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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

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

## 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<br>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

## 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<br>2. Faulty controller | 1. Restore power<br>2. Replace controller  |
| 3<br>a | Possible Alarms<br>Pump 1/2-stop & red LED glow | Pump not working                           | 1. Check pump/wiring   |
| 4      | Pressure error                                  | 1. Loose or short wire<br>2. Sensor faulty | 1. Check connection<br>2. Replace sensor   |
| 5      | Pump run but pressure not build                 | 1. Wrong rotation<br>2. Air in pump        | 1. Interchange two phase from MCB (mains supply)<br>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**

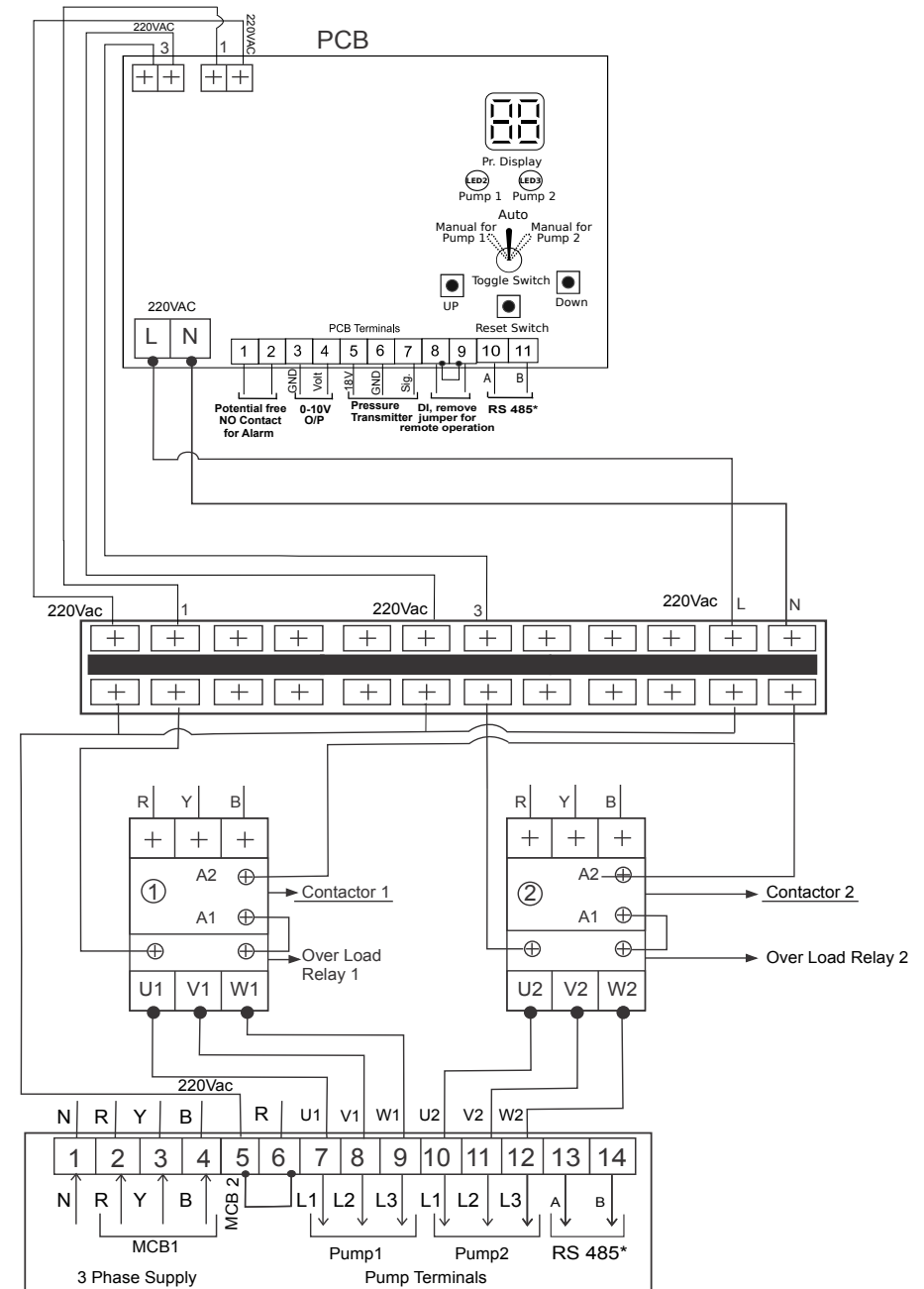
## Receipt of Equipment

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 'Energy'.

