-POI-A-034RA.DWG

PRESS. MEASUREMENT



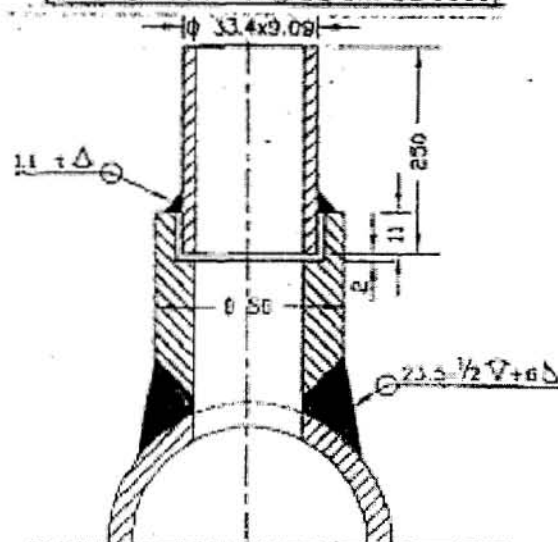
• USE DOUBLE ISOLATION VALVES FOR PRESSURE EQUAL TO OR EXCEEDING 40 Kg/Cm² OR TEMP. MORE THAN 280°C.

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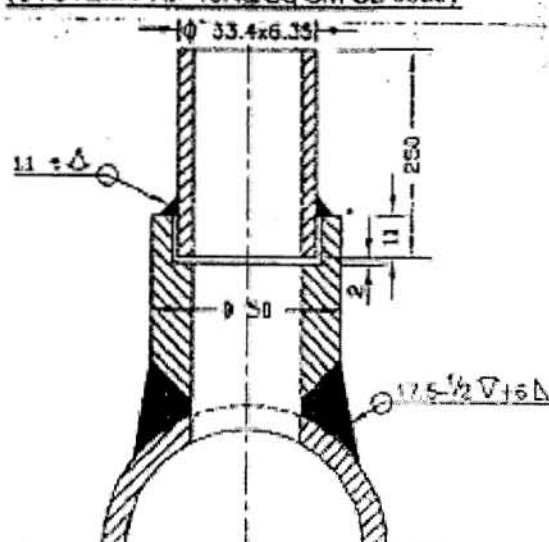
<p>PROJECT: TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p>		<p>FILE: INSTRUMENT SOURCE CONNECTION DETAILS</p>	
<p>DESCRIPTION: FIRST ISSUE</p>		<p>DATE: 28/11/82</p>	
<p>REVISION: 1</p>		<p>SCALE: N.T.S.</p>	
<p>PROJECT NO: 0000-101-POI-A-035</p>		<p>REV. NO: A</p>	

PRESSURE MEASUREMENT

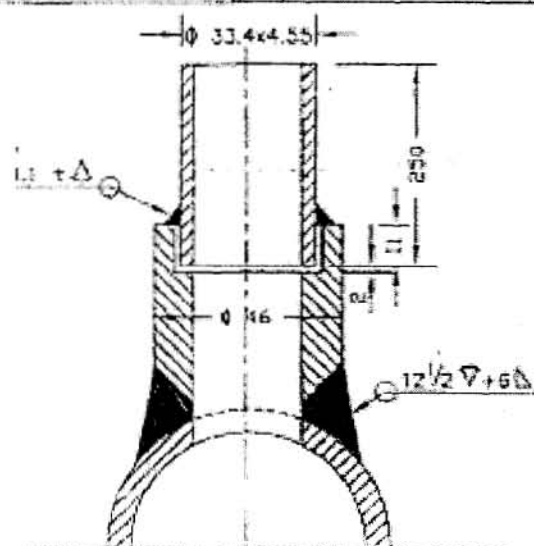
(SYSTEM PR. >40Kg/Sq Cm CL 9000)



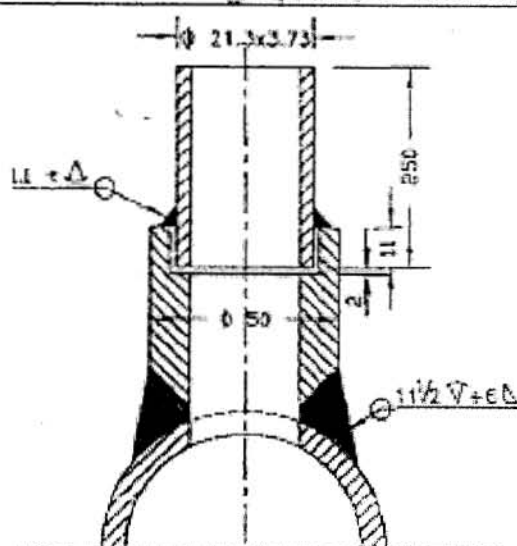
(SYSTEM PR.>40Kg/Sq Cm CL 6000)



(SYSTEM PR. <40Kg/Sq cm Nb 25 CL 3000)



(SYSTEM PR. <40Ka/Sq cm Nb 15 CL 3000)



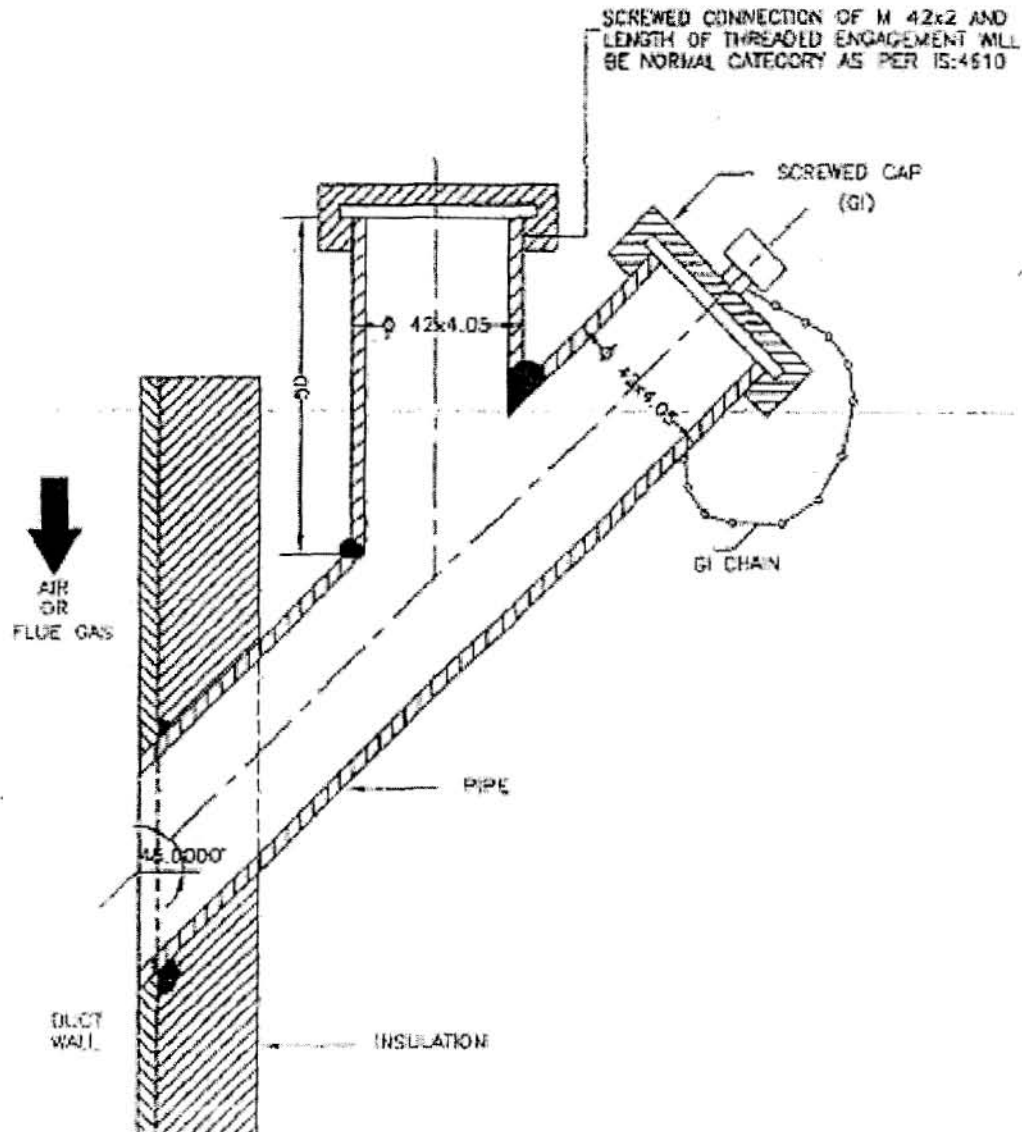
NOTES:-

1. MATERIAL OF THE BOSS AND NIPPLE SHALL BE THE SAME AS THE PIPE INTO WHICH IT IS WELDED AND CONFIRM TO ANSI B 16.11
2. THE LENGTH OF THE NIPPLE SHOULD BE 250mm.
3. THE OTHER END OF THE NIPPLE SHALL BE SOCKET WELDED WITH 1" GLOBE VALVE OF MATERIAL AS PER ANSI B 16.11.
4. TWO ISOLATED VALVES ARE TO BE USED FOR PRESSURE = $>40 \text{ Kg/Cm}^2$ OR TEMP. = $>280^\circ\text{C}$.
5. EDGE HOLE MUST BE CLEAN AND SQUARE OR ROUNDED SLIGHTLY ($1/64"$ RADIUS) FREE FROM BURRS, WIRE EDGES OR OTHER IRREGULARITIES.
6. ORIENTATION OF TAP WILL BE VARY WITH TYPE OF PROCESS FLUID AND NATURE OF RUN OF THE PIPE.
7. ACTIVITIES TO BE COMPLETED AT THE SHOP, WELD THE COUPLING (OR BOSS) ON THE PIPE AND DRILL PRESSURE CONNECTION HOLE (SAME AS I.D OF NIPPLE) IN THE PIPE IN ALIGNMENT WITH HOLE IN THE COUPLING.
8. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

