



**INSTALLATION
&
COMMISSIONING
MANUAL
FOR
GAS BASED PRESSURISATION SYSTEM**

I N T H E S E R V I C E O F T H E B U I L T E N V I R O N M E N T

Anergy Instruments Pvt. Ltd.
40, Sector 27A,
Faridabad- 121003, India

Tel: 91-129-2276589, 4045901
Fax: 91-129-2276482

Email: info@anergy.in
Web: www.anergy.in

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The technical details stated in this manual can be modified without any prior notice due to design improvements

INTRODUCTION

We thank you for procuring Anergy's hydronic pressurisation system.

This system comprises of following items:

1. Air Separator
2. Gas based closed expansion tank
3. Pressurisation unit

This system ensures that the Air Conditioning System operates at positive pressure and entrained air is removed from the system through Air Separator. It is important that all three above equipments are procured and installed to have a good hydronic system.

It is also important that system is installed and commissioned as per the guidelines stipulated in this manual, and by a trained person.

Moreover regular check-ups is also recommended to ensure proper functioning of the system and controls.

We offer Annual Labor Maintenance Contract. You may contact our offices for further details.

CEO

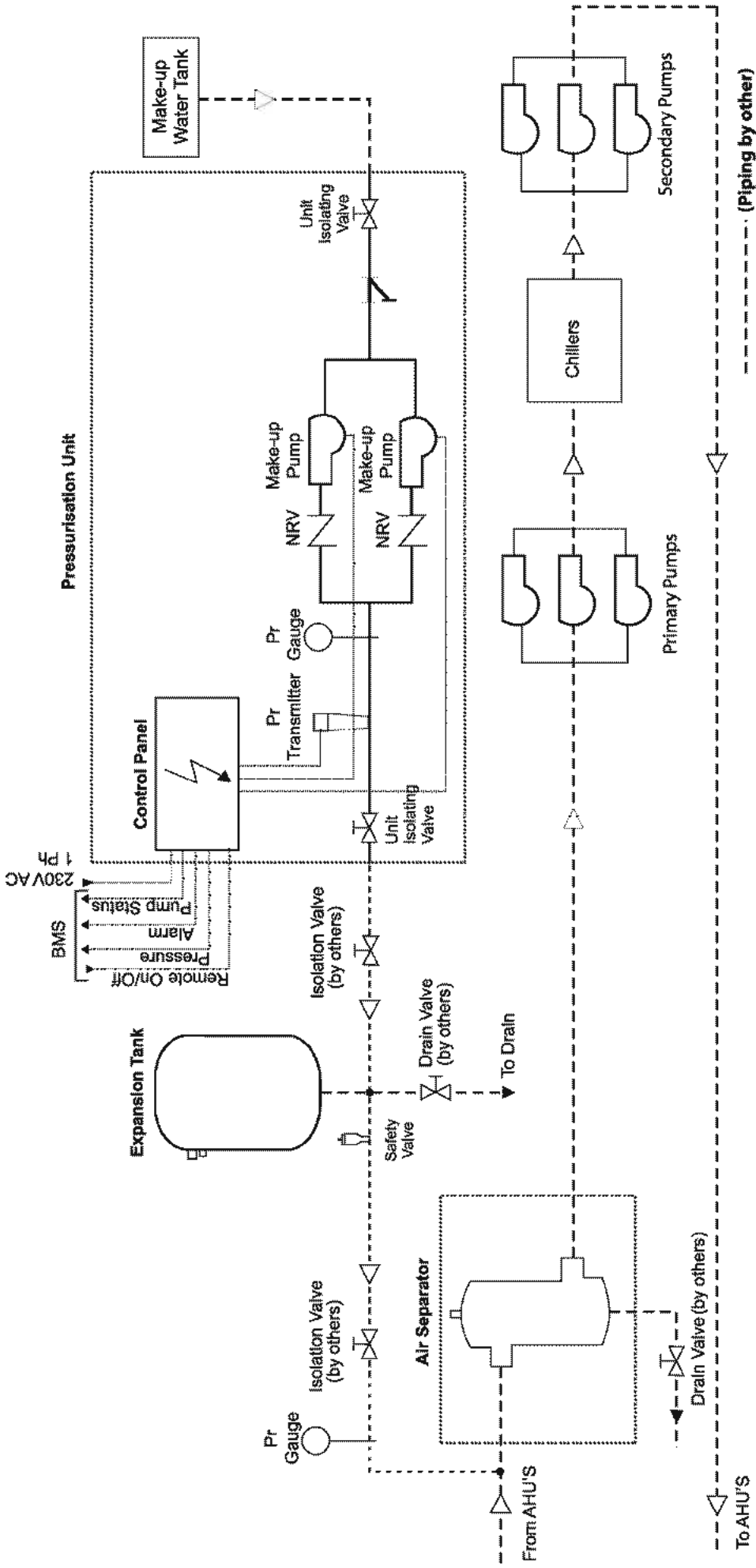
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RECEIPT OF EQUIPMENT

