PRAGATI POWER CORPORATION LIMITED

1500(N) MW PRAGATI-III CCPP

TECHNICAL SPECIFICATION

OF FIELD INSTRUMENTS FOR

FIRE PROTECTION SYSTEM & COMPRESSED AIR SYSTEM

SPECIFICATION NO.: - PE-TS-314-522-A001

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI BUILDING, NOIDA (U.P.)
INDIA

	INDEX **PRAGATI-III CCPP** **1500 MW** **FIELD INSTRUMENTS FOR** **FPS & CAS**	SPECIFICATION NO. **PE-TS-314-522-A001** VOLUME **II B & III** REV. **0**

VOLUME – II B
SECTION – A
INTENT OF SPECIFICATION

1.0 INTENT OF SPECIFICATION

1.1 This specification covers the supply of field instruments as specified, comprising engineering, duly packed for transportation, delivery to site, loading, unloading at site & handover to customer as required for Fire Protection System & Compressed Air System as mentioned in the different sections of this specification for 1500 MW Pragati-III CCPP.

1.2 The bidder shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not..

1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.

1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the document.

1.5 The general term and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification is subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.

1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification. In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.

1.7 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.

1.8 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule along with the cost of withdrawal; otherwise, it will be presumed that the bidder's offer is strictly in line with NIT specification.

1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.

1.10 Unless specified otherwise, all through the specification, the word bidder shall have same meaning as successful bidder / vendor.

1.11 The standard quality plan is included in this specification to enable the bidder to understand the extent of inspection and testing requirements to execute this job. The successful bidder has to follow the quality plan as minimum requirement during manufacturing and testing.

VOLUME – II B
SECTION – B
PROJECT INFORMATION

Clause No.	PROJECT INFORMATION
1.00.00	**PROJECT INFORMATION**
1.01.00	**Introduction** Pragati Power Corporation Ltd. (PPCL) New Delhi, is a company owned by Government of Delhi. PPCL is presently operating Pragati CCPP (330MW), PPCL is planning to setup a Natural Gas/Regasified Liquified Natural Gas (RLNG) based combined cycle power plant of nominal capacity of 1500 MW named as Pragati-III Combined Cycle Power Project. **Location** The site is located at the outskirts of Delhi at Latitude of 28° 35' N and Longitude of 77° 12' E. The site is adjacent to 400kv substation at Bawana. **Configuration** Pragati III combined cycle power project, shall have 2 x (2 GT + 2 HRSG + 1 ST) - Multi shaft Configuration Note : (a) Combination of two(2) Gas Turbines and one Steam Turbine shall be construed as one combined cycle module. (b) In multishaft combined cycle configuration, each Gas Turbine and Steam Turbine of the Module shall drive its own dedicated Electric Generator. The power generated at this power station shall be evacuated through 400KV transmission system. Further to the information given in the following paragraphs, bidders are advised to visit project site and collect data on local conditions to enable them make a fully compliant bid and successful execution of the Contract.
1.02.00	**Approach to Site**
1.02.01	**Road Approach** The Site is approachable from GT road as well by ring road via Rohini & Delhi college of Engineering.
1.02.02	**Air port** Indira Gandhi International Air port, Delhi is about 20 kms away from project site.

Clause No.	PROJECT INFORMATION
1.03.00	**Land Availability** The land identifed for the project is in physical posession of PPCL Bidders are advised to visit the plant site for getting acquainted with the conditions prevailing at site.
1.04.00	**Fuel Availability** RLNG/Natural Gas would be used as the main fuel for the project.
1.04.01	**Natural Gas** Employer shall make RLNG / Natural Gas available at a pressure of about 40 Kg/ cm^2 at a terminal point near Plant Boundary. Expected composition of RLNG/ Natural Gas shall be as indicated at Annexure-I.
1.05.00	**Water Availability** Make up water for the plant shall be treated sewage water drawn from Rithala sewage treatment plant.
1.06.00	**Quality of Raw Water** Raw Water Analysis from above source is enclosed at Annexure - II.
1.07.00	**Meteorological Data** Important meteorological data as obtained from Safdarjund Obsevatory, Delhi based on observations from year 1951 to 1980 is enclosed at Annexure-III.
1.08.00	**Wind Design Criteria** Criteria for Wind resistant design of structures and equipment shall be as per Annexure-IV.
1.09.00	**Earthquake Design Criteria** Criteria for earthquake resistant design of structures and equipment shall be as per Annexure-V.

VOLUME – II B
SECTION – C
SCOPE OF SUPPLY

GENERAL

This specification covers the supply of field instruments as specified, comprising engineering, duly packed for transportation, delivery to site, loading, unloading at site & handover to customer as required for Fire Protection System & Compressed Air System as mentioned in the different sections of this specification for 1500 MW Pragati-III CCPP.

1. SUPPLY SCOPE

S No.	Item Description	Quantity	Remarks
A. FIRE PROTECTION SYSTEM			
1	**TRANSMITTER (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**		
a	PRESSURE TRANSMITTER	5	**YOKOGAWA MODEL: EJA430A-E-'Y'-S4A-92EA**
b	LEVEL TRANSMITTER (ULTRASONIC TYPE)	5	**HAWK MEASUREMENT PVT. LTD., AUSTRALIA MODEL: SULTAN SERIES**
c	LEVEL TRANSMITTER (DP TYPE)	5	**YOKOGAWA MODEL: EJA210A-EMWA1A5A-92EN**
2	**LOCAL GAUGES (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**		
a	PRESSURE GAUGE	5	**General Instruments Consortium, Delhi Model: DPG-B-S-15-S4-S6-A-15NTM-0-2-A-L**
b	LEVEL GAUGE	5	**V. AUTOMAT & INSTRUMENTS (P) LTD., DELHI MODEL: RLG-1650-1630-311-VA2500**
	LEVEL INDICATOR	5	**V. AUTOMAT & INSTRUMENTS (P) LTD., DELHI MODEL: 40C**
c	DIFF-PRESSURE GAUGE	5	**General Instruments Consortium, Delhi Model: BSPG-V-15-AL-S-4-15NTM-0-16-A-L**
3	**PROCESS ACTUATED SWITCHES (PRESSURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**		
a	PRESSURE SWITCH	13	**Indfos Industries Ltd., Ghaziabad. Model: B4 64 S XSC XPC XNH XFS 0.7/14 KG/CM2**

4	**ACTUATORS OF ALL TYPES (HYDRAULIC, PNEUMATIC & MOTORISED) FOR EACH TYPE, MODEL & RATING**		
a	MOTORISED	1	**ROTORK CONTROLS (I) PVT. LTD.**
5	**COMPLETE SOLENOID VALVE OF EACH TYPES**	4	**ROTEX MODEL: 24102-12-4R-B5-M6-S2-24V-DC-22-H**
B. COMPRESSED AIR SYSTEM			
1	**LOCAL GAUGES (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**		
a	PRESSURE GAUGE	5	**A.N. Instruments Model: 6 SSPGAD**
b	TEMPERATURE GAUGE	5	**A.N. Instruments Model: 6 RMSTAV**
c	FLOW GAUGE	5	**EUREKA Model: BPF-MS-80-PG-3**
2	**PROCESS ACTUATED SWITCHES (PRESSURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**		
a	FLOW SWITCH	5	**SWITZER Model: BGM-50-M-TH-33-Z**

Further, for instrument detailed technical parameters, pl. refer Section-D.

2. PACKING

Bidder to note that proper packing shall be provided ensuring safety to the instruments.

3. MAKES OF EQUIPMENTS / ITEMS

Bidder to note that makes shall be as specified above only.

4. DRAWINGS / DOCUMENTS

Bidder to note that engineering documents like Technical Data sheet & Quality Plan needs not be submitted by bidder. However, bidder to ensure supply of instruments as per documents attached under Section – D.
Bidder to furnish the stamped copy of these documents as a token of acceptance.

5. INSPECTION & TESTING

Bidder to furnish the Certificate of Conformance & other test certificates as required by end customer during acceptance of material. Also, bidder to withstand the guarantees as specified in commercial part of specification.

VOLUME – II B
SECTION – D
TECHNICAL DATA SHEET & QUALITY PLAN

एनटीपीसी NTPC

NTPC Limited
(A Govt. of India Enterprise)
CONSULTANCY WING

TRANS.NO. CEI 239
DATE 12/4/10
(SIGN) Akash
(DATE)

Cat IV

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REV.	DATE	DESCRIPTION	DRN.BY	CHD.BY	APPD.BY
0	28.10.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

R E V I S I O N S

PROJECT: 2 x 750 MW,PRAGATI III,COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CONSULTANT: NTPC – CONSULTANCY WING

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATASHEET – PRESSURE SWITCH

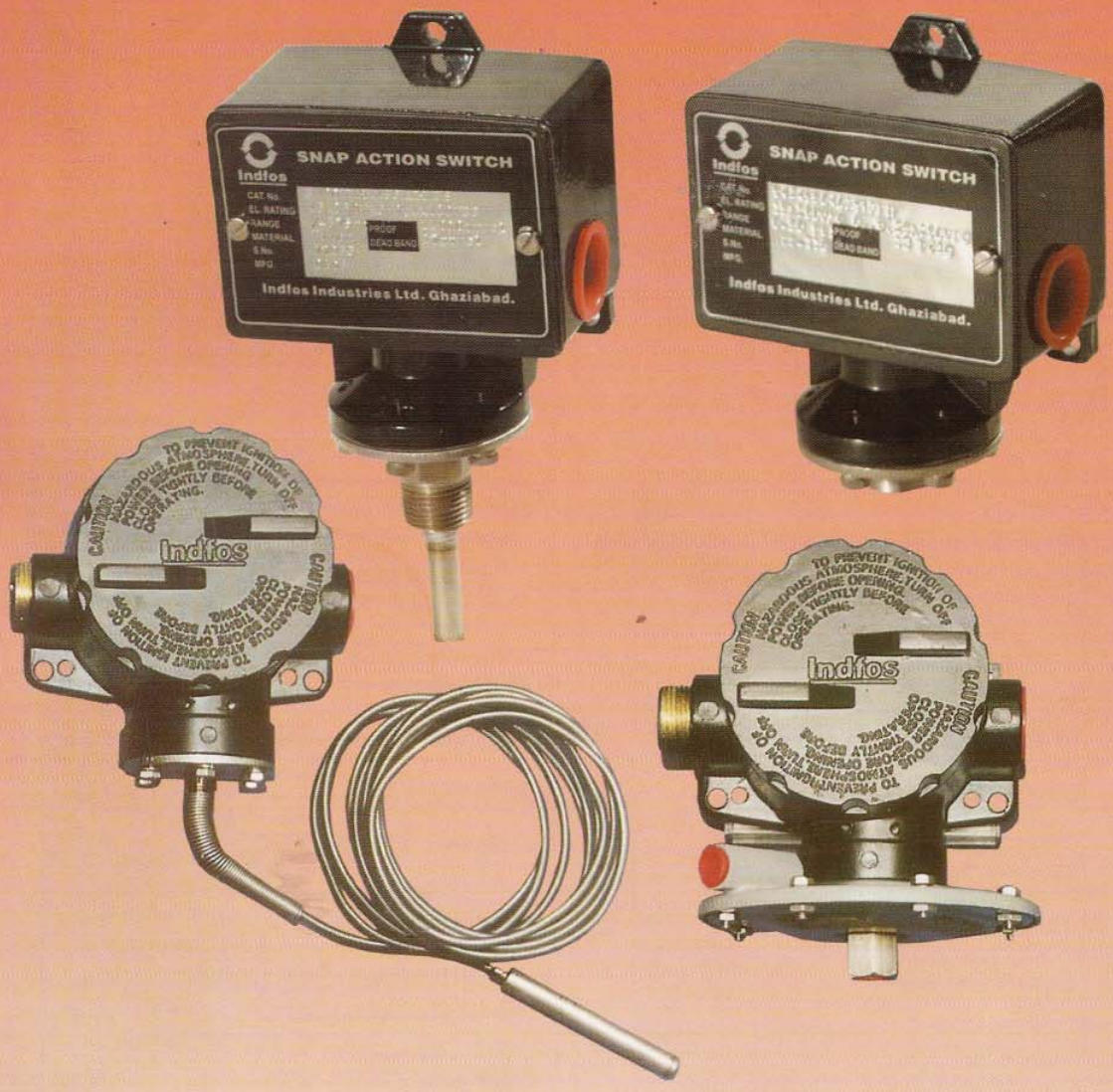
DRAWN	CHECKED	APPROVED	DATE	SCALE	JOB NO.
SBJ	MAR	BSC	28.10.09	NTS	P–269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE–V0–314–552–A066		0	1 OF 2

PRESSURE SWITCH

1.0	Make	Indfos Industries Limited, Ghaziabad
1.1	Model No.	B4 64 S XSC XPC XNH XFS 0.7/14 Kg/Cm²
1.2	Service	Water
1.3	Type	Diaphragm Sealed Piston Actuator
1.4	Process condition	
1.4.1	Working pressure	8.8 kg/cm2
1.4.2	Design temperature	50 deg. C.
1.5	Sensing element	SS-316 Diaphragm
1.6	Wetted Parts	SS-316
1.7	Process connection	½ " NPT(M) through adapter
1.8	Max. permissible temp.	150 deg.C.
1.9	Enclosure material	Die cast aluminium,black powder coated
1.10	Enclosure protection	Weather proof conforming toIP-66 as per IS:2147
1.11	Cable entry	Plug and Socket
1.12	Switch type	2 SPDT, Snap action micro switch
1.13	Contact rating	15 A 250 V AC, 0.5 A 125 V DC, 0.25 A 250 VDC,6A 30 VDC
1.14	Range	0.7 to 14 kg/cm2
1.15	Differential	2.52 kg/cm2(fixed and max.)
1.16	Max. Proof pressure	65 kg/cm2
1.17	Repeatability	+/- 0.5%
1.18	Set point	Adjustable throughout the range
1.19	Actuation	4.5 rising, 6.5 falling
1.20	Accessories	
1.20.1	XSC	SS 316 Adaptor for connection size ¼" NPT(M) X ½" NPT(M)
1.20.2	XPC	7 Pin Plug in Connector
1.20.3	XNH	SS-304 tag plate
1.20.4	XFS	Factory set point(4.5 rising, 6.5 falling)
1.18	Quantity & Location	As per approved P & ID
1.19	Catalogue	Enclosed (9 nos. sheets)

PRESSURE / DIFFERENTIAL PRESSURE & TEMPERATURE SWITCHES TYPE B-SERIES



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Indfos

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B SERIES SWITCHES

B Series Switches utilises diaphragm sealed piston actuator as the sensing element. The rugged diaphragm sealed piston actuator provides set point repeatability of ± 0.5%. The enclosure is die-cast aluminium and is available in weather proof and explosion proof versions (Table A). A wide variety of SPDT and Dual (2) SPDT snap action switches are available to meet many electrical load requirements (Table B). Applications include : Pumps, Compressors, Heat Exchangers, Boilers, Marine Equipment, Lube Systems, Filters, Degreasers, Evaporators, Recovery System, Ground Support Equipments, Textile Machinery, Heating & Air Conditioning Systems, Food Processing, Heat Tracing, Fire Fighting, Bottling, Bulk Conveying Systems, Packing & Filling, Furness, Blowers and Air Dryers etc.

A.	ENCLOSURE
B4	Pressure switch type 400 watertight enclosure to meet weather proofness to IP : 66 as per IS : 13947 (Part I) 1993.
B7	Pressure switch type 700 explosion proof enclosure to meet to gas gr. IIA & IIB as per IS : 2148 1981.
B7 IIC	Pressure switch type 700 explosion proof enclosure to meet to gas gr. IIC as per IS : 2148 1981.
D4	Differential pressure switchtype 400 watertight enclosure to meet weather proofness to IP : 66 as per IS : 13947 (Part I) 1993
D7	Differential pressure switch type 700 explosion proof enclosure to meet to gas gr. IIA & IIB as per IS : 2148 1981.
D7 IIC	Differential pressure switch type 700 explosion proof enclosure to meet to gas gr. IIC as per IS : 2148 1981.
T4	Temperature switchtype 400 watertight enclosure to meet weather proofness to IP : 66 as per IS : 13947 (Part I) 1993
T7	Temperature switch type 700 explosion proof enclosure to meet to gas gr. IIA & IIB as per IS : 2148 1981.
T7 IIC	Temperature switch type 700 explosion proof enclosure to meet to gas gr. IIC as per IS : 2148 1981.

Ambient operating limit - 30º C to 65º C for all Switches.

B.	SWITCH TYPE			
Sl. No.	TYPE	ELE. RATING	CODE	
			1 SPDT	2 SPDT
1.	Low Force	10A 125/250/480 VAC, 1/8 HP 125 VAC, 1/4 HP 250 VAC	10*	
2.	Narrow Dead Band	15 A 125/250 VAC, 0.4A 120 VDC	20	61
3.	Ammonia Service	5 A 125/250 VAC	21	65
4.	Hermetically Sealed Switch, Narrow Dead Band	5A 125/250 VAC, 2.5A 28 VDC	22	67
5.	Heavy Duty AC	22A 125/250 VAC	23	
6.	Genral Purpose	15A, 125/250/480 VAC, 0.5A 125 VDC, 0.25A 250 VDC, 6A 30 VDC	24	64
7.	Heavy Duty DC	10A 125 VAC OR DC	25	66
8.	Sealed Environment Proof	15A 125/250 VAC, 0.4A 125 VDC	26	62
9.	High Temperature 300 Deg. F (150 Deg.C)	15A 125/250 VAC	27	63
10.	Gold Plated Contacts	1A 125 VAC, 1A Res./0.5A Ind. 28VDC	31	70
11.	Hermetically Sealed Switch	11A 125/250 VAC, 5A 30 VDC	32	68
12.	Hermetically Sealed Switch, Gold Plated Contacts	1A 125 VAC, 0.5 A 24 VDC	42	71
13.	Variable Dead Band	15A 125/250 VAC	50	

* Available in pressure ranges of 2.5 - 25 mm H_2O and 5.0 - 50 mm H_2O only.

PRESSURE SWITCHES DEAD BAND CHART FOR B400 / B700 SWITCHES WITH BUNA N DIAPHRAGM

S.NO.	MICROSWITCH → / RANGE ↓	10	20,26 27	21,24, 31,33	22	25	32,42	50		61,62,	64,65 70	67	68,71
			MAX. DEAD BAND					MIN.	MAX.	MAX. DEAD BAND			
LOW PRESSURE RANGE						mm H_2O							
1	25 mm H_2O	2	6										
2	50 mm H_2O	3	7										
3	250 mm H_2O		13	51	26	89	72	9	38	21	81	41	114
4	750 mm H_2O		16	64	51	112	89	11	51	26	102	82	142
5	1500 mm H_2O		33	89	76	157	127	22	64	54	142	122	203
6	2500 mm H_2O		41	140	102	244	196	27	102	64	224	163	305
7	3750mm H_2O		64	216	153	381	305	43	165	102	330	244	483
8	+/-375mm H_2O		19	64	31	112	89	11	51	31	102	49	142
9	+/- 750mm H_2O		15	64	38	112	89	11	51	26	102	61	142
VACCUM RANGE						mm Hg							
10	- 760 mm Hg		18	76	38	132	107	12	56	31	122	61	173
COMPOUND RANGE						mm Hg / Kg/cm2							
11	- 760 mm Hg /		25	76	46	135	107	19	64	41	122	74	170
	1Kg/cm²		0.05	0.11	0.10	0.18	0.15	0.04	0.07	0.08	0.17	0.2	0.24
12	- 760 mm Hg /		38	153	61	254	213	30	114	61	244	98	330
	2Kg/cm²		0.06	0.14	0.09	0.25	0.20	0.05	0.11	0.09	0.23	0.15	0.32
13	- 760 mm Hg /		76	229	114	305	305	63	178	122	356	183	483
	4Kg/cm²		0.11	0.35	0.16	0.61	0.49	0.08	0.28	0.17	0.56	0.26	0.81
PRESSURE RANGE						Kg/cm2							
14	1Kg/cm²		0.02	0.11	0.07	0.18	0.15	0.01	0.07	0.04	0.17	0.11	0.23
15	2Kg/cm²		0.04	0.11	0.07	0.18	0.15	0.02	0.07	0.06	0.17	0.11	0.23
16	4 Kg/cm²		0.07	0.25	0.14	0.44	0.35	0.05	0.18	0.11	0.39	0.23	0.56
17	7 Kg/cm²		0.12	0.35	0.32	0.61	0.49	0.08	0.25	0.19	0.56	0.51	0.79
18	14 Kg/cm²		0.21	0.92	0.53	1.55	1.28	0.14	0.63	0.34	1.48	0.85	2.04
19	28 Kg/cm²		0.5	1.7	0.8	3.0	2.4	0.4	1.1	0.8	2.7	1.2	3.8
20	42 Kg/cm²		0.8	2.1	1.6	3.7	2.96	0.5	1.4	1.2	3.4	2.6	4.7
21	70 Kg/cm²		2.1	7.8	5.6	13.5	10.8	1.3	4.9	3.4	12.4	9.0	17.6
22	110 Kg/cm²		3.2	12.0	9.0	21.0	16.1	2.0	6.0	5.1	19.2	14.2	27.2
23	140 Kg/cm²		3.2	12.0	9.0	21.0	16.1	2.0	6.0	5.1	19.2	14.2	27.2
24	210 Kg/cm²		4.2	16.5	16.2	28.9	23.2	2.6	11.3	6.8	26.5	25.9	37.0

DIFFERENTIAL PRESSURE SWITCHES DEAD BAND CHART FOR D400 / D700 SWITCHES WITH BUNA N DIAPHRAGM

S.NO.	MICROSWITCH → / RANGE ↓	20,26, 27	21,24, 31,33	22	25	32,42	50		61, 62	64,65 70	67	68,71
		MAX. DEAD BAND					MIN	MAX.	MAX. DEAD BAND			
LOW D.P RANGE					mm H2O							
1	250 mm H_2O	13	51	26	89	72	9	38	21	81	41	114
2	750 mm H_2O	15	64	51	112	89	11	51	25	102	81	142
3	1500 mm H_2O	33	89	76	157	127	23	64	53	142	122	203
4	2500 mm H_2O	41	140	102	244	196	28	102	64	224	163	305
5	3750mm H_2O	64	216	152	381	305	46	165	102	330	244	483
HIGH D.P RANGE					Kg/cm²							
5	1Kg/cm²	0.07	0.35	0.10	0.61	0.49	0.05	0.25	0.11	0.56	0.16	0.77
6	2Kg/cm²	0.14	0.35	0.20	0.61	0.49	0.11	0.25	0.23	0.56	0.32	0.77
7	4 Kg/cm²	0.28	0.42	0.39	0.70	0.60	0.21	0.32	0.45	0.68	0.63	0.92
8	7 Kg/cm²	0.7	1.4	1.0	2.5	2.0	0.5	1.1	1.1	2.3	1.6	3.1
9	14 Kg/cm²	1.1	2.8	1.5	4.9	3.9	0.7	1.8	1.7	4.5	2.4	6.3
10	28 Kg/cm²	1.4	4.2	2.0	7.4	5.9	1.1	2.8	2.3	6.8	3.2	9.4
11	42 Kg/cm²	2.8	10.6	3.9	18.3	14.8	2.1	8.1	4.5	16.9	6.3	23.7

Notes :

* Switches May Generally be set between 15% and 100% of nominal range on increasing pressure and 5% and 90% of nominal range on falling pressure.
* The set and reset points must fall within the adjustable range.

* Deadbands for optional diaphragms
  - Viton : Multiply Buna N value by 1.4
  - Teflon : Multiply Buna N value by 1.2
  - SS - 316 : Multiply Buna N value by 1.7
  - Monel : Multiply Buna N value by 1.7

PRESSURE / VACCUM SWITCHES

B Series switches are designed to handle pressure from vaccum to 210 kg/cm^2. These are designed for high proof pressures. B Series switches use a diaphragm sealed piston actuator. As the pressure on the calibrated piston increases, the adjusted spring force is over-come and the snap action switch is actuated. The piston is sealed from the process by a diaphragm. Choice of diaphragm materials offer compatibility with virtually any medium. Stainless steel diaphragm is also available as an option from 12.5 - 250mm H_2O to 7.0 - 140 kg/cm^2.

C. ACTUATOR SEAL (1), (8)					
CODE	DIAPHRAGM MATERIAL	MAX TEMP ºC	RANGE		
			VAC & mmH_2O	0-140 kg cm^2	210 kg cm^2
B	BUNA-N	65	•	•	•
V	VITON	150	•	•	
T	TEFLON	65 (2)	•	•	•
S (7)	SS-316	150	•	•	

NOTE :

(1) Process connection size is ¼" NPT (F) for all ranges.

(2) Max. Temperature can be increased to 150º using option XTV.

(3) Order option XHX for 7 kg/cm^2 max. pressure in mm H_2O ranges.