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										<div>and 11 pl 501 NormaTad</div> <div><div>NTPC LIMITED</div><div>(A GOVERNMENT OF INDIA ENTERPRISE)</div><div>ENGINEERING DESIGN</div></div>			
										PROJECT TYPICAL THERMAL POWER PROJECT			
										TYPE (SG PACKAGE)			
										INSTRUMENT SOURCE CONNECTION DETAILS			

PRESS. MEASUREMENT



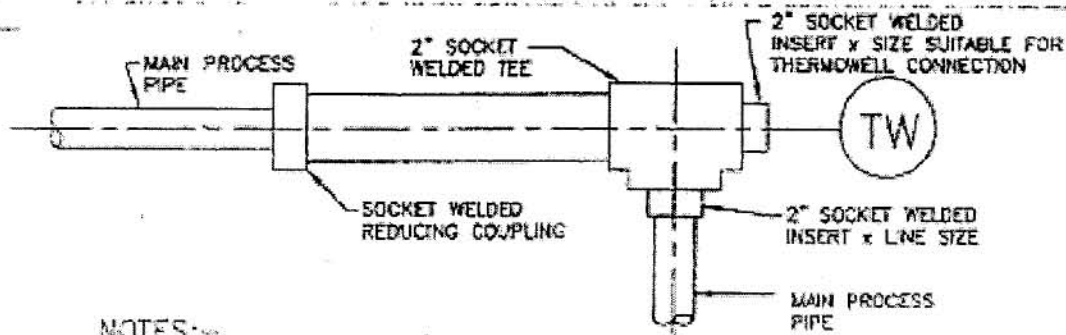
NOTES:

1. THIS TYPE OF PRESSURE CONNECTION SHALL BE PROVIDED FOR PRESSURE MEASUREMENTS IN AIR AND FLUE GAS DUCT/FURNACE.
2. DIMENSIONS ARE INDICATIVE ONLY.

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										HTPC H T P C LIMITED (A COMPANY OF NTPC (INDIA) PRIVATE LIMITED) INDUSTRIAL DEPARTMENT	
										PROJECT TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
										TITLE INSTRUMENT SOURCE CONNECTION DETAILS	
										DRAWING NO. 0000-101-POI-A-035	
										SCALE N.T.S.	
										REV. NO. A	
										CADD FILE NAME: C:\COMMON DRGS\0000-102-POI-A-035\K3A.DWG	

TEMP. MEASUREMENT

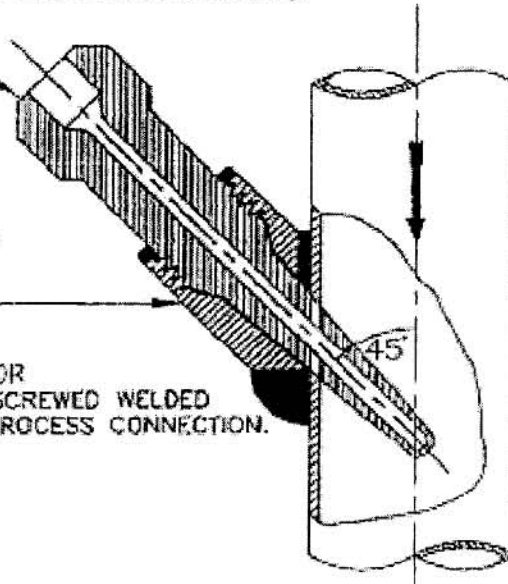


NOTES:-

1. THIS TYPE OF THERMOWELL INSTALLATION IS SUITABLE FOR THE PROCESS PIPE OF 2" NPS AND SMALLER.
2. FOR STEAM SERVICE THIS TYPE OF THERMOWELL INSTALLATION SG BEND MAY BE USED ONLY IN VERTICAL PLANE.
3. THE LENGTH OF THE LARGER PIPE SECTION SHALL BE MINIMUM 150mm (IT MUST BE GREATER THAN THERMOWELL LENGTH).

THERMOWELL SUITABLE FOR THE BOSS

TEMP. BOSS DIMENSIONS SUITABLE FOR INCLINED INSTALLATION SCREWED WELDED CONNECTIONS AS PER PROCESS CONNECTION.



NOTES:-

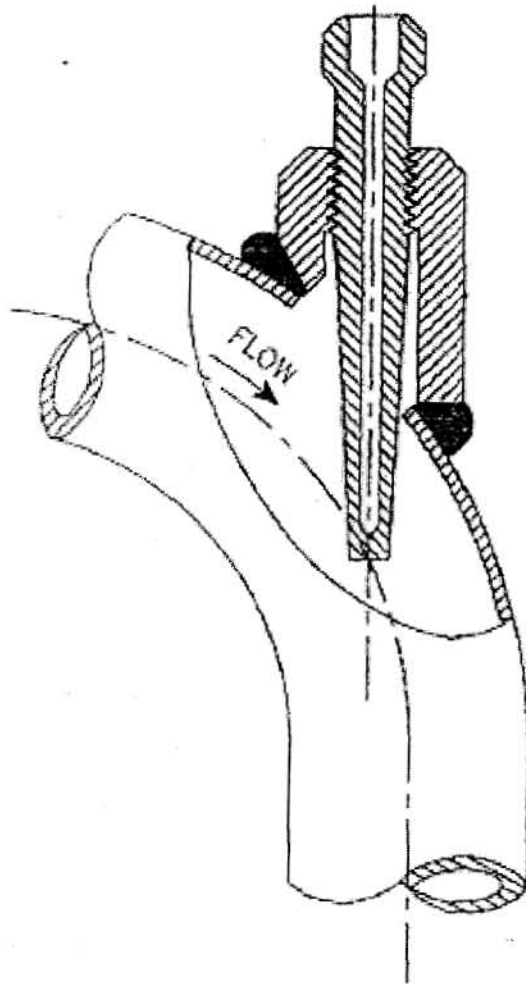
1. INCLINED INSTALLATION OF THERMOWELL SHALL BE APPLICABLE FOR 4" AND SMALLER LINE SIZE BUT LIMITED TO MIN. 3" LINE SIZE.
2. FOR 2" AND SMALLER LINE SIZE NECESSARY EXPANDER OF MIN. 3" SIZE OF MAIN PIPING SPECIFICATION SHALL BE USED.
3. THIS TYPE OF INSTALLATION IS APPLICABLE FOR HORIZONTAL AND VERTICAL PIPE SECTION.
4. FOR STEAM SERVICES EXPANDER SECTION MAY BE USED ONLY IN VERTICAL RUN.
5. THE EXPANDER SECTION SHALL BE OF ADEQUATE LENGTH (ATLEAST 3-4 TIMES DIA OF THE MAIN PROCESS PIPE AT BOTH SIDE OF THE INSTALLED THERMOWELL).

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<div style="display: flex; justify-content: space-between;"> <div> <p>UNIVERSITY NTPC</p> </div> <div> <p>एन टी सी लिमिटेड NTPC LIMITED (A COMPANY OF NDA OVERSEAS) ENGINEERING DIVISION</p> </div> </div>									
PROJECT TYPICAL THERMAL POWER PROJECT (SG PACKAGE)									
FILE INSTRUMENT SOURCE CONNECTION DETAILS									
A	REV	DESCRIPTION	DATE	BY	CHECKED	DATE	SHEET NO.	SCALE	DATE
1	1	2000-10-1	2000-10-1	2000-10-1	2000-10-1	2000-10-1	1	N.T.S.	2000-10-1

CAD FILE NAME: C:\COMMON DRGS\0000-102-POI-A-0355H4RA.DWG

TEMP. MEASUREMENT



NOTES:-

1. FLOW INSTALLATION OF THERMOWELL SHALL BE APPLICABLE FOR 4" AND SMALLER LINE SIZE BUT LIMITED TO MINIMUM 3" LINE SIZE.
2. FOR 2" AND SMALLER LINE SIZE NECESSARY EXPANDER OF ELBOW FORM (AS SHOWN) OF MINIMUM 3" SIZE SHALL BE USED.
3. ELBOW EXPANDER SECTION IN HORIZONTAL PLANE MAY BE USED FOR LIQUID SERVICES. ONLY STEAM SERVICES EXPANDER SECTION MAY BE USED IN VERTICAL PLANE.

