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# **FUNCTIONAL SPECIFICATION**

## **FOR**

## **PRESSURE SWITCH**

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## 1.0 SCOPE OF THIS DOCUMENT:

- 1.1 This functional specification describes the essential design considerations for the selection of pressure switch (electrical) for the intended service.

## 2.0 CODES & STANDARDS:

### 2.1 Reference Documents and Specifications:

- Instrumentation Design Criteria
- Basic Bid Work
- Project P & IDs
- Process Design Criteria / Instrument Process Data Sheets / Instrument List with Process Parameters

## 3.0 SCOPE OF SUPPLY:

- The quantity to be supplied and installed shall be as per the requirements indicated in the Basic Bid Work, Design Criteria and the P & IDs.
- The vendor shall be responsible for the selection of the pressure switch (electrical) suitable for its intended application, its procurement, tagging, packing, testing & calibration, preparation for shipment, along with accessories, spares, and assistance where required for its installation & commissioning at site. This FS shall be read in conjunction with the Instrument Design Criteria.

## 4.0 PRESSURE SWITCH (ELECTRICAL):


### 4.1 Switch Type:

#### 4.1.1 Electrical type.

#### 4.1.2 General:

- 4.1.2.1 The switch mechanism shall be a hermetically sealed micro-switch of SPDT, snap action type.
- 4.1.2.2 The switch shall be provided with 2Nos. ½"NPT (F) cable entries. One cable entry shall be plugged with suitable explosion-proof plug.
- 4.1.2.3 Arcing during making or breaking of switch contacts shall be minimum. The switch contacts shall have long life and minimum wear. The material chosen for switch contact shall have good thermal conductivity for dissipating heat.
- 4.1.2.4 There shall be minimum bounce during making and breaking of switch contacts and switch mechanism shall be designed to minimize the vibration.
- 4.1.2.5 Process connection from bottom side, 316SS threaded ½" NPTF.
- 4.1.2.6 The switch element shall be selected in such a way that it can withstand an over-range pressure of 1.5 times maximum range without loss of calibration.
- 4.1.2.7 Pressure switches shall be heavy duty, with user adjustable set point. Adjustments shall be tamper-proof.

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**4.1.2.8** The pressure-sensing element shall be designed to meet a service life of one million switching cycles.

**4.1.2.9** Vendor shall ensure that set point falls between 35% and 70% of adjustable range of the selected model in general.

**4.1.2.10** Pressure switch shall have tamper-proof set point adjustment.

**4.1.2.11** All pressure instrument shall be mounted as close as possible to sensing point.

**4.1.2.12** Mountings accessories required for Pressure Instrument shall be 316SS or better. When switches and other devices are grouped and mounted on a instrument stand it should be in such a manner that removal of each instrument shall be possible without the need to disconnect, dismantle or remove any other instruments or tubing.

**4.1.2.13** All the switches shall be Ex d .

#### **4.2 Material:**

**4.2.1** The material requirements for Pressure switch shall in general be according to clause 3.6.4.5 of Instrumentation Design Criteria and the material selection chart provided in Annexure I of this specification.

**4.2.2** Instrument parts shall be resistant to the corrosive properties of the process fluid and ambient conditions to which they are exposed.

#### **4.3 Accuracy:**


The maximum error shall not exceed 1% of the span. Repeatability shall be  $\pm 1\%$ .

**4.4 Reading Scales:** Units for pressure switch shall be in kg/cm<sup>2</sup>.

#### **4.5 Enclosure Class:**

In addition to weatherproof, the switch enclosure shall be explosion-proof to NEMA-7 and certified by third party agencies like UL/FM/BASIEFA or equal for use in hazardous area (CL 1,DIV.1, GR.D).

