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INSTALLATION
&
COMMISSIONING
MANUAL
for
GAS BASED PRESSURISATION SYSTEM

IN THE SERVICE OF THE BUILT ENVIRONMENT

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Preventive Maintenance

S.No	Description	Inspection Frequency
1.	Check Nitrogen Pressure in Pressurised Tank, To Check Nitrogen Pressure, isolate expansion tank from system and drain its water. Charge with Nitrogen, if required.	Quarterly.
2.	Clean Make-up water Strainer.	After initial commissioning and then Quarterly.
3.	Check all Electrical connections Tighten if loose.	Quarterly.

Recommended Spare Parts List

Pressurisation Unit

1. Pressure Transmitter
2. Pump (as Per Model)
3. Controller (as Per Model)
4. Safety Valve
5. Pressure Gauge

Expansion Tank

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

Air Separator/MBDS

1. Supervent

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

Commissioning Procedure

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 schematic diagram.		<input type="checkbox"/>
4	Piping connection are done as per schematic 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 schematic 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	

Trouble Shooting Chart

S.No.	Symptom	Possible causes	Solution
1	MCB tripping	1. Short circuit	1. Check wiring
2	No display in controller LCD	1. No power supply 2. Faulty controller	1. Restore power 2. Replace controller
3 a	Possible Alarms Pump 1/2-stop & red LED glow	Pump not working	1. Check pump/wiring
4	Pressure error	1. Loose or short wire 2. Sensor faulty	1. Check connection 2. Replace sensor
5	Pump run but pressure not build	1. Wrong rotation 2. Air in pump	1. Interchange two phase from MCB (mains supply) 2. Open purge screw & remove air

Introduction

We thank you for procuring Hydronic Pressurisation System from us.

This system comprises of following items:

1. Air Separator
2. Pressurised 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 Labour maintenance Contract. You may contact our offices for further details.