1. Check all material is received as per packing list.
2. Ensure that there is no transport damage. In case of any damage, same should be rectified.
3. Check and record the factory pre-charge pressure indicated on the pressure gauge. In case of no pressure inform 'Anergy'.

Do's & Don't

Do's	Don't
<ol style="list-style-type: none">1. The equipment should be installed on level P.C.C foundation.2. Piping connections should be as per typical flow diagram.3. Always give proper power supply as per model of pressurisation unit.4. Only trained person should install and commission the system.	<ol style="list-style-type: none">1. Never fill water in expansion tank until required pressure of nitrogen gas has been charged.2. Do not connect expansion tank during hydro-testing.



Typical schematic drawing of pressurisation unit, expansion tank and air separator with primary and secondary pumps.

Installation of Closed Expansion Tank

1. Mount the expansion tank on level P.C.C foundation/floor
2. Tank is generally connected to the suction side of the primary pump before the air separator.
3. Connect pipe 'C' to expansion tank connection as per table and diagram on page 6.
4. Install pipe and two isolation valves V1 & V2 on either side of the tank as per size indicated in table on page 6.
5. If multiple expansion tanks of smaller capacities are used in same CHW line to have larger capacity, then provide common isolation ball valves.
6. Install the drain piping and valve V3 of 1" size at the bottom of the tank for drainage.
7. Install the safety valve on the pipe connecting expansion tank to the system.
8. Keep valves V1 & V2 closed and open drain valve V3 and drain water from the expansion tank, if any.
9. Check standing pressure at gauge P1 of chilled water system.
10. The expansion tank should be charged with nitrogen through Air Valve provided on the tank, as per site requirements.
11. The charge pressure P2 should be calculated as per typical example indicated below.
12. After charging required nitrogen pressure, close drain valve V3 and open valves V1 and V2 to fill the tank.