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## **ANNEXURE – I**

### **Material Selection Chart for Pressure switch**

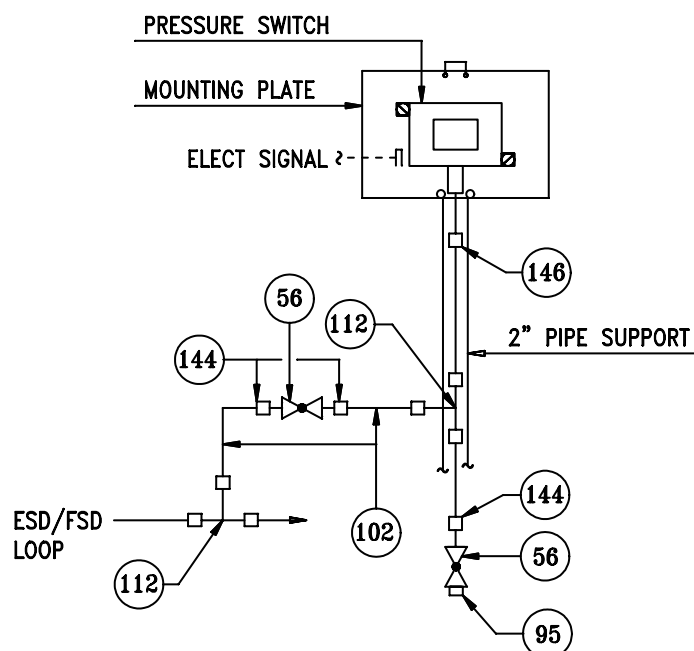
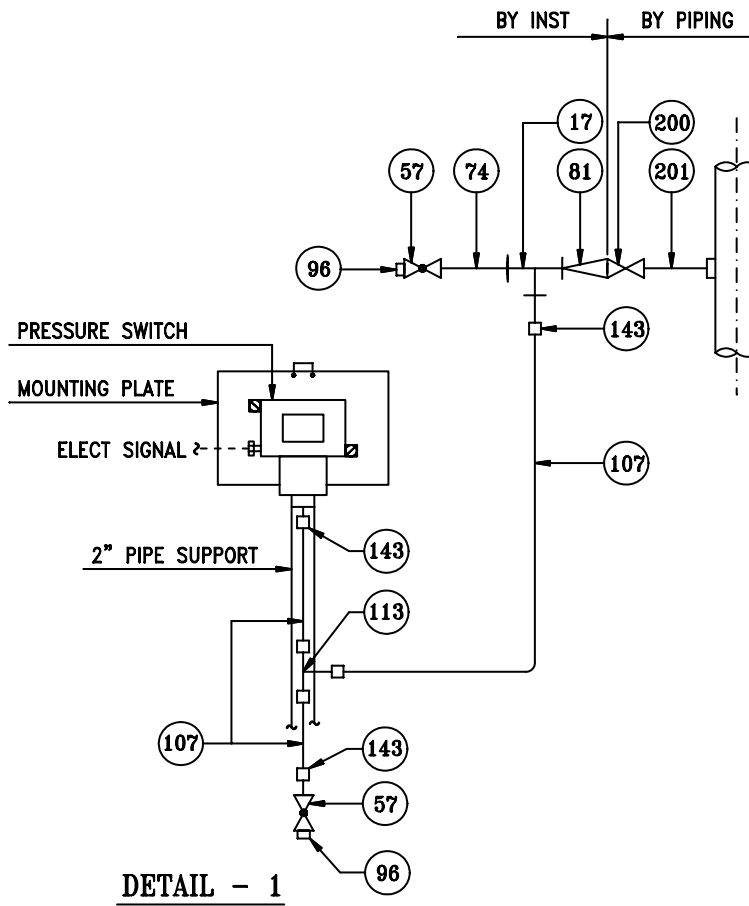
S. No.	Piping Class	ELEMENT/SOCKET
1	A1, B1, D1, E1, F1, XF1, F1, PA1, PB1, PD1, PE1, PXF1, PF1, A2, B2, D2, E2, XG1, A1H, A3, B3, A8 (EXCEPT WAT. INJ. SERVICE)	SS316
2	INJECTION WATER SERVICE	MONEL
3	A4, A6, A9, B9, D9, E9	SS316
4	A5	MONEL
5	A7	
6	A1N, B1N, D1N, E1N, F1N, XF1N, PA1N, PB1N, PD1N, PF1N, XG1N	SS316
7	A10, B10, D10, E10, F10	SS316L
8	A11, B11, D11, E11, F11, PA11, PB11, PD11, PE11, PF11	MONEL 400

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## ANNEXURE – II

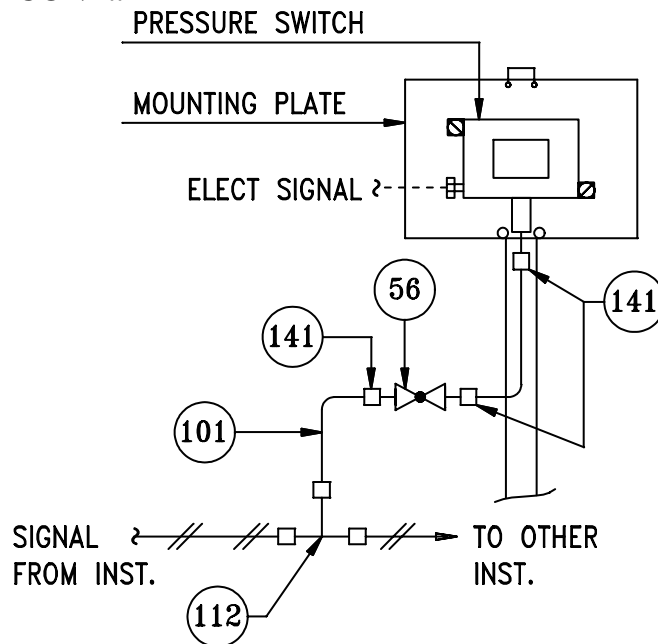
(Hook Up Drawing)



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## ANNEXURE –II CONT..