CEO
Anergy Instruments Pvt. Ltd

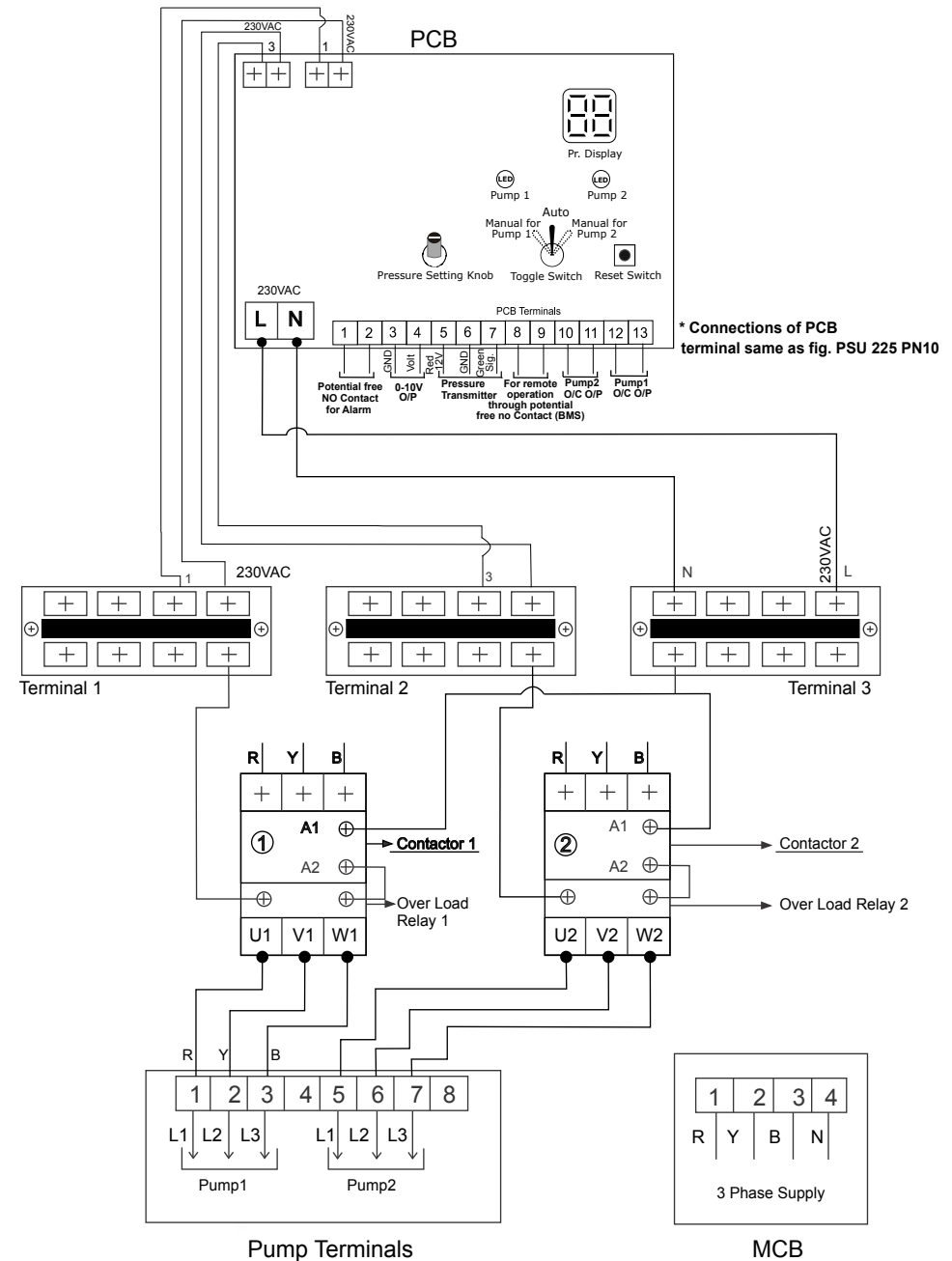
Receipt of Equipment

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 before installation/commissioning.
3. Check and record the factory pre-charge pressure indicated on the pressure gauge. In case of no pressure inform 'Anergy'.

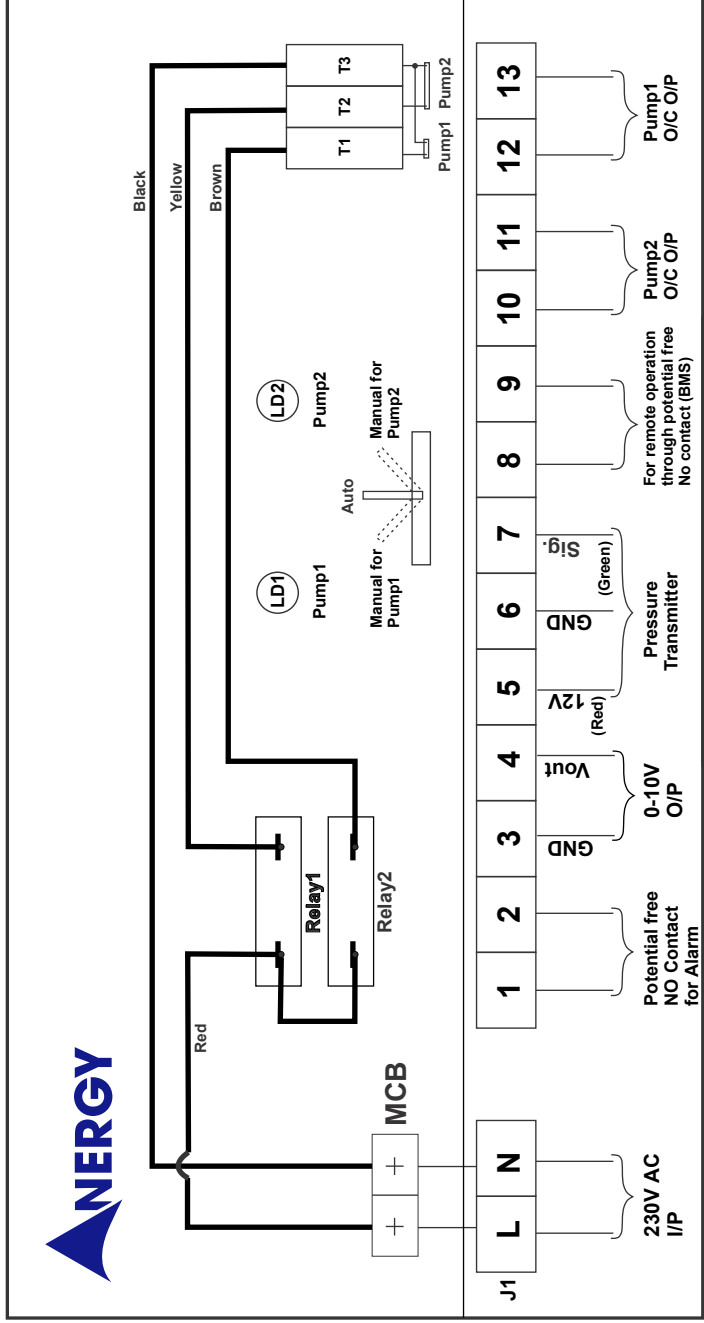
Do's & Don't

Do's	Don't
1. The equipment should be installed on level P.C.C foundation.	1. Never fill water in pressurised expansion tank until required pressure of nitrogen gas has been charged.
2. Piping connections should be as per schematic diagram.	2. Do not connect expansion tank during hydro-testing.
3. Always give proper power supply as per model of pressurisation unit.	
4. Only trained person should install and commission the system.	
5. The make-up pressure should be within 0.5 bar to 2 bar.	