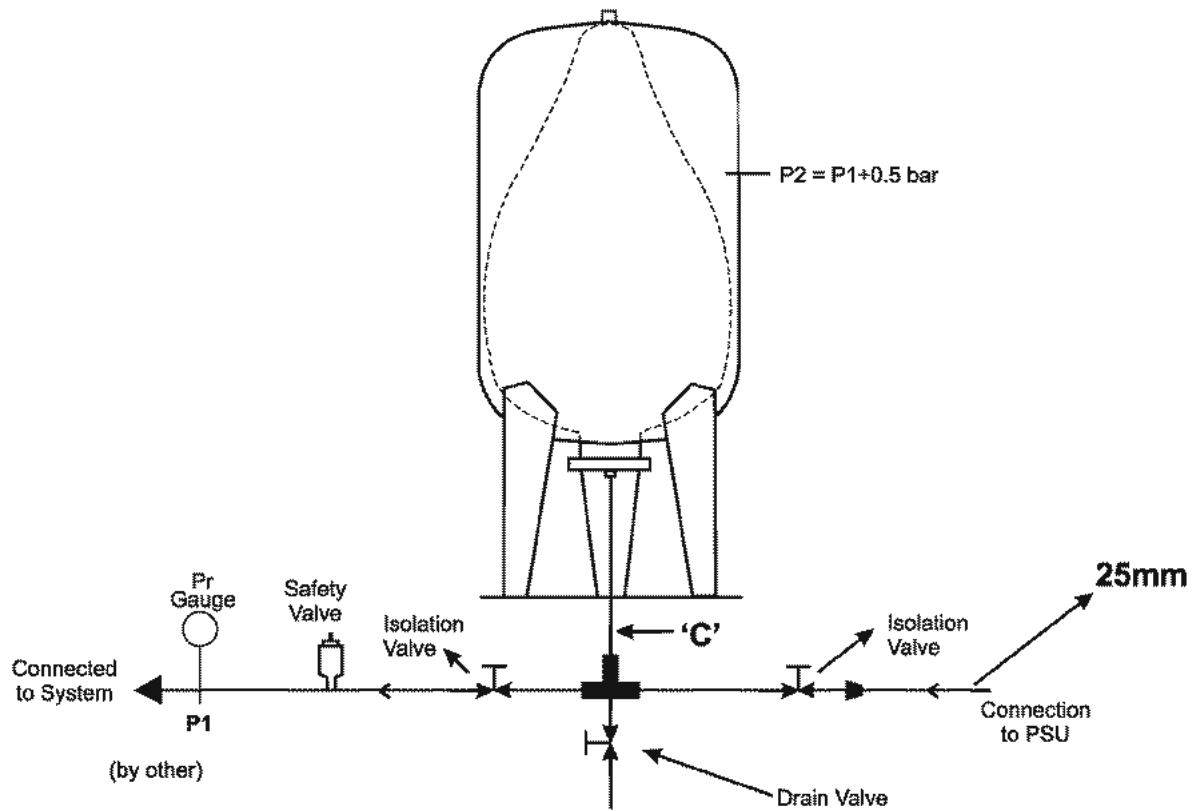
Example:-

IF Building Height is	-----30m	=	3 bar (Static Head)
	Add For Safety	=	0.5 bar
	Expansion tank N2 Pressure charge	=	3.5 bar (Total)

Important:- 1. Never fill water into tank until the tank is charged with required nitrogen pressure. Bladder can get damaged if water is released without nitrogen gas charging.

2. Do not connect expansion tank during hydro-testing.

Closed Expansion Tank Connections



MODEL	Connection Size (C)
CET 24	1"
CET 50	1"
CET 100	1"
CET 300	1 1/4"
CET 500	1 1/4"
CET 750	2"
CET 1000	2"
CET 1500	2"
CET 2000	2"
CET 3000	2"
CET 4000	2"
CET 5000	2"

Installation of Pressurisation Unit

- A. Mount on a level PCC foundation.
- B. Connect water supply to the inlet connection, of pressurisation unit as per typical flow diagram.
- C. The make-up water to the pressurisation unit should be at positive pressure, with minimum pressure of 0.2bar.
- D. Install piping of 1" size from pressurisation unit to expansion tank connection and to main chilled water return pipe as shown in diagram.
- E. Connect power supply to single/three phase MCB in control panel as per model of pressurisation unit.

Building Height is ----- 30m = 3 bar (Static Head)
 Add For Safety = 0.5 bar
 Expansion Tank N2 Pressure charge = 3.5 bar
 Pressure Transmitter Setting = 4.5 bar

(Pump on at - 4.0 bar)
 (Pump off at - 4.5 bar)

Dimensions in mm.