## DETAIL - 3

BILL OF MATERIAL						
ITEM	QTY.FOR			SIZE	DESCRIPTION	MATERIAL
	DET.1	DET.2	DET.3			
17	1	-	-	1	PIPE TEE , TH x TH x TH, NPTF	
74	1	-	-	1/2"	PIPE NIPPLE, SMLS, 3"LONG, TH x TH, NPTM	
81	1	-	-	3/4" x 1/2"	SWAGE NIPPLE, CONC., SMLS, PL x TH (OR) TH x TH, NPTM	
95	-	1	-	1/4"	PIPE PLUG, SCRD NPTM	SS 316
96	2	-	-	1/2"	PIPE PLUG, SCRD NPTM	
57	2	-	-	1/2"	GLOBE VALVE, SCRD NPTF	
56	-	2	1	1/4"	GLOBE VALVE, SCRD NPTF	SS 316
101	-	-	A/R	1/4"OD x 0.035"THK.	TUBING	SS 316
102	-	A/R	-	3/8"OD x 0.035"THK.	TUBING	SS 316
107	A/R	-	-	1/2"OD x 0.065"THK.	TUBING	
111	-	-	1	1/4"OD x 1/4"OD x 1/4"OD	TUBING TEE	SS 316
112	-	2	-	3/8"OD x 3/8"OD x 3/8"OD	TUBING TEE	SS 316
113	1	-	-	1/2"OD x 1/2"OD x 1/2"OD	TUBING TEE	
141	-	-	3	1/4"THK. x 1/4"OD	MALE TUBING CONNECTOR, NPTM	SS 316
143	3	-	-	1/2"THK. x 1/2"OD	MALE TUBING CONNECTOR, NPTM	
144	-	3	-	1/4"THK. x 3/8"OD	MALE TUBING CONNECTOR, NPTM	SS 316
146	-	1	-	1/2"THK. x 3/8"OD	MALE TUBING CONNECTOR, NPTF	SS 316
200	-	-	-	-	VALVE	BY PIPING

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### **ANNEXURE – III :- TYPICAL DATA SHEET**

<b>PRESSURE SWITCHES (ELECTRICAL)</b>										
UNITS: - Flow    Liquid – M3/HR    Gas – NM3/HR    Pressure – kg/cm2    Temperature – deg C Level/length -M										
1	Type		Pneumatic		<b>MEASURING UNIT</b>					
2	Function		Indicate Pressure		26	Service				
3	Mounting				27	Element Type				
4	Case, Window				28	Element Material				
5	Electrical Area Class		-		29	Socket Material				
6	Enclosure Class				30	Body Material				
7	Intrinsically Safe				31	Connection location				
8	Air Supply				32	DIAPHRAGM SEAL (Wherever Required)				
9	Power Supply					Type				
10	Cable entry					Wetted Parts				
11	Accuracy					Other Material				
12	Repeatability					Process Connection				
<b>SWITCH</b>						Facing & Finish				
13	Electric					Capillary Material				
14	Quantity					Armour Material				
15	Form					Capillary Length				
16	Type					Flushing Filling conne.				
17	Rating				<b>MISCELLANIOUS</b>					
18	Load Type				33	Over range protection				
19	Cable Entry				34	Blow out protection		-		
20	No. Of Entries				35	Options				
21	Pneumatic				A	Mounting accessories				
22	Type				B	Air filter regulator with Gauge				
					C	Intrinsically safe weather proof out put meter				
					D	Pressure gauges for supply, input and output				
					E	Snubber				
					F	Gauge saver				
					G	Air filter regulator				
23	Signal				H	Vaccum protection				
24	Set point adjustment				36	Pneumatic Connect.				
25	Differential					Load driving capability				
<b>TAG No.</b>	<b>RANGE</b>	<b>SET POINT 1</b>	<b>SET POINT 2</b>	<b>PRESSURE OVER MAX</b>		<b>TEMP. OPER MAX</b>		<b>FLUID</b>	<b>SERVICE</b>	<b>OPTIONS</b>

NOTE:-

VENDOR SEAL AND SIGNATURE

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