Wiring Diagram PSU-225/260/2100 PN16/2150 PN20



Control Wiring Diagram Model PSU-225 PN10



Ensure Pressure Transmitter Red & Green Wires are Connected in Terminal 5 & 7 Respectively

* Connections of PCB terminal same as fig. PSU 225 PN10

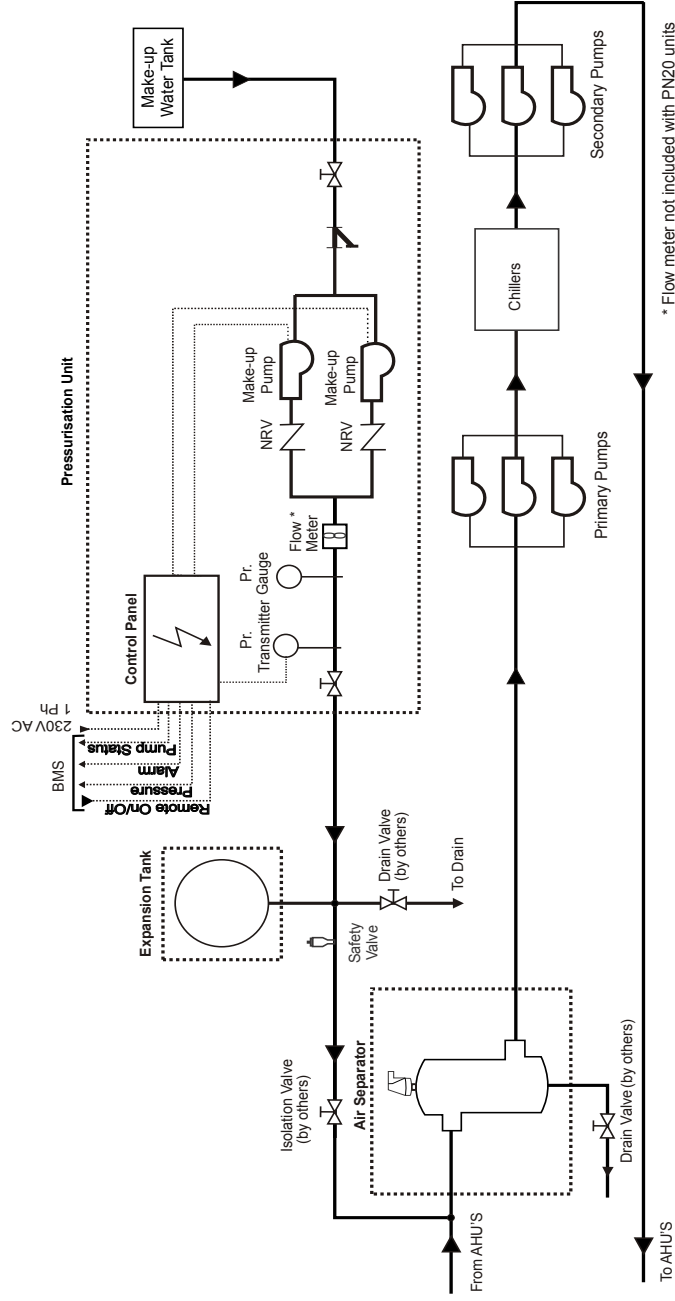


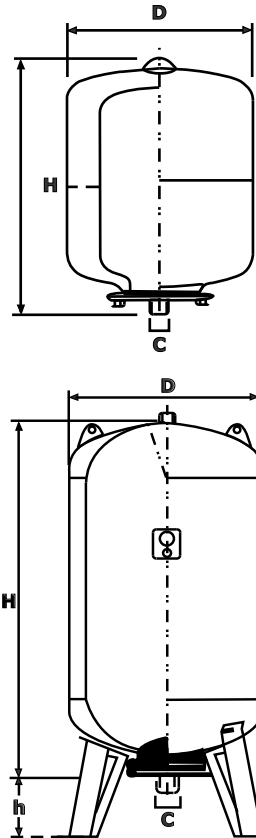
Fig. 1 Schematic drawing of pressurisation unit, expansion tank and air separator with primary and secondary pumps.