(4) These ranges are not available with SS Diaphragm

(5) These range available with SS-316 diaphragm with viton gasket for sealing.

(6) These ranges also available with process connection size of ½" MPT(M)

(7) Max. Pressure for SS diaphragm is 165 kg/cm^2

(8) Other diaphragm material like SS-316L, Monel etc. can also be provided on specific request.

* These ranges are available with microswitch Type 10 only.

D. ADJUSTABLE RANGE	PROOF PRESSURE
VACCUM	
(-) 760-0 mm Hg	16 kg/cm^2 (4)
COMPOUND	
(-) 375-(+) 375 mm H_2O	1.4 kg/cm^2 (3), (4)
(-) 760-(+) 760 mm H_2O	1.4 kg/cm^2 (3), (4)
(-) 1-(+) 1kg/cm^2	16 kg/cm^2 (4)
(-) 1-(+) 2kg/cm^2	16 kg/cm^2 (4)
(-) 1-(+) 4kg/cm^2	16 kg/cm^2 (4)
WATER COLUMN	
2.5-25 mm H_2O*	1.4 kg/cm^2 (3), (4)
5.0-50 mm H_2O*	1.4 kg/cm^2 (3), (4)
12.5-250 mm H_2O	1.4 kg/cm^2 (3)
37.5-750 mm H_2O	1.4 kg/cm^2 (3)
75-1500 mm H_2O	1.4 kg/cm^2 (3)
125-2500 mm H_2O	1.4 kg/cm^2 (3)
187.5-3750 mm H_2O	1.4 kg/cm^2 (3)
PRESSURE	
0.05-1.0 kg/cm^2	33 kg/cm^2
0.1-2.0 kg/cm^2	33 kg/cm^2
0.2-4.0 kg/cm^2	33 kg/cm^2
0.35-7.0 kg/cm^2	65 kg/cm^2
0.7-14.0 kg/cm^2	65 kg/cm^2
1.4-28.0 kg/cm^2	170 kg/cm^2
2.1-42.0 kg/cm^2	170 kg/cm^2
3.5-70.0 kg/cm^2	800 kg/cm^2 (6)
5.5-110.0 kg/cm^2	800 kg/cm^2 (5), (6)
7.0-140.0 kg/cm^2	800 kg/cm^2 (5), (6)
10.5-210.0 kg/cm^2	800 kg/cm^2 (4), (6)

DIFFERENTIAL PRESSURE SWITCHES

B Series differential pressure switches are designed for high or low differential pressure ranges from 12.5-250 mm H_2O to 4.2-42 kg/cm^2 (Table F). The low range differential pressure switches are diaphragm actuated. Process pressure acts on both sides of a diaphragm and ensures true response. The PSI range Differential pressure switches consist of two identical calibrated pistons which are sealed from the process by diaphragms.

E. ACTUATOR SEAL*				
CODE	DIAPHRAGM MATERIAL	MAX TEMP ºC	RANGE	
			mmH_2O	Kg/cm^2
B	BUNA-N	65	•	•
V	VITON	150	•	•
T	TEFLON	65	•	•
S(9)	SS-316	150	•	•

(9) Available upto 6 kg/cm^2.

* Other diaphragm material like SS-316L, Monel etc. can also be provided on specific request.

F. ADJUSTABLE RANGE	MAX. STATIC PRESSURE
LOW PRESSURE	
12.5-250 mm H_2O	3800 mm H_2O (10),(11),(12)
75-750 mm H_2O	3800 mm H_2O (10),(11),(12)
150-1500 mm H_2O	3800 mm H_2O (10),(11),(12)
250-2500 mm H_2O	3800 mm H_2O (10),(11),(12)
375-3750 mm H_2O	3800 mm H_2O (10),(11),(12)
HIGH PRESSURE	
0.1-1 kg/cm^2	33 kg/cm^2 (13)
0.2-2 kg/cm^2	33 kg/cm^2 (13)
0.4-4 kg/cm^2	33 kg/cm^2 (13)
0.7-7 kg/cm^2	65 kg/cm^2
1.4-14 kg/cm^2	65 kg/cm^2
2.8-28 kg/cm^2	65 kg/cm^2
4.2-42 kg/cm^2	130 kg/cm^2

(10) Max. Proof pressure is 1.4 kg/cm^2.

(11) Order option XHX for 2.8 kg/cm^2 max. static pressure and 11.2 kg/cm^2 proof pressure.

(12) These ranges are available with SS-316 diaphragm with viton gasket for sealing.

(13) These ranges are available with SS diaphragm with teflon O ring for sealing.

TEMPERATURE SWITCHES

B Series temperature switches are designed to maintain temperatures at desired set points. A wide range of temperature selection from -40ºC to 400ºC is offered to meet many applications. Temperature switches are available in direct mounting type as well as remote mounted capillary type.

The direct mounting type series is available in different stem lengths from 70 mm to 305 mm (Table H).

The remote mounted switches have SS 316 capillary, length of which can vary from 1.5 to 7.5 meters (Table G). Capillary armouring is standard.

Thermowell bushings are available for capillary type switches. A split rubber grommet allows easy installation and adjustment of immersion length. Order option X 69 C.

G. REMOTE MOUNTED THERMAL SYSTEM

CODE	CAPILLARY LENGTH (14)	STYLE
T05030	1.5 Meters	SS-316 Capillary with SS-304 armouring. 76 mm long/9.5 mm dia bulb
T10030	3.0 Meters	
T15030	4.5 Meters	
T20030	6.0 Meters	
T25030	7.5 Meters	

H. DIRECT MOUNT THERMAL SYSTEM

CODE	STEM LENGTH (14)	STYLE
TS027	70 mm	9.5 mm dia SS-316 stem with ½" NPT (M) connection
TS040	102 mm	
TS060	152 mm	
TS090	229 mm	
TS120	305 mm	

A wide temperature range selection is offered (TABLE I). The vapour pressure system ensures quick response and ± 1% repeatability.

I. ADJUSTABLE RANGE	MAX. TEMP.
- 40 to 16ºC	205ºC
- 20 to 40ºC	205ºC
25 to 95ºC	205ºC
65 to 125ºC	205ºC
70 to 170ºC	260ºC
110 to 190ºC	260ºC
175 to 275ºC (15)	370ºC
260 to 400ºC (15)	480ºC

(14) For stem length and capillary length other than the standard, Please contact our nearest sales office.

(15) Available in remote mounted style only.

TEMPRATURE SWITCHES DEAD BAND CHART FOR T400 / T700 SWITCHES

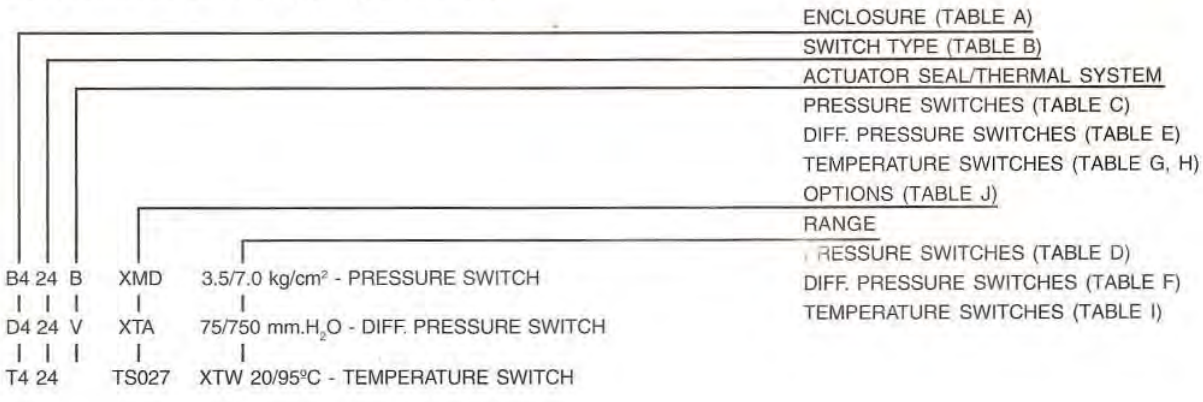
S.NO.	MICROSWITCH →	20,26, 27	21,24, 31,33	22	25	32,42	50		61,62,	64,65 70	67	68,71
	RANGE (DEG. C) ↓	MAX. DEAD BAND					MIN.	MAX.	MAX. DEAD BAND			
1	20 TO 95	1.9	8.9	5.0	28.0	13.0	1.4	6.7	3.1	14.0	8.0	20.0
2	65 TO 125	1.7	6.7	5.0	20.0	13.0	1.2	4.7	2.2	10.6	8.0	20.0
3	70 TO 170	1.7	6.7	5.0	20.0	13.0	1.4	4.7	3.1	10.6	8.0	20.0
4	110 TO 190	1.7	6.7	5.0	20.0	13.0	1.4	4.7	3.1	10.6	8.0	20.0
5	175 TO 275	2.5	8.9	5.6	28.0	19.0	1.8	6.7	4.0	14.0	8.9	28.0
6	260 TO 400	4.4	16.7	12.8	-	27.8	4.0	13.3	7.0	26.7	20.5	44.5
7	- 20 TO 40	1.7	6.7	4.2	22.0	11.0	1.2	4.7	2.2	10.6	6.7	17.0
8	- 40 TO 16	1.1	4.4	3.3	15.6	8.9	0.8	3.1	1.8	7.1	5.3	14.0

Notes :

* All deadbands are in degree centigrades only.
Set point and reset points must fall within the adjustable range.

ORDERING

To order desired Model write your option in this form



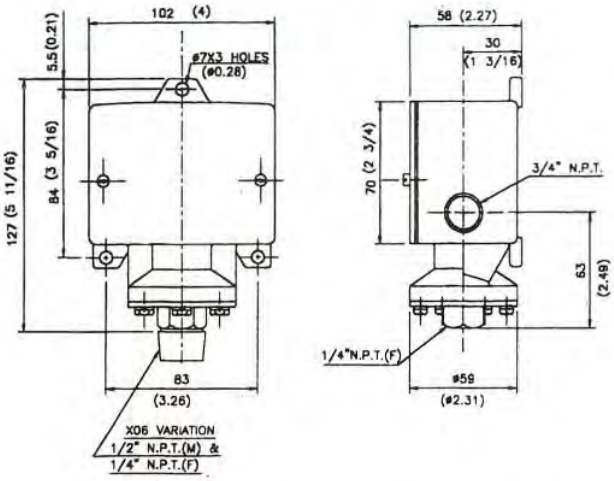
OPTIONS / ACCESSORIES LIST

CODE	DESCRIPTION
XHX	High Static Pressure
XJL	Al 1/2"NPT cable entry bushing
XJM	SS 1/2"NPT cable entry bushing
XCHC	Chained Cover
X69C	Sliding bushing
XK3	Terminal block for1SPDTswitches in expln.proof housing only.
XBP	Wall mounting bracket
XTM	2"pipe mounting bracket
XNH	SS tag plate
XSC	Adaptor for connection size SS
XFS	Factory set point
XCG	Nickel plated brass weatherproof cable gland
XCH	AL. Weatherproof cable gland
XCI	SS weatherproof cable gland
XCJ	Nickel plated brass explosionproof cable gland IIA & IIB
XCK	AL. Explosion proof cable gland IIA & IIB
XCL	SS.Explosion proof cable gland IIA & IIB
XCM	Nickel plated brass explosionproof cable gland IIC
XCN	AL explosion proof cable gland IIC
XCO	SS explosionproof cable gland IIC
XPC	Plug in connector
X2108	Special option for Terminal block in weather proof housing
XSN	Snubber
XSYCS	Syphon Carbon Steel
XSYSS	Syphon Stainless Steel
XGS	Gauge saver SS
X6B	Oxygen cleaning
XSP	SS cable entry plug
XTV	150deg C process temp.forTeflon diaphragm for PSI range
XTW	Thermowell
XIS	Indicating Scale
XCC	Temperature switch with copper bulb & capillary with SS-304 armouring
XPM	Switches with 20" lead wires
X2B	Breather Drain
X2GC	2 Way Gauge Cock
X3GC	3 Way Gauge Cock
X2VM	2 Valve Manifold
X3VM	3 Valve Manifold
X5VM	5 Valve Mnifold
X2NV	2 Way Needle Valve

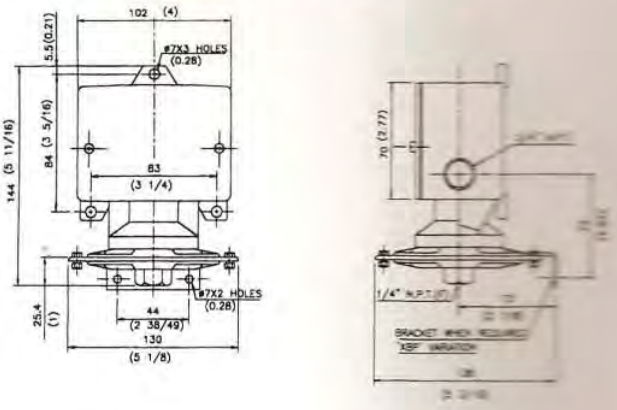
DIMENSIONS

TYPE 400 DIMENSIONS :

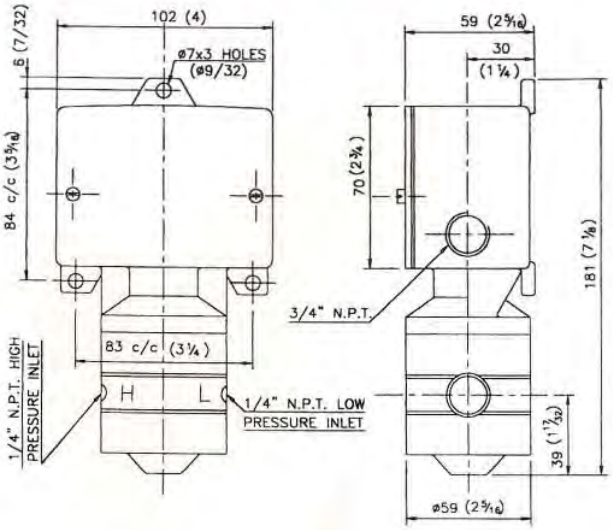
Pressure Switch - Kg/Cm² Range



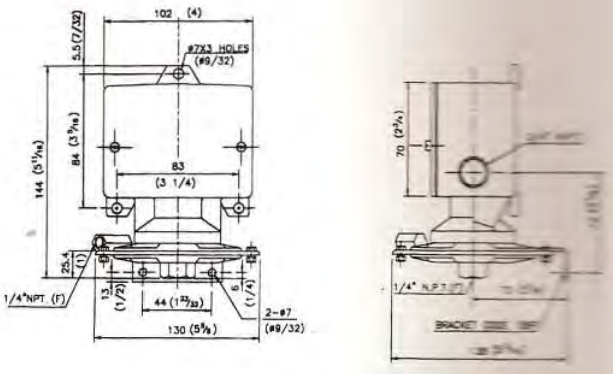
Pressure Switch - mm H_2O Range



Diff. Pressure Switch - Kg/Cm² Range

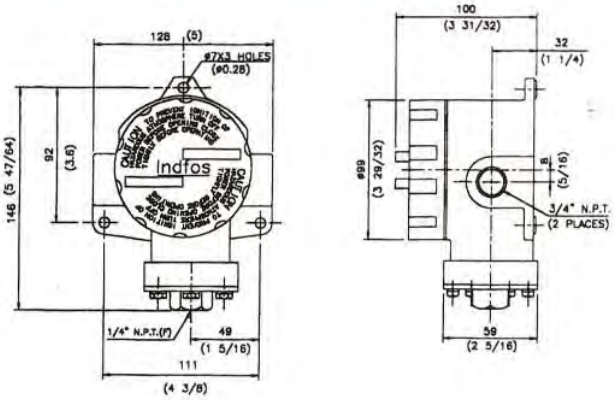


Diff. Pressure Switch - mm H_2O Range

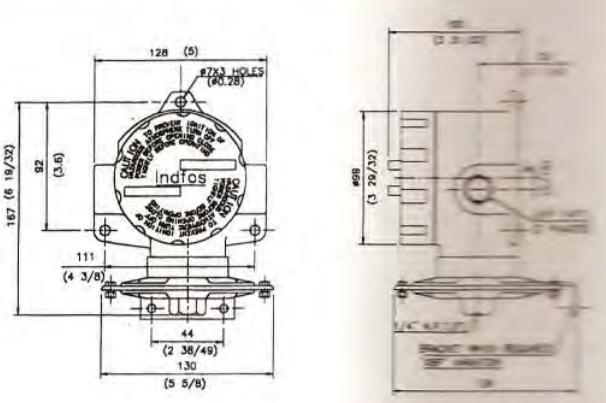


TYPE 700 DIMENSIONS :

Pressure Switch - Kg/Cm² Range



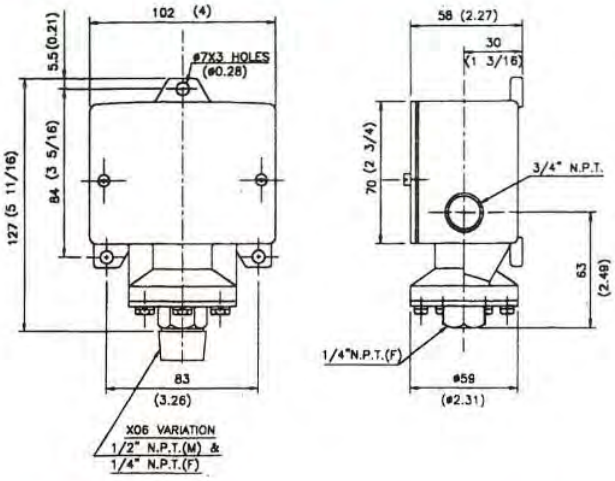
Pressure Switch - mm H_2O Range



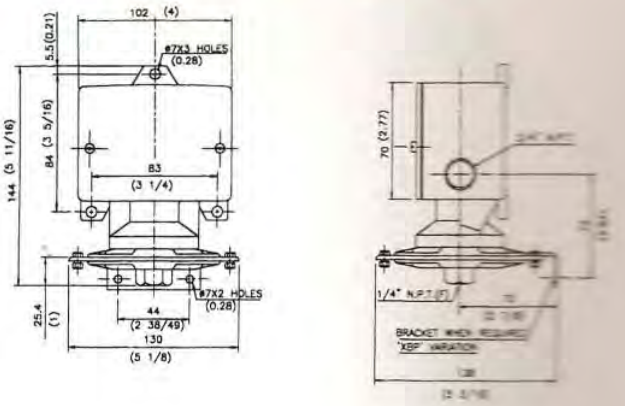
DIMENSIONS

TYPE 400 DIMENSIONS :

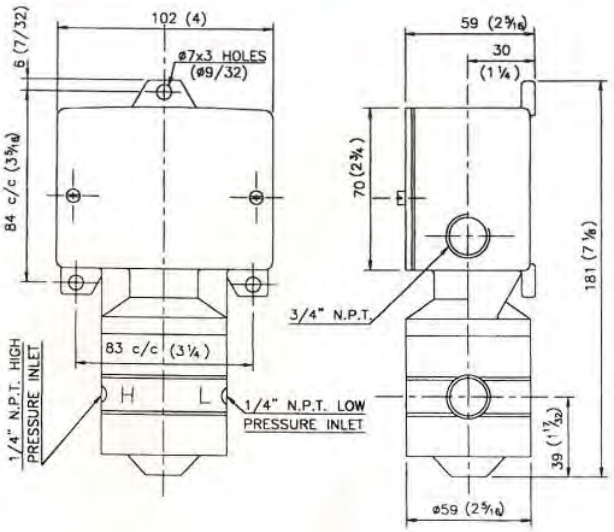
Pressure Switch - Kg/Cm² Range



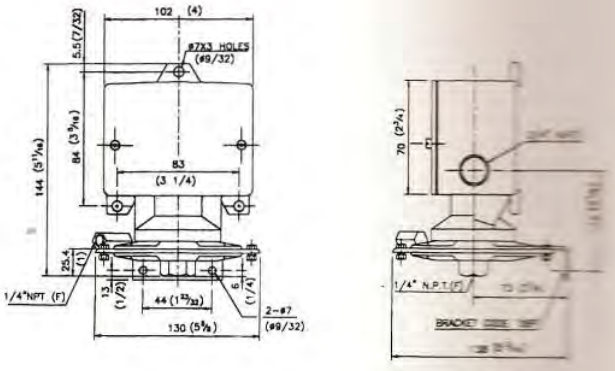
Pressure Switch - mm H_2O Range



Diff. Pressure Switch - Kg/Cm² Range

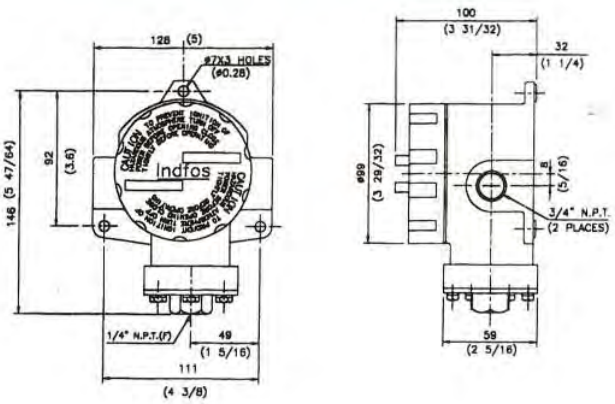


Diff. Pressure Switch - mm H_2O Range

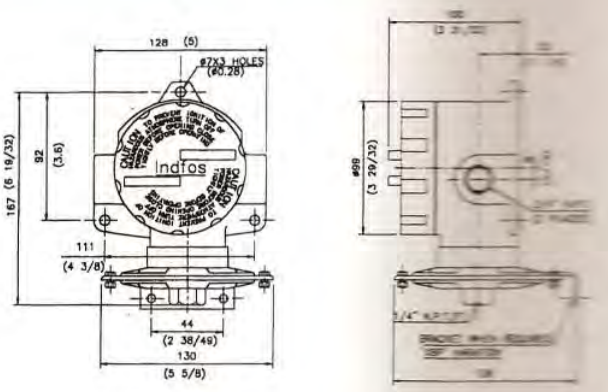


TYPE 700 DIMENSIONS :

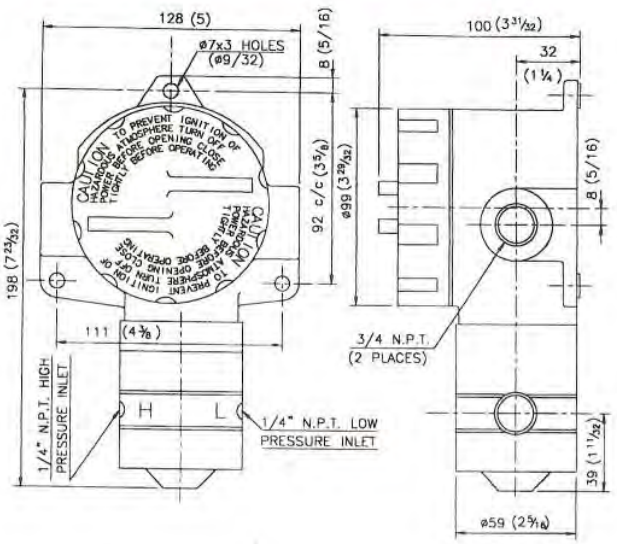
Pressure Switch - Kg/Cm² Range



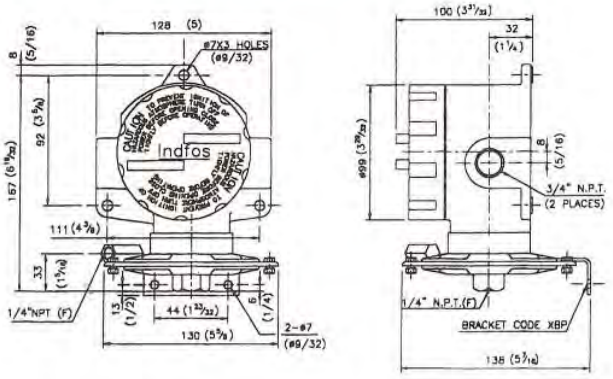
Pressure Switch - mm H_2O Range



Diff. Pressure Switch - Kg/Cm² Range



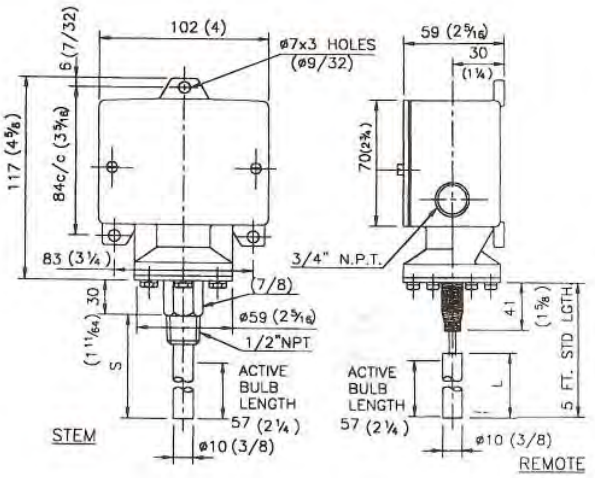
Diff. Pressure Switch - mm H_2O Range



TEMPERATURE SWITCHES

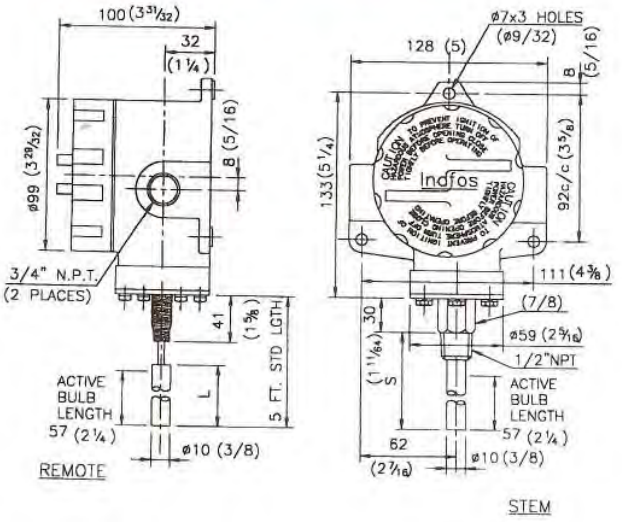
TYPE 400 Dimensions

Remote Mount / Direct Mount



TYPE 700 Dimensions

Remote Mount / Direct Mount



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Tel.: (044) 28295723, 28293407 Fax: (044) 28291760 E-mail : iilche@md4.vsnl.net.in