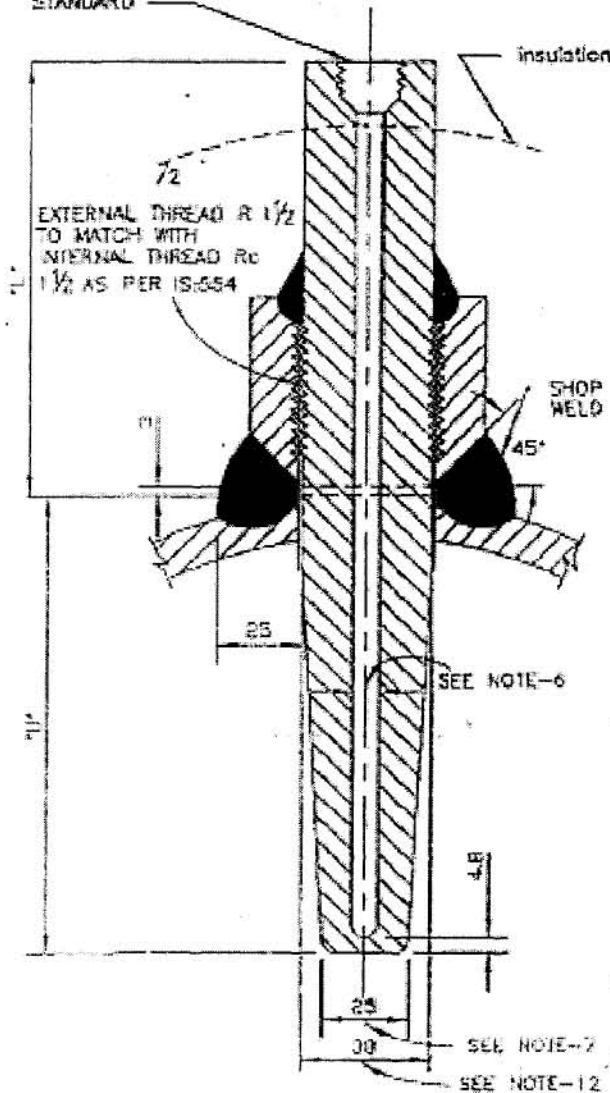
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<div style="display: flex; justify-content: space-between;"> <div> <p>एन टी सी लिमिटेड NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) CHANDIGARH, INDIA</p> </div> <div> <p>PROJECT: TYPICAL THERMAL POWER PROJECT (SG PACKAGE)</p> <p>FILE: INSTRUMENT SOURCE CONNECTION DETAILS</p> </div> </div>																																							
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REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.	REV. NO.																														
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CAD FILE NAME: C:\COMMON DRG'S\0000-102-POI-A-035SHSRA.DWG

TEMP. MEASUREMENT

1/2" NPT EQUIVALENT AS
PER MANUFACTURER'S
STANDARD



NOTES:-

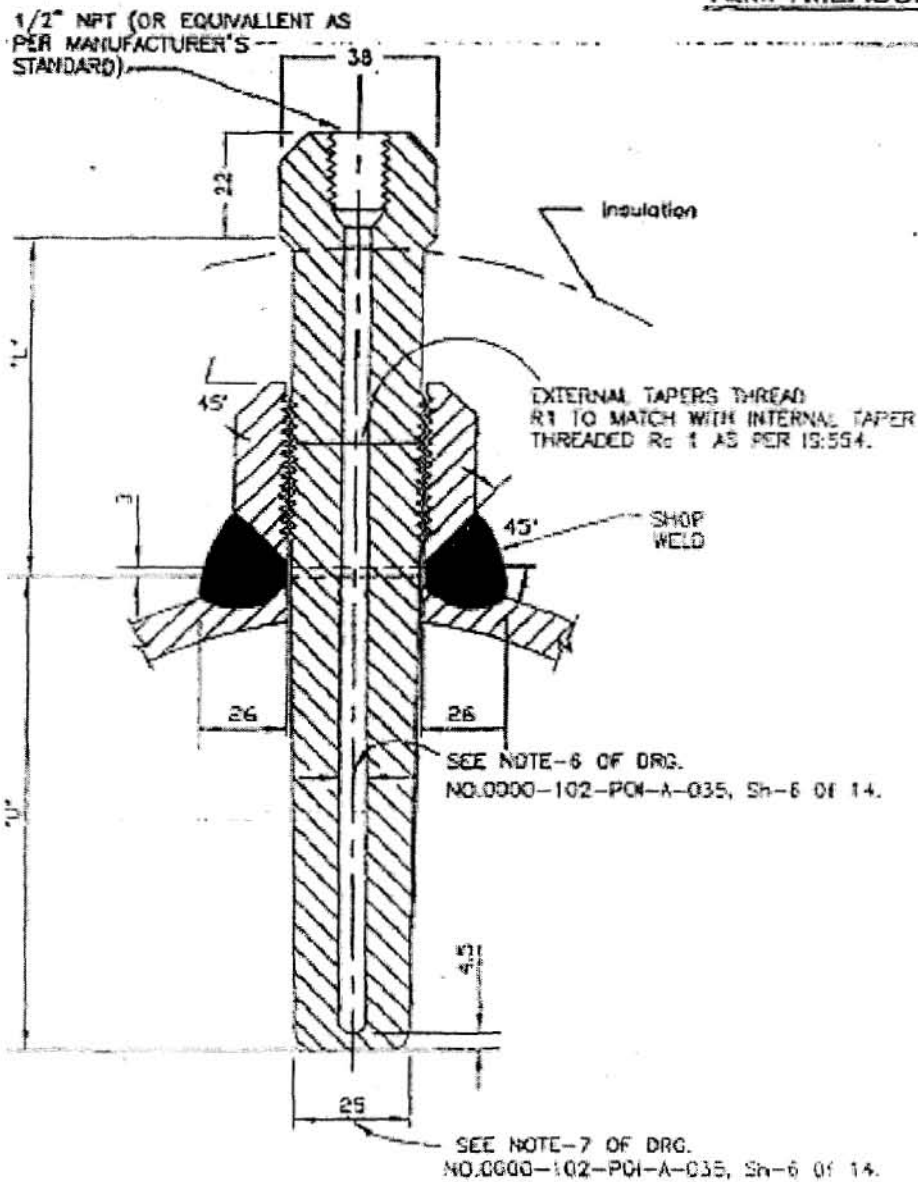
1. THIS TYPE OF TEMPERATURE BOSS SHALL BE USED FOR THE PROCESS PRESS EQUAL/ABOVE 40 Kg/Cm²(g).
2. THE MATERIAL OF THE BOSS SHOULD BE SIMILAR TO THAT OF PIPING MATERIAL OF SPECIFICATION.
3. ALL WELD TO BE TESTED IN ACCORDANCE WITH APPLICABLE CODES BY MANUFACTURER.
4. MATERIAL OF THE THERMOWELL SHALL BE OF 316SS.
5. THERMOWELL SHALL BE DRILLED BARSTOCK TYPE.
6. INTERNAL BORE OF THE THERMOWELL SHOULD BE SELECTED BASED ON THE NORMAL SIZE OF THE SENSING ELEMENT AS PER ASME, PTC-19.3.
7. THE BOTTOM DIAMETER OF THE THERMOWELL TYPICALLY SHOWN HERE SHALL BE SUBJECT TO VARIATION BASED ON THE INTERNAL BORE OF THERMOWELL AND THICKNESS OF THERMOWELL MATERIAL TO WITHSTAND THE PROCESS PRESS AND TEMP. AS PER ASME, PTC-19.3.
8. THE TYPE OF TAPERED THERMOWELL SHALL BE USED FOR LIQUID VELOCITIES UP TO 82 M.P.S. (300 F.T.P.S.).
9. THERMOWELL WITH THE INSULATION LAG EXTENSIONS SHALL BE USED WHEREVER APPLICABLE.
10. ACTIVITIES TO BE COMPLETED AT THE SHOP, WELD THE BOSS ON THE PIPE AND DRILL THE HOLE IN THE PIPE IN ALIGNMENT WITH HOLE IN THE BOSS. PROVIDE INTERNAL THREAD AS PER IS:554 TO MATCH WITH THE THERMOWELL EXTERNAL THREAD.
11. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
12. WILL BE SUITABLE TO MATCH THE STUB DIMENSIONS AS PER RC 1 1/2
13. THE "U" & "L" DIMENSIONS SHALL BE BE SELECTED BASED ON PARTICULAR APPLICATION AND THE SAME SHALL BE SUBJECT TO OWNER'S APPROVAL DURING DETAILED ENGINEERING.
14. ALL DIMENSIONS ARE INDICATIVE ONLY.

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PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT SOURCE CONNECTION DETAILS	
A REV NO.	PART NAME DESCRIPTION	SEE A4	SCALE N.T.S.
DATE 12/11/03		Dwg. No. 0000-101-P01-A-035 10-1 OF 14	

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TEMP. MEASUREMENT



NOTES:-

1. THIS TYPE OF TEMPERATURE BOSS IS APPLICABLE FOR THE PROCESS PRESSURE BELOW 40 Kg/Cm²(g)
2. FOR PRESSURE TIGHT JOINTS THE BOSS SHOULD HAVE INTERNAL TAPERED PIPE THREAD R₁ AS PER IS:554. THE LENGTH OF THREAD ENGAGEMENT SHOULD BE AS PER ABOVE STANDARD.
3. PIPES HAVING PROBABILITY OF PROLONGED VIBRATION SEAL WELDING MAY BE DONE ALL AROUND AFTER TIGHTENING THERMOWELL WITHIN THE BOSS.
4. SEE NOTES-2 TO 14 OF DRG. NO. 0000-102-POI-A-035, Sh-6 OF 14

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NTPC

NTPC LIMITED
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ENGINEERING DIVISION