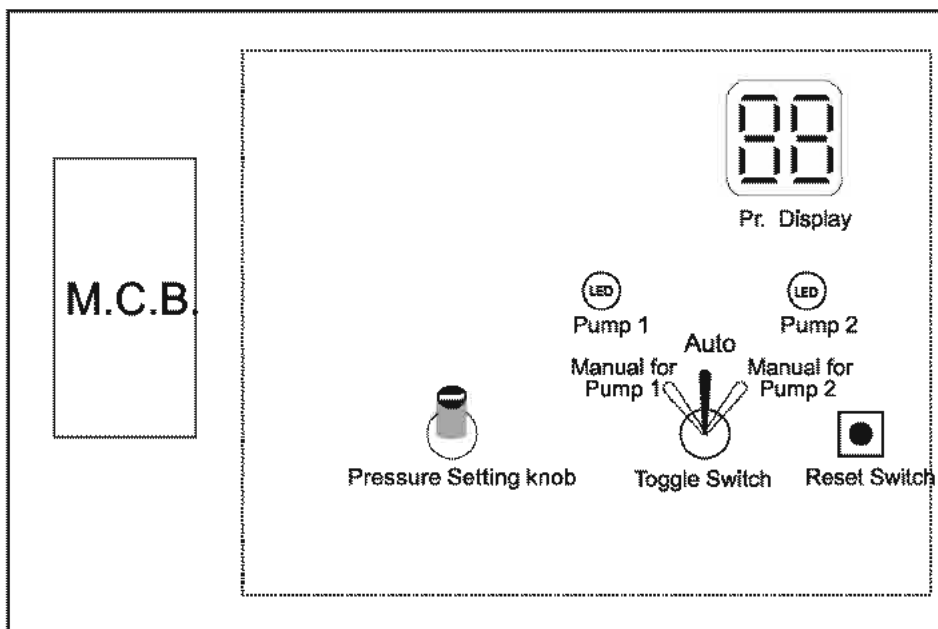
	PSU-225	PSU-245	PSU-290	PSU-2135
L	520	1000	1000	1000
W	500	700	700	700
H	550	900	900	1000

Control Panel Operation

- A Set Point - The Set point of the pressure is set by turning the pressure setting knob. On turning the knob, display starts blinking and shows the set-point. It again shows the actual pressure when it is left idle for 15secs.
- B Auto Mode - Pump switches OFF when the pressure exceeds the set-point and is switched ON, as the pressure goes (0.5 bar) below the set-point. If the pressure is not achieved in 15mins, the pump will switch OFF and after 1min other pump will start to achieve the required pressure.
- C Manual Mode - Operation can be switched from Auto mode to Manual mode for Pump 1/ Pump 2 by the toggle switch. In manual mode pump operates continuously for 30mins, then stops for 10mins before restarting.
- D Alarm - A NO contact of relay is provided for the alarm which closes when a alarm is raised. In case of alarm, press reset key to clear alarm or switch OFF & then switch ON the mains.
- E Remote Operation - For operating pressurisation unit from a remote location, manually or through BMS, an NO contact can be provided across terminal 8 and 9 of the control panel after removing the jumper.