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Tel.: (033) 22824599, 22824215 Fax: (033) 22824215 E-mail : indfos@vsnl.net

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Works :

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UNITECH MACHINES LIMITED

COMPLAINCE REPORT

General Comments:-

1	This doc. Can not be reviewed because it is in preliminary stage:- a) Respective P&IDs has not been approved b) Instrument Schedule has not been attached	**P&ID approved in CAT-II** **Instrument Schedule submitted to M/s NTPC dated 16.10.09**
2	Pls explain codification BSPG-V-15-AL-S-4-15NTM-0~16-A-L	**BSPG – Type of Gauge; V-Bottom entry, Local mounting; 15-Dial 150mm; AL- Case Die Cast Aluminium; S-Borden/Socket material SS316/SS316; 4- Movement material SS304; 15NTM-process connection ½" Male; 0~16 – Range of pressure gauge; A- Unit in kg/cm2(g); L- Other options NIL.**
3	Pl. indicate the blow out disc	**Provided.** **Please refer point-9 of datasheet.**
4	As per model no. 0.5% accuracy is indicated	**Please refer above point no. 4 reply. 'A' stands for 'Unit' in kg/cm2(g). However we have considered as per specification, accuracy +/- 1% of FSD. Please accept.**
5	Pl. include related Inst schedule indicating Tag no., service, process range & P&ID no.	**Instrument Schedule submitted to M/s NTPC dated 16.10.09**
6	Accessories to be indicated here in as per application Snubber, pulsation dampener to be provided	**Indicated in Datasheet. However, other fittings shall be as per the approved instrument hook up diagram.**

Unitech Machines Limited New Delhi

At - IV

Pl ensure any changes in P&ID / Instrument Sch shall be reflected in datasheet

REV.	DATE	DESCRIPTION	DRN.BY	CHD.BY	APPD.BY
1	11.12.09	GENERALLY REVISED AS PER M/s NTPC COMMENTS	SBJ	MAR	BSC
0	13.08.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

R E V I S I O N S

PROJECT: 2 x 750 MW,PRAGATI III,COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CBI-147 11/1/10 Akash

Cat IV 13/01/2010

CONSULTANT: NTPC – CONSULTANCY WING

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATASHEET – PRESSURE GAUGE

UNITECH M... GURGAON

DRAWN	CHECKED	APPROVED	DATE		JOB NO.
SBJ	MAR	BSC	13.08.09		P-269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A067	P269-D-520	1	1 OF 2

PRESSURE GAUGE

1	Make	General Instruments Consortium , Delhi
2	Model No.	BSPG-V-15-AL-S-4-15NTM-0~16-A-L
3	Service	Water
4	Type / Sensing Element	Bourdon
5	Process condition	
5.1	Working pressure	8.8 kg/cm2
5.2	Design pressure	12 kg/cm2
5.3	Design temperature	50 deg. C.
6	Dial size	150 mm nominal dia
7	Scale	Black lettering on white background in 270 Deg. Arc.
8	Pointer	Micrometer adjustable
9	Blow out disc	Provided
10	Window	Shatterproof glass
11	Case	Weatherproof to IP67 as per IS:13947, Die cast Aluminium, with screwed Aluminium bezel ring
12	MOC	
12.1	Element	SS 316
12.2	Socket	SS 316
12.3	Movement	SS 304
13	Process connection	½ " NPT(M) bottom
14	Range	0 -16 kg/cm2
15	Over-range protection	130 % of FSD
16	Accuracy	+/- 1% of FSD
17	SS tag plate	Provided
18	Accessories	Snubber & other instrument fittings shall be as per approved Instrument Hook-up Drg.
19	Quantity & Location	As per approved P & ID
20	Catalogue	Enclosed (3 nos. sheets)

Unitech Machines Limited New Delhi

UNITECH MACHINES LIMITED

COMPLAINCE REPORT

General Comments:-

DOC. No. PE-V0-314-552-A069 Rev-1 dated 11.12.2009 DATASHEET – SOLENOID VALVE – (CAT-IVR)		
1	Model No./Valve Code not matching with catalogue attached	**Revised Catalogue attached.** **Valve code: 24102-12-4R-B5-M6-S2** **24102 - Type** **12 - Orifice size(12mm)** **4R - Port Connection (1/2'' NPTF)** **B5 – Body/Internal material (SS316)** **M6 – Manual Override (Screw driver)** **S2 – Seal (Viton)** **Solenoid Code: 24V-DC-22-H** **24V – Supply Voltage** **DC – Current** **22 – Plug in Connector** **H – Coil insulation Class H**

IV

REV	DATE	DESCRIPTION	DRN BY	CHD BY	APPD BY
2	18.02.10	GENERALLY REVISED AS PER M/s NTPC COMMENTS 13.01.10	SBJ	MAR	BSC
1	11.12.09	GENERALLY REVISED AS PER M/s NTPC COMMENTS	SBJ	MAR	BSC
0	13.08.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

R E V I S I O N S

PROJECT: 2 x 750 MW,PRAGATI III,COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CONSULTANT: NTPC - CONSULTANCY WING

Sahdev 10/3/10

CSI-194 9/3/10

CLIENT: BHEL — BHARAT HEAVY ELECTRICALS LTD SECTOR NEW DELHI

Cat IV

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SECTOR - 44
GURGAON - 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATA SHEET - SOLENOID VALVE

DRAWN	CHECKED	APPROVED	DATE	SCALE	DRG. NO.
SBJ	MAR	BSC	13.08.09	NTS	

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A069	P269-D-526	2	1 OF 2

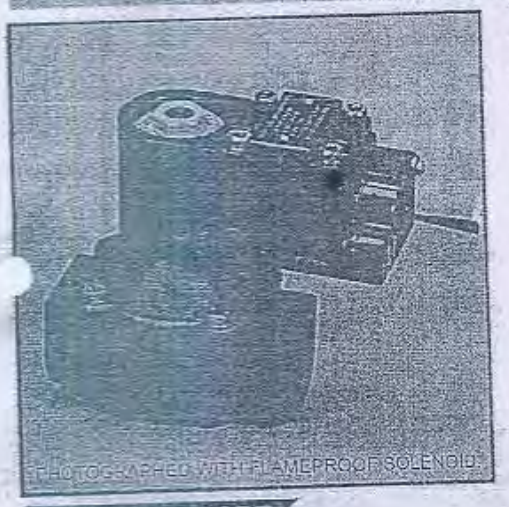
Solenoid valve

1	Make	ROTEX
2	Type	2/2 way internal pilot operated, diaphragm type, Normally closed
3	Valve Code + Solenoid Code	24102-12-4R-B5-M6-S2+24V-DC-22-H
4	Media/Service	Water
5	Operating pressure range	1 – 20 Kg/cm2
6	Seat/Seal Material	Viton
7	Body Material	SS 316
8	Coil Insulation	Class 'H'
9	Coil Voltage	24V DC (Min. Pick-up Voltage - 19.20 V DC Max. Tolerated Voltage – 28.80 V DC)
10	Coil size	I
11	No. Of coils	1
12	Coil Enclosure	Weatherproof as per IP-67
13	Process Connection	½" NPT (F)
14	Electrical Connection	Plug & Socket type
15	Orifice	NW = 12mm
16	Power Consumption	8 Watt
17	Manual Override	Provided
18	Application Area	Non Hazardous
19	Operation Philosophy	To remote operation for Deluge Valve and HPT tank pressure release
20	Quantity & Location	As per approved Instrument Schedule and P&ID
21	Inspection & Testing	As per approved datasheet
22	Catalogue	Enclosed (3 No sheets)

ROTEX
FLUID CONTROL SYSTEM

2/2 INTERNAL PILOT, DIAPHRAGM OPERATED, INLINE SOLENOID VALVE

TYPE	PRESSURE TYPE	PRESSURE TYPE	PRESSURE TYPE	PRESSURE
24101	0.5-10 bar		NC	
24102	1-20 bar			
24201	0.5-10 bar		NO	
24202	1-20 bar			


PHOTOGRAPHED WITH FLAMEPROOF SOLENOID

FEATURES

- Internal Pilot Operated.
- Line mounted valve.
- Normally Closed / Normally Open.
- Special versions may be developed on request.
- Suitable for air, water, gas, liquid, oil.

CONNECTIONS

TYPE	INLET	OUTLET
24101,24102	1	2
24201,24202	2	1

ORDERING CODE

VALVE CODE For options available : Refer page G-5, page G-4 for a.

TYPE SUFFIX — a — b — c — d — e

a: ORIFICE
b: PORT CONNECTION
c: BODY & INTERNAL
d: MANUAL OVERRIDE
e: SEAL

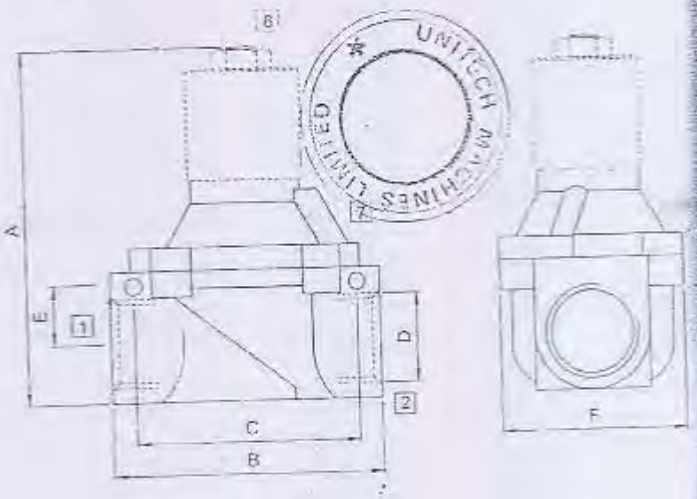
SOLENOID CODE For options available : Refer page G-5.

ORDERING EXAMPLE

Standard Version 24101-25-8G-+220V-50Hz.
Special Version 24101-25-8G+220V-50Hz-30-H

DIMENSIONS

TYPE	A	B	C	D	E	F
24101	122	65	-	1/2"	-	50
	135	110	90	3/4"	22	75
24101	135	110	90	1"	22	75
24201	159	135	115	1 1/2"	29	92
24101	183	165	-	2"	-	165
	148	110	90	3/4"	22	75
24102	146	110	90	1"	22	75
24202	172	135	115	1 1/2"	29	92
				2"		



ROTEX
FLUID CONTROL SYSTEM

OLD MODEL EQUIVALENT

OLD SOLENOID ENCLOSURE	REPLACED WITH
[illegible]	Plug in moulded or flying lead moulded
[illegible]	Terminal box Al cast or SS cast
[illegible]	Plug in moulded
[illegible]	Explosion proof in Al pressure die cast SS cast

OLD MODEL	REPLACED WITH
[illegible]	51424, 51442, 51450
30102, 30120, 30121	30318, 51424, 51442, 51450
[illegible]	57450-6
30127	30318

VALVE CONSTRUCTION

[illegible]	SS304
[illegible]	SS430 Electroless Nickel Plated
[illegible]	SS302
[illegible]	SS304
[illegible]	6, 12, 24, 27, 36, 42, 48, 72, 110, 125, 220, 242, 256, 440
[illegible]	DC 50HZ, 60HZ

SOLENOID ENCLOSURE

SOLENOID WEATHERPROOF

TYPE	CODE
INDOOR	
[illegible]	X
[illegible]	02
[illegible]	03
[illegible]	22
INDOOR AND OUTDOOR	
[illegible]	
[illegible]	15
[illegible]	16
[illegible]	19
[illegible]	70

FLAMEPROOF SOLENOID (IP 67)

TYPE	CABLE ENTRY 3/4 ET	1/2" NPT	M20 X 1.5
FLYING CABLE EEx m, IP 67			
[illegible]	55	56	57
JUNCTION BOX Exd IIC, T4 OR T5 OR T6, IP 67			
Side cable entry	36	37	39
INTRINSICALLY SAFE COIL WITH CIRCUIT, Ex ia IIC T6, IP 67			
Side cable entry	62	63	64
LOW POWER INTRINSICALLY SAFE COIL, Ex ia IIC T6, IP 67			
TERMINAL BOX	66	67	68
FLAMEPROOF [illegible]	71	72	73
PLUG IN	65C1 (CABLE ENTRY PG9)		

Refer to Page 32 to 36 for Solenoid enclosure and specifications.

APPROVAL

APPROVAL	CODE
INDIA	※
EUROPE	01
US CANADA	02

INSULATION

CLASS	CODE
CLASS F	※
CLASS H	H

※ Do not specify code if opted.

SPARES ORDERING CODE

VALVE SPARES

TYPE - SUFFIX - ORIFICE - PORT CONNECTION - BODY AND INTERNALS MATERIAL - MANUAL OVERRIDE - SEAL - SPARE CODE

Plunger Assembly	Plunger with seats and springs.
Seal Kit	Set of 'O'-Rings, Seals excluding the plunger seats
Repair Kit	Set of 'O'-Rings, plunger assembly, all moving and wearing compontnts, Fasteners.
Manual Override Assembly	Manual Override with spring & O ring.

Spare Part Description			
Plunger Assembly	30	Repair Kit	99
Seal Kit	98	Manual Override Assembly	97

The information regarding the valve can be found from the catalogue or from the label affixed on the ROTEX valve.

SPARE SOLENOID

VOLTAGE - CURRENT - SOLENOID ENCLOSURE - APPROVAL - INSULATION - SPECIAL VERSION

The information regarding the solenoid can be found from the catalogue or from the label affixed on the ROTEX solenoid.

UNITECH MACHINES LIMITED

ROTEX
FLUID CONTROL SYSTEM

ORDEING OPTIONS

VALVE CODE

TYPE | SUFFIX — a — b — c — d — e

a — ORIFICE

7mm	7
10mm	10
12mm	12
20mm	20
25mm	25
40mm	40
50mm	50
65mm	65

b — PORT CONNECTION

SIZE	BSP	NPT	FLANGE
1/4"	2G	2R	-
3/8"	3G	3R	-
1/2"	4G	4R	4F
3/4"	6G	6R	6F
1"	8G	8R	8F
1 1/2"	12G	12R	12F
2"	16G	16R	16F
2 1/2"	20G	20R	20F

c — BODY & INTERNAL

BODY	INTERNAL	CODE
Aluminium	Standard	※
Aluminium	SS304	B1
Brass	Standard	B2
Brass	SS304	B3
SS304	Standard	B4
SS316	SS316	B5

d — MANUAL OVERRIDE

Push Button	※
Nil	M0
MA.LA.	M2
Screw Driver	M6
Lever	M4

e — SEAL

NBR	※
EPDM	S1
VITON	S2
NEOPRENE	S3

NOTE : SEAL MATERIAL WILL BE GENERALLY SELECTED BY ROTEX DEPENDING UPON MEDIA,MEDIA PRESSURE AND MEDIA TEMPERATURE.

SOLENOID CODE

VOLTAGE — CURRENT — a — b — c

VOLTAGE	CURRENT
6	50Hz
12	60Hz
24	DC
27	
36	
42	
48	
72	
110	
125	
220	
240	
256	
440	

a — CONSTRUCTION

GENERAL PURPOSE/WEATHER PROOF TYPE	IP 54	IP 67
Flying lead 0.6m	06	01
Flying lead 1.5m	02	04
Flying lead 3.0m	03	05
Terminal box 3/4"ET	10	15
Terminal box 1/2"NPT	11	16
Terminal box 3/4"ET with LED	12	17
Terminal box 1/2"NPT with LED	13	18
Plug in PG9	20	25
Plug in PG9 with LED	21	26
Open stud type	28	–
36mm Flying Lead	–	※
36mm Plug In	–	22

FLAMEPROOF SOLENOID (IP 67) TYPE	Cable entry 3/4"ET	1/2"NPT
FLYING CABLE		
IIA,IIB	50	51
IIC	55	56
JUNCTION BOX WITH LED		
IIA,IIB (Top entry)	30	31
IIC (Top entry)	32	33
IIA,IIB (Side entry)	34	35
IIC (Side entry)	36	37
INTRINSICALLY SAFE IP 67 NOTE: voltage 24V DC only		
E Ex ia (Top entry)	60	61
E Ex ia (Side entry)	62	63

b — INSULATION

CLASS F	※
CLASS H	H
CLASS C	C

c — SPECIAL VERSION

Nil	※
Manual Reset	MR
Ammonia	AM
Oxygen	OX
Intrinsically Safe	IS
Refinery	PC
Nuclear	NP
Corrosive environment	CO
Temp. Class	T6
Latching	LC
Limit Switch	LS
Valve position non contact	NS
Cryogenic	SZ

UNITECH MACHINES LIMITED

COMPLAINCE REPORT

General Comments:-

DOC. No. PE-V0-314-552-A069 Rev-1 dated 11.12.2009 DATASHEET – SOLENOID VALVE – (CAT-IVR)		
1	Model No./Valve Code not matching with catalogue attached	**Revised Catalogue attached.** **Valve code: 24102-12-4R-B5-M6-S2** **24102 - Type** **12 - Orifice size(12mm)** **4R - Port Connection (1/2'' NPTF)** **B5 – Body/Internal material (SS316)** **M6 – Manual Override (Screw driver)** **S2 – Seal (Viton)** **Solenoid Code: 24V-DC-22-H** **24V – Supply Voltage** **DC – Current** **22 – Plug in Connector** **H – Coil insulation Class H**

IV

REV	DATE	DESCRIPTION	DRN BY	CHD BY	APPD BY
2	18.02.10	GENERALLY REVISED AS PER M/s NTPC COMMENTS 13.01.10	SBJ	MAR	BSC
1	11.12.09	GENERALLY REVISED AS PER M/s NTPC COMMENTS	SBJ	MAR	BSC
0	13.08.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

R E V I S I O N S

PROJECT: 2 x 750 MW,PRAGATI III,COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CONSULTANT: NTPC - CONSULTANCY WING

Sahdev 10/3/10

CSI-194 9/3/10

CLIENT: BHEL — BHARAT HEAVY ELECTRICALS LTD SECTOR NEW DELHI

Cat IV

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SECTOR - 44
GURGAON - 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATA SHEET - SOLENOID VALVE

DRAWN	CHECKED	APPROVED	DATE	SCALE	DRG. NO.
SBJ	MAR	BSC	13.08.09	NTS	

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A069	P269-D-526	2	1 OF 2

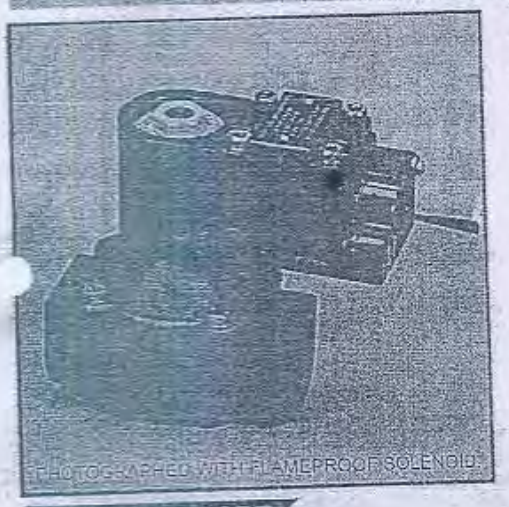
Solenoid valve

1	Make	ROTEX
2	Type	2/2 way internal pilot operated, diaphragm type, Normally closed
3	Valve Code + Solenoid Code	24102-12-4R-B5-M6-S2+24V-DC-22-H
4	Media/Service	Water
5	Operating pressure range	1 – 20 Kg/cm2
6	Seat/Seal Material	Viton
7	Body Material	SS 316
8	Coil Insulation	Class 'H'
9	Coil Voltage	24V DC (Min. Pick-up Voltage - 19.20 V DC Max. Tolerated Voltage – 28.80 V DC)
10	Coil size	I
11	No. Of coils	1
12	Coil Enclosure	Weatherproof as per IP-67
13	Process Connection	½" NPT (F)
14	Electrical Connection	Plug & Socket type
15	Orifice	NW = 12mm
16	Power Consumption	8 Watt
17	Manual Override	Provided
18	Application Area	Non Hazardous
19	Operation Philosophy	To remote operation for Deluge Valve and HPT tank pressure release
20	Quantity & Location	As per approved Instrument Schedule and P&ID
21	Inspection & Testing	As per approved datasheet
22	Catalogue	Enclosed (3 No sheets)

ROTEX
FLUID CONTROL SYSTEM

2/2 INTERNAL PILOT, DIAPHRAGM OPERATED, INLINE SOLENOID VALVE

TYPE	PRESSURE TYPE	PRESSURE TYPE	PRESSURE TYPE	PRESSURE
24101	0.5-10 bar		NC	
24102	1-20 bar			
24201	0.5-10 bar		NO	
24202	1-20 bar			


PHOTOGRAPHED WITH FLAMEPROOF SOLENOID

FEATURES

- Internal Pilot Operated.
- Line mounted valve.
- Normally Closed / Normally Open.
- Special versions may be developed on request.
- Suitable for air, water, gas, liquid, oil.

CONNECTIONS

TYPE	INLET	OUTLET
24101,24102	1	2
24201,24202	2	1

ORDERING CODE

VALVE CODE For options available : Refer page G-5, page G-4 for a.

TYPE SUFFIX — a — b — c — d — e

a: ORIFICE
b: PORT CONNECTION
c: BODY & INTERNAL
d: MANUAL OVERRIDE
e: SEAL

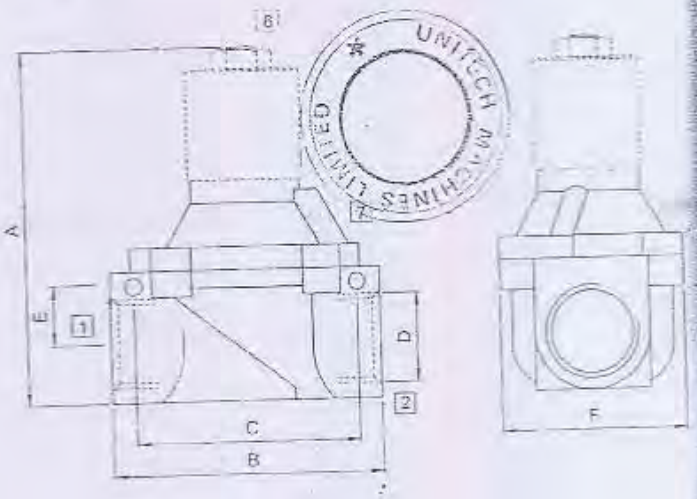
SOLENOID CODE For options available : Refer page G-5.