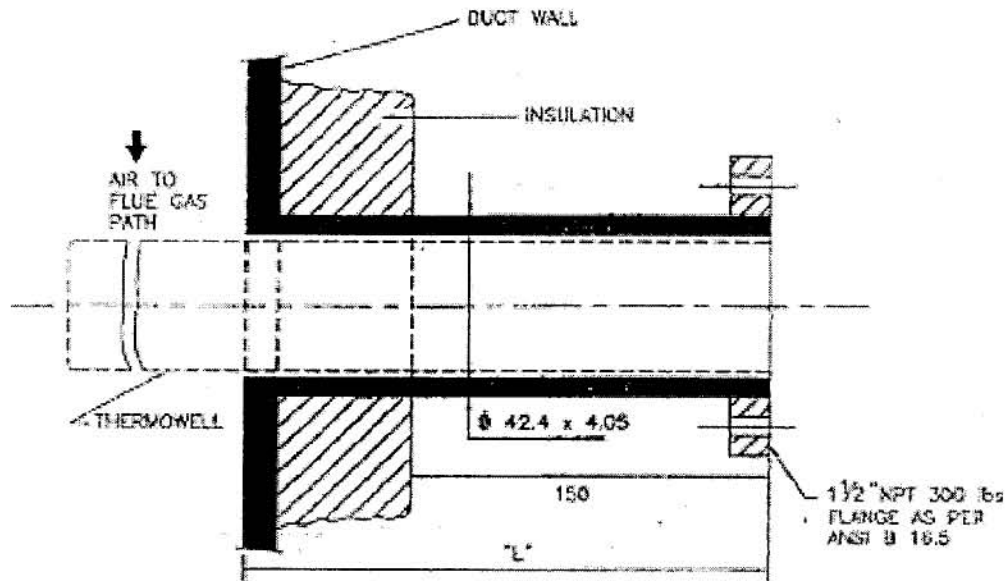
PROJECT TYPICAL THERMAL POWER PROJECT (SG PACKAGE)

TITLE INSTRUMENT SOURCE CONNECTION DETAILS

FIRST ISSUE	DESIGN	CHECK	APPROVED	DATE	SCALE	DRW. NO.	REV. NO.
DESCRIPTION	233	A6	N.T.S.	0000-101-POI-A-035	Sh-7 OF 14	A	

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TEMP. MEASUREMENT



NOTES:-

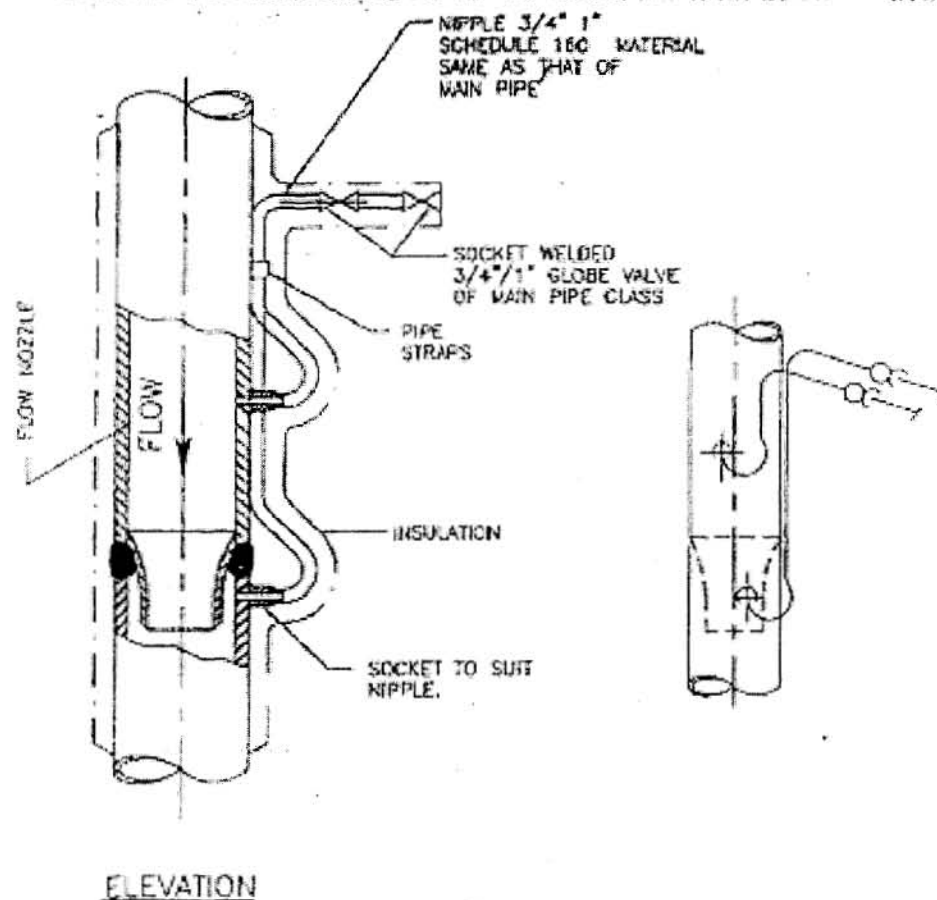
1. THIS TYPE OF TEMPERATURE CONNECTIONS SHALL BE PROVIDED FOR TEMPERATURE MEASUREMENT IN AIR AND FLUE GAS DUCT.
2. MATERIAL OF THERMOWELL SHALL BE OF 316SS.
3. EXTERNAL CONNECTION SHALL BE OF SUP ON FLANGED TYPE AND THERMOWELL DESIGN SHALL BE AS PER ASME PTC-19.3 (REFER NOTES 5&10 OF DRG. NO. 0000-101-POI-A-035, SH-6 OF 14).
4. BIDDER TO SUPPLY AND INSTALL THE COUNTER FLANGED AND THERMOWELL (ALONG WITH TEMP. ELEMENT).
5. ALL DIMENSIONS ARE INDICATIVE ONLY.

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PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT SOURCE CONNECTION DETAILS	
A NO. 1	FIRST ISSUE 22/11/2011	DRG. NO. 0000-101-POI-A-035	SHEET NO. 1 OF 14
DESCRIPTION		SCALE N.T.S.	REF. NO. A

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FLOW MEASUREMENT

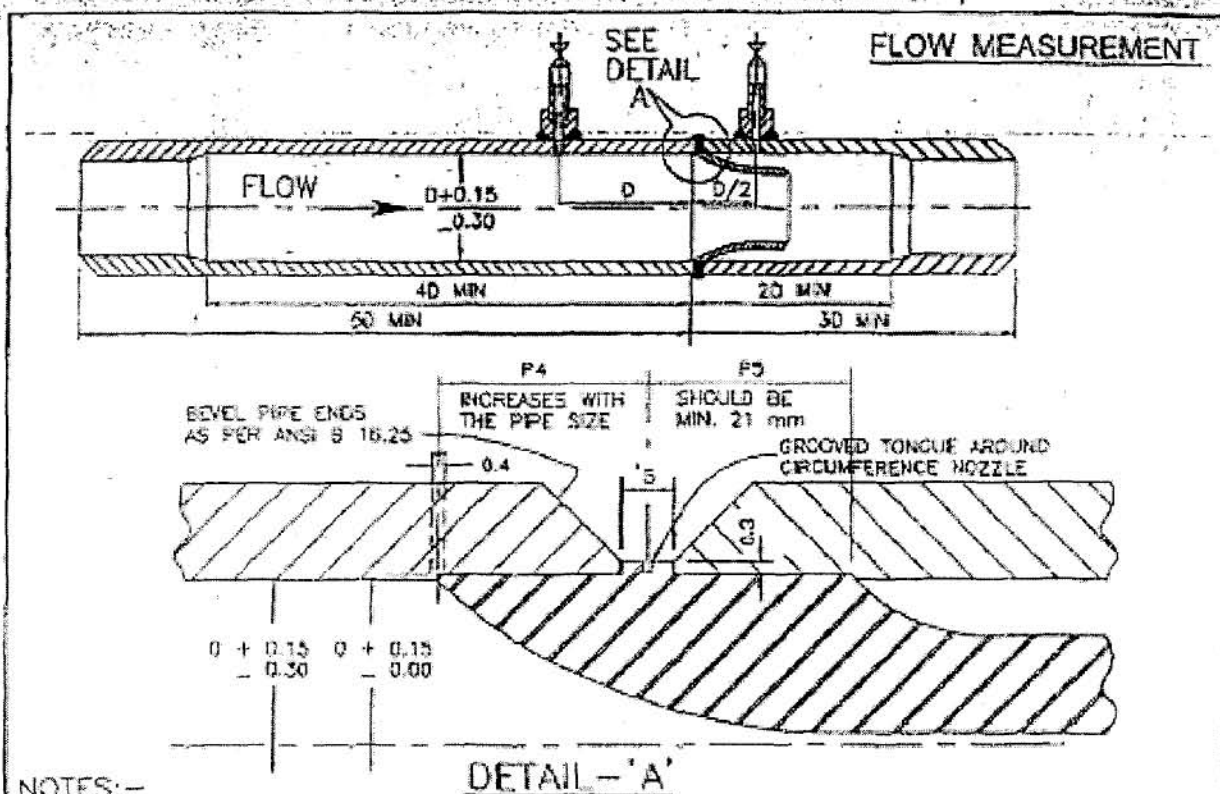


NOTES:-

1. THIS METHOD OF CONNECTING NIPPLES AND VALVES ON THE VERTICAL STEAM PIPE IS APPLICABLE FOR MEASUREMENT OF STEAM AT TEMP. ABOVE 155°C
2. THE ENTIRE LENGTH OF THESE NIPPLES AS WELL AS SHUT OFF VALVES SHOULD BE LAGGED IN WITH STEAM LINE AS SHOWN IN THE DRAWING.
3. ON VERTICAL STEAM PIPE BOTH HIGH TEMPERATURE (SPECIAL VENTS) NIPPLES WILL BE LONG ENOUGH SO THAT HIGH AND LOW PRESSURE CONNECTION NIPPLES WILL BE AT SAME LEVEL.
4. UP STREAM AND DOWN STREAM PRESSURE CONNECTIONS MUST BE INSTALLED IN DIFFERENT PLANES PASSING THROUGH THE CENTRE OF THE PIPE.
5. FLOW ELEMENTS SHALL BE PROVIDED WITH 3 PAIRS OF TAPPING POINTS.