## Do's & Don't

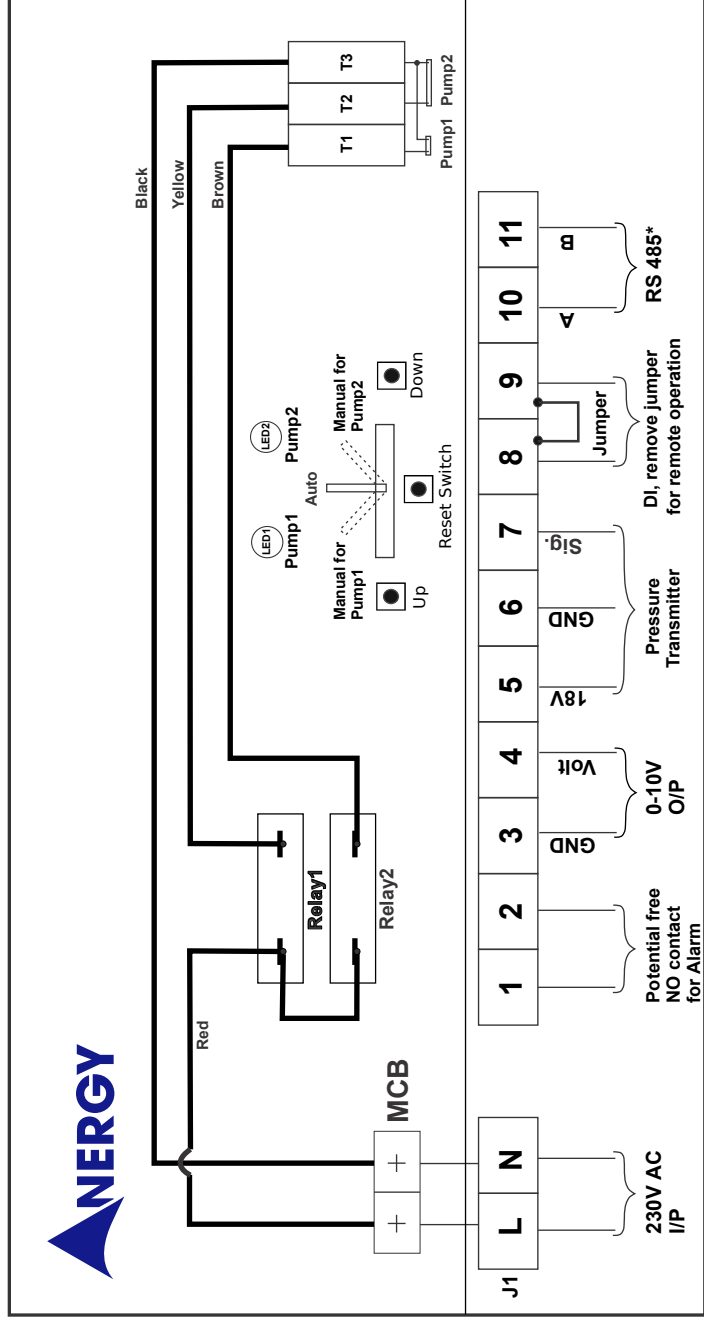
| Do's  | Don't   |
|---|---|
| 1. The equipment should be installed on level P.C.C foundation.         | 1. Never fill water in pressurised expansion tank until required pressure of nitrogen gas has been charged. |
| 2. Piping connections should be as per schematic diagram.               | 2. Do not 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 Model PSU-225/260/2100/2150-R4\* PN16, PN20, PN25