ORDERING EXAMPLE

Standard Version 24101-25-8G-+220V-50Hz.
Special Version 24101-25-8G+220V-50Hz-30-H

DIMENSIONS

TYPE	A	B	C	D	E	F
24101	122	65	-	1/2"	-	50
	135	110	90	3/4"	22	75
24101	135	110	90	1"	22	75
24201	159	135	115	1 1/2"	29	92
24101	183	165	-	2"	-	165
	148	110	90	3/4"	22	75
24102	146	110	90	1"	22	75
24202	172	135	115	1 1/2"	29	92
				2"		



ROTEX
FLUID CONTROL SYSTEM

OLD MODEL EQUIVALENT

OLD SOLENOID ENCLOSURE	REPLACED WITH
[illegible]	Plug in moulded or flying lead moulded
[illegible]	Terminal box Al. cast or SS cast
[illegible]	Plug in moulded
[illegible]	Explosion proof in Al. pressure die cast SS cast

OLD MODEL	REPLACED WITH
[illegible]	51424, 51442, 51450
30102, 30120, 30121	30318, 51424, 51442, 51450
[illegible]	57450-6
[illegible]	30318

VALVE CONSTRUCTION

[illegible]	SS304
Core Tube & Plunger	SS430 Electroless Nickel Plated
[illegible]	SS302
[illegible]	SS304
[illegible]	6, 12, 24, 27, 36, 42, 48, 72, 110, 125, 220, 242, 256, 340
[illegible]	DC 50HZ, 60HZ

SOLENOID ENCLOSURE

SOLENOID WEATHERPROOF		FLAMEPROOF SOLENOID (IP 67)			
TYPE	CODE	TYPE	CABLE ENTRY		
			3/4"ET	1/2"NPT	M20 X 1.5
INDOOR		FLYING CABLE EExm, IP 67			
[illegible]	X	[illegible]	55	56	57
[illegible]	02	JUNCTION BOX Exd IIC, T4 OR T5 OR T6, IP 67			
[illegible]	03				
[illegible]	22	Side cable entry	36	37	39
		INTRINSICALLY SAFE COIL WITH CIRCUIT, Ex ia IIC T6, IP 67			
INDOOR AND OUTDOOR		Side cable entry	62	63	64
[illegible]		LOW POWER INTRINSICALLY SAFE COIL, Ex ia IIC T6, IP 67			
[illegible]	15	TERMINAL BOX	66	67	68
[illegible]	16	FLAMEPROOF [illegible]	71	72	73
[illegible]	19	PLUG IN	65CH (CABLE ENTRY PG9)		
[illegible]	70				

Refer to Page 32 to 36 for Solenoid enclosure and specifications.

APPROVAL

APPROVAL	CODE
INDIA	※
EUROPE	01
US CANADA	02

INSULATION

CLASS	CODE
CLASS F	※
CLASS H	H

※ Do not specify code if opted.

SPARES ORDERING CODE

VALVE SPARES

TYPE - SUFFIX - ORIFICE - PORT CONNECTION - BODY AND INTERNALS MATERIAL - MANUAL OVERRIDE - SEAL - SPARE CODE

Plunger Assembly	Plunger with seats and springs.
Seal Kit	Set of 'O'-Rings, Seals excluding the plunger seats
Repair Kit	Set of 'O'-Rings, plunger assembly, all moving and wearing compontnts, Fasteners.
Manual Override Assembly	Manual Override with spring & O ring.

Spare Part Description			
Plunger Assembly	30	Repair Kit	99
Seal Kit	98	Manual Override Assembly	97

The information regarding the valve can be found from the catalogue or from the label affixed on the ROTEX valve.

SPARE SOLENOID

VOLTAGE - CURRENT - SOLENOID ENCLOSURE - APPROVAL - INSULATION - SPECIAL VERSION

The information regarding the solenoid can be found from the catalogue or from the label affixed on the ROTEX solenoid.

UNITECH MACHINES LIMITED

ROTEX
FLUID CONTROL SYSTEM

ORDEING OPTIONS

VALVE CODE

TYPE | SUFFIX — a — b — c — d — e

a — ORIFICE

7mm	7
10mm	10
12mm	12
20mm	20
25mm	25
40mm	40
50mm	50
65mm	65

b — PORT CONNECTION

SIZE	BSP	NPT	FLANGE
1/4"	2G	2R	-
3/8"	3G	3R	-
1/2"	4G	4R	4F
3/4"	6G	6R	6F
1"	8G	8R	8F
1 1/2"	12G	12R	12F
2"	16G	16R	16F
2 1/2"	20G	20R	20F

c — BODY & INTERNAL

BODY	INTERNAL	CODE
Aluminium	Standard	※
Aluminium	SS304	B1
Brass	Standard	B2
Brass	SS304	B3
SS304	Standard	B4
SS316	SS316	B5

d — MANUAL OVERRIDE

Push Button	※
Nil	M0
MA.LA.	M2
Screw Driver	M6
Lever	M4

e — SEAL

NBR	※
EPDM	S1
VITON	S2
NEOPRENE	S3

NOTE : SEAL MATERIAL WILL BE GENERALLY SELECTED BY ROTEX DEPENDING UPON MEDIA,MEDIA PRESSURE AND MEDIA TEMPERATURE.

SOLENOID CODE

VOLTAGE — CURRENT — a — b — c

VOLTAGE	CURRENT
6	50Hz
12	60Hz
24	DC
27	
36	
42	
48	
72	
110	
125	
220	
240	
256	
440	

a — CONSTRUCTION

GENERAL PURPOSE/WEATHER PROOF TYPE	IP 54	IP 67
Flying lead 0.6m	06	01
Flying lead 1.5m	02	04
Flying lead 3.0m	03	05
Terminal box 3/4"ET	10	15
Terminal box 1/2"NPT	11	16
Terminal box 3/4"ET with LED	12	17
Terminal box 1/2"NPT with LED	13	18
Plug in PG9	20	25
Plug in PG9 with LED	21	26
Open stud type	28	–
36mm Flying Lead	–	※
36mm Plug In	–	22

FLAMEPROOF SOLENOID (IP 67) TYPE	Cable entry 3/4"ET	1/2"NPT
FLYING CABLE		
IIA,IIB	50	51
IIC	55	56
JUNCTION BOX WITH LED		
IIA,IIB (Top entry)	30	31
IIC (Top entry)	32	33
IIA,IIB (Side entry)	34	35
IIC (Side entry)	36	37
INTRINSICALLY SAFE IP 67 NOTE: voltage 24V DC only		
E Ex ia (Top entry)	60	61
E Ex ia (Side entry)	62	63

b — INSULATION

CLASS F	※
CLASS H	H
CLASS C	C

c — SPECIAL VERSION

Nil	※
Manual Reset	MR
Ammonia	AM
Oxygen	OX
Intrinsically Safe	IS
Refinery	PC
Nuclear	NP
Corrosive environment	CO
Temp. Class	T6
Latching	LC
Limit Switch	LS
Valve position non contact	NS
Cryogenic	SZ

Cat-IV

Pl. ensure any changes in P&ID / Instrumental Sch shall be referred in datasheet.

REV.	DATE	DESCRIPTION	DRN.BY	CHD.BY	APPD.BY
1	11.12.09	GENERALLY REVISED AS PER M/s NTPC COMMENTS	SBJ	MAR	BSC
0	13.08.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

REVISIONS

PROJECT: 2 x 750 MW, PRAGATI III, COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

C&I-147 11/1/10 Cat IV 13/1/2010

CONSULTANT: NTPC - CONSULTANCY WING

Akas

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR - 44
GURGAON - 122002

PACKAGE: FIRE PROTECTION SYSTEM

UNITECH M... GURGAON

TITLE: DATASHEET - LEVEL INDICATOR

DRAWN	CHECKED	APPROVED	DATE	SCALE	JOB NO.
SBJ	MAR	BSC	13.08.09	NTS	P-269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A071	P269-D-523	1	1 OF 2

Level Indicator

1	Make	V. Automat & Instruments(P) Ltd, Delhi
2	Model No.	40C
3	Service	Water
4	Type	Float and Chord
5	Process condition	
5.1	Design pressure	12 kg/cm2
5.2	Design temperature	50 deg. C.
6	Tank Height	9.7 meters
7	Range	0 to 9.7 meters
8	Pointer	CS epoxy painted with red indication
9	Scale	Aluminium channel with plastic letters fixed
10	Material of construction	
10.1	Pulley	SS 304
10.2	Housing	Cast aluminium
10.3	Float	SS 316
10.4	Float chord	SS 316
10.5	Anchor tension assembly	CS
10.6	Anchort bar	CS
10.7	Spring assembly	MS
11	Process connection	1" ANSI, 150#
12	Resolution	50 mm
13	Accuracy	50 mm
14	Graduation	100 mm
15	Scale width	70 mm
16	Letter height	40 mm
17	Quantity & Location	As per approved P & ID
18	Accessories	As per approved Instrument Hook-up dia.
19	Catalogue	Enclosed (5 nos. sheets)

UNITECH MACH. GURGAON

Cat IV

Pl. ensure any changes in P&ID / Inst Sch. shall be reflected / accomodated in datasheet

REV.	DATE	DESCRIPTION	DRN.BY	CHD.BY	APPD.BY
1	11.12.09	GENERALLY REVISED AS PER M/s NTPC COMMENTS	SBJ	MAR	BSC
0	13.08.09	SUBMISSION FOR APPROVAL	SBJ	MAR	BSC

REVISIONS

PROJECT: 2 x 750 MW,PRAGATI III,COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CBI-147 dt 30/12/10

CONSULTANT: NTPC – CONSULTANCY WING

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATASHEET – LEVEL GAUGE

UNITECH MACHINES LTD. GURGAON

DRAWN	CHECKED	APPROVED	DATE		JOB NO.
SBJ	MAR	BSC	13.08.09		P–269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE–V0–314–552–A072	P269–D–524	1	1 OF 2

UNITECH MACHINES LIMITED, GURGAON	
Title : Data Sheet – Level Gauge	
Project : 2X750MW Pragati-III, CPP	Package : Fire Protection System

Level Gauge

1	Make	V. Automat & Instruments(P) Ltd, Delhi
2	Model No.	RLG-1650-1630-311-VA2500
3	Service	Water
4	Type	Reflex(Toughened borosilicate glass)
5	Process condition	
5.1	Design pressure	12 kg/cm2
5.2	Design temperature	50 deg. C.
6	Material of construction	
6.1	Chamber	Forged Carbon Steel
6.2	Valve body	Forged Carbon Steel
6.3	Cover Plate	Forged Carbon Steel
6.4	Process connection	Forged Carbon Steel
6.5	Scale	SS 304
7	Tank Height	4.134 meters
8	C to C distance	1650 mm
9	Visibility	1630 mm
10	Process connection	1 " ANSI 150 #
11	Accuracy	+/- 2 % of Full scale range
12	Over range protection	125 % of Full scale range
13	Orientation	Side-Side
14	Drain valve	15 NB, CS
15	Vent Plug	15 NB, CS
16	Accessories	As per approved Instrument Hook-up Dia.
17	Quantity & Location	As per approved P & ID
18	Catalogue	Enclosed (5 nos. sheets)

एन टी पी सी लिमिटेड
भारत सरकार का उद्यम
NTPC Ltd.
A Govt. of India Enterprise
(Formerly National Thermal Power Corporation Ltd.)
परामर्श खण्ड/ Consultancy Wing

CW-EN-9538-PM-C&I –318

Date: 03.09-2010
Recd on 10/09/10.

Shri S.C. JAIN, GM (PMG)

2nd Floor, BHEL House,

Siri Fort, New Delhi-110049

Dear Sir,

Enclosed please find the commented copy of the following drawing / document for further necessary action at your end please:-

SL. No	Drawing Title	Drawing. No	Rev	Cat.
1	Datasheet - Level Transmitter (Ultrasonic)-Fire Protection System	PE-VO--314-552-A078	01	I

Thanking you,

Yours faithfully,

(T. DAS)

DGM- Engineering

CC: Shri R. Tiku, ED / Project

Pragati Power Corporation Ltd.

Pragati Power Station,

IP Estate, Ring Road, New Delhi – 110002

cc: Mr. Harish Kumar, Recd on 13/9/10
Sy. Manager, MAUX,
– with stamped doc.

Sh. Amit Kumar Garg
Engr/MAX
(1) Pl. forward copy to MS Unit
(2) Pl. retain o/c - 4
13/9/10

Singhmen
10/09/10

अनुसंधान एवं विकास कार्यालय, ए-8ए, सैक्टर-24, नोएडा-201 307(उ०प्र०) टेली/Tel. : 0120-2410601-611 फैक्स/Fax : 0120-2410644
R & D Building, A - 8A, Sector - 24, NOIDA-201 307 (U.P.) ई-मेल/-E-mail : consultancy@ntpc.co.in
पंजीकृत कार्यालय एन.टी.पी.सी भवन, स्कोप कम्पलैक्स, 7, इन्स्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110003 दूरभाष : 0120-24360100 फैक्स : 011-24361018
Regd. Office : NTPC Bhavan, SCOPE Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003 Tel : 011-24360100 Fax : 011-24361018

Ca - 1

Note :--

BHEL / UNITECH to ensure Counter thread on Process Side shall match with thread on Instrument.

REV.	DATE	DESCRIPTION	PRD.BY	CHD.BY	APPD.BY
01	23.07.10	GENERALLY REVISED AS PER COMMENTS	AK	MAR	BSC
0	30.01.10	SUBMISSION FOR APPROVAL	RAVI	MAR	BSC

R E V I S I O N S

Subject to 9/9/10

PROJECT: 2 x 750 MW, PRAGATI III, COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CBI-318 3/9/10 — Cat I

CONSULTANT: NTPC – CONSULTANCY WING

Afaq

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE:

DATA SHEET – LEVEL TRANSMITTER (ULTRASONIC TYPE)

PREPARED	CHECKED	APPROVED	DATE		JOB NO.
RAVI	MAR	BSC	30.01.10		P-269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A078	P269-D-A078	01	1 OF 5

UNITECH MACHINES LIMITED

UNITECH MACHINES LIMITED

COMPLAINCE REPORT

General Comments:-

DOC. No. PE-V0-314-552-A078 Rev-0 dated 30.01.2010 DATASHEET – LEVEL TRANSMITTER (ULTRASONIC)		
1	Item not listed in approved sub-vendor list. M/s Unitech to get the mfgr. approved from NTPC	**HAWK Measurement Pty Ltd, Australia for Level Transmitter (Ultrasonic Type) meets the specification and moreover they have the latest technology on Ultrasonic like Foundation Filed Bus, Profibus etc.** **Further, Hawk measurement is already approved in NTPC Mauda (2X500MW) Station Piping Package and IGSTPP, Jhajjar (3x500MW) Station piping package.** **The approval of NTPC attached herewith for above.**

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
A Govt. of India Enterprise
(Formerly National Thermal Power Corporation Ltd.)
कॉर्पोरेट कार्यालय/Corporate Centre, Noida

E.O.C. Plot No.A8A, Sector-24, Noida (U.P.) – 201 301.
Tele No 0120 – 2410747 / 2596338, Fax No.0120 – 2410411
eMail : mpchokkanathan@ntpceoc.co.in; sujeet@ntpceoc.co.in

Ref.No.CC:PEV:9561:131-02:01 Date :07.08.2009

M/S UNITEC MACHINES LTD.
UM HOUSE PLOT-35P, SEC-44
GURGAON
KA; Mr. Sh. R.Iyer CGM-Projects
email : r.iyer@unitechmachines.com

1. Mr Vijai Tayal
Sr. Project Manager
M/S UNITEC MACHINES LTD.
UM HOUSE PLOT-35P, SEC-44 GURGAON
email : vijay.tayal@unitechmachines.com

Sub: Mauda (2X500 MW), - Station Ppg Pkg.NOA No: CS-9561-131-2/FC/NOA-5341 - : Sub Vendor Approval of M/s Hawk Measurement Pty Ltd, Australia for the supply of Ultrasonic Type Level Transmitter.

Dear Sir,

This is with reference to M/s Unitech Machines Limited, Gurgaon proposal vide letter P-271/1885 dated July 29, 2009. In this regards following may please be noted.

NTPC agrees to the proposal for supplying Ultrasonic Type Level Transmitter (Sultan series) from M/s Hawk Measurement Pty Ltd, Australia , having work address as-15-17 Maurice Court, Nunawading, Vic 3131,Australia .

Actual item to be supplied shall be as per technical specification/data sheet/QP requirements.

Item is to be treated as Cat-II item for inspection. Please submit QP inline with above requirement.

This is for your information and necessary action please

Thanking you,

Yours Sincerely,

(Sujeet Kumar)
ACDE (PE-MVD-T/F) For AGM & CTF (M,D,V&U TF)

URS
UKAS 043-A
NABCB
Engineering Division
ISO 9001:2008 Certified
UNITECH MACHINES LIMITED

अभियांत्रिकी कार्यालय परिसर, प्लाट नं.- ए 8ए, सेक्टर-24, पोस्ट बाक्स नं - 13, नोएडा (उ प्र) पिन–201 307
टेलिफोन नं.- 0120-2410333, 2410116 फैक्स-0120-2410136, 2410137
पंजीकृत कार्यालय: एनटीपीसी भवन, स्कोप कॉम्प्लेक्स, 7 इन्स्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110 003
टेलिफोन नं.- 011-24361018 फैक्स-011-24361018, वेबसाइट: www.ntpc.co.in
ENGINEERING OFFICE COMPLEX, Plot No A-8A, Sector-24, Post Box No: 13, Noida (UP), Pin-201 307
Telephone No: 0120-2410333, 2410116 Fax-0120-2410136, 2410137
Registered Office: NTPC Bhawan, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi-110 003
Telephone No: 011-24360100 Fax-011-24361018 Website: www.ntpc.co.in

एन टी पी सी लिमिटेड
भारत सरकार का उद्यम
NTPC Limited
A Govt. of India Enterprise
(Formerly, National Thermal Power Corporation Ltd.)
कॉर्पोरेट केन्द्र, Corporate Centre, Noida

Ref No. CC:PEJ:0330:131:01 Date:16.10 2009

M/s Unitech Machines Ltd.
'UM' House, Plot No.- 35 P
Sector- 44, Gurgaon

Kind Attn: Mr. Avinash Kumar, H O.D (Design)

Sub: IGSTPP, Jhajjar (3x500MW) –Station Piping Package

- ***Ultrasonic Type Level Transmitters from M/s Hawk Measurement Pty Ltd, Australia***

Dear Sir,

This has the reference to the subject proposal received thru UML mail dated 29.08.09.
M/s Unitech Machines proposal to supply Ultrasonic Type Level Transmitters from M/s Hawk Measurement Pty Ltd, Australia is acceptable to NTPC for the subject Project Package. However the item may be as per NTPC Tech Spec / NTPC Appd Data Sheet requirements.

Item may be treated as Cat-II item for inspection. Kindly submit the QAP inline with the requirements

This is for your kind information and necessary action please.

Thanking you,
Yours faithfully,

(Atul Shrivastava)
CTF (Jhajjar & Vallur TF)

AiBayaaMi~kI kayaa-laya pirsar, PlaaT naM - e 8e, saO@Tr-24, paosT baa@sa naM - 13, naaOeDa (j p') ipna--201 307
Toilafaona naM:- 0120-2410333, 2410116 fO@sa-0120-2410136, 2410137
pMjaIkRt kayaa-laya: enaTIplsal Bavana, skaop kamplac@sa, 7 [nsTiTUyaUSanala eiryaa, laaoQal raoD, na[- idlla!-110 003
Toilafaona naM - 011-24361018 fO@sa-011-24361018, vaobasaa[T www.ntpc.co.in,
ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector-24, Post Box. No: 13, Noida (UP), Pin-201 307
Telephone No: 0120-2410333, 2410116 Fax-0120-2410136, 2410137
Registered Office, NTPC Bhawan, Scope Complex,7 Institutional Area, Lodhi Road, New Delhi-110 003
Telephone No: 011-24360100 Fax-011-24361018, Website: www.ntpc.co.in

Engineering Division
ISO 9001:2008 Certified

UNITECH MACHINES LIMITED

Level Transmitter(Ultrasonic type)

1.0	**Manufacturer**	:	HAWK Measurement Pvt Ltd, Australia
2.0	Model No.	:	SULTAN SERIES
3.0	Type	:	Ultrasonic – Non contact type 2 Wire
4.0	**Transmitter**- AWR2SB H X X X:		
5.0	Quantity	:	04 Nos.
5.1	Power Supply	:	24V DC
5.2	Display	:	2 line x 8 digit alphanumeric LCD Display
5.3	Zero & Span	:	Provided on transmitter
5.4	False Echo & diagnostic	:	In built and self diagnostic
5.5	Housing	:	Polycarbonate with IP 65 Class Protection
5.6	Output	:	4-20 mA output, 500 Ohms., with HART protocol compatible through HART communicator
5.7	Mounting	:	Field mounting
5.8	Accuracy	:	± 0.25% of calibrated span (FS)
5.9	Repeatability	:	3 mm of Calibrated Span.
5.10	Ambient temperature	:	-30 Deg. C. to +65 Deg. C.
5.11	Temperature compensation	:	In built
5.12	Electrical Connection / Cable entry	:	Plug & Socket Type
6.0	**Sensor** – AWRT30T4TB20XC15XX		
6.1	Quantity	:	04 Nos.
6.2	Measuring range	:	11 mtr.
6.3	Calibrated range	:	0 to 9.71 mtrs.
6.4	Blanking distance	:	0.5 Mtr. (Maximum)
6.5	Material housing	:	Polypropylene with Teflon face for corrosion resistant
6.6	Operating temperature	:	-20 Deg. C. to +80 Deg. C.
6.7	Operating pressure	:	1.3 bar (absolute)
6.8	Protection	:	IP 68
6.9	Pulse frequency	:	30 KHZ.
6.10	Mounting	:	Top vertically on sump
6.11	Process connection	:	2" BSP Threaded
6.12	Catalogue	:	Enclosed

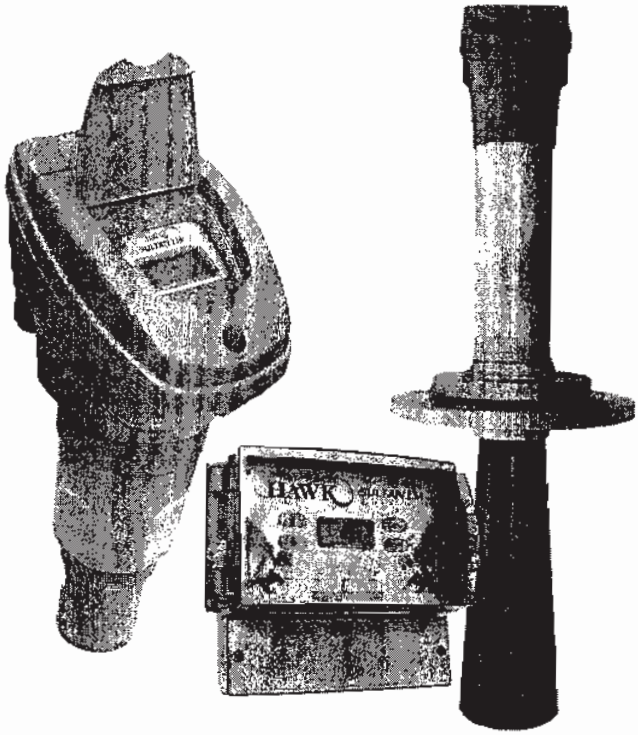
UNITECH MACHINES LIMITED

A higher level of performance

Data Sheet

Sultan 234 - Acoustic Wave Technology

Solids / Liquids level and position measurements to 182m (597ft)



Principle of Operations

The SULTAN 234 emits a high powered **acoustic wave** transmit pulse which is reflected from the surface of the material being measured. The reflected signal is processed using specially developed software to enhance the correct signal and reject false or spurious echoes.

The transmission of high powered acoustic waves ensures minimal losses through the environment where the sensor is located. Due to the high powered emitted pulse, any losses have far less effect than would be experienced by traditional ultrasonic devices. More energy is transmitted hence more energy is returned. Advanced receiver circuitry is designed to identify and monitor low level return signals even when noise levels are high. The measured signal is temperature compensated to provide maximum accuracy to the outputs and display.

Primary Areas of Applications

- **Waste water/water:**

River level, wet wells, inlet screens, tanks, sumps, pump stations, water towers, dams, basin levels, chemical storage, etc.

- **Mining:**

Crushers, surge bins, ore passes, conveyor profile, blocked chute, stockpile, stackers, reclaimers, storage silos etc.

- **Power Stations:**Boiler bunkers, raw coal bunkers, ash pits, fly ash silos, etc.