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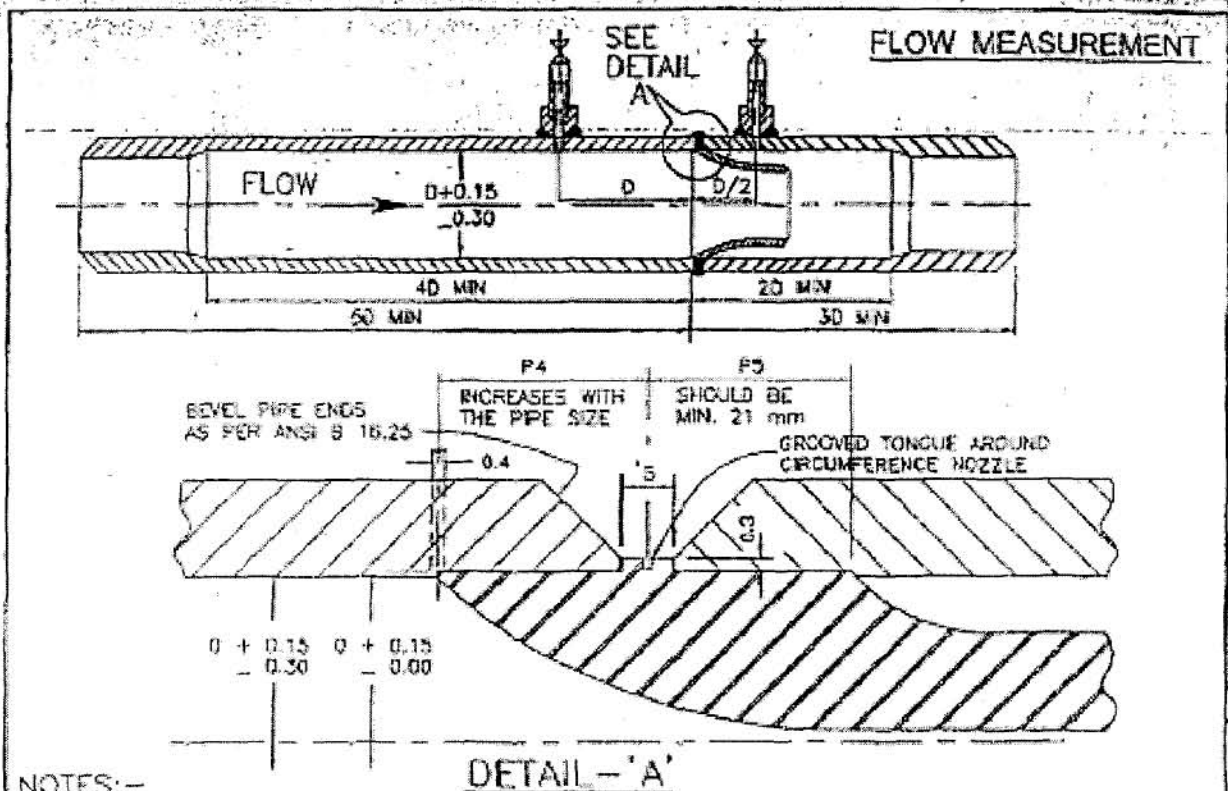
NOTES:-

1. COMPLETE FLOW NOZZLE BRANCH ASSEMBLY ALONG WITH NIPPLES AND SOURCE ISOLATION VALVES SHALL BE SUPPLIED BY THE BIDDER. THE BIDDER ALSO TO INSTALL FLOW NOZZLE WITHIN THE MACHINED BRANCH, -PRESSURE STUBS ON THE BRANCH PIPE (FOR ORIENTATION OF PRESSURE TAP REF. NOTE-3) ALONG WITH NIPPLE AND SOURCE ISOLATION VALVES.
2. THE MACHINING OF BRANCH PIPE SHOULD BE DONE AFTER PRESSURE CONNECTIONS HAVE BEEN WELDED TO PIPE AND ALSO EXTEND FOR ATLEAST 40 IN THE INLET SECTION, 20 IN THE OUTLET SECTION, MEASURED FROM THE INLET FACE OF FLOW NOZZLE. TOTAL BRANCH PIPE ASSEMBLY SHOULD BE ATLEAST A LENGTH OF 80/30 IN THE INLET SECTION AND 30 IN THE OUTLET SECTION, MEASURED FROM THE INLET FACE OF THE FLOW NOZZLE AS SHOWN ABOVE.
3. ON HORIZONTAL PIPE RUN PRESSURE CONNECTIONS ARE TO BE LOCATED ON SIDES OF THE PIPE FOR LIQUID AND STEAM SERVICE AND ON THE TOP FOR DRY GAS SERVICE FOR PROCESS LIQUIDS, INSTALLATION OF PRESS. TAPS MAY BE ALLOWED WITHIN AN ANGLE OF 45° ELBOW HORIZONTAL FOR SPECIAL CASES BUT NO BOTTOM CONNECTIONS ARE ALLOWED.
4. THE LOCATION OF PRESSURE TAPS MUST BE WITHIN 1.5 mm (1/16") OF DISTANCE SPECIFIED AND NUMBER OF PAIRS OF PRESSURE TAPS TO BE PROVIDED WILL BE AS PER FLOW MEASUREMENT DATA SHEET.
5. PRESSURE TAPS SHOULD BE DRILLED RADICALLY WITH RESPECT TO PIPE AND THIS DRILLING SHOULD BE DONE AFTER ANY COUPLING FOR ATTACHING THE PRESSURE TUBING HAS BEEN WELDED TO THE PIPE. THE HOLE WHERE IT BREAKS THROUGH THE INNER SURFACE OF THE PIPE MUST BE FREE OF BURRS OR WIRE EDGE AND CORNER OF EDGE HOLE LEFT ROUNDED VERY SLIGHTLY (1/64" RADIUS).
6. RECOMMENDED MAXIMUM DIAMETERS OF PRESSURE TAP HOLES IN THE BRANCH PIPES WILL BE AS PER ASME PTC 19.5. THE DIAMETER FOR HOLE SHOULD REMAIN SAME FOR DISTANCE NOT LESS THAN 2.5 TIME OF DIA FROM THE INNER SURFACE OF THE PIPE.
7. FLOW NOZZLE SHALL BE CENTRED IN THE PIPE WITHIN 0.8 mm (1/32") OF THE PIPE AXIS. INSIDE DIAMETER MEASURED AT FOUR POINTS AT ANY CROSS SECTION SHALL NOT DIFFER BY MORE THAN 1%.
8. BRANCH PIPE SHALL BE AS PER MAIN PIPING MATERIAL SPECIFICATION. INTERNAL SURFACE OF BORED SECTIONS MUST BE SMOOTH AND STRAIGHT, FREE FROM SCALES, PITS, BURRS OR ANY IRREGULARITIES.
9. FLOW NOZZLE MATERIAL SHALL BE 316 SS AND THE DESIGN AS PER ASME.
10. MAXIMUM UPSTREAM AND DOWN STREAM STRAIGHT LENGTH REQUIRED FROM INLET FACE OF FLOW NOZZLE SHALL BE AS PER ASME, PTC-19.5.

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PROJECT		TYPICAL THERMAL POWER PROJECT (SG PACKAGE)	
TITLE		INSTRUMENT SOURCE CONNECTION DETAILS	
REV. NO.	DESCRIPTION	REV. NO.	DESCRIPTION
1	FIRST ISSUE	1	FIRST ISSUE
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FILE NO.	0000-101-POI-A-035	REV. NO.	A

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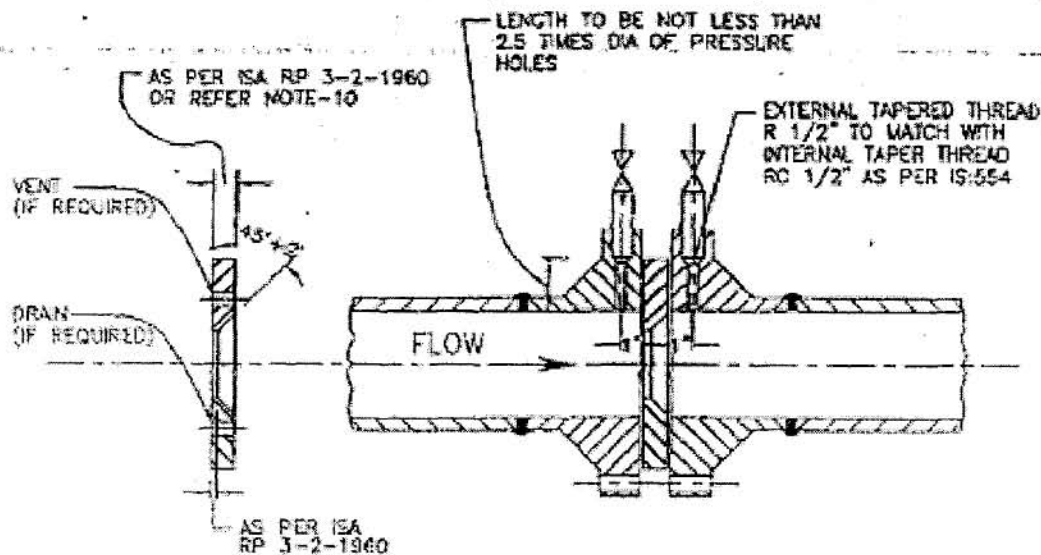
NOTES:-