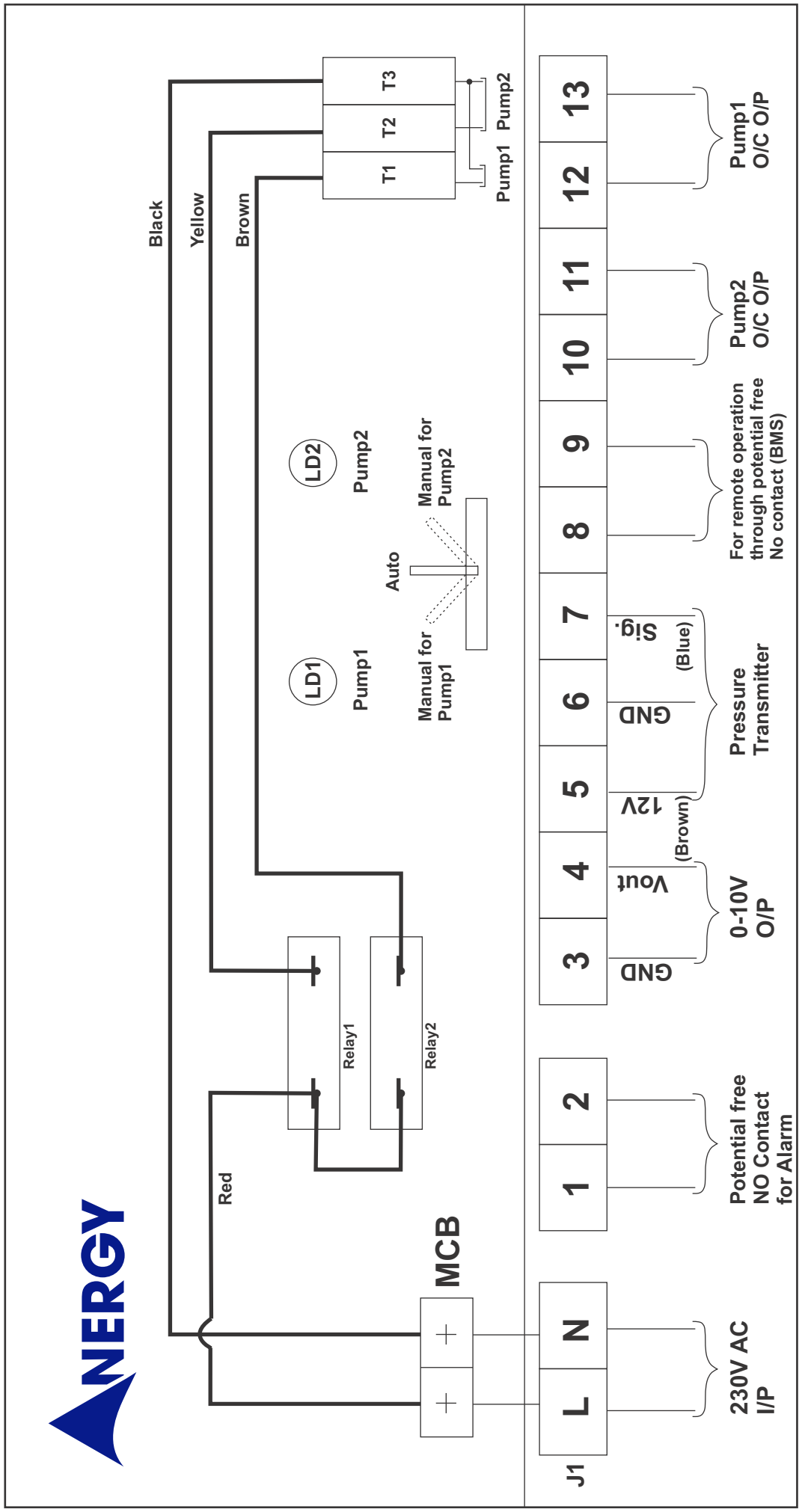
Please note the operation of pump shall be as per pressure transmitter setting and system pressure.

- F Remote Monitor of Pump - To monitor pump operation status, input can be taken from terminal 10 & 11 for pump 2 and 12 & 13 for pump1

