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TECHNICAL SPECIFICATION FOR PNEUMATIC PURGING PANEL
(DRAWING NO.:BMH/LT/0000/01)

TECHNICAL SPECIFICATION FOR PNEUMATIC PURGING PANEL

1. Introduction

The Pneumatic purging panel is an engineered control system designed to automatically raise, hold, and release air or gas pressure in the connected system over continuous operations. This panel automates the entire preservation process instead of relying on manual valve operation. The vendor shall fabricate the panel as per schematic. Further, the function requirements need to be fulfilled.

2. Schematic Diagram & Bill of Material

Refer to drawing No.:BMH/LT/0000/01 (enclosed) for the panel schematic and their bill of material.

3. Functional Requirement

The cavity needs to be pressurized with air / nitrogen against preset value of pressure. Post pressurization, this pressure needs to be hold for predefined period(dwelling). Post dwelling, pressure needs to be vented and the cycle needs to be repeated continuously until stop manually. A simplified functional sequence block diagram is enclosed as annexure - A:

4. PLC & HMI

A Programmable logic controller (PLC) and Human machine interface (HMI) shall work together. The PLC shall execute control logic behind the screens,

while the HMI shall provide a visual screen for operator to monitor and interact with the panel.

A Human Machine Interface (HMI) shall have the following capabilities: -

- (a) Real Time monitoring: Display system status, set point for pressure, temperature and dwell time and their actual values
- (b) Process Control: Allow the operator to start / stop the panel, change the set values without altering the underlying program.
- (c) Alarm: Alert the operator for system fault
- (d) Data logging: the HMI should display the total operational time and the total number of cycles (cycle counter).
- (e) The unit of measurement for pressure, temperature and time is kg/cm², Celsius and minutes respectively
- (f) Size of display screen shall be minimum 7 inch.
- (g) HMI shall be compatible with PLC.

5. Housing / Enclosure

The enclosure should have the following features: -

- (a) The enclosure shall serve as a fully integrated housing for all system sub components including needle valve, filter, pressure regulator, reservoir, transmitter, PLC, HMI, UPS, SRV, solenoid valves and interconnected pipeline. The enclosure shall have sloped front surface and this slope surface provides an ideal surface for mounting the operator controls and instrumentation. The pressure gauges and stack

light / tower light (red, yellow, green) may be mounted on the top of the panel.

(b) The enclosure shall be constructed with minimum 2mm thick stainless steel and stainless-steel grade shall be SS-316.

(c) The human machine interface (HMI) must be recessed with panel surface.

(d) Centre of gravity must be kept low. The heavy components such as reservoir, UPS, must be floor mounted to avoid the tipping during the movement.

(e) The enclosure shall equip with 4" polyurethane caster wheels (02 nos swivel, 02 nos rigid) with foot operated directional and wheel brakes.

(f) The overall dimension of enclosure shall be 0.7m length X 0.6m width X 1.5m height.

6. Reservoir

The reservoir shall be fabricated with SS316 material. The reservoir shall withstand the pressure of 35 kg/cm² and the factor of safety shall be 2. The volume and the preferred shape are 05 liter and stadium (capsule shape) respectively.

7. Pipelines

The pipelines shall be fabricated with SS 316 material and the minimum diameter of the pipeline shall be 10mm. The pipeline shall withstand the pressure of 35 kg/cm² and the factor of safety (FOS) of pipeline shall be 4.

8. Fittings (Adaptors) / End fittings

All fittings need to be designed and fabricated to interconnect the sub components in the system in accordance with system requirements. The fitting material is SS-316. The fitting shall withstand the pressure of 35 kg/cm² and the factor of safety (FOS) of fitting shall be 4.

The end fittings (E1, E2, E3, &E4) for all inlets and outlet ports of the panel shall be Male M18X1.5 with 60° internal cone (for mating component sealing) and mating end fitting connection (customer scope) is M18X1.5 Swivel nut with hollow bull nose nipple. Necessary metal dust cap with chain shall be provided on the end fittings.

9. Acceptance Test

The vendor shall execute the following strength and leak testes for the assemblies and their subassemblies:

(a) All pressure pipelines shall be hydro / pneumatic strength tested at 35 kg/cm². During the strength test, deformation is not allowed. Pneumatic leak test at 15 kg/cm² by pressure drop method shall be conducted. No pressure drop is allowed for the duration of 30 minutes.