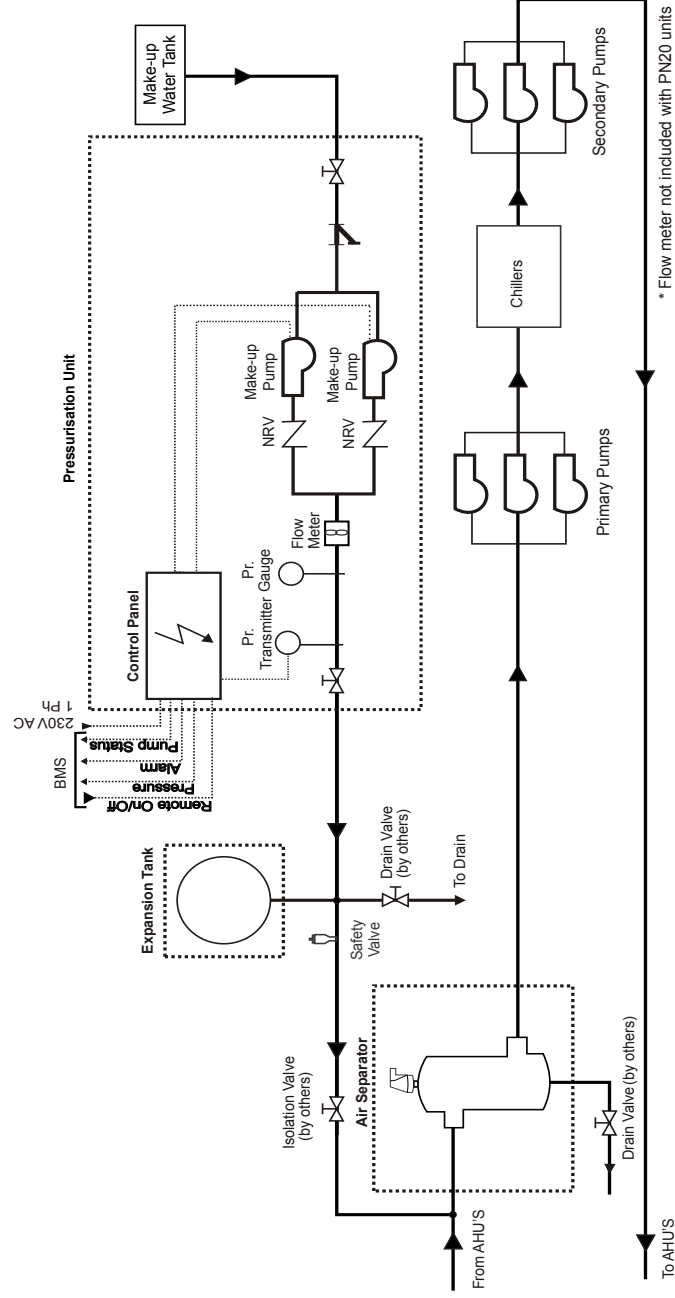


\* RS 485 option available at extra cost

Control Wiring Diagram Model PSU-225/225C-R4\*, PN10



\* RS 485 option available at extra cost



\* Flow meter not included with PN20 units

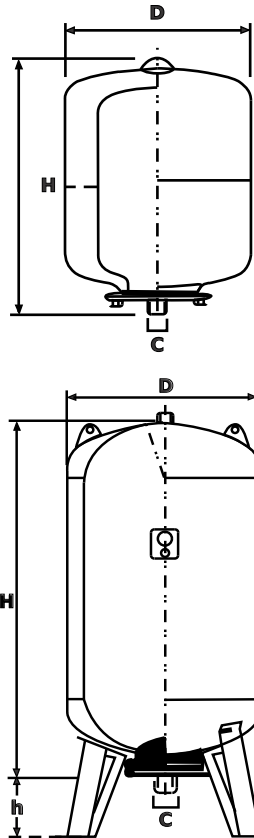
Fig. 1 Schematic drawing of pressurisation unit, expansion tank and air separator with primary and secondary pumps.

## 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"             | 490  | 115 | 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  | 70                          |
| CET - 750  | 750             | 2"             | 1300 | 300 | 870  | 220                         |
| CET - 1000 | 1000            | 2"             | 1600 | 300 | 910  | 265                         |
| CET - 1500 | 1500            | 2"             | 1600 | 300 | 1110 | 405                         |
| CET - 2000 | 2000            | 2"             | 2110 | 300 | 1110 | 490                         |
| CET - 2500 | 2500            | 2"             | 1900 | 300 | 1310 | 680                         |
| CET - 3000 | 3000            | 2"             | 2300 | 300 | 1310 | 780                         |
| CET - 4000 | 4000            | 2"             | 2300 | 300 | 1520 | 1110                        |

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



## Pressurisation Unit

### Dimensions

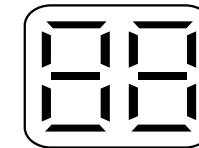
| Model           | L    | W   | H    |
|-----------------|------|-----|------|
| PSU-225 (PN10)  | 600  | 500 | 580  |
| PSU-225 (PN16)  | 1050 | 700 | 830  |
| PSU-260 (PN16)  | 1050 | 700 | 830  |
| PSU-2100 (PN16) | 1050 | 700 | 830  |
| PSU-2150 (PN20) | 1050 | 700 | 1050 |

All dimensions are in mm .

## Control Panel Operation

- A Set Point - The Set point of the pressure is set by up and down keys, on pressing any key, 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.