1. COMPLETE FLOW NOZZLE BRANCH PIPE ASSEMBLY ALONG WITH NIPPLES AND SOURCE ISOLATION VALVES SHALL BE SUPPLIED BY THE BIDDER. THE BIDDER ALSO TO INSTALL FLOW NOZZLE WITHIN THE MACHINED BRANCH. -PRESSURE STUBS ON THE BRANCH PIPE (FOR ORIENTATION OF PRESSURE TAP REF. NOTE-3) ALONG WITH NIPPLE AND SOURCE ISOLATION VALVES.
2. THE MACHINING OF BRANCH PIPE SHOULD BE DONE AFTER PRESSURE CONNECTIONS HAVE BEEN WELDED TO PIPE AND ALSO EXTEND FOR ATLEAST 4D IN THE INLET SECTION, 2D IN THE OUTLET SECTION, MEASURED FROM THE INLET FACE OF FLOW NOZZLE. TOTAL BRANCH PIPE ASSEMBLY SHOULD BE ATLEAST A LENGTH OF 8D/3D IN THE INLET SECTION AND 3D IN THE OUTLET SECTION, MEASURED FROM THE INLET FACE OF THE FLOW NOZZLE AS SHOWN ABOVE:
3. ON HORIZONTAL PIPE RUN PRESSURE CONNECTIONS ARE TO BE LOCATED ON SIDES OF THE PIPE FOR LIQUID AND STEAM SERVICE AND ON THE TOP FOR DRY GAS SERVICE. FOR PROCESS LIQUIDS, INSTALLATION OF PRESS. TAPS MAY BE ALLOWED WITHIN AN ANGLE OF 45° ELBOW HORIZONTAL FOR SPECIAL CASES BUT NO BOTTOM CONNECTIONS ARE ALLOWED.
4. THE LOCATION OF PRESSURE TAPS MUST BE WITHIN 1.5 mm (1/16") OF DISTANCE SPECIFIED AND NUMBER OF PAIRS OF PRESSURE TAPS TO BE PROVIDED WILL BE AS PER FLOW MEASUREMENT DATA SHEET.
5. PRESSURE TAPS SHOULD BE DRILLED RADIALLY WITH RESPECT TO PIPE AND THIS DRILLING SHOULD BE DONE AFTER ANY COUPLING FOR ATTACHING THE PRESSURE TUBING HAS BEEN WELDED TO THE PIPE. THE HOLE WHERE IT BREAKS THROUGH THE INNER SURFACE OF THE PIPE MUST BE FREE OF BURRS OR WIRE EDGE AND CORNER OF EDGE HOLE LEFT ROUNDED VERY SLIGHTLY (1/54" RADIUS).
6. RECOMMENDED MAXIMUM DIAMETERS OF PRESSURE TAP HOLES IN THE BRANCH PIPES WILL BE AS PER ASME PTC 19.5. THE DIAMETER FOR HOLE SHOULD REMAIN SAME FOR DISTANCE NOT LESS THAN 2.5 TIME OF DIA FROM THE INNER SURFACE OF THE PIPE.
7. FLOW NOZZLE SHALL BE CENTRED IN THE PIPE WITHIN 0.8 mm (1/32") OF THE PIPE AXIS. INSIDE DIAMETER MEASURED AT FOUR POINTS AT ANY CROSS SECTION SHALL NOT DIFFER BY MORE THAN 1%.
8. BRANCH PIPE SHALL BE AS PER MAIN PIPING MATERIAL SPECIFICATION. INTERNAL SURFACE OF BORED SECTIONS MUST BE SMOOTH AND STRAIGHT, FREE FROM SCALES, PITS, BURRS OR ANY IRREGULARITIES.
9. FLOW NOZZLE MATERIAL SHALL BE 316 SS AND THE DESIGN AS PER ASME.
10. MAXIMUM UPSTREAM AND DOWN STREAM STRAIGHT LENGTH REQUIRED FROM INLET FACE OF FLOW NOZZLE SHALL BE AS PER ASME, PTC-19.5.

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FLOW MEASUREMENT



NOTES:-

- ORIFICE PLATE MOUNTED BETWEEN FLANGES WITH FLANGE TAPPING (AS SHOWN ABOVE) SHOULD BE LIMITED TO PIPE SIZES OF 2" OR LARGER.
- ORIFICE PLATE SHALL BE MOUNTED BETWEEN PIPING FLANGES WITH THE SHARP EDGE FACING UPSTREAM SUCH THAT CENTRE OF THE CONCENTRIC ORIFICE SHOULD BE WITHIN 0.75 mm (1/32") OF THE AXIS OF THE PIPE.
- TWO GASKETS SHALL BE INSERTED BETWEEN THE PLATE AND THE FLANGES AND INSIDE DIAMETER OF THE GASKETS SHOULD BE ATLEAST 1.5 mm (1/16") GREATER THAN THE INSIDE DIAMETER OF THE PIPE SO THAT THEY DO NOT PROTRUDE INTO THE PIPE.
- PIPING FLANGES SHALL BE ANSI WELD NECK, RAISED FACE TYPE. THE FLANGE IS TO BE ALIGNED WITH THE FACE PERPENDICULAR TO THE FLOW AXIS.
- BIDDER TO SUPPLY ORIFICE PLATE SPECIAL TYPE (HAVING PRESS. CONNECTIONS) OF FLANGES ALONG WITH GASKETS, NIPPLES AND SOURCE VALVES.
- ON HORIZONTAL PIPE RUN PRESSURE CONNECTIONS ARE TO BE TAKEN FROM SIDES FOR LIQUID AND STEAM SERVICE AND FROM TOP FOR DRY GAS SERVICE. FOR PROCESS LIQUIDS INSTALLATION OF PRESSURE TAPS MAY BE ALLOWED WITHIN AN ANGLE OF 45° ELBOW THE HORIZONTAL IN SPECIAL CASES BUT NO BOTTOM CONNECTIONS ARE ALLOWED.
- THE LOCATION OF PRESSURE TAPS MUST BE WITHIN 1.5 mm (1/16") OF THE DISTANCE SPECIFIED.
- MAXIMUM DIAMETER OF PRESS. CONNECTION HOLES SHALL BE AS PER RECOMMENDATIONS OF ASME PTC 19.3. THE DIAMETER OF THE HOLE SHOULD REMAIN THE SAME FOR A DISTANCE NOT LESS THAN 2.5 TIMES OF THE DIAMETER BEFORE EXPANDING INTO THE PRESSURE PIPE.
- THERE MUST BE NO BURRS WIRE EDGES OR OTHER IRREGULARITIES ALONG THE EDGE OF THE HOLE AND IT MUST BE SQUARE AND ROUNDED SLIGHTLY (1/64" RADIUS).
- ORIFICE PLATE SHOULD BE FLAT WITHIN 0.02 mm (0.001") AND THE SURFACE ROUGHNESS SHOULD NOT EXCEED 20 MICRO INCH. THE THICKNESS OF THE ORIFICE PLATE SHOULD BE AS PER ASME PTC-19.5.
- FOR HORIZONTAL PIPE RUN DRAIN HOLES IN ORIFICE PLATES ARE AT THE BOTTOM (APPROX. TANGENT TO INSIDE DIA OF PIPE) FOR STEAM OR GAS SERVICE. VENT HOLES SHOULD BE LOCATED ON UPPER SIDE FOR INCOMPRESSIBLE FLUID.
- ORIFICE PLATE SHOULD BE OF 316 SS (ASTM A187-54 GRADE-1).
- RECOMMENDED MINIMUM LENGTHS OF STRAIGHT PIPE PRECEDING AND FOLLOWING ORIFICES SHALL BE AS PER ASME PTC-19.5.
- THREE PAIRS OF PRESSURE TAPS SHALL BE PROVIDED WITH NIPPLES OF REQUIRED LENGTH AND SOURCE VALVES AND THE UN-USED TAPS ARE PLUGGED.
- THE INTERNAL TAPERED CONNECTION WITHIN THE FLANGE FOR PRESSURE TAPS SHOULD BE RC 1/2" AND THE NIPPLE SHOULD ALSO OF EXTERNAL THREADED R 1/2" AS PER IS:554. THE LENGTH OF THREADED ENGAGEMENT SHALL BE AS PER ABOVE STANDARD.

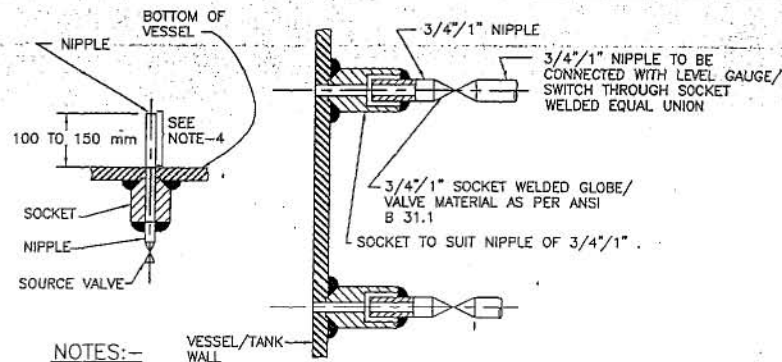
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<p>FILE: INSTRUMENT SOURCE CONNECTION DETAILS</p>		<p>SEE: A4</p>	
<p>SCALE: N.T.S.</p>		<p>DOC NO: 0000-101-POI-A-035</p>	
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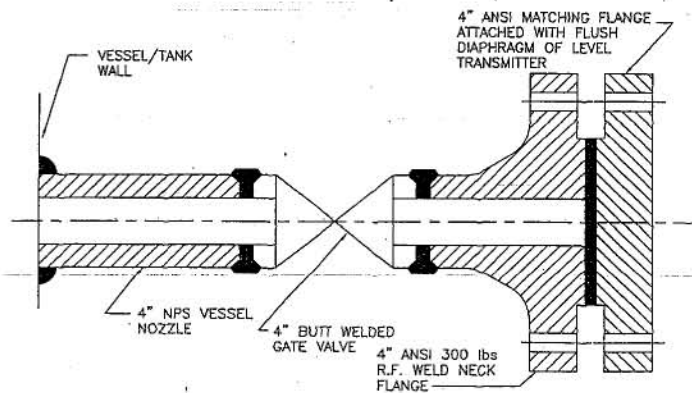
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LEVEL MEASUREMENT