- **Others:**

Food, Cement, Plastics, Grain, Chemicals, Paper, Irrigation, Quarries

Function

The Sultan 234 is a non intrusive acoustic wave transmitter with flexibility, used for measuring level of liquids, slurries and solids

Universal Supply

2 Wire Loop Powered
3 Wire DC
4 Wire AC/DC

Certifications

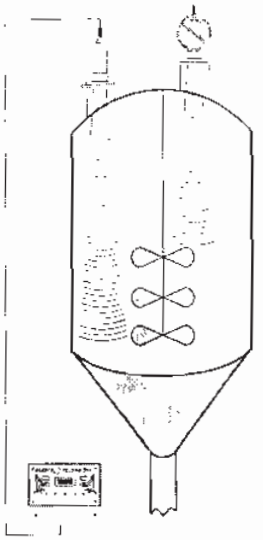
ATEX, SAA/IECEx, CE, (CSA, FM pending)

Features:

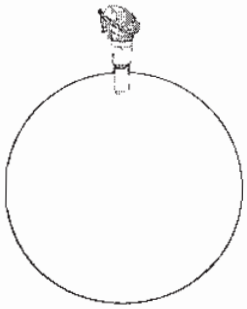
- Non contact measurement
- High Power even with two wire loop supply
- Low cost per point
- Wide range of communications: DeviceNet, GosHawk, HART, Modbus, Profibus DP, Foundation Fieldbus & Profibus PA
- Pump Control x5 pumps
- Auto compensation for dust, steam and losses
- Protection IP67, NEMA (IP68 Dam
- Programmable safe mode
- High temperature options on request
- GSM/GMD setup for
- Differential average level (2 transducers)

Typical Applications

Conical Shape Vessels

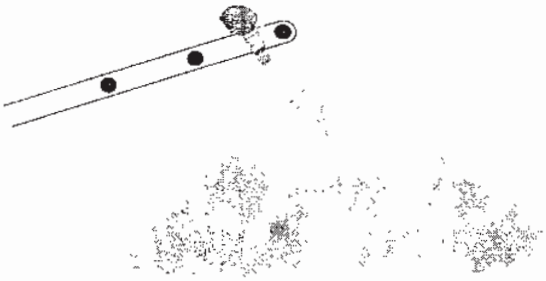


Horizontal Cylindrical/Ball Tanks



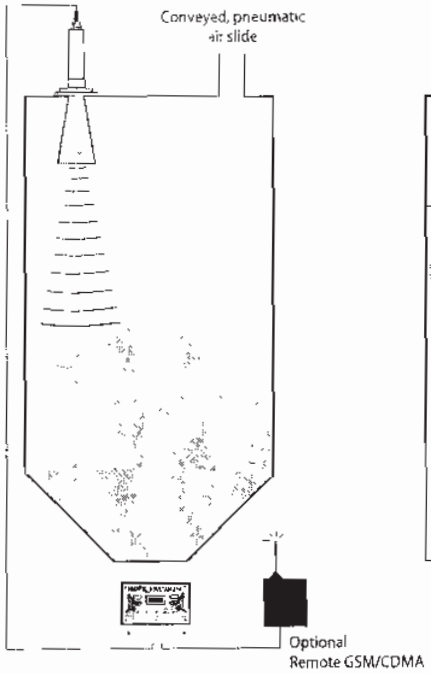
Sultan Acoustic Wave Transmitter

Stockpile Stockpile
Reservoir



Solids Vessels

High/Low/Continous level
(Granular/Powder)

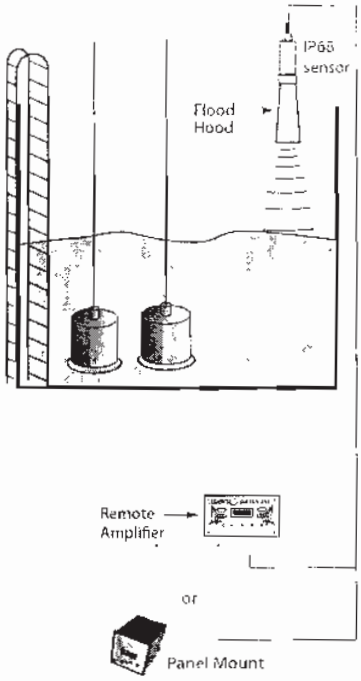


Storage Tanks

High/Low/Continous level
(Liquid/Chemical)

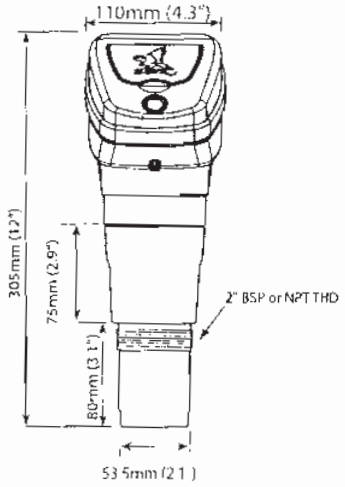
Sewage Wet Well

High/Low/Continous level
Up to 5 Pumps

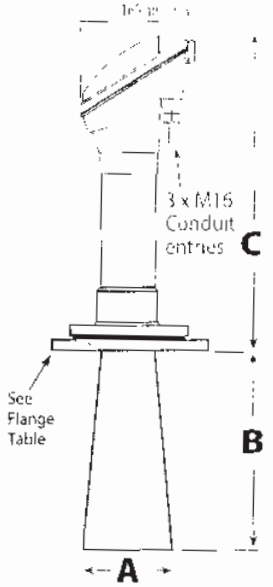


UNITECH MACHINES LIMITED

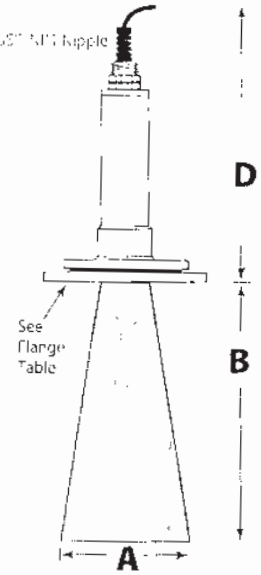
Integral Unit
AWI2SX30/40/50
AWI234SX30/40/50



Integral



Remote



All horns must protrude into the vessel by at least 50 mm (2 inches) past the mounting nozzle

Integral Transmitter Table

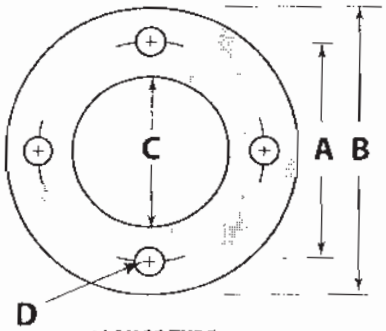
Model	Selected Flange	A mm in	B mm in	C mm in
AWI 5 kHz	10"		455 17.9	840 33.1
AWI 10 kHz	10" *8"		415 16.3 280 11.1	540 21.3 540 21.3
AWI 15 kHz	10" *8"		455 17.9 280 11.0	440 17.3 440 17.3
AWI 20 kHz	4"		280 11.0	390 15.4
AWI 30 kHz	4"		280 11.0	350 13.8

*8" is non standard. Please contact factory beofre selecting

Remote Transducer Table

Mode	Selected Flange	A mm in	B mm in	C mm in
AWI 5 kHz	10"		455 17.9	750 29.5
AWI 10 kHz	10" *8"		415 16.3 280 11.1	450 17.7 450 17.7
AWI 15 kHz	10" *8"		455 17.9 280 11.0	350 13.8 350 13.5
AWI 20 kHz	4		280 11.0	300 11.8
AWI 30 kHz	4"		280 11.0	260 10.2

*8" is non standard. Please contact factory beofre selecting



FLANGE TYPE:
A = ANSI Flange
J = JIS Flange
D = DIN Flange
Others Available

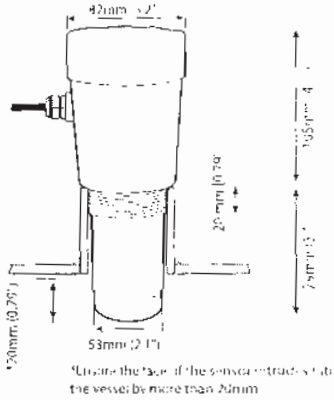
STANDARD ANSI/DIN/JIS FLANGE DIMENSIONS

SIZE	FLANGE TYPE	A (PCD) mm	A (PCD) in.	B (OD) mm	B (OD) in.	C (ID) mm	C (ID) in.	D (Hole) mm	D (Hole) in.
4"	FA4	190.5	7.5	228	9.0	100	4	19	0.75
	FD4	180	7.0	220	8.7	100	4	18	0.7
	FJ4	175	6.9	210	8.4	100	4	15	0.6
10"	FA10	362	14.3	406	16.0	250	10	25	1.0
	FD10	350	13.8	395	15.6	250	10	22	0.85
	FJ10	355	14.0	400	15.7	250	10	23	0.9
NON STANDARD ANSI/DIN/JIS FLANGE DIMENSIONS									
6"	FA6	241	9.5	279.5	11.0	150	6	22	0.85
	FD6	240	9.4	285	11.2	150	6	22	0.85
	FJ6	240	9.4	280	11.0	150	6	19	0.75
8"	FA8	298.5	11.8	343	13.5	200	8	22	0.85
	FD8	295	11.6	340	13.4	200	8	22	0.85
	FJ8	290	11.4	330	13.0	200	8	19	0.75

Note: Other flange sizes available upon request.

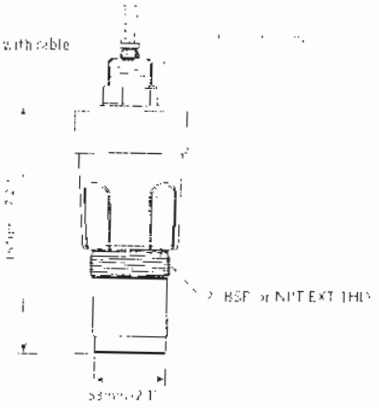
2 inch Remote Mounting Dimensions

Screwtop with integral junction box



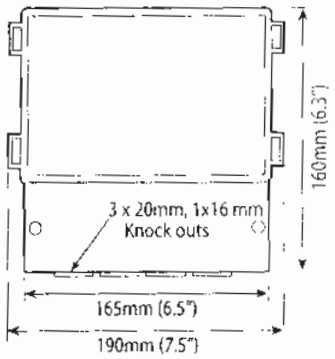
*Ensure the face of the sensor contacts the vessel by more than 20mm

IP68 Sealed unit with cable



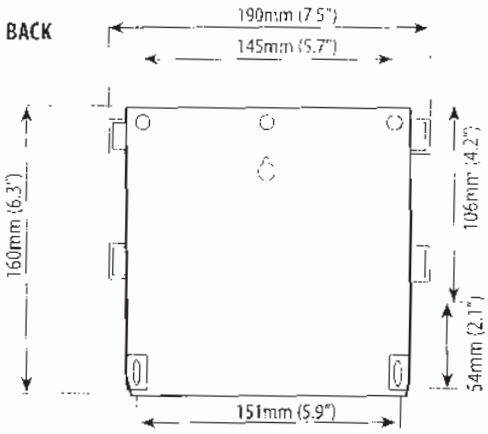
REMOTE ENCLOSURES - Field Mount
AWR2, AWR234

FRONT

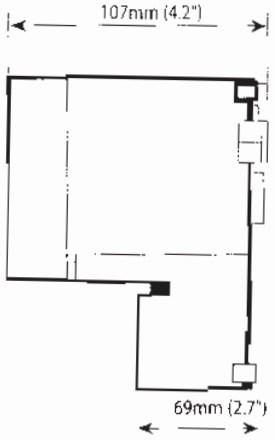


DIN Rail or screw mountable

BACK

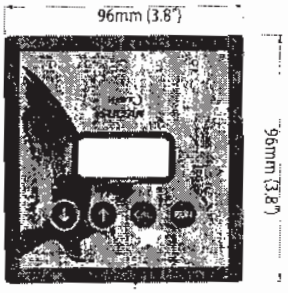


SIDE

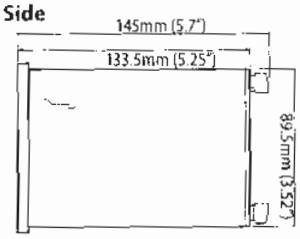


Panel Mount

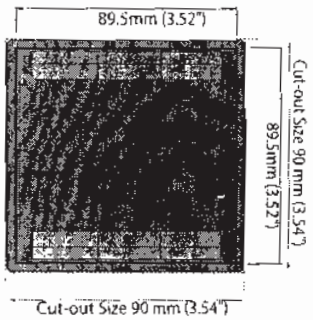
Front



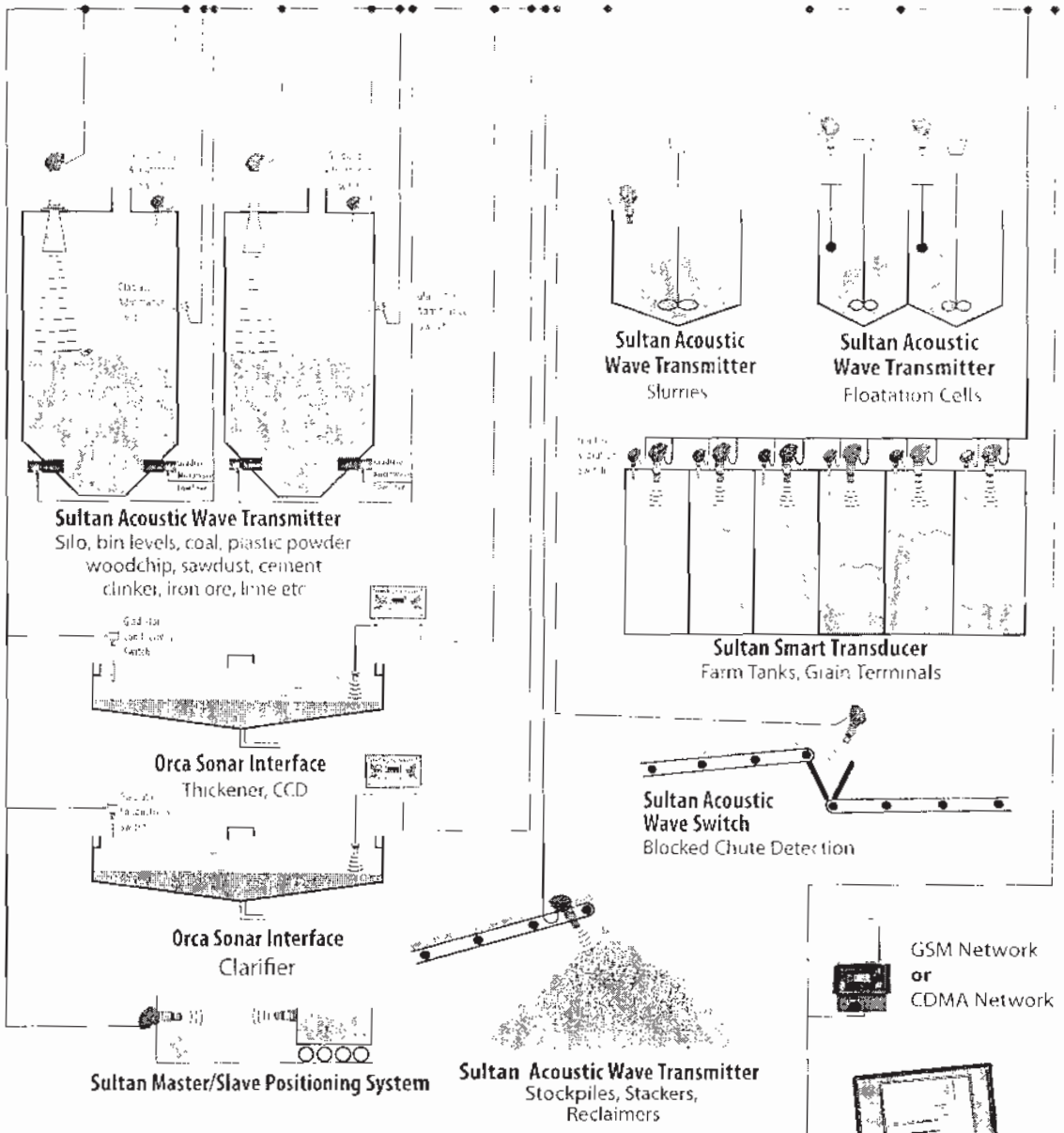
Side



Back



Modbus and Profibus



GSM or CDMA Network

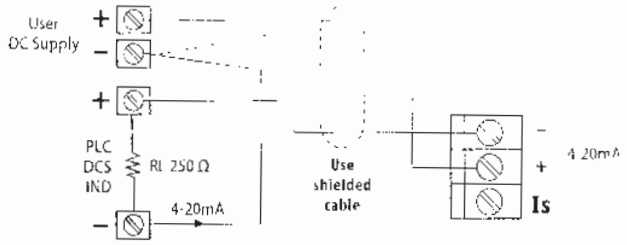
- Typically up to 31 transmitters or switches per string.
- Maximum 250 transmitters or switches
- Using GSM/CDMA network transmitters and switches can be monitored, calibrated remotely.
- Alarm status, diagnostics can be monitored
- Support from factory engineering for customer application problems

Laptop or PC Communications or PLC / DCS with MODBUS RTU Port GosHawk Software for inventory monitoring on PC

(Limited Modbus query rate for Switches only)

Terminal Connections for DC Supply – Model dependant

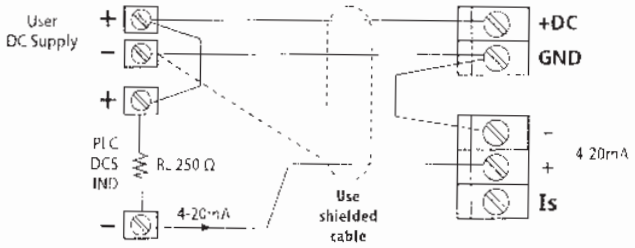
a) 2 Wire DC Loop Powered



Note: RL Max = 600Ω
if user DC Supply 24V

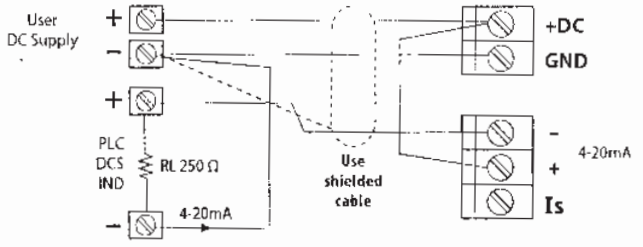
Terminal Connections for DC Supply – Model dependant

b) 3 Wire DC – Modulating from Common User Supply (RL to +DC)



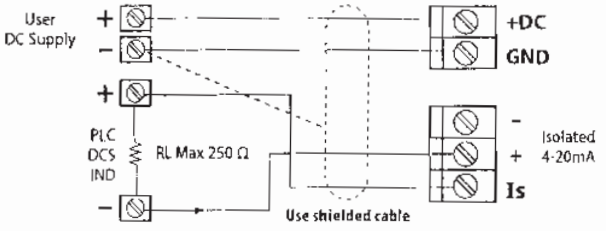
Note: RL Max = 750Ω
if user DC Supply 24V

c) 3 Wire DC – Modulating from Common User Supply (RL to GND)



Note: RL Max = 750Ω
if user DC Supply 24V

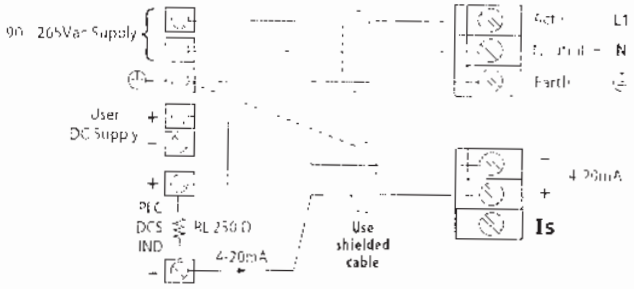
d) 4 Wire DC – Driving from Internal Isolated Supply (Is)



Note: Isolated current output can be made common with +DC or GND if required. (e.g. RL – connected to GND)

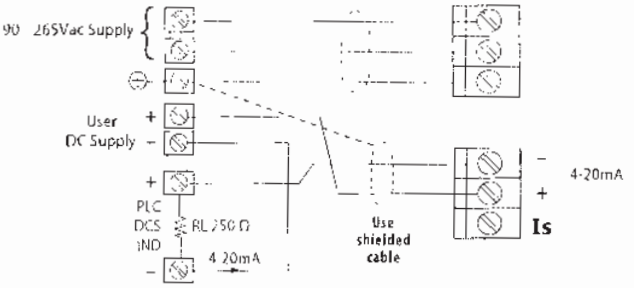
Terminal Connections for AC Supply – Model dependant

e) Modulating from User's External DC Supply (RL to Pos.)



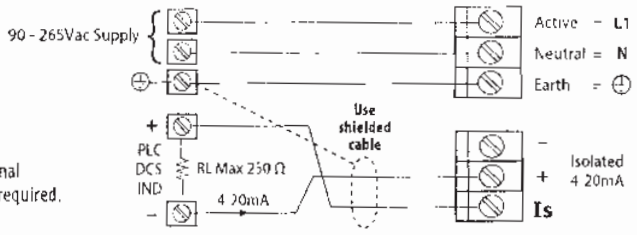
Note: RL Max – 750Ω
if user DC Supply 24V

f) Modulating from User's External DC Supply (RL to Neg.)



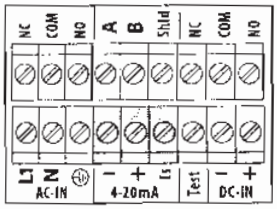
Note: RL Max = 750Ω
if user DC Supply 24V

g) 4 Wire AC – Driving from Internal Isolated Supply (Is)

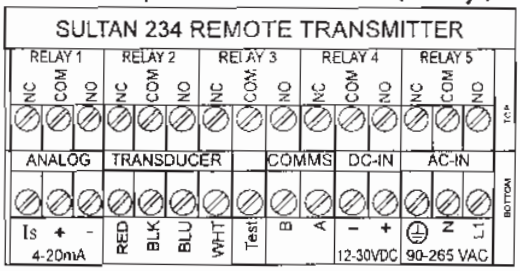


Note: Isolated current output
can be made common with external
DC Supply Positive or Negative if required.
(e.g RL – connected to GND)

AW Series Transmitter
Integral Version (2 Relays)



AW Series Transmitter
Remote, Field or Panel Version (5 Relays)



Sultan AW Remote Electronics

Model

AWR2 Remote 2 Wire, Housing / Facia Display Connection Board Process Module, No relays
AWR234 Remote 2/3/4 Wire 5 relays, Housing / Facia Display Connection Board Process Module, 5 relays
AWR2S1 Remote 2/3/4 Wire 5 relays, Housing / Facia Display Connection Board Process Module, 5 relays for Flow

Housing

S Standard polycarbonate electronics housing
P Panel Mount Housing

Power Supply

B 24 VDC standard
C 48 VDC for 2/3/4 units only
U Universal AC power supply (90-260 VAC input) for 2/3/4 units only

Output Configuration (PC comms Goshawk standard)

S Switch only, 5 relays for AWR234 only
X 4-20mA analogue output module, includes Modbus comms
H HART 2 wire only
I HART Isolated 4 wire 2/3/4 only
W Modbus Comms only (not available for 2 wire Sultan)
P Profibus DP***
E Ethernet
D Devicenet
Z Special Request

Internal HawkLink Modem (not available with ATEX 0/20 approval)

X Not Required
G2 GSM Frequency 800/1900 MHz/19200 Baud for USA,Canada,Argentina,Chile for Sultan 234 only
G4 GSM Frequency 900/1800 MHz/19200 Baud for Australia,Europe,Chile for Sultan 234 only

Approval Standard

X Not Required
A0 Intrinsic Safe (AWR2 only) IECEx Zone 0 (Ex ia IIA T4) / ATEX (Grp II Cat 1 GD IP67 EEx ia IIA T4)

Position Unit / Crane Master Options for Sultan 234 Only

PS Position Slave
CM Crane Master
X Not required

AWR2	S	B	X	G4	X	X

Sultan AW Remote Transducer

Model

AWR1 Acoustic Wave Remote Transducer

Transducer Frequency

50 50kHz for applications up to 5m, available in 2" only
40 40kHz for applications up to 7m, available in 2" only
30 30kHz for applications up to 11m for 2" and 15m for 3" (4" cone is recommended for 3" units)
20 20kHz for applications up to 20m, available in 3" only (4" cone is recommended)
15 15kHz for applications up to 30m, available in 3" only (10" cone is recommended)
10 10kHz for applications up to 40m, available in 3.5" only (10" cone is recommended)
09 9kHz for high power extended range applications up to 170m (10" cone is recommended)
05 5kHz for applications up to 60m maximum, available in 3.5" only (10" cone is recommended)
04 4kHz for high power extended range applications up to 170m (10" cone is recommended)

Process Temperature - Facing material selection

S Standard Temperature Dry Atmosphere only, (Polyolfin face) for 4, 5, 9, 10 and 15kHz only
T Standard Temperature Wet Atmosphere,(Teflon face)
Y High Temperature Wet and Dry Atmosphere 150C, (Titanium face) for 10kHz only
Z Special Request

Transducer Housing Material

4 Poly propylene, not available for 2"
6 Tefzel for 2" (standard) For 3" Teflon please contact factory

Thread Standards

X Not Required (Standard Flange Mount, see flange & cone selection)
TB BSP
TN NPT

Mounting Thread Sizes

X Not Required (Standard Flange Mount, see flange & cone selection)
20 2" thread for 50,40,30 kHz in Tefzel housing only
30 3" thread on the back cap for 30,20,15 kHz only. For 15kHz use "B" type flange
50 3.5" thread on the end cap for 10 and 5kHz only