(b) The reservoir shall be hydro / pneumatic strength tested at 35 kg/cm² and pneumatic leak test at 15 kf/cm² by pressure drop method shall be conducted and no pressure drop is allowed for the duration of 30 minutes.

(c) The whole system shall be pressure tested at 10 kgf/cm² by pressure drop method and no pressure drop is allowed for the duration of 30 minutes.

Necessary fittings and stoppers required for conduct test need to be fabricated by the vendor and all tests to be executed in front of the customer.

10. Safety Interlock

The following safety interlock should be provided in the system: -

(a) The temperature of air / nitrogen exceeds the 40⁰C (or preset value), the panel shall stop supplying the air / gas into the pressurization cavity and pressure in the cavity to be vented immediately.

(b) The set pressure values for SRV1 & SRV2 are 0.6 kg/cm² & 1.1 kg/cm² respectively and their values shall be marked / tagged on the valves. The flow coefficient (Cv) of SRV1 & SRV2 should be higher than selected needle valve and pressure regulator.

(c) The stack light / tower light (red, yellow, green) shall be provided on the top of the panel. Yellow, red and green lights have to glow during the pressurization, holding and depressurization respectively.

11. Miscellaneous Points

The following points to be considered while fabricating the panel:

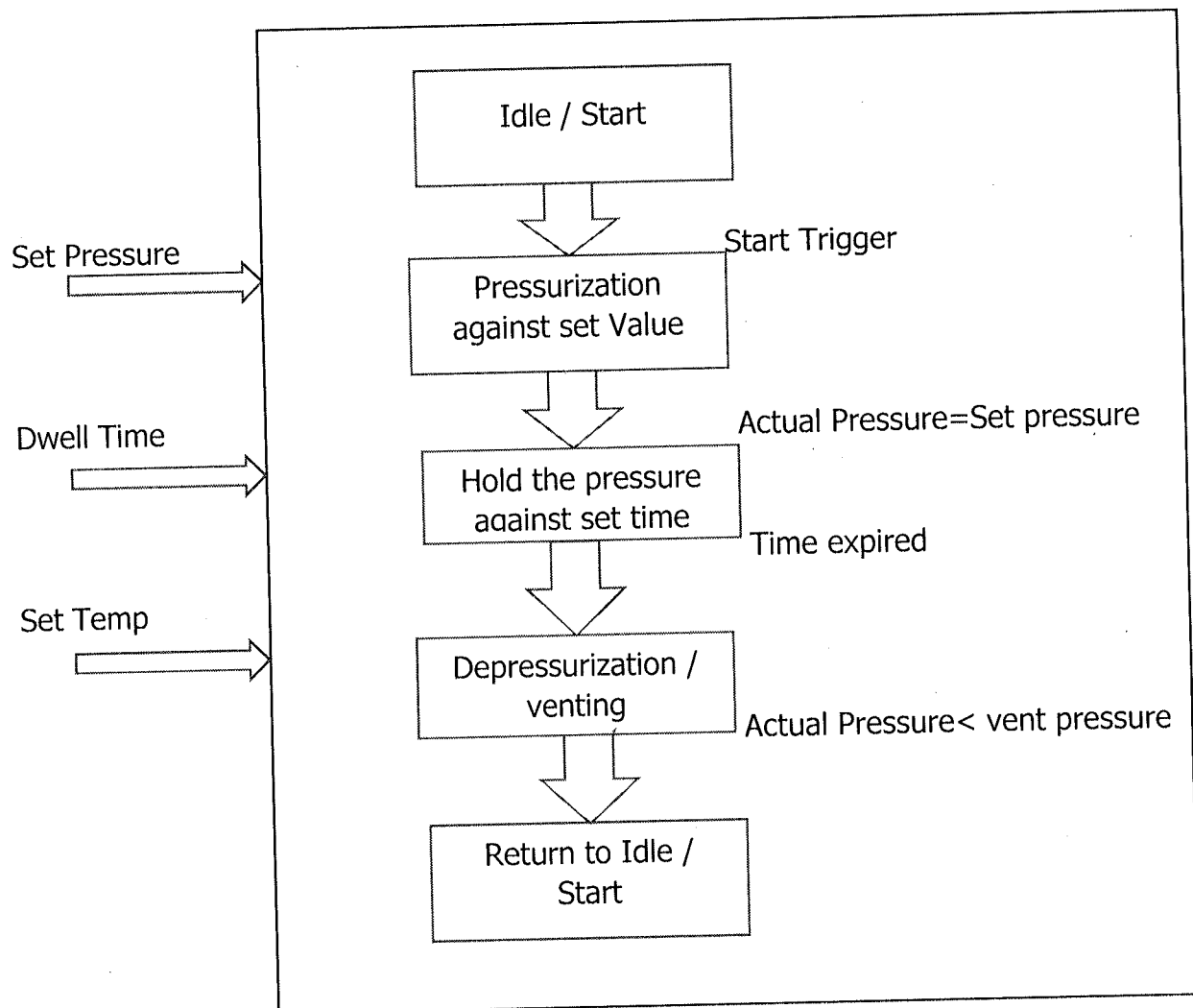
(a) The temperature sensor shall be installed directly on the main supply line.