Closed Expansion Tank

Dimensions

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"	491	117	410	11
CET - 100	100	1"	760	120	460	15
CET - 300	300	1¼"	1130	120	650	45
CET - 500	500	1¼"	1400	200	750	71
CET - 750	750	2"	1741	184	740	100
CET - 1000	1000	2"	1995	175	848	139
CET - 1500	1500	2"	1400	300	1186	480
CET - 2000	2000	2"	2110	300	1112	460
CET - 3000	3000	2"	2300	300	1316	760
CET - 4000	4000	2"	2300	300	1520	1095
CET - 5000	5000	2"	2800	300	1520	1300

All dimensions are in mm .
Tanks as per IS: 2825-1969 / EN: 97/23/EC



Pressurisation Unit

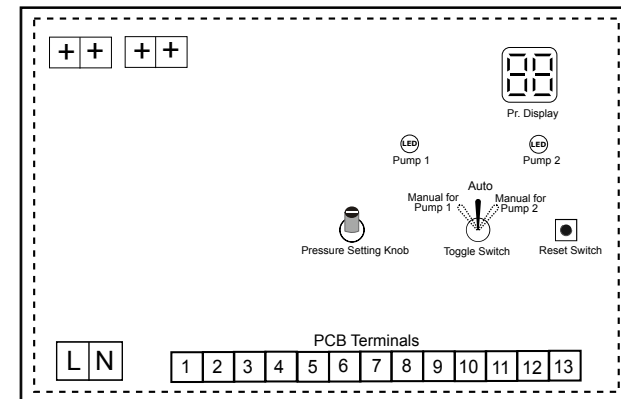
Dimensions

Model	L	W	H
PSU-225 (PN10)	520	500	550
PSU-225 (PN16)	1050	700	900
PSU-260 (PN16)	1050	700	900
PSU-2100 (PN16)	1050	700	900
PSU-2150 (PN20)	1050	700	1000

All dimensions are in mm .

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.



PCB Layout diagram

Installation of Pressurisation Unit

No.	Description	Tick if OK
1.	Only trained person should carry out installation.	<input type="checkbox"/>
2.	Mount on a level PCC foundation.	<input type="checkbox"/>
3.	The inlet connection, of pressurisation unit is connects to make-up water pipe according to fig. 2 .	<input type="checkbox"/>
4.	The make-up water to the pressurisation unit should be at positive pressure, with minimum of 0.5 bar and maximum of 2 bar.	<input type="checkbox"/>
5.	Install piping of 1" size from pressurisation unit to expansion tank connection and to main chilled water return pipe as shown in fig. 2 .	<input type="checkbox"/>
6.	Connect power supply to single/three phase MCB in control panel as per model of pressurisation unit.	<input type="checkbox"/>

Pressure Setting of Pressurisation Unit

Typical Example:

IF Building Height is ----- 30m = 3.0 bar (Static Head)
 Add for Safety = 0.5 bar
 Expansion Tank N2 Pressure charge = 3.5 bar
 Pressure Transmitter Setting = 4.5 bar

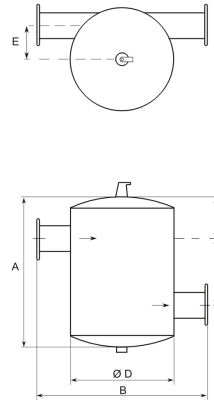
(Pump on at - 4.0 bar
 Pump off at - 4.5 bar)

Centrifugal Air Separator (PNI0)

Dimensions

Model	A	B	C	∅D	E	F	Weight (Kgs)
CAS-250F	1125	1002	435	750	230	345	185
CAS-300F	1350	1152	540	900	280	405	290
CAS-350F	1575	1356	655	1050	340	460	430
CAS-400F	1800	1514	750	1200	390	525	660
CAS-450F	2025	1664	865	1350	435	580	830
CAS-500F	2250	1876	970	1500	490	640	1260
CAS-600F	2700	2184	1200	1800	575	750	1800

All dimensions are in mm .
 Flanges to IS: 6392 - 1971.