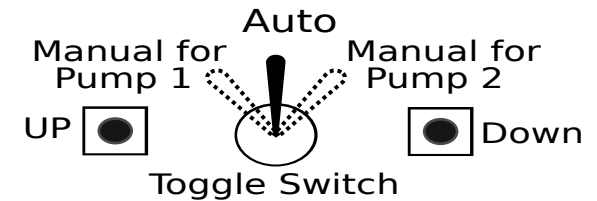
Pr. Display



Pump 1



Pump 2



## 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 P.C.C foundation.  | <input type="checkbox"/> |
| 3.  | The inlet connection, of pressurisation unit is connects to make-up water pipe according to <b>fig. 2</b> .                                       | <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 <b>fig. 2</b> . | <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

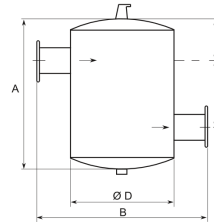
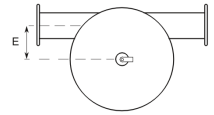
( Pump on at - 4.0 bar  
Pump off at - 4.5 bar )

## 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.

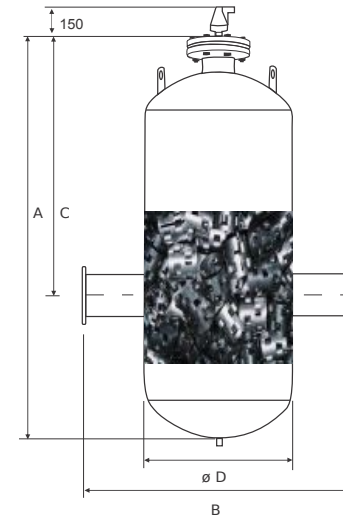


## Microbubble Air & Dirt Separators (PNI6)

### Dimensions

| Model      | A    | B    | C    | ∅D   | Weight (Kgs) |
|------------|------|------|------|------|--------------|
| MBDS - 80F | 685  | 460  | 455  | 220  | 38           |
| MBDS-100F  | 685  | 460  | 460  | 220  | 38           |
| MBDS-125F  | 800  | 520  | 515  | 275  | 55           |
| MBDS-150F  | 910  | 570  | 575  | 325  | 65           |
| MBDS-200F  | 1135 | 650  | 685  | 400  | 95           |
| MBDS-250F  | 1360 | 800  | 800  | 500  | 135          |
| MBDS-300F  | 1585 | 960  | 910  | 600  | 215          |
| MBDS-350F  | 1785 | 1110 | 1025 | 700  | 340          |
| MBDS-400F  | 2035 | 1270 | 1135 | 800  | 425          |
| MBDS-450F  | 2260 | 1430 | 1245 | 900  | 540          |
| MBDS-500F  | 2485 | 1590 | 1360 | 1000 | 820          |
| MBDS-600F  | 2935 | 1900 | 1585 | 1200 | 1395         |

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



## Technical Data

|                          |   |              |                           |        |       |
|--------------------------|---|--------------|---------------------------|--------|-------|
| <b>Model</b>             | : PSU-225 PSU-225 PSU-260 PSU-2100 PSU-2150 |              |                           |        |       |
| <b>Pump</b>              |   |              |                           |        |       |
| 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 .....                          |              |                           |        |       |
| <b>Controls</b>          |   |              |                           |        |       |
| Pressure range           | : ..... 0 to 10 bar .....                   |              | : ..... 0 to 25 bar ..... |        |       |
| Pressure differential    | : ..... 1 bar .....                         |              |                           |        |       |
| Control panel protection | : ..... IP55 .....                          |              |                           |        |       |

## Closed Expansion Tank Connections

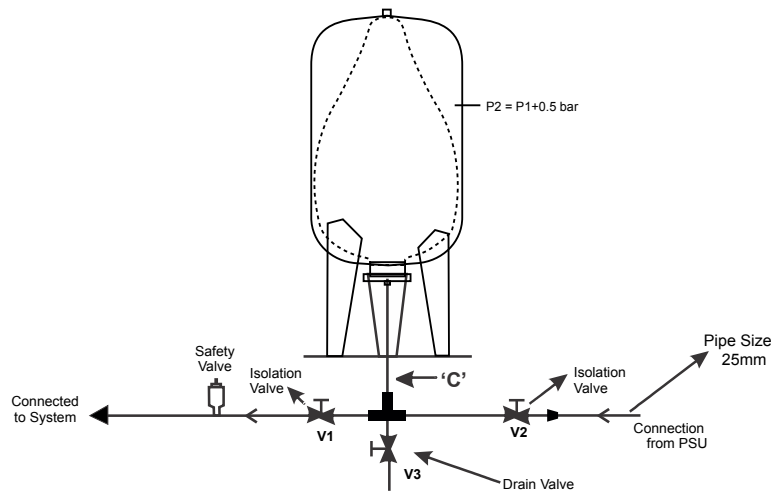


Fig. 2 Typical Connections of Pressurised Tank

## 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 P.C.C 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.