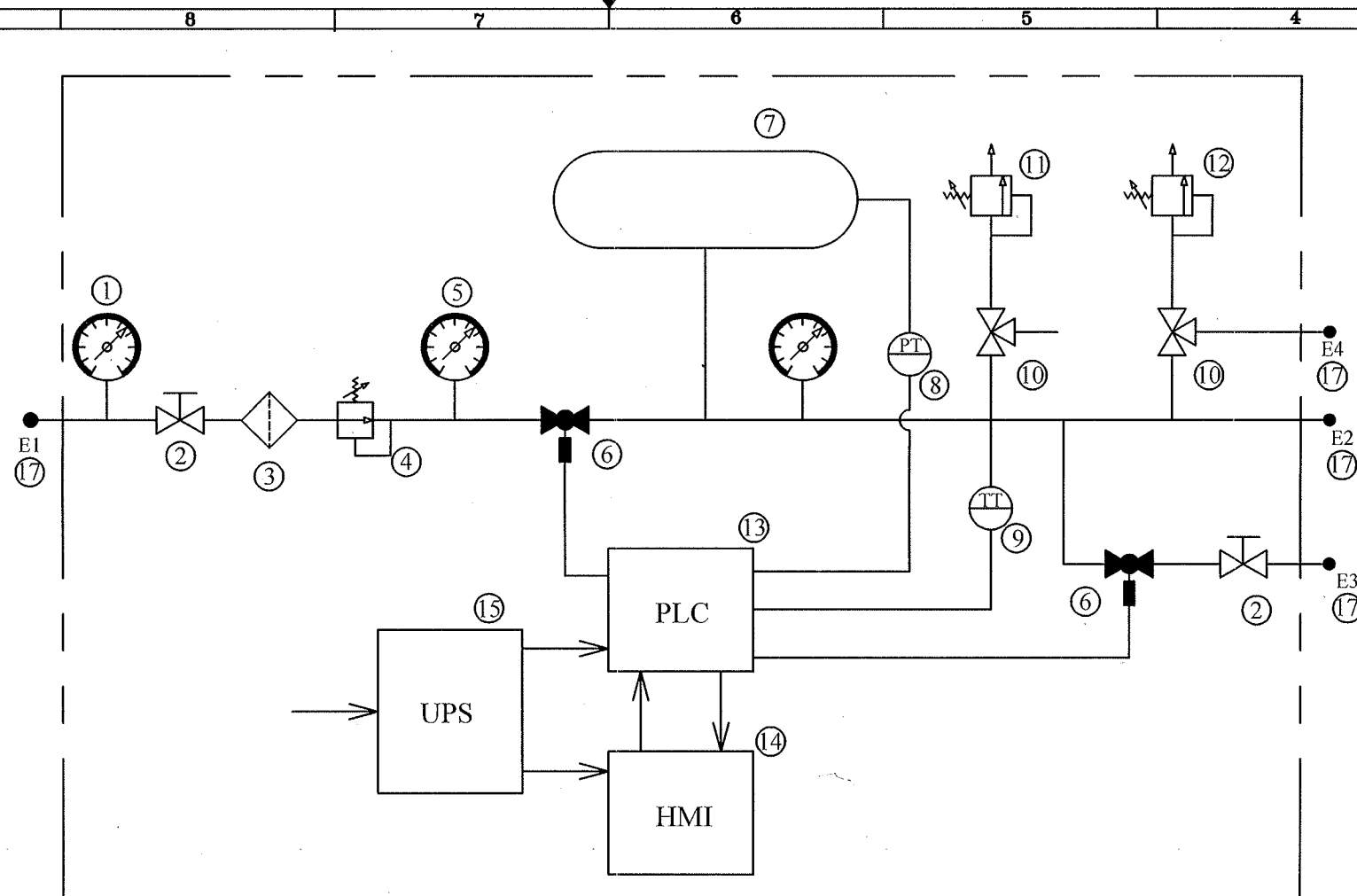
- (b) The panel shall be designed to be as compact as possible.
- (c) The Protective earthing shall be provided for the panel body and all individual electrical instruments.
- (d) Mount the pressure sensor in a reservoir location that ensures an accurate uniform pressure reading.
- (e) The pressure gauge shall feature a dual scale dial indicating pressure in both kg/cm² and bar.