Approval Standard

X Not Required
A0 Intrinsic Safe: IECEx Zone 0 (Ex ia IIA T4)/ATLX (GrpII Cat1 GD IP67 EEx ia IIA 14)
A1 ATEX Encapsulated (Grp II Cat 2 GD EEx m II IP68)
A20 ATEX Dust (Grp II Cat 1 D T85C IP67)
A21 ATEX Dust (Grp II Cat 2 D T85C IP67)
A22 ATEX Dust (Grp II Cat 3 D T85C IP67)

Connection

C IP68 Sealed unit with cable
S Screwtop with integral junction box (available only for 2" units)

Cable Length

6 6m cable (Standard)
15 15m cable
30 30m cable
50 50m cable
X Not Required

Mounting Accessories

X Not Required
CS Cable Suspension for remote 50/40/30/20kHz only

Position Unit /Crane Master/Software Options

PS Position Slave
FP Fast Pulsing
X Not Required

AWRT	30	T	4	X	X	X	C	6	X	X

Sultan AW Integral Transmitter

Model

AW12 Integral 2 Wire, Housing / Facia Display Connection Board Process Module, No relays
AW1234 Integral 2/3/4 Wire, Housing / Facia Display Connection Board Process Module, 5 relays
AW11234 Integral 2/3/4 Wire, Housing / Facia Display Connection Board Process Module, 5 relays for Flow

Housing
S Standard Valox 357U moulded electronics housing

Power Supply
B 24 VDC standard
C 48VDC for 2/3/4 only
U Universal AC power supply (90-260 VAC input) and 12-30VDC , For 2/3/4 only

Transducer Frequency
50 50kHz for applications up to 5m, available in 2" only
40 40kHz for applications up to 7m, available in 2" only
30 30kHz for applications up to 11m for 2" and 15m for 3" (4" cone required for 3" units)
20 20kHz for applications up to 20m, available in 3" only (4" cone required)
15 15kHz for applications up to 30m, available in 3" only (10 " cone required)
10 10kHz for applications up to 40m, available in 3.5" only (10" cone required)
09 9kHz for high power extended range applications up to 170m (10" cone required)
05 5kHz for applications up to 60m maximum, available in 3.5" only (10" cone required)
04 4kHz for high power extended range applications up to 170m (10" cone required)

Process Temperature - Facing material selection
S Standard Temperature Dry Atmosphere only. (Polyolfin face)
T Standard Temperature Wet Atmosphere,(Teflon face)
Y High Temperature Wet and Dry Atmosphere 150C. (Titanium face) for 10kHz only

Transducer Housing Material
4 Polypropylene
6 Tefzel for 2" (standard). For 3" Teflon please contact us

Thread Standards
X Not Required (Standard Flange Mount, see flange & cone selection)
TB BSP
TN NPT

Mounting Thread Sizes
X Not Required (Standard Flange Mount, see flange & cone selection)
20 2" thread for 50,40,30 kHz in Tefzel housing only
30 3" thread on the back cap for 30, 20, 15 kHz only For 15kHz use "B" type flange
50 3.5" thread on the end cap for 10 and 5kHz only

Output Configuration (PC comms Goshawk standard)
S Switch only. 5 relays for AWR234 only
X 4-20mA analogue output module, 2/3/4 includes Modbus comms
H HART 2 wire only
I HART Isolated 4 wire 2/3/4 only
W Modbus Comms only (not available for 2 wire Sultan)
P Profibus DP
E Ethernet
D Devicenet
Z Special Request

Approval Standard
X Not Required
A0 Intrinsic Safe: IECEx Zone 0 (Ex ia IIA T4) / ATEX (Grp II Cat 1 GD IP67 EEx ia IIA T4)
A22 ATEX Dust (Grp II Cat 3 D T85C IP67)

Position / Crane master/Software Options for Sultan 234 Only
PS Position Slave
CM Crane Master
X Not required

AW12 S B T 4 X X X X X

Flange Selection

F Flange

Dimension Standard

A ANSI
D DIN
J JIS
Z Special Request

Flange Sizes

2N 2" NPT flange
2B 2" BSP flange
3 3" acoustically isolated flange
4 4" acoustically isolated flange
6 6" acoustically isolated flange
8 8" acoustically isolated flange
10 10" acoustically isolated flange
Z Special Request

Flange Mounting Position

A Cone Mounted
B Transducer Body Mounted for polyurethane cone
C Angle flange

Flange Material

4 Polypropylene
6 Teflon
Z Special Request

F A 4 A - 4

Cone Selection

C Focalizer Cone

Cone Size

02N Adaptor for 2" NPT sensor to fit into 4" cone (included)
02B Adaptor for 2" BSP sensor to fit into 4" cone (included)
03 3" cone for 30,20 and 15kHz transducers with TB30 or TN30 threads
04 4" cone, 30 and 20kHz 3" transducer
06 6" cone. 30 and 20kHz 3" transducer
08-15 8" cone,15kHz
08-10 8" cone. 10kHz
10-15 10" cone,15kHz
10-09 10" cone, 9kHz
10-10 10" cone. 10kHz
10-04 10" cone. 4kHz
10-05 10" cone. 5kHz

Cone Material

4 Polypropylene
6 Teflon
7A Carbon Fibre. Comes attached to ANSI Carbon Fibre Flange
7D Carbon Fibre. Comes attached to DIN Carbon Fibre Flange
7J Carbon Fibre. Comes attached to JIS Carbon Fibre Flange
8 Polyurethane. Flange needs to be transducer Body Mounted
Z Special Request

C 04 - 4

Specifications

Frequency
• 5kHz, 10kHz, 15kHz, 20kHz, 30kHz, 40kHz, 50kHz
(4/9 are long range versions of 5/10)

Operating Voltage
• 12 - 30Vdc (residual ripple no greater than 100mV)
• 90 - 265Vac 50/60Hz
• 48Vdc,48Vac-90Vac 50/60Hz

Power Consumption
• <5W @ 24Vdc
• <10VA @ 240Vac
• <4W @ 48Vdc, <7VA @ 48Vac - 90Vac

Analog Output
• 4 -20mA (750 ohms @ 24Vdc User supply, 250 ohms internally driven)

Communications
• Goshawk, HART, Modbus, Profibus DP, DeviceNet
(Foundation Fieldbus & Profibus PA pending)
Multidrop mode can address 1 -250 units over 4 wires

Relay Output: (2) Integral (5) Remote
• Form 'C' (SPDT) contacts, rated 0.5A at 240Vac non-inductive
• All relays have independently adjustable dead bands
• Remote failsafe test facility for one relay.

Blanking Distance
• 50kHz = 0.25 m (10")
• 40kHz 0.30 m (12")
• 30kHz - 0.35 m (14")
• 20kHz = 0.45 m (17")
• 15kHz = 0.60 m (24")
• 10/9kHz = 1.0 m (39")
• 5/4kHz = 1.5 m (59")

Maximum Range

• 5 m (16ft)	50kHz	liquids
• 7 m (22ft)	40kHz	liquids
• 10 m (33ft)	30kHz	liquids, 5m (16ft) solids
• 20 m (65ft)	20kHz	liquids/slurries, 10m (33ft) solids
• 30 m (98ft)	15kHz	liquids/slurries, 20m (65ft) solids
• 50 m (165ft)	10kHz	liquids/slurries/powders/solids
• 60 m (196ft)	5kHz	liquids/slurries/powders/solids
• 180 m (588ft)	4/9 kHz for extended range	

Resolution
• 1 mm (0.04") 50, 40, 30,20, 15, 10, 5kHz
• 4 mm (0.2") 9, 4kHz

Electronic Accuracy
• +/- 0.25% of maximum range

Operating Temperature
• Integral System -40°C (-40°F) to 80°C (176°F)
• Remote electronics -40°C (-40°F) to 80°C (176°F)
• Remote transducer -40°C (-40°F) to 80°C (176°F)
-40°C (-40°F) to 175°C (Hi-Temp, 10kHz version)

Transducer/Amplifier Separation
• up to 1000m using specified extension cabl

Cable
• 4 conductor shielded twisted pair instrument cable
Conductor size dependent on cable length
BELDEN 3084A, DEKORON or equivalent
Max BELDEN 3084A = 500m (1640 ft)
Max DEKORON H DI83AA002 = 350m (1980 ft)

Maximum Operating Pressure
• +/- 7.5 PSI (+ - 0.5 Bar)

Beam Angle

• 7.5°	without focaliser	50kHz/40kHz 30kHz
• 4°	with focaliser	50kHz/40kHz
• 6°	with focaliser	30kHz/20kHz/15kHz/10kHz/5kHz
• 10°	with focaliser	9kHz/4kHz

Display
• 2 line x 8 digit alphanumeric LCD

Memory
• Non-Volatile (No backup battery required)
• >10 years data retention

Enclosure Sealing
• Integral System IP67
• Remote Electronics IP65 (Nema 4x)
• Remote Transducer IP68

Cable Entries
• Integral: 3 x M16 Glands
• Remote: 3 x 20mm, 1 x 16mm knock outs

Mounting
• ANSI, JIS or DIN Flange
• 4 in/100mm to 10 in/250mm
• 2in BSP Thread / NPT Thread

Typical Weight
Sultan AW System with appropriate flange and cone

Frequency (in kHz)		kg	lb
4/5	4 or 5kHz Transducer	13	28.6
9/10	9 or 10kHz Transducer	10	22.0
15	15kHz Transducer	8	17.6
20/30	20 or 30kHz (3") Transducer	3	6.6
30/40/50	30 (2"), 40 or 50kHz Transducer	1	2.2

Configuration		kg	lb
R6	Remote system with 6m cable	1	2.2
R15	Remote system with 15m cable	3	6.6
R30	Remote system with 30m cable	6	13.2
R50	Remote system with 50m cable	10	22.0

Additional product warranty and application guarantees upon request.

Technical data subject to change without notice.

Contact

Hawk Measurement Systems (Head Office)
15-17 Maurice Court
Nunawading VIC 3131
Australia
Phone: +61 3 9873 4750
Fax: +61 3 9873 4538
info@hawk.com.au

Hawk Measurement
7 River Street
Middleton, MA 01949
USA
Phone: +1 888 HAWKLEVEL (1-888-429-5538)
Phone: +1 978 304 3000
Fax: +1 978 304 1462
info@hawkmeasure.com

Global representatives on www.hawkmeasure.com

Represented by:
EIP Enviro Level Controls PVT LTD
B-45, SECTOR-8, NOIDA-201301 (U.P.) INDIA
Tel:0120-2421831, 2421832
Fax: 0120-2421833, 011-26026244
Email: rgoyal@vsnl.com
Mobile: 9810181109
www.eipenviroindia.com

Note: Electrical Connection shall be plug & Socket type. which is not clearly indicated in Catalogue.

REV.	DATE	DESCRIPTION	PRD.BY	CHD.BY	APPD.BY
01	20.03.10	SUBMISSION FOR APPROVAL AS PER DISCUSSION	RAVI	MAR	BSC
0	11.02.10	SUBMISSION FOR APPROVAL	RAVI	MAR	BSC

REVISIONS

Sahoo 17/2/10

PROJECT: 2 x 750MW, PRAGATI III, COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CONSULTANT: NTPC CONSULTANCY WING

CONSULTANCY WING
TRANS NO. 681 239
DATE 12/4/10
(SIGNATURE)
(DATE)
I. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION
II. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION SUBJECT TO INCORPORATION OF COMMENTS/MODIFICATIONS AS NOTED/RESUBMIT REVISED DRAWING/DOCUMENT
III. NOT APPROVED/RESUBMIT REVISED DRAWING/DOCUMENT AFTER INCORPORATION OF COMMENTS/MODIFICATIONS
IV. NOTED
V. RETURNED AS REQUESTED
VI. RETURNED AND RESUBMIT FOR INFO. & REC.
APPROVAL CONVEYED HEREIN NEITHER RELIEVES THE CONTRACTOR OF HIS CONTRACTUAL OBLIGATION AND RESPONSIBILITIES FOR ...
MATERIAL OF CONSTRUCTION, DESIGN ...
... AND STATUTORY ...
... IN WRITING

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

UNITECH MACHINES GURGAON

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE:
DATA SHEET – LEVEL TRANSMITTER (DP TYPE)

PREPARED	CHECKED	APPROVED	DATE		JOB NO.
RAVI	MAR	BSC	11.02.10		P-269

BHEL Doc. NO.	UML Doc. NO.	REV.	SHEET
PE-V0-314-552-A079	P269-D-A079	01	1 OF 3

S.No	Location	Range	Qty	Tag No.	Remark
1	On Hydro pneumatic Tank	0-1715 mmWC	1	9SGA01CL001	
2	On Hydro pneumatic Tank	0-1715 mmWC	1	9SGA01CL002	

UNITECH MACHINES GURGAON

Data sheet for the Flange Mounted Differential Pressure Transmitter

Model No. EJA210A-EMWA1A5A-92EN
Calibration Range : 0 – 1715 mmWC

Model	**EJA210A-EMWA1A5A-92EN**
Make	YOKOGAWA
Type of Transmitter	Microprocessor based 2-wire HART compatible differential Pressure Transmitter.
Principle of Sensor	Silicon Resonant type.
Accuracy	±0.075% of span
Output	4-20mA superimposed digital signal based on HART protocol.
Measurement Span	100-10000mmWC
Calibration Range	0 – 1715 mmwc
Working pressure limits	2.7KPa to flange rating.
Rangeability	100 : 1
Stability	±0.1% of URL per 60 months.
Power Supply	10.5 to 42VDC
Load Impedance	570Ω at 24VDC
Electrical connection	Plug & Socket type.
Process Connection – High pressure side	2-inch ANSI CLASS 150,
Process Connection – Low pressure side	¼-inch NPT (F) on the cover flanges.
Housing	Die Cast Aluminum with poly urethane paint.
Ambient Temperature	-30°C to +80°C
Process Temperature	-40°C to +120°C
Diaphragm	Hastelloy-C
All Wetted Parts	SS316
Filled Fluid	Silicon Oil.
Diagnostics Details	Self disgnostics in the transmitter with diagnostics indication on the local display.
Span & Zero Adjustment	Remote as well as manually adjustable.
Zero Elevation & Suppression	Standard feature, within Lower & Upper Range Limits
Degree of Protection	IP67

YOKOGAWA INDIA * NEW DELHI * YOKOGAWA 4.2.2010

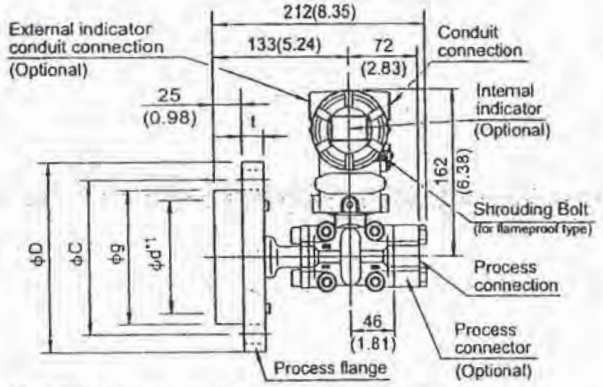
UNITECH MACHINES LTD.

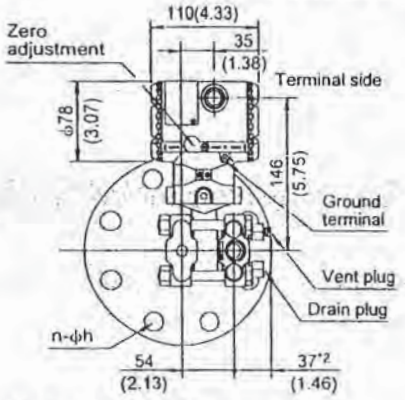
Drawings

Model EJA210A
Flange Mounted
Differential Pressure Transmitter

DPharp

Unit: mm(approx. inch)





*1: Indicates inside diameter of gasket contact surface.
*2: When Optional code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.

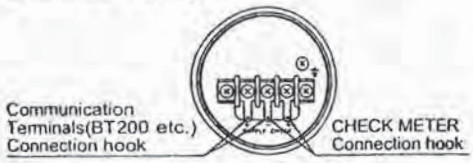
Flange size: 3-inch (80mm)

Flange Nominal Diameter and Rating	ϕD	ϕC	ϕg	ϕd	t	Bolt Holes	
						No.(N)	Dia.(ϕh)
JIS 10K	185(7.28)	150(5.91)	130(5.12)	90(3.54)	18(0.71)	8	19(0.75)
JIS 20K	200(7.87)	160(6.30)	130(5.12)	90(3.54)	22(0.87)	8	23(0.91)
ANSI Class150	190.5(7.50)	152.4(6.00)	130(5.12)	90(3.54)	23.9(0.94)	4	19.1(0.75)
ANSI Class300	209.6(8.25)	168.1(6.62)	130(5.12)	90(3.54)	28.5(1.12)	8	22.4(0.88)
JPI Class150	190(7.48)	152.4(6.00)	130(5.12)	90(3.54)	24(0.44)	4	19(0.75)
JPI Class300	210(8.27)	168.1(6.62)	130(5.12)	90(3.54)	28.5(1.12)	8	22(0.87)
DIN PN 10/16	200(7.87)	160(6.30)	130(5.12)	90(3.54)	20(0.79)	8	18(0.71)
DIN PN 25/40	200(7.87)	160(6.30)	130(5.12)	90(3.54)	24(0.44)	8	18(0.71)

Flange size: 2-inch (50mm)

Flange Nominal Diameter and Rating	ϕD	ϕC	ϕg	ϕd	t	Bolt Holes	
						No.(N)	Dia.(ϕh)
JIS 10K	155(6.10)	120(4.72)	100(3.94)	61(2.40)	16(0.63)	4	19(0.75)
JIS 20K	155(6.10)	120(4.72)	100(3.94)	61(2.40)	18(0.71)	8	19(0.75)
ANSI Class150	152.4(6.00)	120.7(4.75)	100(3.94)	61(2.40)	19.1(0.75)	4	19.1(0.75)
ANSI Class300	165.1(6.50)	127(5.00)	100(3.94)	61(2.40)	22.4(0.88)	8	19.1(0.75)
JPI Class150	152(5.98)	120.6(4.75)	100(3.94)	61(2.40)	19.5(0.71)	4	19(0.75)
JPI Class300	165(6.50)	127(5.00)	100(3.94)	61(2.40)	22.5(0.89)	8	19(0.75)
DIN PN 10/16	165(6.50)	125(4.92)	100(3.94)	61(2.40)	18(0.71)	4	18(0.71)
DIN PN 25/40	165(6.50)	125(4.92)	100(3.94)	61(2.40)	20(0.79)	4	18(0.71)

● Terminal Configuration



● Terminal Wiring

SUPPLY + −	Power supply and output terminal
CHECK + −	External indicator(anmeter) terminal
⏚	Ground terminal

SD 01C21C02-01E
1st Edition: June 1, 1997
4th Edition: Apr. 16, 2001

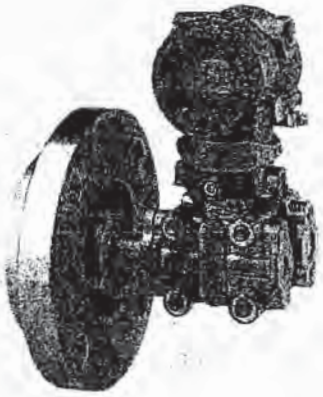
General Specifications

Model EJA210A and EJA220A
Flange Mounted Differential Pressure Transmitters

DPharp

GS 01C21C01-00E

The high performance flange mounted differential pressure transmitter models EJA210A and 220A can be used to measure levels of densities of solidifying or precipitating liquids. Both output a 4 to 20 mA DC signal corresponding to the measured differential pressure. Models EJA210A and 220A also feature remote setup and monitoring through communications with the BRAIN™ terminal and CENTUM CS™ or μXL™ or HART® 275 host.



■STANDARD SPECIFICATIONS

Refer to GS 01C22T02-00E for FOUNDATION Fieldbus communication type and GS 01C22T03-00E for PROFIBUS PA communication type marked with "◇."

□ PERFORMANCE SPECIFICATIONS

Zero-based calibrated span, linear output, wetted parts material code'S' for 3-inch flange flush type and 4-inch flange extended type.

Reference Accuracy of Calibrated Span
(including the effects of zero-based linearity, hysteresis, and repeatability)

±0.075 % of Span

For spans below X,

$$\pm[0.025 + 0.05 \frac{X}{\text{Span}}] \text{ \% of Span}$$

where X equals:

Capsule	X kPa (inH_2O)
M	10 (40)
H	100 (400)

Ambient Temperature Effects
Total Effects per 28 °C (50 °F) Change

Capsule	Effect
M	±[0.224 % Span + 0.056 % URL]
H	±[0.14 % Span + 0.028 % URL]

Static Pressure Effects

Total Effects per Change
±[0.028 % Span+0.007 % URL] per 0.69 MPa {100 psi}

Effect on Zero (can be corrected at line pressure)
±0.007 % of URL per 0.69 MPa {100 psi}

Stability
±0.1 % of URL per 60 months

Power Supply Effects "◇"
±0.005 % per Volt (from 21.6 to 32 V DC, 350 Ω)

□ FUNCTIONAL SPECIFICATIONS

Span & Range Limits

Measurement Span and Range		kPa	inH_2O (/D1)	mbar (/D3)	mmH_2O (/D4)
M	Span	1 to 100	4 to 400	10 to 1000	100 to 10000
	Range	-100 to 100	-400 to 400	-1000 to 1000	-10000 to 10000
H	Span	5 to 500	20 to 2000	50 to 5000	0.05 to 5 kgf/cm²
	Range	-500 to 500	-2000 to 2000	-5000 to 5000	-5 to 5 kgf/cm²

NOTE 0=5

URL is defined as the Upper Range Limit from the table above.

Zero Adjustment Limits
Zero can be fully elevated or suppressed, within the Lower and Upper Range Limits of the capsule.

External Zero Adjustment "◇"
External zero is continuously adjustable with 0.01 % incremental resolution of span. Span may be adjusted locally using the digital indicator with range switch.

Output "◇"
Two wire 4 to 20 mA DC output with digital communications. BRAIN or HART FSK protocol are superimposed on the 4 to 20 mA signal.

Failure Alarm
Output status at CPU failure and hardware error;
Up-scale: 110%, 21.6 mA DC or more(standard)
Down-scale: -5%, 3.2 mA DC or less
-2.5%, 3.6 mA DC or less (Optional code /F1)
Note: Applicable for Output signal code D and E

YOKOGAWA ◆

Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
Phone: 81-422-52-5690 Fax: 81-422-52-2018

GS 01C21C01-00E

21st Edition Oct. 2008

Damping Time Constant (1st order)
The sum of the amplifier and capsule damping time constant must be used for the overall time constant. Amp damping time constant is adjustable from 0.2 to 64 seconds.

Model	EJA210A		EJA220A	
Capsule (Silicone Oil)	M	H	M	H
Time Constant (sec.)	0.4	0.4	0.4	0.4

Ambient Temperature Limits
(approval codes may affect limits)
-40 to 85 °C (-40 to 185 °F)
-30 to 80 °C (-22 to 176 °F) with LCD Display

Process Temperature Limits
(approval codes may affect limits)
-40 to 120 °C (-40 to 248 °F)

Ambient Humidity Limits
5 to 100 % RH @ 40 °C (104 °F)

Working Pressure Limits (Silicone Oil)
2.7 kPa abs(0.38 psia) to flange rating (see graph below)

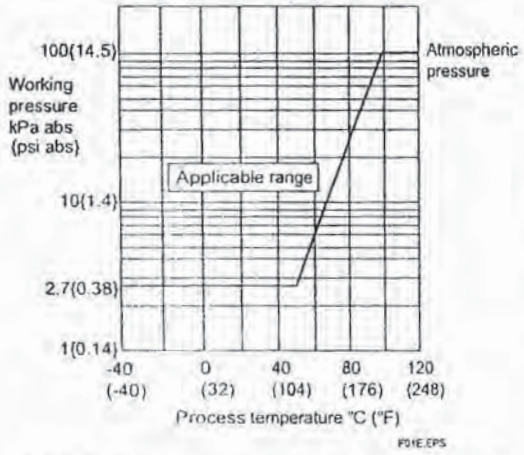


Figure 1. Working Pressure and Process Temperature

EMC Conformity Standards "◇" CE , C N200
EN61326-1 Class A, Table2 (For use in industrial locations)
EN61326-2-3

European Pressure Equipment Directive 97/23/EC
Sound Engineering Practice

Supply & Load Requirements
(Safety approvals may affect electrical requirements)
With 24 V DC supply, up to a 570 Ω load can be used. See Figure 2.