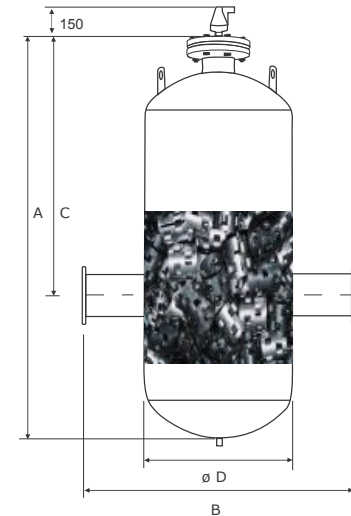


Microbubble Air & Dirt Separators (PNI6)

Dimensions

Model	A	B	C	∅D	Weight (Kgs)
MBDS - 80F	685	460	455	220	36
MBDS-100F	685	460	460	220	38
MBDS-125F	800	520	515	275	55
MBDS-150F	910	570	575	325	70
MBDS-200F	1135	650	685	400	100
MBDS-250F	1360	800	800	500	165
MBDS-300F	1585	960	910	600	245
MBDS-350F	1810	1110	1025	700	380
MBDS-400F	2035	1270	1135	800	485
MBDS-450F	2260	1430	1245	900	610
MBDS-500F	2485	1590	1360	1000	930
MBDS-600F	2935	1900	1585	1200	1555

All dimensions are in mm .
 Flanges to IS: 6392 - 1971.



Technical Data

Model	: PSU-225 PSU-225 PSU-260 PSU-2100 PSU-2150				
Pump					
Type	: Multistage, Centrifugal				
Power (KW)	: 0.55	: 0.55	: 1.1	: 1.5	: 2.2
Power supply (AC, 50Hz)	: 230V, 1Ph		: 415V, 3Ph		
Max. flow rate (CMH)	: 2	: 2	: 2	: 2	: 2
Max. head (mWC)	: 25	: 25	: 60	: 100	: 150
Pressure rating	: PN10	: PN16		: PN20	
Max. fluid temp.	: 70°C				
Protection	: IP55				
Controls					
Pressure range	: 0 to 10 bar		: 0 to 25 bar		
Pressure differential	: 1 bar				
Control panel protection	: IP55				

Closed Expansion Tank Connections

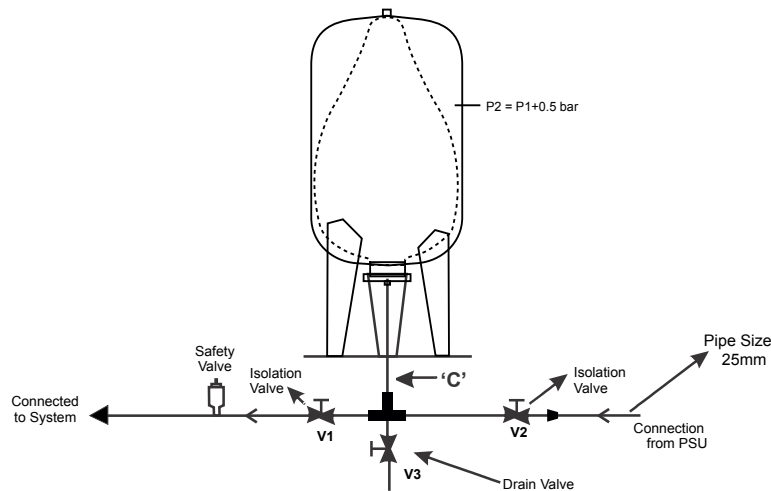


Fig. 2 Typical Connections of Pressurised Tank

Installation of Closed Expansion Tank

No.	Description		Tick if OK
1	Only trained person should carry out installation.		<input type="checkbox"/>
2	Mount the expansion tank on level PCC foundation/floor.		<input type="checkbox"/>
3	Tank is generally connected to the suction side of the primary pump before the air separator.		<input type="checkbox"/>
4	Connect pipe 'C' to expansion tank connection as per table on page 5 and diagram on page 7.		<input type="checkbox"/>
5	Install pipe and two isolation valves V1 & V2 on either side of the tank.		<input type="checkbox"/>
6	If multiple expansion tanks of smaller capacities are used in same CHW line to have larger capacity, then provide common isolation ball valves.		<input type="checkbox"/>
7	Install the drain piping and valve V3 of 1" size at the bottom of the tank for drainage.		<input type="checkbox"/>
8	Install the safety valve on the pipe connecting expansion tank to the system.		<input type="checkbox"/>
9	Keep valves V1 & V2 closed and open drain valve V3 and drain water from the expansion tank, if any.		<input type="checkbox"/>
10	Check standing pressure at gauge P1 of chilled water system.	_____ Bar	
11	The expansion tank should be charged with nitrogen through Air Valve provided on the tank, as per site requirements.		<input type="checkbox"/>
12	The charge pressure P2 should be calculated as per typical example indicated below.		<input type="checkbox"/>
13	After charge required nitrogen pressure, close drain valve V3 and open valves V1 and V2 to fill the tank.		<input type="checkbox"/>

Pressure Setting of Expansion Tank

Typical Example:

IF Building Height is-----30m = 3.0 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 into tank, without nitrogen gas charging.
 2. Do not connect expansion tank during hydro-testing of complete system.