NOTES:-

1. THIS TYPE OF PROCESS CONNECTION SHALL BE USED FOR LEVEL GAUGE AND EXTERNAL CAGE TYPE FLOAT OR DISPLACER OPERATED LEVEL SWITCH.
2. FOR GAUGES 3/4" NIPPLE ALONG WITH 3/4" SW SOURCE VALVE AND FOR SWITCHES 1" NIPPLE ALONG WITH 1" SW SOURCE VALVE SHALL BE PROVIDED AS PROCESS CONNECTION.
3. SOURCE CONNECTION ON VESSEL SHOULD NOT BE LOCATED AT PLACES SUBJECTED TO INTERFACE AND TURBULENCE FROM INLETS AND OUTLETS.
4. IF LOWER CONNECTION IS TAKEN FROM BOTTOM OF THE VESSEL THEN THE NIPPLE MUST BE 100 mm TO 150 mm ABOVE THE BOTTOM OF THE VESSEL.



NOTES:-

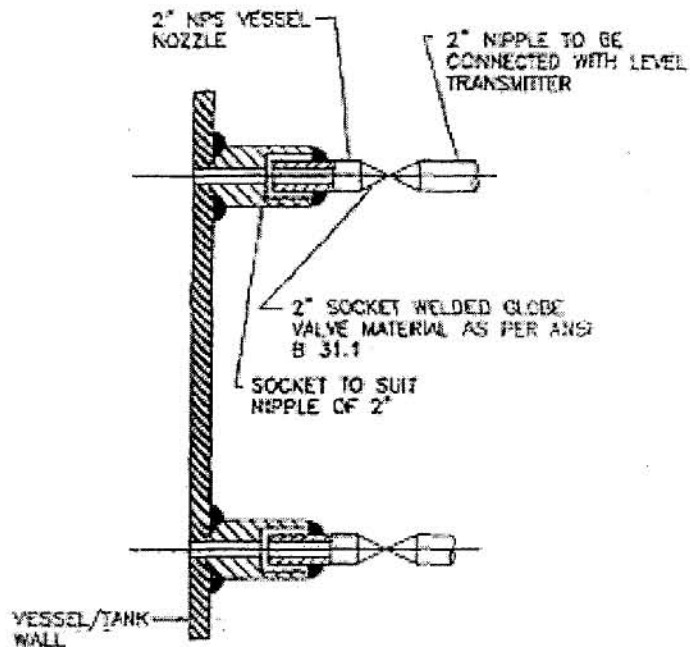
1. THIS TYPE OF PROCESS CONNECTION SHALL BE PROVIDED FOR TANK LEVEL MEASUREMENT OF VISCOUS OR CORROSIVE LIQUID USING FLUSH DIAPHRAGM/WAFER TYPE LEVEL TRANSMITTER.
2. WELDING OF MATCHING FLANGE TO GATE VALVE SHALL BE DONE BY BIDDER.

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LEVEL MEASUREMENT



NOTES:-

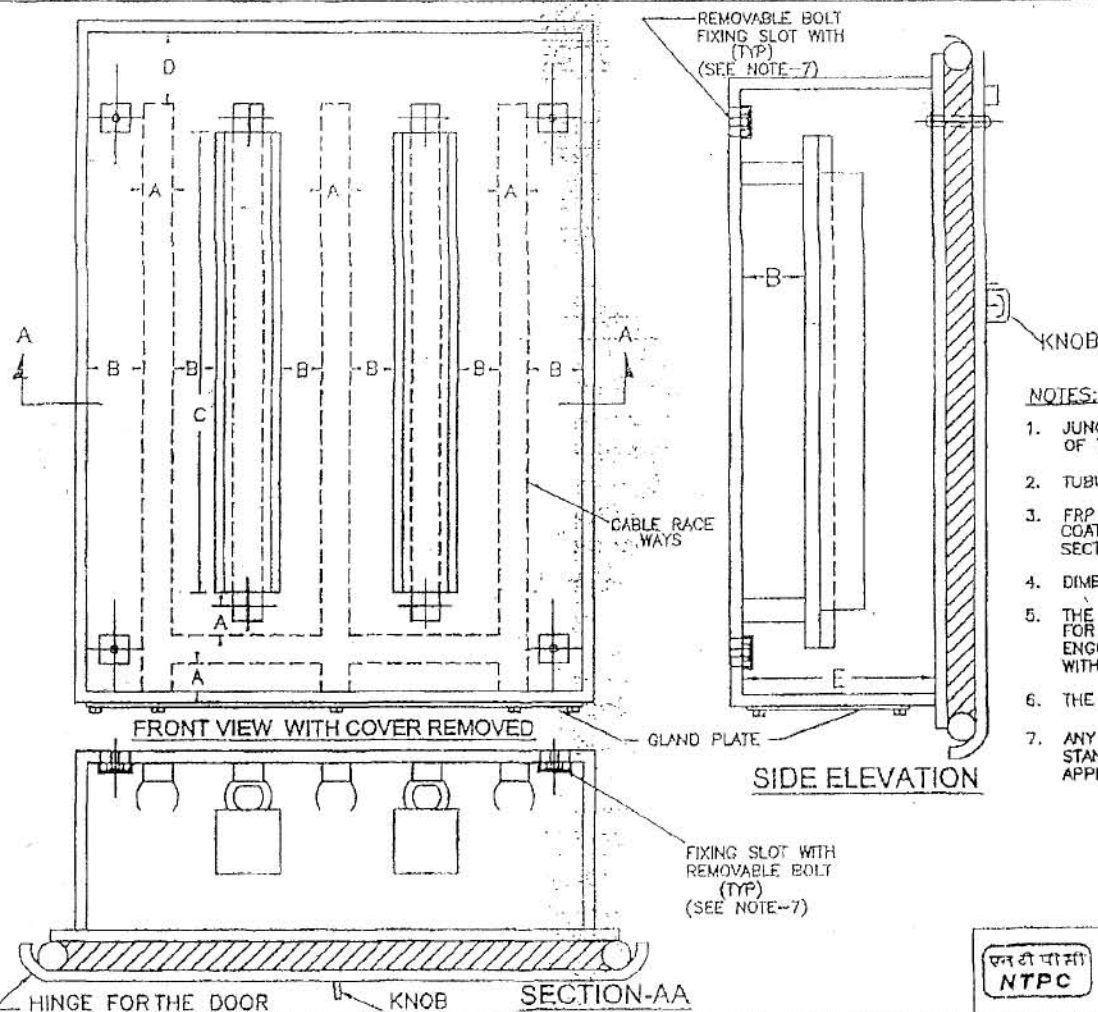
1. THIS TYPE OF PROCESS CONNECTION SHALL BE USED FOR DISPLACER TYPE LEVEL TRANSMITTER.
2. SOURCE CONNECTION ON VESSEL SHOULD NOT BE LOCATED AT PLACES SUBJECTED TO INTERFACE AND TURBULENCE FROM INLETS AND OUTLETS.
3. IF LOWER CONNECTION IS TAKEN FROM BOTTOM OF THE VESSEL THEN THE NIPPLE MUST BE 100 mm TO 150 mm ABOVE THE BOTTOM OF THE VESSEL.

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A - 75 mm
B - 25 mm
C - SEE NOTE-4
D - 100 mm
E - 150 mm

NOTES:-

1. JUNCTION BOXES SHALL HAVE GLAND PLATES AT THE BOTTOM OF THE BOX ONLY.
2. TUBULAR TYPE GASKETS WILL BE USED.
3. FRP JUNCTION BOXES, SHALL BE PROVIDED WITH POLYETHYLENE COATING. ALSO REFER SUB SECTION INST CABLE, PART-B SECTION-VI FOR DETAILS.
4. DIMENSION OF 'F' SHALL BE BASED ON NO. OF TERMINAL BLOCKS.
5. THE EXACT TYPE & DIMENSION OF JUNCTION BOXES TO BE USED FOR A PARTICULAR APPLICATION SHALL BE AS DECIDED DURING DETAIL ENGG. STAGE AND SHALL BE SUBJECT TO EMPLOYER'S APPROVAL WITHOUT ANY PRICE REPERCUSSION.
6. THE KNOB FOR ALL THE JUNCTION BOXES SHALL BE IDENTICAL.
7. ANY TYPE OF SEALED FIXING ARRANGEMENT AS PER MANUFACTURER'S STANDARD CAN ALSO BE PROVIDED SUBJECT TO EMPLOYER'S APPROVAL.