12. Deliverables

The followings shall be delivered along with the panel:

- (a) List of bought out items and their make & model
 - (b) COC of the all bought out items
 - (c) Calibration certificate for pressure gauge, pressure transducer and temperature transmitter.
 - (d) Material confirmation certificate for pipeline, fitting and housing
 - (e) Strength and leak test reports for pipelines, reservoir and system
 - (f) Operational manual for panel
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Annexure – A**FUNCTIONAL SEQUENCE BLOCK DIAGRAM**



19	Other Fittings ((As per the requirement)		Material : SS316/SS321 Working pressure : 35 kgf/cm2
18	Pipelines (As per the requirement)		Material : SS316/SS321 Working pressure : 35 ktf/cm2 ID of Pipe : 10mm
17	End fitting(E1, E2, E3 & E4)	04	Size : Male M18X1.5 with internal 600 cone for sealing Material : SS316
Part No	Item Description	Qty	Specification

3		2		1	
REV.NO.	ZONE	REVISION		DATE	REVISED BY
16	Housing / Enclosure	01	Material : SS Sheet thickness : Min 2mm Type : Portable and movable Max Dimensions : 0.7m length X 0.6m width X 1.5m height		
15	UPS	01	Make : APC/Cyberpower Power rating :600VA/360W		
14	HMI (Display Unit)	01	Make : Antonics / Siemens/Allen bradley Screen Size : Min 7"		
13	PLC Controller	01	Make : Antonics / Siemens/Allen bradley		
12	SRV (Set 1.1)	01	Max working pressure : 10 kg/cm2 Make : Parker Set pressure : 1.1 kg/cm2		
11	SRV (Set 0.6)	01	Max working pressure : 10 kg/cm2 Make : Parker Set pressure : 0.6 kg/cm2		
10	3-way Valve	02	Working Pressure : 10 kg/cm2 Make : Parker Body Material : SS		
09	Temperature Transmitter	01	Range : 0-750C Make : Emerson /Wika/ ABB/Rosemount/Yokagawa		
08	Pressure Transducer	01	Range : 0-10 kg/cm2 Make : Wika/Omega / Honeywell/ABB/Yokigawa		
07	Reservoir (05 lt)	01	Range : 0-24 kg/cm2 / bar Make : Wika (4") Class : ±1.0% Type : Analog & Bottom mount		
06	Solenoid Valve	02	Working Pressure : 10 kg/cm2 Make : SMC / Festo / Aventics (Normally closed)		
05	Pressure Gauge (0-16)	02	Range : 0-16 kg/cm2 / bar Make : Wika(4") Class : ±0.6% Type : Analog & Bottom mount		
04	Pressure Regulator	01	Inlet range : 0-35 kg/cm2 Outlet range : 0-10 kg/cm2 Make : Parker / Tescom Material : SS		
03	Filter	01	Make : Parker Material : SS Working pressure : 35 kg/cm2 Filtration Size : 15 micron		
02	Needle Valve	02	Working Pressure : 0-35 kg/cm2 Make : Parker Material : SS		
01	Pressure Gauge (0-24)	01	Range : 0-24 kg/cm2 / bar Make : Wika (4") Class : ±1.0% Type : Analog & Bottom mount		
Part No	Item Description	Qty	Specification		

STANDARD FOR NON-TOLERANCED DIMENSIONS:
IS-2102 (MEDIUM GRADE)
ALL DIMENSIONS ARE IN mm.
DO NOT SCALE THE DRAWING.
ASK IF IN DOUBT.

DESIGNED	Ch.Naresh	26/09/26
CHECKED	B.Karthik	26/09/26
APPROVED	<i>[Signature]</i>	
SCALE	SIGN	DATE
NTS		

BRAHMOS AEROSPACE

MAT: --- QTY: --- WT: ----

TITLE Pneumatic Purging Panel

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