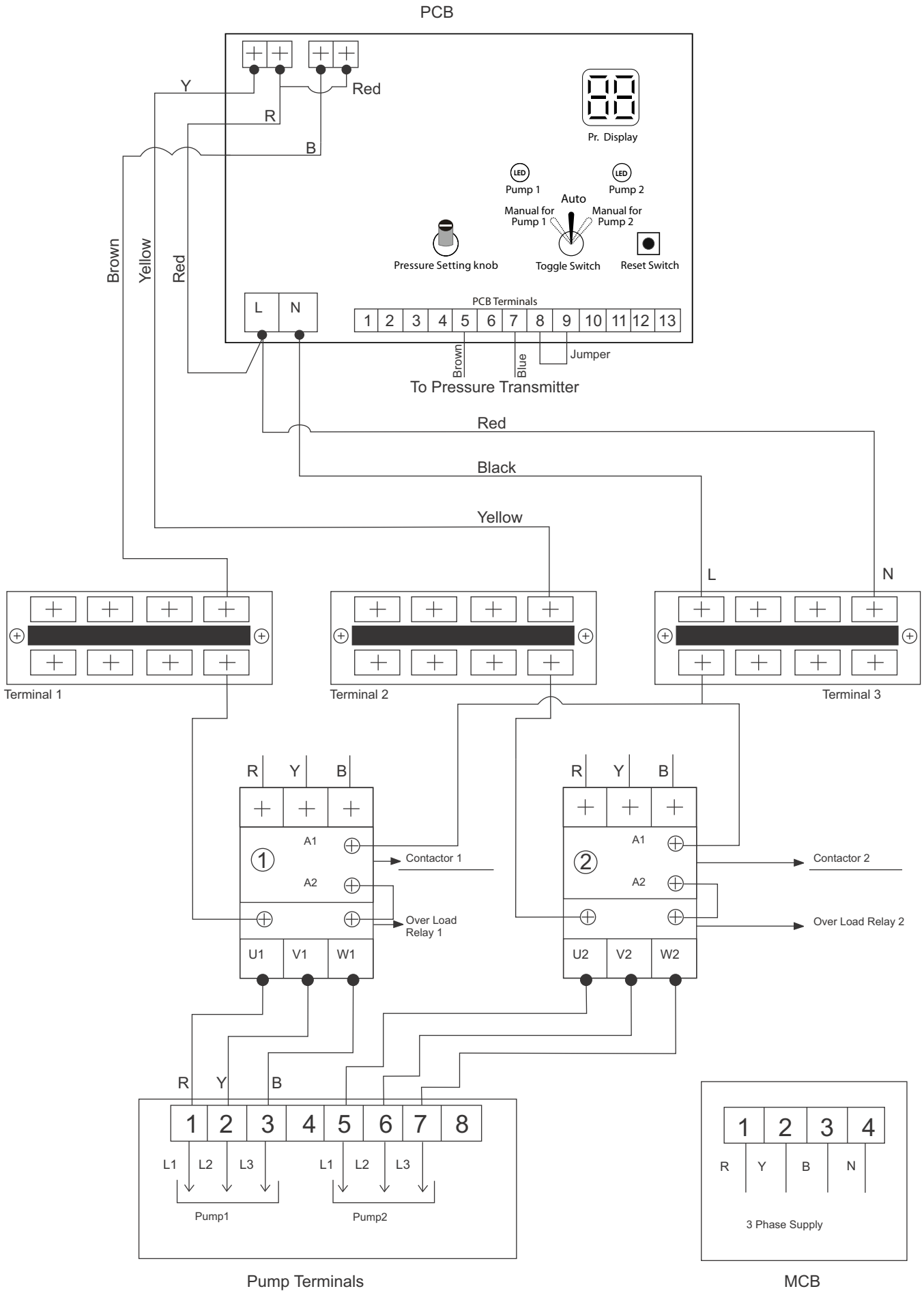


Control Panel

Wiring Diagram Model PSU-225



Wiring Diagram Model PSU-245/290/2135



Technical Data of Pressurisation Unit

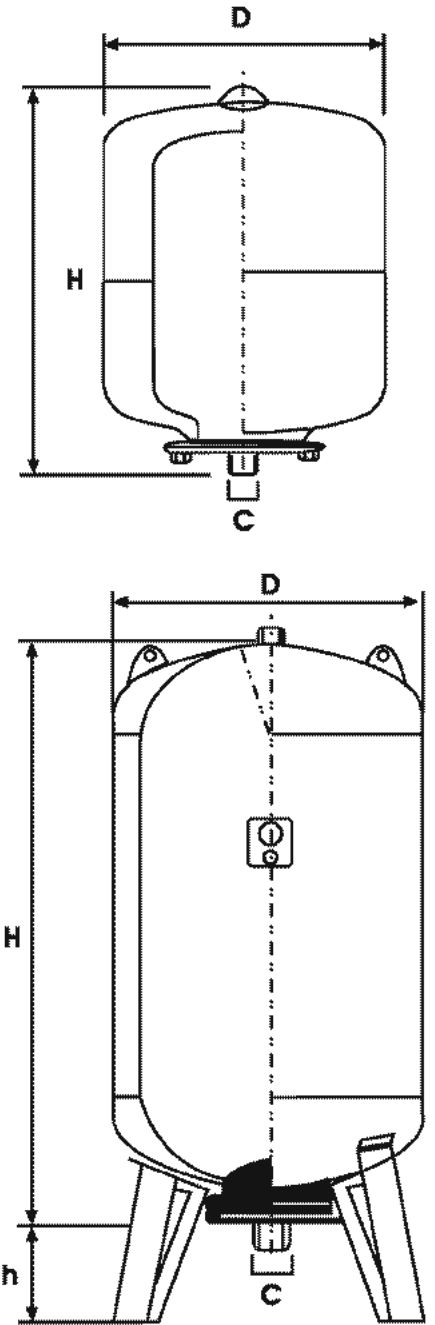
Model	:	PSU-225	PSU-245	PSU-290	PSU-2135
Pump					
Type	: Multistage, centrifugal			
Power(KW)	:	0.6	0.75	2.2	2.2
Power supply (AC, 50Hz)	:	230V,1Ph 415V, 3Ph		
Max flow rate (CMH)	:	2	2	2	2
Max dynamic head (mWC)	:	25	45	90	135
Max. fluid temperature	: 50°C			
Protection	:	IP44 IP55		
Controls					
Pressure Range	:0 to 10 bar.....	0 to 20 bar.....	
Pressure Differential	: 1 bar			
Control Panel Protection	: IP55			