Supply Voltage "◇"
10.5 to 42 V DC for general use and flameproof type
10.5 to 32 V DC for lightning protector (Optional code /A)
10.5 to 30 V DC for intrinsically safe, Type n, nonincendive, or non-sparking type
Minimum voltage limited at 16.4 V DC for digital communications, BRAIN and HART

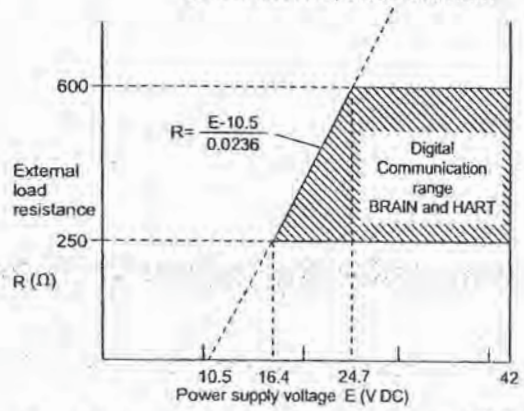


Figure 2. Relationship Between Power Supply Voltage and External Load Resistance

Load (Output signal code D and E)
0 to 1335 Ω for operation
250 to 600 Ω for digital communication

Communication Requirements "◇"

BRAIN

Communication Distance
Up to 2 km (1.25 miles) when using CEV polyethylene-insulated PVC-sheathed cables. Communication distance varies depending on type of cable used.

Load Capacitance
0.22 μF or less (see note)

Load Inductance
3.3 mH or less (see note)

Input Impedance of communicating device
10 kΩ or more at 2.4 kHz.

Note : For general-use and Flameproof type.
For Intrinsically safe type, please refer to 'OPTIONAL SPECIFICATIONS.'

□ PHYSICAL SPECIFICATIONS

Wetted Parts Materials

High side:
See wetted parts materials of the model code

Low side:

Diaphragm
Hastelloy C-276

Cover flange
SCS14A

Process connector
SCS14A

Capsule Gasket
Teflon-coated SUS316L

Vent and Drain Plug
SUS316

Process Connector Gasket
PTFE Teflon

Non-wetted Parts Materials

Bolting
SCM435, SUS630, or SUH660

Housing
Low copper cast-aluminum alloy with polyurethane paint (Munsell 0.6GY3.1/2.0)

Degrees of Protection
IP67, NEMA4X, JIS C0920 immersion proof

Cover O-rings
Buna-N

Name plate and tag
SUS304 or SUS316 (option)

Fill Fluid
Silicone, Fluorinated oil(option)

Weight
10.7 kg(23.6 lb) (Model EJA210A with 3" ANSI 150 flange; without integral indicator and process connector.)
16.1 kg(35.5 lb) (Model EJA220A with 4" ANSI 150 flange, X_2= 100, without integral indicator and process connector.)

Connections
Refer to the model code to specify the process and electrical connection type. The high pressure side will be a flange connected, low pressure side is threaded.
Process Connection of Low Side Cover Flange:
DIN 19213 with 7/16 inch × 20 unf female thread.

< Settings When Shipped > "◇"

Tag Number	As specified in order *1
Output Mode	'Linear' unless otherwise specified in order
Display Mode	'Linear' unless otherwise specified in order
Operation Mode	'Normal' unless otherwise specified in order
Damping Time Constant *2	'2 sec.'
Calibration Range Lower Range Value	As specified in order
Calibration Range Higher Range Value	As specified in order
Calibration Range Units	Selected from mmH_2O, mmAq, mmWG, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm^2, kgf/cm^2, inH_2O, inHg, ftH_2O, or psi (Only one unit can be specified)

T02E.EPS

*1: Up to 16 alphanumeric characters for BRAIN and 8 characters for HART including '-' and '.' will be entered in the amplifier memory. If specified Tag includes other characters than above, it will not be entered in the amplifier memory.
*2: If using square root output, set damping time constant to 2 sec. or more.

< Related Instruments > "◇"

Power Distributor: Refer to GS 01B04T01-02E or GS 01B04T02-02E
BRAIN TERMINAL: Refer to GS 01C00A11-00E

< Reference >

1. Teflon; Trademark of E.I. DuPont de Nemours & Co.
2. Hastelloy; Trademark of Haynes International Inc.
3. HART; Trademark of the HART Communication Foundation.
4. FOUNDATION; Trademark of Fieldbus Foundation.
5. PROFIBUS; Registered trademark of Profibus Nutzerorganisation e.v., Karlsruhe, Germany.

Material Cross Reference Table

SUS316L	AISI 316L
SUS316	AISI 316
SUS304	AISI 304
S25C	AISI 1025
SCM435	AISI 4137
SUS630	ASTM630
SCS14A	ASTM CF-8M

T03E.EPS

6. Other company names and product names used in this material are registered trademarks or trademarks of their respective owners.

< Specification Conformance >

The model EJA210A/220A maintains a specification conformance to at least 3 σ.

Note: Handheld calibrator to be supplied (01 No). Cat - IV

HART calibrator Universal type is provided by BHEL-EDN with main plant package and hence not req. for individual package.

Amit
Amit Kr. Garg
BHEL-PEM

NTPC Limited
(A Govt. of India Enterprise)
CONSULTANCY WING

TRANS NO. CSI-330
DATE 09/11/2010

- I. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION.
- II. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION SUBJECT TO INCORPORATION OF COMMENTS/ MODIFICATIONS AS NOTED RESUBMIT REVISED DRAWING/DOCUMENT.
- III. NOT APPROVED RESUBMIT REVISED DRAWING/DOCUMENT AFTER INCORPORATION OF COMMENTS/MODIFICATIONS AS NOTED.
- IV. FOR INFORMATION AND RECORDS.
- V. REVISE AND RESUBMIT FOR INF & REC.

(SIGNATURE)
(DATE)

APPROVAL CONVEYED HERE IN NEITHER RELIVES THE CONTRACTOR OF HIS CONTRACTUAL OBLIGATION AND RESPONSIBILITIES FOR CORRECTNESS OF CONSTRUCTION DRAWING DETAILS ASSEMBLY, PERFORMANCE PARTICULARS AND CONFORMITY OF THE SUPPLIES WITH THE SPECIFICATIONS, APPROVED SCHEMES AND STATUTORY REGULATIONS. THE PURCHASERS RIGHT UNDER THE CONTRACT OR CHANGE IN APPROVED DRAWING/DOCUMENTS IS PERMITTED WITHOUT PRIOR WRITTEN WARNING

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REVISIONS

REV.	DATE	DESCRIPTION	PRD.BY	CHD.BY	APPD.BY
0	11.02.10	SUBMISSION FOR APPROVAL	RAVI	MAR	BSC

PROJECT: 2 x 750 MW, PRAGATI III, COMBINED CYCLE PROJECT

CUSTOMER: PRAGATI POWER CORPORATION LIMITED

CONSULTANT: NTPC – CONSULTANCY WING

CLIENT: BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

VENDOR: UNITECH MACHINES LIMITED
PLOT NO. 35P, SCETOR – 44
GURGAON – 122002

PACKAGE: FIRE PROTECTION SYSTEM

TITLE: DATASHEET – PRESSURE TRANSMITTER

UNITECH MACHINES

PREPARED	CHECKED	APPROVED	DATE		JOB NO.	
RAVI	MAR	BSC	11.02.10		P–269	
BHEL Doc. NO. PE-V0-314-552-A080			UML Doc. NO. P269-D-A080		REV. 0	SHEET 1 OF 6

ENDORSEMENT SHEET FOR DATA SHEET/ CONFIGURATION DRAWING

TO BE FILLED IN BY SUPPLIER AT TIME OF SUBMISSION		To be filled in by NTPC
PROJECT NAME	Fire Protection System for 2x250 MW Pragati CCPP	Data sheet No.:- PE-YD-214-552-A080 UNLDS No. - P267-D-A080 Rev.-0 ; Date- 11/02/2010
CONTRACT NO.:	PEHR/ECP/BOP-RAWANA/1882.REV3 1890 DTD. 01/07/2009	
PACKAGE NO.	—	
MAIN SUPPLIER	Unitech Machines Limited	DISTRIBUTION OF ENDORSEMENT OF A) DATA SHEET: 1. MAIN SUPPLIER 2. RIO/ CQA, as applicable
MANUFACTURER NAME	Yokogawa India Limited, Bangalore	
MAJOR EQUIPMENT DETAILS: NAME OF EQUIPMENT: BOM WITH MODEL NO. ENCLOSED AT: ANY OTHER IMPORTANT PARAMETER	Pressure Transmitter, model No. EJA430A-EAS4A-92EA	
REF. APP. DS/DRG. NO. DT. 0000-405-PEI-Y-0032 Rev. No: 00 DTD. 1/06/2007	PROJECT/ PKG. SPECIFIC DS/DRG NO. DT.	

I) CERTIFIED that the item/ component is identical to that considered for reference DS approval.
II) That there are minor changes in the item/ component with respect to that considered for reference DS approval, however the same affect the reference DS slightly, as indicated below/ in attached sheet.
a) Deviation – i) Page No - 12 of 19
Hand held Calibrator - Not required

SIGN.: DATE: 11.02.10 (MAIN SUPPLIER/ CONTRACTOR)	SIGN.: DATE: 3-2-2010 (SUB-CONTRACTOR/ MANUFACTURER)	APPROVED BY: SIGN.: NTPC (Date & Seal)

YOKOGAWA INDIA LTD. NEW DELHI

FOR[illegible]01-PEL-W12/F1-R0

UNITECH MACHINES LTD. 02/10

S.No	Location	Range	Qty	Tag No.	Remark
1	On discharge header of HP-01	0.3-30 bar	1	9SGA10CP001	
2	On discharge of HP-01	0.3-30 bar	1	9SGA10CP002	
3	On discharge header of HP-02	0.3-30 bar	1	9SGA20CP001	
4	On discharge of HP-02	0.3-30 bar	1	9SGA20CP002	
5	On discharge of diesel engine driven HP-03	0.3-30 bar	1	9SGA30CP001	
6	On discharge of diesel engine driven HP-03	0.3-30 bar	1	9SGA30CP002	
7	On discharge header of SP-01	0.3-30 bar	1	9SGC20CP001	
8	On discharge of SP-01	0.3-30 bar	1	9SGC20CP002	
9	On discharge of diesel engine driven SP-02	0.3-30 bar	1	9SGC10CP001	
10	On discharge of diesel engine driven SP-02	0.3-30 bar	1	9SGC10CP002	
11	On discharge of JP-01	0.3-30 bar	1	9SGA40CP001	
12	On discharge of JP-02	0.3-30 bar	1	9SGA50CP001	
13	On Common Hydrant Header	0.3-30 bar	1	9SGA35CP001	
14	On Common Spray Header	0.3-30 bar	1	9SGC25CP001	
15	On Hydro pneumatic tank	0.3-30 bar	1	9SGA01CP001	
16	On Hydro pneumatic tank	0.3-30 bar	1	9SGA01CP002	
17	On discharge of Air commpressor-1	0.3-30 bar	1	9SGA55CP001	
18	On discharge of Air commpressor-2	0.3-30 bar	1	9SGA55CP002	

Yokogawa India Limited
203 Somdutt Chambers II
9, Bhikaji Cama Place
New Delhi - 110 066, India
Tel.: 91-11-26108740, 26103873
Fax : 91-11-26167985

YOKOGAWA

YIL Document No. 07/01/AW/TR	Date: 01 / 06 / 07
NTPC Document No.:	
Vendor Name: YOKOGAWA	
Vendor Document Ref.:	Date: 01 / 06 / 07

REFERENCE DATA SHEET FOR PRESSURE, DIFFERENTIAL PRESSURE, FLOW & LEVEL TRANSMITTERS

YOKOGAWA MAKE

FOR ALL NTPC PROJECTS.

THIS DOCUMENT IS APPLICABLE

TO

PRESSURE, DIFFERENTIAL PRESSURE & REMOTE SEAL TRANSMITTERS SUPPLIED BY M/s YOKOGAWA.

NTPC PROJECT ENGG.-C&I		
APPROVED		
(SIGN)	31.07.07 (DATE)	R K Singh NAME
VALID UPTO 31.07.12 DATE		

Rev No. : 00	01 / 06 / 2007	Initial Release

Registered Office :
Plot No. 96, Electronics City Complex
Hosur Road, Bangalore - 560 100. INDIA

Reference data sheet - 4:

YOKOGAWA

Application: A) Steam and water gauge pressure measurement (medium pressure).
B) Instrument / service air pressure measurement.

MAKE	**: YOKOGAWA, JAPAN.**
MODEL	**: EJA430A- E- 'Y'-S4A-92EA. (For Y refer table-1).**
TYPE OF TRANSMITTER	: Microprocessor based 2-WIRE, HART compatible gauge pressure transmitter.
PRINCIPLE OF SENSER	: Silicon resonant type.
ACCURACY	: a) +/- 0.075% of calibrated span for turn down ratio 1:1 to 10:1. b) +/- (0.025 + 0.05 X / SPAN)% of span for span below X. Where X equals 43 PSI for capsule code A, 200 PSI for capsule code B. including combined effects of zero-based linearity, hysteresis and repeatability.
OUTPUT	: 4-20 mA super imposed digital signal based on HART protocol.
TURN DOWN RATIO	: Dependent on 'Y' and shall be as per table-1.
SPAN LIMIT	: Dependent on 'Y' and shall be as per table-1.
OVER PRESS / STATIC PRESS	: Dependent on 'Y' and shall be as per table-1.
STABILITY	: ± 0.1% of URL over a 5 year period.
ZERO AND SPAN DRIFT	: +/_ (0.084% SPAN + 0.017%URL) per 28 deg C change in temp.
POWER SUPPLY	: 10.5 – 42 VDC.
LOAD IMPEDANCE	: 570 Ω at 24 VDC.
ELECTRICAL CONNECTION	: Plug and socket type, (3 pin gold plated socket on Trx. housing and crimping type plug on other side).

एनटीपीसी NTPC PROJECT ENGG.-C&I
APPROVED
(SIGN) 31.07.07 (DATE) R. K. Srivastava NAME
VALID UPTO 30.07.10 DATE

YOKOGAWA INDIA LTD.

PROCESS CONNECTION	: 1/2" NPT (F).
HOUSING	: DIE CAST ALUMINIUM with polyurethane coating, IP-67.
AMBIENT TEMP.	: - 30^{0}C to + 80^{0}C.
PROCESS TEMP.	: - 40 ^{0}C to + 120 ^{0}C.
DIAPHRAGM	: Hastelloy C.
ALL WETTED PARTS	: SS316.
FILLED FLUID	: SILICONE OIL.
DIAGNOSTICS DETAIL	: Self diagnostics in the transmitter with diagnostic indication on the local display.
SPAN & ZERO ADJUSTMENT	: Zero & Span adjustment can be done anywhere within the range. It can be done either manually through Push buttons or remotely through Hand held configurator.
ACCESSORIES	: 2 inch pipe bracket for mounting SS tag plate with all relevant data engraved.
TYPE TEST REPORT AS PER BS-6447/ IEC-60770.	: As per contract.
Hand held calibrator	: Shall be provided as per specification requirement.

YOKOGAWA

NTPC PROJECT ENGG.-C&I
APPROVED
(SIGN) 31.07.07 (DATE) NAME
VALID UPTO 30.07.10 DATE

YOKOGAWA INDIA LTD. YOKOGAWA NEW DELHI

YOKOGAWA INDIA LTD. NEW DELHI

TABLE-1

YOKOGAWA

SENSER CODE 'Y'	MAXIMUM SPAN (URL)	MINIMUM SPAN	TURN DOWN RATIO POSSIBLE	TURN DOWN USED(meeting accuracy reqn.)	ZERO & SPAN DRIFT	OVER PRESS LIMITS	
A	30 bar	0.3 bar	100:1	Ideally should be less than 15:1	Refer above	45 bar	✓
B	140 bar	1.4 bar	100:1	Ideally should be less than 15:1	Refer above	210 bar	

NOTE-1 : 'Y' has to be selected in line with process range and considering turn down ratio/accuracy limitation. **Suitability of over pressure limits should be checked for the process (over pressure should be 1.5 times the max. operating pressure).**

NOTE-2 : Special approvals / requirements for hazardous area applications should be considered additionally based on application. Accordingly model code shall be changed.

एनटीपीसी NTPC PROJECT ENGG.-C&I
APPROVED
(SIGN) 31.07.07 (DATE) NAME
VALID UPTO 30.07.10 DATE

YOKOGAWA INDIA YOKOGAWA NEW DELHI

Aradhna NEW DELHI

REV.	DATE	DESCRIPTION	DRN.BY	CHD.BY	APPD.BY
0	09.08.10	SUBMISSION FOR APPROVAL	PK	SB	AKS

R E V I S I O N S

CUSTMOR:

PRAGATI POWER CORPORATION LIMITED

CONSULTANT:

NTPC CONSULTANCY WING

PROJECT:

PRAGATI – III COMBINED CYCLE POWER PROJECT
2X750 MW AT BAWANA, DELHI

CLIENT:

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

PACKAGE: FIRE PROTECTION SYSTEM

UNITECH MACHINES LIMITED
'UM' HOUSE, PLOT NO. 35P, SECTOR-44
GURGAON, HARYANA 122002.

TITLE:

DATA SHEET FOR ACTUATOR GATE VALVE

DRAWN	CHECKED	APPROVED	DATE	SCALE	JOB NO.
PK	SB	AKS	09.08.10	NTS	P-269

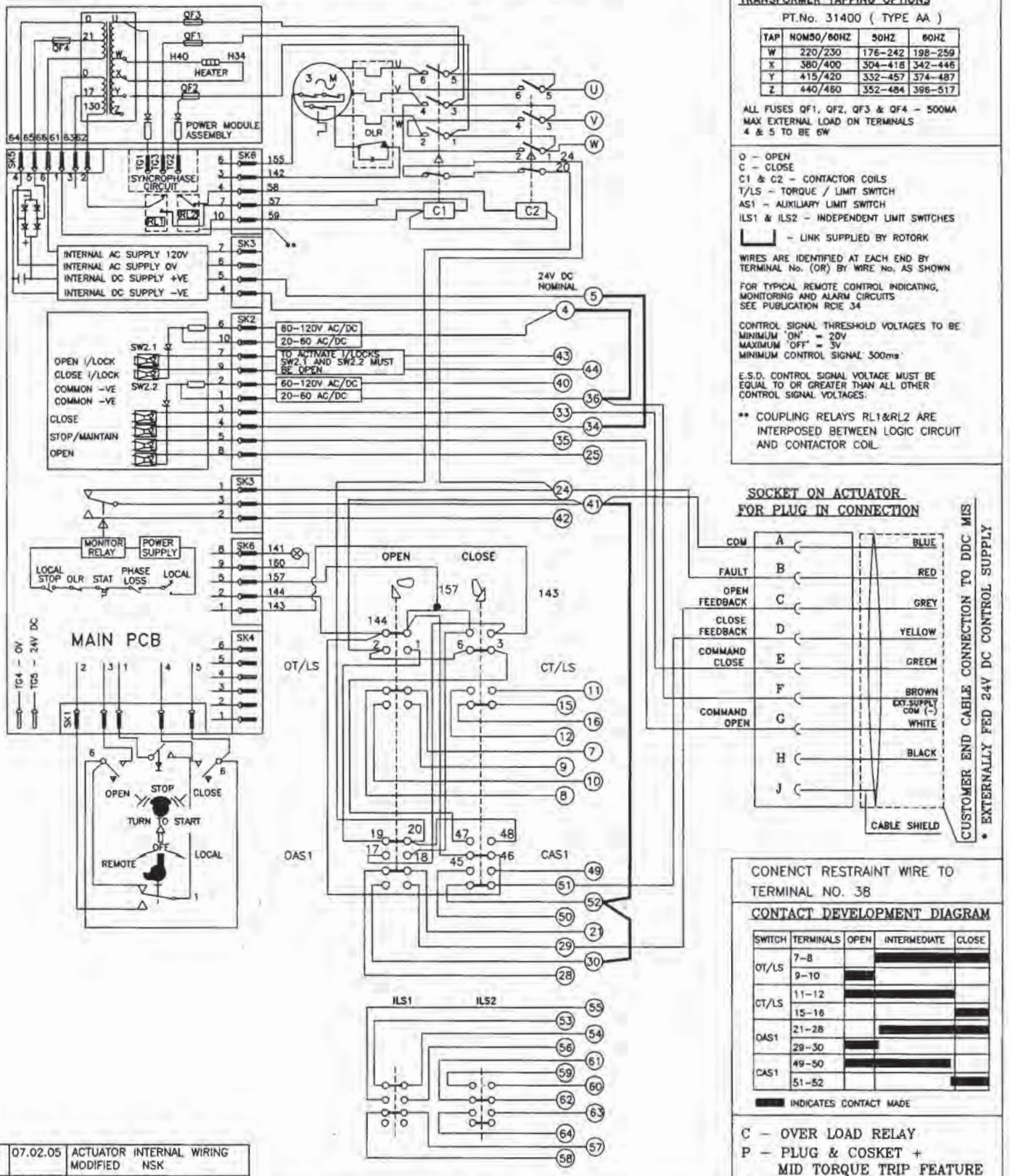
BHEL DRG. NO.	UML DRG. NO	REV.	SHEET
PE-V0-314-552-A084	P269-D-A084	00	1 OF 9

DATA SHEET FOR GATE VALVE 150 NB

SLNO	DECRIPTION	UNITS	DATA
01	ACTUATOR MANUFACTURAR	----	ROTORK CONTROLS (I) PVT. LTD
02	Torque Range & RPM	Kg-M	2.48 -6.22, 48 RPM
03	Duty Cycle		60 starts per Hr (S2-15 Min)
04	Enclosure (TENV)		IP-68
05	Average/Nominal Output	Kw	0.27
06	Rated Voltage	V	415V
07	Rated Frequency	Hz	50
08	No of Phase		3
09	ADMISSIBLE Voltage FLUCTUATION	%	+/-10%
10	ADMISSIBLE FREQUENCY FLUCTUATION	%	+/-5%
11	Admissible Voltage & Freq variation	%	±10 (ABS)
12	Average Load	A	1.7
13	Locked Rotork Current	A	6.0
14	Full Load Speed	RPM	2880
15	Insulation Class		F
16	Power Factor		0.60
17	Average Load Efficiency	%	37
18	Admissible Amb Temp	Deg C	-30 to +70
19	Temp rise over Amb Temp	Deg C	70
20	Type		Syncropak Actuator (With Integral Starter)
21 A	Cable Gland Size : Power- (1 No) Double Compression Cable Gland		¾" BSC- (3CX 2.5 Sqmm) CU/PV Insulated OD 14 +/- 2
21B	Cable Gland Size : Control- (1 No) Double Compression Cable Gland		¾" BSC- (3CX 2.5 Sqmm) CU/PV Insulated OD 14 +/- 2
22	Gear box lubrication		Alpha SP68 or SAE EP 80
23	Position Limit Switch	Nos	2NO+2NC-4 Nos
24	Torque Switch	Nos	2NO+2NC-2 Nos
25	Rating of Switch	A	5A 240VAC, 0.5A (inductive)/220VDC
26	Position Transmitted-On/Off duty		NA
27A	Space Heater Power Supply		160V AC, 1 Phase , 50Hz(internally fed)
27B	Space Heater Terminal Suitable	-	2Cx 2.5 Sq.mm/CU/PV
28	Thermostat	3 Nos	Provided
29	Internal Wiring		With suitable voltage grade copper wire, 650 V (PVC - 1.5 mm²)

30	Control CKT Diagram		WD 1687Z00CP3+CLI
31	Weight	Kg	60 (Approx)
32	Motor Suitable For On-Off/ Inching		On off.
33	Motor Type & Ref Std		Squirrel Cage Induction, IS 325
34	OLR Set Value	A	1.8
35	Plug & Socket (Integral Mounted on the Actuator)		2 Nos 9 pin plug & socket to suit 4 pair X 0.5 Sqmm Type G Instrumentation cable, OD Maximum 18.5 mm
36	The color coding of cable for 9 pin Plug & Socket suitable for 4 pair G type cable		PIN No — Cable Colors A (1) — Blue B(2) — Red C(3) — Grey D(4) — Yellow E(5) — Green F(6) — Brown G(7) — White H(8) — Black J(9) — Shield
37	Material of Hand Wheel Hub		SG Iron
38	Painting Shade		RAL 5012(Blue)
39	Single Phase & Wrong Phase Sequence Protection		Yes
40	Local Mechanical Indication (0-100%)		Provided

CIRCUIT IS DRAWN FOR A VALVE IN THE FULLY CLOSED POSITION WITH POWER OFF



CIRCUIT DIAGRAM No.
1687Z00CP3

TRANSFORMER TAPPING OPTIONS

PT.No. 31400 (TYPE AA)

TAP	NOM50/60HZ	50HZ	60HZ
W	220/230	176-242	198-259
X	380/400	304-418	342-446
Y	415/420	332-457	374-487
Z	440/460	352-484	396-517

ALL FUSES QF1, QFZ, QF3 & QF4 - 500MA
MAX EXTERNAL LOAD ON TERMINALS 4 & 5 TO BE 6W

O - OPEN
C - CLOSE
C1 & C2 - CONTACTOR COILS
T/LS - TORQUE / LIMIT SWITCH
AS1 - AUXILIARY LIMIT SWITCH
ILS1 & ILS2 - INDEPENDENT LIMIT SWITCHES
⌊⌋ - LINK SUPPLIED BY ROTORK

WIRES ARE IDENTIFIED AT EACH END BY TERMINAL No. (OR) BY WIRE No. AS SHOWN

FOR TYPICAL REMOTE CONTROL INDICATING, MONITORING AND ALARM CIRCUITS SEE PUBLICATION RCIE 34

CONTROL SIGNAL THRESHOLD VOLTAGES TO BE
MINIMUM 'ON' = 20V
MAXIMUM 'OFF' = 3V
MINIMUM CONTROL SIGNAL 300ms

E.S.D. CONTROL SIGNAL VOLTAGE MUST BE EQUAL TO OR GREATER THAN ALL OTHER CONTROL SIGNAL VOLTAGES.