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ENGINEERING DIVISION

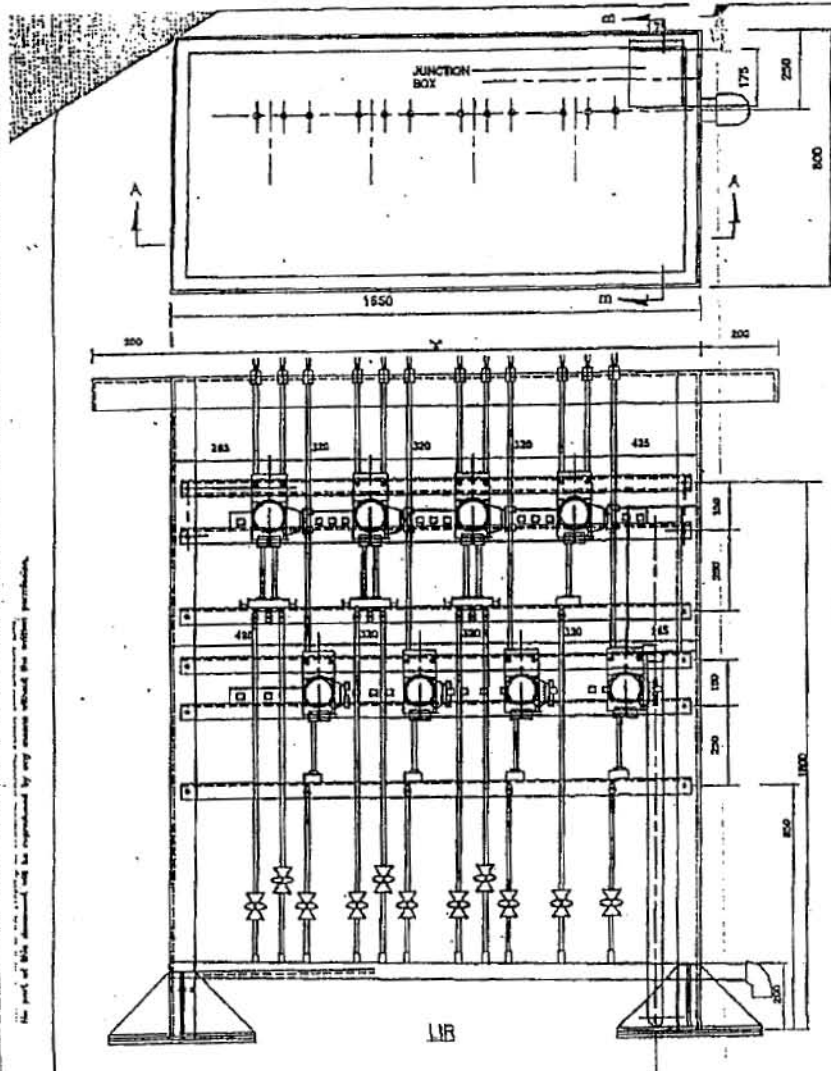
													PROJECT TYPICAL THERMAL POWER PLANT			
D	GENERALLY REVISED											30.11.06	TITLE			
C	GENERALLY REVISED											04.08.06	LOCAL JUNCTION BOX CONNECTION DETAILS			
B	GENERALLY REVISED	S.K.	AR	PS								04.08.06				
A	FIRST ISSUE	S.K.	AR	PS								04.08.06				
REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	V	E	G	C&I	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.	
					CLEARED BY							A3	H.T.S.	0000-999-POI-A-017	D	

Technical drawing of a rectangular structure, likely a tank or container, showing dimensions and internal components. The overall width is 1250 and the height is 600. The structure is divided into two main horizontal sections by a dashed line. The top section contains a horizontal row of seven vertical lines, with the leftmost one labeled "PURGE AIR". To the right of this row is a "JUNCTION BOX" with a width of 175. The bottom section contains two vertical lines, with the rightmost one labeled "PURGE AIR SERVICE AIR". Dimensions include 175, 100, 275, 450, and 100. Section lines A-A and B-B are indicated with arrows.

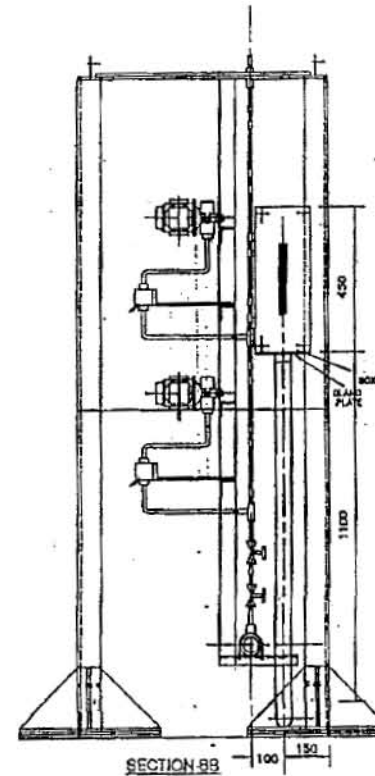
Technical drawing of a vertical section of a machine. The drawing shows a central vertical shaft with various components attached. On the left side, there is a pump-like assembly with a circular head and a handle. Below it, there are two valve-like components with circular heads and handles. On the right side, there is a gland plate with a central opening. Above the gland plate, there is a component labeled "JUNCTION BOX". Dimensions are indicated: "450" for the height of the gland plate assembly and "1100" for the total height of the machine section.

 नेशनल थर्मल पावर कॉर्पोरेशन लिमिटेड <i>National Thermal Power Corporation Ltd</i> (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT TYPICAL THERMAL POWER PROJECT SG, TG, BOP PACKAGE	
TITLE TYPICAL GA OF LOCAL INSTRUMENT ENCLOSURE / RACK	
SIZE A5	SCALE N.T.S.
Dwg. NO. 0000-999-POI-A-084	REV. NO. 0
SHEET NO. 02 OF 03	
FILE NAME: C:\PC\MS\BAR\STDP 3\BOP\0000-999-POI-A-084.dwg	

		ADD	REV					
D	IS LOCATION ALTERED. OVERALL DIMENSIONS REDUCED.							
C	TYPE-G ADDED + MINOR CONNECTION		AR	AR				
B	SECOND ISSUE	AR	AR	PS				
A	FIRST ISSUE	AR	AR	PS				
REVING		DRAWN	DESIGN	CHECK	M	E	C	CAR
DESCRIPTION					CLEARED BY			



LR TYPE	MAX. NO. OF TRANSMITTERS	DIMENSION 'X' (mm)
A	8	1650
B	6	1330
C	4	1010



NOTE:-

1. MATERIAL OF JES FOR LIRs SHALL BE FINALISED DURING DETAIL ENGINEERING.

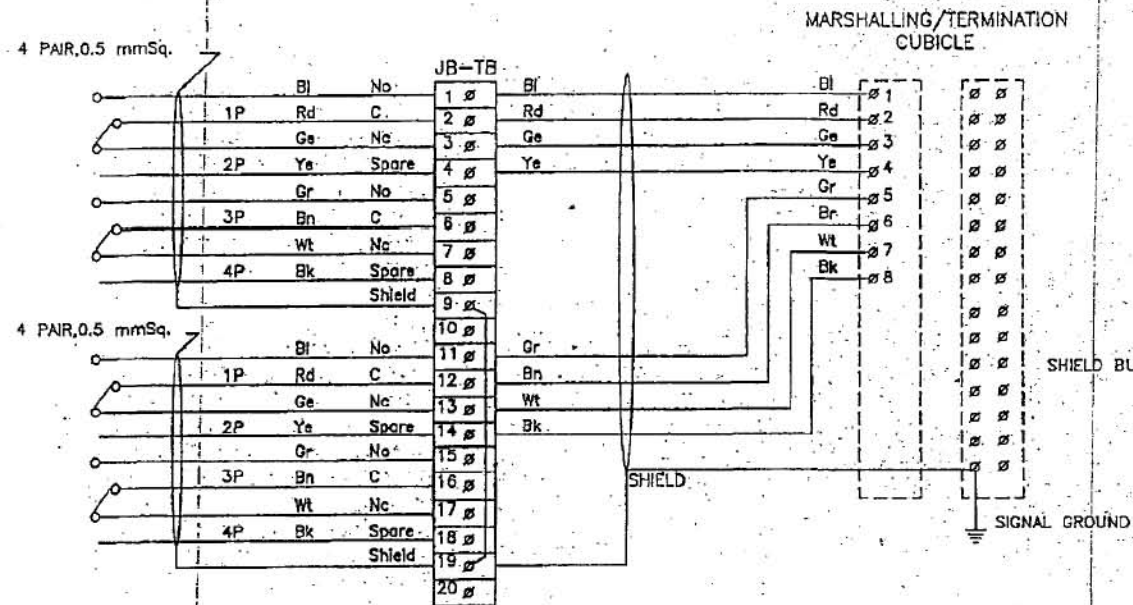
SECTION-AA
LIR WITHOUT PURGING

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PROJECT: TYPICAL THERMAL POWER PROJECT SG, TG, BOP PACKAGE	
TITLE: TYPICAL GA OF LOCAL INSTRUMENT ENCLOSURE / RACK	
REV. NO.	0000-099-POI-A-064
DATE	page 927 95
SCALE	1:1
NO.	01 OF 01
REV. NO.	D

REV.	DESCRIPTION	DATE	BY	CHKD.	APPD.	DATE	BY	CHKD.	APPD.	DATE	BY	CHKD.	APPD.
0	FOR THERMAL POWER PROJECT SG, TG, BOP PACKAGE	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS
1	TYPE-G ADDED + MINOR CORRECTION	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS
2	SECOND ISSUE	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS
3	FIRST ISSUE	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS	11.07.95	PS	PS	PS

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NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT		TYPICAL THERMAL POWER PROJECT	
TITLE		INTERFACING OF FIELD INSTRUMENTS/ SWGR SWITCH (COC) TERMINATION DETAILS	
SIZE	SCALE	DRG. NO.	REV. NO.
A3	NTS	0000-999-PCI-A-065	A
DATE		SH 01 OF 14	

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE
A	FIRST ISSUE										29.04.08
CLEARED BY											