CLOSED EXPANSION TANK

Dimensions

All DIMENSIONS are in mm

MODEL TYPE	Capacity Litres	Conn. Size (C)	H	h	D	Approx. Weight Kgs. (empty)
CET 24	24	1"	470	-	280	5
CET 50	50	1"	420	180	409	10
CET 100	100	1"	720	250	480	20
CET 300	300	1 1/4"	980	250	634	50
CET 500	500	1 1/4"	1250	300	740	80
CET 750	750	2"	1650	300	740	130
CET 1000	1000	2"	1900	300	800	200
CET 1500	1500	2"	2100	300	960	250
CET 2000	2000	2"	2000	300	1150	600
CET 3000	3000	2"	1700	300	1500	900
CET 4000	4000	2"	2300	300	1500	1200
CET 5000	5000	2"	2800	300	1500	1500

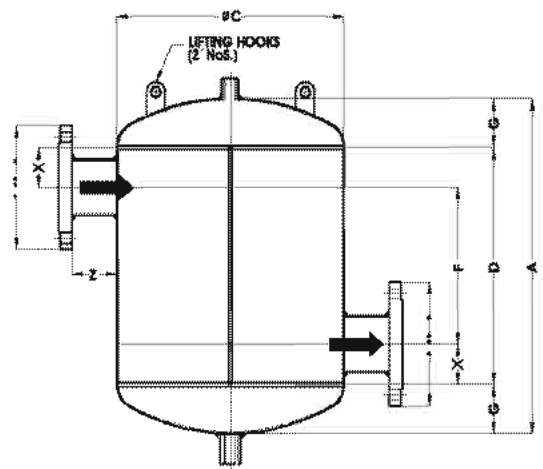
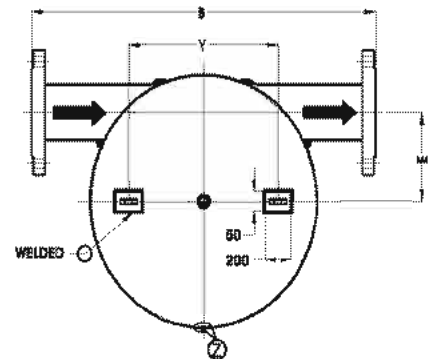