** COUPLING RELAYS RL1&RL2 ARE INTERPOSED BETWEEN LOGIC CIRCUIT AND CONTACTOR COIL.

CONENCT RESTRAINT WIRE TO TERMINAL NO. 38

CONTACT DEVELOPMENT DIAGRAM

SWITCH	TERMINALS	OPEN	INTERMEDIATE	CLOSE
OT/LS	7-8		■	■
	9-10	■		
CT/LS	11-12	■	■	
	15-16			■
OAS1	21-28		■	■
	29-30	■		
CAS1	49-50	■	■	
	51-52			■

■ INDICATES CONTACT MADE

C - OVER LOAD RELAY
P - PLUG & COSKET + MID TORQUE TRIP FEATURE
3 - THREE THERMOSTATS ON MOTOR

ON/OFF

CIRCUIT DIAGRAM No.
1687Z00CP3

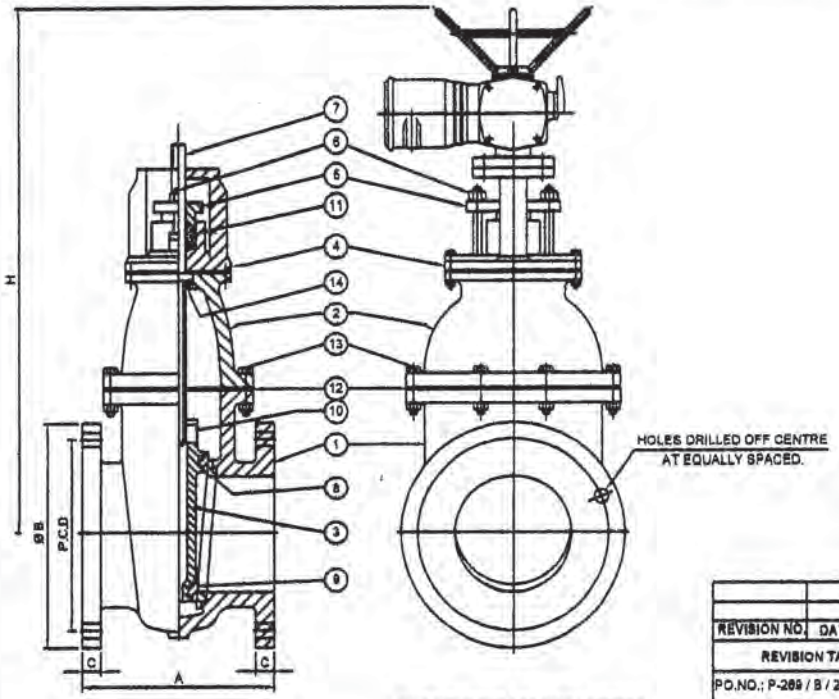
NO.	DATE	REVISION
3	07.02.05	ACTUATOR INTERNAL WIRING MODIFIED NSK
2	19.10.2K	MID TRAVEL TORQUE TRIP FACILITY MTR ADDED.
1	20.09.2K	OLR&CONTROL SUPPLY INTROD. IN MONITOR RELAY CIRCUIT. BLACK WIRE MADE AS SPARE TERMINAL. RL1& RL2 NOTE NITRD. AS PER CUSTOMER REQUIREMENT.

DRAWN NSK 19.10.2000

CHECKED NSM 19.10.2000

ROTORK CONTROLS (I) LTD.
28B IND.ESTATE (N)
MADRAS 600 098.

QTY.	NOMINAL SIZE OF VALVE NB (MIN)	FACE TO FACE A	FLANGE DIMENSIONS					HYD.TEST PRESSURE Kg / Cm²		HEIGHT 'H' (MAX)	STEM DIA Ø d (MIN)	WALL THICKNESS		OPERATING TIME CLOSED / OPEN (APPROX)
			DIA B	THICK C	P.C.D.	NO. OF HOLES	HOLE DIA D	BODY	BACK SEAT & SEAT			BODY	COVER	
2	150	267 ±3	279.5	25.4 +3	241.3	8	22.2	24	18	1150	27	11.7	11.7	35 SECONDS



ALL DIMENSIONS ARE IN MILLIMETRES

PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION
14	BACK SEAT BUSH	BRONZE	IS:318, LTB-2
13	BOLTS&NUTS	CARBON STEEL	IS:1367,CL-4.6/4
12	GASKET	C.A.F.	IS:2712,GR-C.
11	GLAND PACKING	GRAPHITED ASBESTOS	
10	WEDGE NUT	BRONZE	IS:318, LTB-2
9	WEDGE SEAT RING	BRONZE	IS:318, LTB-2
8	BODY SEAT RING	BRONZE	IS:318, LTB-2
7	STEM	STAINLESS STEEL	ASTM-A-276, TYPE-410
6	GLAND STUDS & NUTS	CARBON STEEL	IS:1367,CL-4.6/4
5	GLAND	CAST IRON	IS:210,FG-200
4	YOKE	CAST IRON	IS:210,FG-200
3	WEDGE	CAST IRON	IS:210,FG-200
2	BONNET	CAST IRON	IS:210,FG-200
1	BODY	CAST IRON	IS:210,FG-200

REVISION NO.	DATE	NAME

REVISION TABLE

PO.NO.: P-269 / B / 28 / 15903

DATE : 24.12.09.

PROJECT :- PRAGATI POWER STATION
PACKAGE :- FIRE DETECTION & PROTECTION SYSTEM.
CONTRACTOR:- BHEL / UNITECH MACHINES LTD.

NOTES

1. MANUFACTURING STANDERD : GENERALLY AS PER BS : 6160
2. PRESSURE RATING : PN - 16
3. FACE TO FACE AS PER : BS : 6160
4. FLANGE DIMENSIONS & DRILLING : ANSI B 16 . 5 , CLASS - 150 , FLAT FACE
5. OPERATION OF VALVE - BY ROTORK CONTROL MAKE, ELECTRIC ACTUATOR MODEL NO: K50F10A / 48 / 51NM, SYNCROPAK TYPE, 48 RPM
6. INSPECTION & TESTING : AS PER APPROVED Q.A.P.

	NAME	DATE
DRAWN	S.MONDAL	26.02.10.
CHECKED	S. DAS.	26.02.10.
APPROVED	S.D.GHOSH	26.02.10.

MANUFACTURER:-
JOB. NO.: N.036 / J

SCALE - N. T. S.

TITLE

"BANKIM" CAST IRON GATE VALVE
IN SIDE SCREWED NON-RISING STEM.

MANUFACTURER:-

BANKIM & COMPANY

DRG. NO.: BM / UML / NTPC / BHEL / N.036 / J / CISV-190 REV. 0

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Rev	Date	Description	Prepd By	Checked By
0	18.09.09	Submitted for Approval.		
01	29.6.10	Submitted for Approval.		
02	10.05.10	Submitted for Approval for Sr nos 3 to 5		
03	6.07.10	Submitted for Approval for Sr nos 3		

NTPC Limited
(A Govt. of India Enterprise)
CONSULTANCY Wing

TRANS NO C&I-
DATE 20.7.10
SIGNATURE

☐I APPROVED/RELEASED FOR FABRICATION
☐II APPROVED/RELEASED FOR FABRICATION SUBJECT TO INCORPORATION OF COMMENTS/MODIFICATIONS AS NOTED. RESUBMIT DRAWING/DOCUMENT FOR INFORMATION
☐III NOT APPROVED/RELEASED. REVISED DRAWING/DOCUMENT TO BE SUBMITTED AFTER INCORPORATING COMMENTS/MODIFICATIONS AS NOTED

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Digitally signed by Nisha Rai
Date: 2010-07-07 17:00+05:30

NEITHER APPROVAL NOR RELEASE OF DRAWINGS BY THE PURCHASER RELIEVES THE CONTRACTOR OF HIS OBLIGATION AND RESPONSIBILITY FOR CORRECTNESS OF DIMENSIONS, MATERIAL OF CONSTRUCTION, DESIGN, ASSEMBLY, PERFORMANCE PARTICULARS AND CONFORMITY TO SPECIFICATIONS, APPROVED SCHEMES AND STANDARDS. NOR DOES IT LIMIT THE PURCHASERS RIGHT UNDER THE CONTRACT.
II. NO CHANGE IN APPROVED DRAWING/DOCUMENTS IS PERMITTED WITHOUT OWNER'S CONCURRENCE IN WRITING.

Pragati – III Combined Cycle Power Project,
1500MW (Nominal) At Bawana ,Delhi

Consultant : NTPC – Consultancy Wing

Bharat Heavy Electrical Ltd
Power Sector Project Engineering Management
New Delhi

Atlas Copco India Ltd
Svea Nagar, Mumbai Pune Road, Dapodi
Pune 411 012

Prepd	Chkd	Scale
Engr	Dept Head	Date:6.07.10

Drg / Doc Title	**Technical Data Sheet for Instruments**	Job No : 314
ACIL Doc No	15622 00 018	Rev 03
BHEL Doc No	PE-VO-314-555-A106	Rev 03

611

(2)

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TEMPERATURE GAUGES

Sr.No.	Description	Offered
1	Make	**A. N. Instruments**
2	Model	**6 RMSTAV**
3	Type	**Rigid Stem, Mercury In Steel**
4	Dial Size	**150 mm**
5	Bulb Connection	**1/2" NPT (M),**
6	Mounting	**Vertical with Bottom Entry**
7	Zero Adjustment	**Provided**
8	Case Material	**Die Cast Aluminium (With Epoxy Coating)**
9	Accuracy	**+/- 1% FSD**
10	Bulb & Stem Material	**SS 316**
11	Bulb Fitting Type	**Adjustable Gland**
12	Bulb O. D	**10 mm**
13	Stem O. D	**10 mm**
14	Over Range Protection	**120% FSD**
15	Protection Class	**Weather Proof As Per IP 65**
16	Thermowell	**SS Bar Stock**
17	Well Material	**SS 316**
18	Well I.D.	**12 mm**
19	Well O.D.	**18 mm**
20	Thermowell Bulb Connection	**1/2" NPT (F)**
21	Process Connection	**1/2" NPT (M)**
23	Instrument Range	**As Per List**
24	Accessories Per Gauge	**1) Socket, carbon steel, GI dipped, ½" NPT (F), weldable 1" length, - 1No**
25	Qty.	**28 Nos**

Tag No.	Service	Range
QFB 12 CT 301	Cooling Water Return Line Inst Air comp 1	0 – 100 Deg.C.
QFB 12 CT 302	Cooling Water Supply Line Inst Air comp 1	0 – 100 Deg.C.
QFB 12 CT 303	Air Dryer 1 cooling water supply line	0 – 100 Deg.C.
QFB 12 CT 304	Air Dryer 1 cooling water return line	0 – 100 Deg.C.
QFB 12 CT 305	Air Dryer 1 outlet	0 – 100 Deg.C.
QFB 10 CT 306	Instrument Air receiver 1	0 – 100 Deg.C.
QFB 10 CT 307	Instrument Air receiver 2	0 – 100 Deg.C.
QFB 12 CT 308	Air Dryer 2 outlet	0 – 100 Deg.C.
QFB 12 CT 309	Air Dryer 2 cooling water return line	0 – 100 Deg.C.
QFB 12 CT 310	Air Dryer 2 cooling water supply line	0 – 100 Deg.C.
QFB 12 CT 311	Cooling Water supply Line Inst Air comp 2	0 – 100 Deg.C.
QFB 12 CT 312	Cooling Water Return Line Inst Air comp 2	0 – 100 Deg.C.
QFB 12 CT 313	Cooling Water return Line Inst Air comp 3	0 – 100 Deg.C.
QFB 12 CT 314	Cooling Water supply Line Inst Air comp 3	0 – 100 Deg.C.
QFB 12 CT 315	Air Dryer 3 cooling water return line	0 – 100 Deg.C.
QFB 12 CT 316	Air Dryer 3 cooling water supply line	0 – 100 Deg.C.
QFB 12 CT 317	Air Dryer 3 outlet	0 – 100 Deg.C.
QFB 12 CT 318	Instrument Air Receiver 3	0 – 100 Deg.C.
QFB 12 CT 319	Water inlet header	0 – 100 Deg.C.
QFB 12 CT 320	Water outlet header	0 – 100 Deg.C.
QEB 10 CP 301	Plant Air Receiver 1	0 – 100 Deg.C.
QEB 10 CP 302	Plant Air Compressor 1 outlet	0 – 100 Deg.C.
QEB 10 CT 303	Cooling Water Supply Line Plant Air comp 1	0 – 100 Deg.C.
QEB 10 CT 304	Cooling Water Return Line Plant Air comp 1	0 – 100 Deg.C.
QEB 10 CT 305	Cooling Water return Line Plant Air comp 2	0 – 100 Deg.C.

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QEB 10 CT 306	Cooling Water supply Line Plant Air comp 2	0 – 100 Deg.C.
QEB 10 CT 307	Plant Air Compressor 2 outlet	0 – 100 Deg.C.
QEB 10 CT 308	Plant Air receiver 1	0 – 100 Deg.C.

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Pressure Gauges

SR.NO.	Description	Offered
1	Make	**A. N. Instruments**
2	Model	**6SSPGAD**
3	Type	**Direct Indicating**
4	Mounting	**Male bottom entry**
5	Dial Size	**150 mm**
6	Case Material	**Die Cast Aluminium Stove (With Epoxy Coating)**
		Enameled Black
7	Dial Colour	**White With Black letter**
8	Bezel Ring	**Screwed**
9	Window Material	**Shatterproof Glass**
10	Enclosure	**Weatherproof IP 65**
11	Pressure Element	**Bourdon**
12	Element Material	**SS 316**
13	Socket Material	**SS 316**
14	Accuracy	**+/- 1% FSD**
15	Connection	**½" NPT (M)**
16	Movement Material	**SS 304**
17	Over Range Protection	**130% FSD**
18	Blow Out Protection	**Provided**
19	Zero Adjustment	**Provided**
20	Accessories Per Pressure guage	**1) Socket, carbon steel, GI dipped, ½" NPT (F), weldable 1" length, - 1No** **2) ½"NPT (M) X ½" Weldable sch 40, seamless, SS316 6"Length Nipple -1no** **3) ½" globe valve, socket weldable, forged C.S. body, SS trim,- 1 no.** **4) 2 valve manifold SS316, ½" NPT (F) X ½" NPT (F) Drain port - 1 no.**
21	Qty.	**28 Nos**

Tag No.	Service	Range
QFB 12 CT 301	Cooling Water Return Line Inst Air comp 1	0-16 Kg/Cm2
QFB 12 CT 302	Cooling Water Supply Line Inst Air comp 1	0-16 Kg/Cm2
QFB 12 CT 303	Air Dryer 1 cooling water supply line	0-16 Kg/Cm2
QFB 12 CT 304	Air Dryer 1 cooling water return line	0-16 Kg/Cm2
QFB 12 CT 305	Air Dryer 1 outlet	0-16 Kg/Cm2
QFB 10 CT 306	Instrument Air receiver 1	0-16 Kg/Cm2
QFB 10 CT 307	Instrument Air receiver 2	0-16 Kg/Cm2
QFB 12 CT 308	Air Dryer 2 outlet	0-16 Kg/Cm2
QFB 12 CT 309	Air Dryer 2 cooling water return line	0-16 Kg/Cm2
QFB 12 CT 310	Air Dryer 2 cooling water supply line	0-16 Kg/Cm2
QFB 12 CT 311	Cooling Water supply Line Inst Air comp 2	0-16 Kg/Cm2
QFB 12 CT 312	Cooling Water Return Line Inst Air comp 2	0-16 Kg/Cm2
QFB 12 CT 313	Cooling Water return Line Inst Air comp 3	0-16 Kg/Cm2
QFB 12 CT 314	Cooling Water supply Line Inst Air comp 3	0-16 Kg/Cm2
QFB 12 CT 315	Air Dryer 3 cooling water return line	0-16 Kg/Cm2
QFB 12 CT 316	Air Dryer 3 cooling water supply line	0-16 Kg/Cm2
QFB 12 CT 317	Air Dryer 3 outlet	0-16 Kg/Cm2
QFB 12 CT 318	Instrument Air Receiver 3	0-16 Kg/Cm2
QFB 12 CT 319	Water inlet header	0-16 Kg/Cm2

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QFB 12 CT 320	Water outlet header	0-16 Kg/Cm2
QEB 10 CP 301	Plant Air Receiver 1	0-16 Kg/Cm2
QEB 10 CP 302	Plant Air Compressor 1 outlet	0-16 Kg/Cm2
QEB 10 CT 303	Cooling Water Supply Line Plant Air comp 1	0-16 Kg/Cm2
QEB 10 CT 304	Cooling Water Return Line Plant Air comp 1	0-16 Kg/Cm2
QEB 10 CT 305	Cooling Water return Line Plant Air comp 2	0-16 Kg/Cm2
QEB 10 CT 306	Cooling Water supply Line Plant Air comp 2	0-16 Kg/Cm2
QEB 10 CT 307	Plant Air Compressor 2 outlet	0-16 Kg/Cm2
QEB 10 CT 308	Plant Air receiver 2	0-16 Kg/Cm2

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FLOW SWITCH

Sr. No.	Description	Offered
1	Make	Switzer
2	Model	BGM-50-M-TH-33-Z
3	Type	Paddle Type
4	Max. Flow	240 LPM (water)
5	Switch setting	60 LPM
6	Process Connection	1" BSPM
7	Material Of Construction	Brass Body / Ph. Br. Bellow / 316SS paddle
8	Case Material	Die Cast Aluminum
9	Electrical Connection	¾" ET
10	Process Temperature Limit	100 Deg. C
11	Repeatability	+/- 2 % FSR
12	Micro switch type / rating	2 NO + 2 NC / 15A, 230V AC potential free
13	Line Pressure	8 kg/cm2
14	Line Temperature	45 Deg C
15	Flow details	Flow Media:- Cooling Water, Flow maximum:- 240 LPM, Flow Normal :- 150 LPM, Max Fluid Pressure 10 Bar , Max Fluid Temperature 50 Deg. C
16	Line Size	50NB
17	Protection	Weather proof IP-66
18	Accessories	1) 1 " BSP Industrial Grade Plug & socket-1 No. 2) SS Tag Plate
19	Qty	5 Nos.

Sr.No.	Tag No.	Application
1.	QFB 12 CT 201	Inst Air Comp1 Cooling Water Outlet
2.	QFB 12 CT 202	Inst Air Comp2 Cooling Water Outlet
3.	QFB 12 CT 203	Inst Air Comp3 Cooling Water Outlet
4.	QEB 12 CT 201	Plant Air Comp1 Cooling Water Outlet
5.	QEB 12 CT 202	Plant Air Comp2 Cooling Water Outlet

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Date: 2010-07-07 17:01+05:30

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Flow Indicator

Sr. No.	Description	Offered
1	Make	Eureka
2	Model	BPF-MS-80-PG-3
3	Type	Byepass Type Rotameter
4	Rotameter Measuring Tube	Borosilicate Glass
5	Rotameter Float	AISI SS 316
6	Rotameter Retainers	AISI SS 316
7	Orifice Plate	AISI SS 316
8	Rating	ANSI 300 # WNRF
9	Orifice Flange Assembly	ASTM A105, Rating : ANSI 300#WNRF
10	Flanges	Orifice type flanges
11	Accuracy	+/- 2 % of full flow
12	Measuring range	8 - 40m3/hr
13	No of Tappings	Two per Flange, 180 Deg Apart
14	Tapping Connections	1 / 2 " NPT (F)
15	Flow Rate Max.	36 m3/hr
16	Medium	Cooling Water
17	Accessories	1) Gasket, Stub(ASTMT-A-193 Gr 87), 2) Nut (ASMT-A-194 Gr. 2H), Jack Screw
18	Quantity	2 nos

Sr.No.	Tag No.	Application
1.	QFB 12 CF 301	Cooling water -Inlet header
2.	QFB 12 CF 302	Cooling water Outlet header

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Date: 2010-07-07 17:01:05.30

VOLUME – III
ANNEXURE-I
DEVIATION FORMAT

ANNEXURE - I

PROJECT:- 1500 MW PRAGATI-III CCPP

PACKAGE:- FPS & CAS

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION / TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	**DESIGNATIONS**	**SIGN & DATE**	

NOTES:

1. For self manufactured items of bidder, cost of withdrawl of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawl of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawl of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawl of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawl is to be given seperately for each deviation. In no event bidder should club cost of withdrawl of more than one deviation else cost of withdrawl of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawl (positive/negative) is not specified it shall be assumed as positive.
14. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

VOLUME – III
ANNEXURE-II
SUGGESTIVE PRICE FORMAT

BHARAT HEAVY ELECTRICALS LIMITED

PRAGATI POWER CORPORATION LIMITED,PRAGATI-III,BAWANA,DELHI

SUGGESTIVE PRICE FORMAT

S No.	Item Description	Quantity to be supplied	Unit Price	Total Price	Remarks
A. FIRE PROTECTION SYSTEM					
1	**TRANSMITTER (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**				
a	PRESSURE TRANSMITTER	5			**YOKOGAWA MODEL: EJA430A-E-'Y'-S4A-92EA**
b	LEVEL TRANSMITTER (ULTRASONIC TYPE)	5			**HAWK MEASUREMENT PVT. LTD., AUSTRALIA MODEL: SULTAN SERIES**
c	LEVEL TRANSMITTER (DP TYPE)	5			**YOKOGAWA MODEL: EJA210A-EMWA1A5A-92EN**
2	**LOCAL GAUGES (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**				
a	PRESSURE GAUGE	5			**General Instruments Consortium, Delhi Model: DPG-B-S-15-S4-S6-A-15NTM-0-2-A-L**
b	LEVEL GAUGE	5			**V. AUTOMAT & INSTRUMENTS (P) LTD., DELHI MODEL: RLG-1650-1630-311-VA2500**
	LEVEL INDICATOR	5			**V. AUTOMAT & INSTRUMENTS (P) LTD., DELHI MODEL: 40C**
c	DIFF-PRESSURE GAUGE	5			**General Instruments Consortium, Delhi Model: BSPG-V-15-AL-S-4-15NTM-0-16-A-L**
3	**PROCESS ACTUATED SWITCHES (PRESSURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**				
a	PRESSURE SWITCH	13			**Indfos Industries Ltd., Ghaziabad. Model: B4 64 S XSC XPC XNH XFS 0.7/14 KG/CM2**
4	**ACTUATORS OF ALL TYPES (HYDRAULIC, PNEUMATIC & MOTORISED) FOR EACH TYPE, MODEL & RATING**				
a	MOTORISED	1			**ROTORK CONTROLS (I) PVT. LTD.**
5	**COMPLETE SOLENOID VALVE OF EACH TYPES**	4			**ROTEX MODEL: 24102-12-4R-B5-M6-S2-24V-DC-22-H**
B. COMPRESSED AIR SYSTEM					
1	**LOCAL GAUGES (PRESSURE, TEMPERATURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**				
a	PRESSURE GAUGE	5			**A.N. Instruments Model: 6 SSPGAD**
b	TEMPERATURE GAUGE	5			**A.N. Instruments Model: 6 RMSTAV**
c	FLOW GAUGE	5			**EUREKA Model: BPF-MS-80-PG-3**
2	**PROCESS ACTUATED SWITCHES (PRESSURE, LEVEL, FLOW, DIFF-PRESSURE ETC.)**				
a	FLOW SWITCH	5			**SWITZER Model: BGM-50-M-TH-33-Z**
NOTES:					
NOTE:					

1	Bidder must submit prices in the Pro Forma duly filled in signed and stamped on every page without any ambiguity. The price shall be written against each item. Term such as "refer covering letter" etc. are not acceptable. Extra sheet may be attached if the space provided is not sufficient.
2	Price format shall not be changed by the bidder.
3	Bidder shall furnish absolute values (Rs) instead of percentage (%) against all items in this schedule.