AIR SEPARATOR

Dimensions

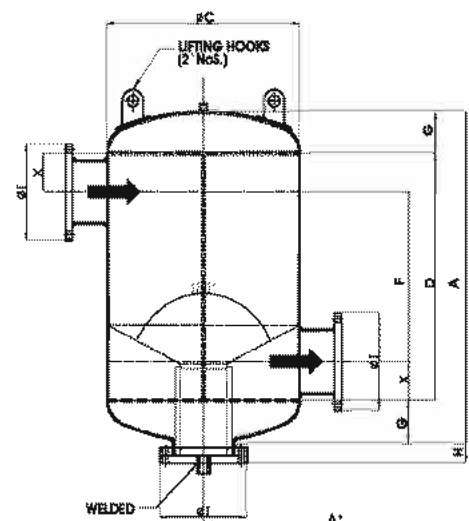
All DIMENSIONS are in mm

MODEL	A	B	∅ C	E	F	Weight (Kgs)
CAS 80	375	490	254	65	136	20
CAS100	595	675	450	80	156	50
CAS125	595	675	450	105	225	54
CAS150	675	675	450	130	277	61
CAS200	900	900	600	180	310	125
CAS250	1125	1050	750	230	485	185
CAS300	1350	1200	900	280	540	290
CAS350	1575	1406	1050	330	715	430
CAS400	1800	1564	1200	380	830	660
CAS450	2025	1714	1350	430	955	830
CAS500	2250	1876	1500	480	1070	1295
CAS600	2750	2200	1800	580	1300	2000



AIR & SEDIMENT SEPARATOR

MODEL	A'	F	Free Strainer Area (cm ²)	Weight (Kgs)
CASS80	430	180	237	25
CASS100	645	220	325	65
CASS125	650	240	624	70
CASS150	730	275	924	80
CASS200	1195	360	1572	165
CASS250	1195	425	2438	240
CASS300	1525	520	3666	380
CASS350	1530	680	4732	465
CASS400	1832	720	6213	858
CASS450	2025	750	7926	1180
CASS500	2263	800	9812	1680
CASS600	3045	980	14463	2500



Other dimensions same as that of air separator
Flanges to IS 6392

F = Space required for removal of strainer

$$G = \frac{A - E}{2}$$

PRE-COMMISSIONING CHECKLIST

No.	Description		Tick if OK
1	Check factory pre-charge and record.	_____ Bar	
2	Check for any leakage from air valve by soap test.		<input type="checkbox"/>
3	System is installed as per flow diagram.		<input type="checkbox"/>
4	Piping connection are done as per flow diagram.		<input type="checkbox"/>
5	Makeup water with positive pressure is connected at inlet connection of pressurisation unit.		<input type="checkbox"/>
6	Safety valve is installed as indicated in the flow diagram.		<input type="checkbox"/>
7	Pressure gauge is installed at main return pipe to assess the CHW system static head.		<input type="checkbox"/>
8	Correct power is supplied/connected as per model of pressurisation unit.		<input type="checkbox"/>
9	Correct charge of nitrogen is charged in tank and recorded.	_____ Bar	
10	Ensure correct pressure of pressure transmitter is set at the control panel and recorded.	_____ Bar	

Recommended Spare Parts List

Pressurisation Unit

1. Pressure Transmitter
2. Pump (As Per Model)
3. Controller(As Per Model)
4. Safety Valve

Expansion Tank

1. Bladder (As Per Model)
2. Pressure Gauge
3. Air Valve

Air Separator

1. Strainer (As Per Model)
2. Supervent

HEAD OFFICE

FARIDABAD : 40, Sector 27A,
Faridabad - 121 003
Haryana
Tel : 91-129-4045901, 2258184
Fax : 91-129-2276482
E-mail : info@anergy.in

BRANCH OFFICES

BANGALORE : E-mail: anergy_bng@anergy.in
Mob: +91-77608 93652

CHENNAI : E-mail: anergy_chn@anergy.in
Mob: +91-93646 60005

HYDERABAD : E-mail: anergy_hyd@anergy.in
Mob: +91-93964 18000

MUMBAI : Email: anergy_mum@anergy.in
Mob: +91-93242 33066