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INSTALLATION  
&  
COMMISSIONING  
MANUAL  
for  
**PRESSURE MAINTAINING STATION**



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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

### Pressure Maintaining Station

1. Pressure Transmitter
2. Pump (as Per Model)
3. Controller
4. Safety Valve
5. Level/Pressure Transmitter
6. Spill Control Valve

### Expansion Tank

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

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

## 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.	Possible Alarms		
a	Pump 1/2-Fail	Pump not working Reverse Rotation Air in pump	1. Check wiring 2. Change phase 3. Remove air
b	High System Pressure	1. Spill control valve not opening 2. Pump running inspite of set point achieved	1. Check Spill control valve function 2. Replace controller PCB
c	Low System Pressure	1. No make-up water supply	1. Restore water supply
d	Spill control valve 1/2-Fail	1. Feed back wire loose  2. Actuator not working	1. Check connection at terminal TS1-3 & TS1-5 2. Replace
e	EPRUN	1. Excessive water make-up water in tank due to leakage in chilled water system	1. Identify and stop leakage
f	Sensor fault	1. Loose or short wire 2. Sensor faulty	1. Check connection 2. Replace sensor
4.	Soft starter LED flashing		
	One Time	Overload	Reset overload
	Two Times	Over temperature	Allow time for unit to cool
	Three Times	Phase reversal	Check for proper phase rotation
	Four Times	Phase loss	Check line and load connections to SMC-3
	Five Times	Phase imbalance	Check line current in each phase
5.	No air purge from Supervent installed at top of Unpressurised tank	1. Cap of Supervent tight	1. Loosen same

## Introduction

We thank you for procuring Hydronic Pressurisation System from us.

This system comprises of following items:

1. Unpressurised tank
2. Pressurised Closed Expansion tank
3. Pressure Maintaining Station (PMS)

This system ensures that the Air Conditioning System operates at positive pressure and entrained air is removed from the system by pressure reduction method in the unpressurised tank.

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

Moreover, regular check-ups are 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.	3. Never Switch on the equipment until all connections are done.
4. Only trained person should install and commission the system.	
5. The make-up pressure should be within 0.5 bar to 2 bar.	

## Commissioning Procedure

No.	Description		Tick if OK
1.	Keep all isolating valves to connection ① ② ③ ④ & ⑤ of PMS closed.		<input type="checkbox"/>
2.	Check factory pre-charge pressure of pressurised tank and record.	_____ Bar	
3.	Charge required pressure of nitrogen in the pressurised expansion tank as per below example and record.	_____ Bar	
4.	Check for any leakage from air valve of closed expansion tank if no leakage close with the cap.		<input type="checkbox"/>
5.	Ensure make-up tank is connected to connection ② of PMS.		<input type="checkbox"/>
6.	Ensure water is filled in make-up tank.		<input type="checkbox"/>
7.	Open only valves to connection ① ② ④ & ⑤ of PMS as shown in Fig.2.		<input type="checkbox"/>
8.	<b>Do not open valves to connection ③ of PMS which is connected to system.</b> * Ensure the water is available to pumps.		<input type="checkbox"/>
9.	Check correct power supply is available.		<input type="checkbox"/>
10.	Set pressure of pressure transmitter at the control panel as per <b>Customer Menu</b> on page 11.		<input type="checkbox"/>
11.	Water will start filling the system through make-up and start-up of pump.		<input type="checkbox"/>
12.	To remove any air from pump chamber switch off power supply then bleed air from pump air purge valve (located below pump motor).		<input type="checkbox"/>
13.	<b>Now open valves to connection ③ of PMS as shown in Fig.2.</b>		<input type="checkbox"/>
14.	Loosen the cap installed on top of Supervent/Air inhibitor.		<input type="checkbox"/>

**Important Note: Do not open valve to connection ③ of PMS which is connected to the system till all parameters are set.**

### Pressure Setting

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 Setting = 4.5 bar

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

Spill valve

starts opening at - 4.6 bar

Full open at - 5.0 bar

## Modes

Mode 0 - For display only no password required, access by pressing **Enter** Key.

Mode 1 - For entering parameters, password required. Password can be changed by customer.

Mode 2 - No function by customer, password protected, access by **Anergy** engineer only.

**Modes Description:** Following are the display/functions of various modes.

Mode 0 - Scroll down for **Alarms, Input Status, Output Status.**

Alarms		Input Status		Output Status	
Pump 1-	Fail	System Pressure		Pump 1	ON/OFF
Pump 2-	Fail	Tank LVL	-----mm	Pump 2	ON/OFF
High Pressure	Hi Pr	Remote	ON/OFF	SCV 1	% Opening
Low Pressure	Lo Pr	SCV 1-	Status	SCV 2	% Opening
SCV 1-	Fail	SCV 2-	Status	MUPVLV	ON/OFF
SCV 2-	Fail	Dgs time L	-----min		
EPRUN -		Flow puls	ON/OFF		
Pressure Sensor	Fail	Total vol.	-----KL		
		Makeup vol.	-----KL		

Mode 1 - Enter Password

Alarms		Input Status		Output Status		Controls	
Pump 1-	Fail	System Pressure		Pump 1	ON/OFF	System Operation -	ON/OFF
Pump 2-	Fail	Tank LVL	-----mm	Pump 2	ON/OFF	Degassing	- ON/OFF
High Pressure	-	Remote	ON/OFF	SCV 1	% Opening		
Low Pressure	-	SCV 1-	Status	SCV 2	% Opening		
SCV 1-	Fail	SCV 2-	Status	MUPVLV	ON/OFF		
SCV 2-	Fail	Dgs time L	-----min				
EPRUN -		Flow puls	ON/OFF				
Pressure Sensor	Fail	Total vol.	-----KL				
		Makeup vol.	-----KL				

## Alarms

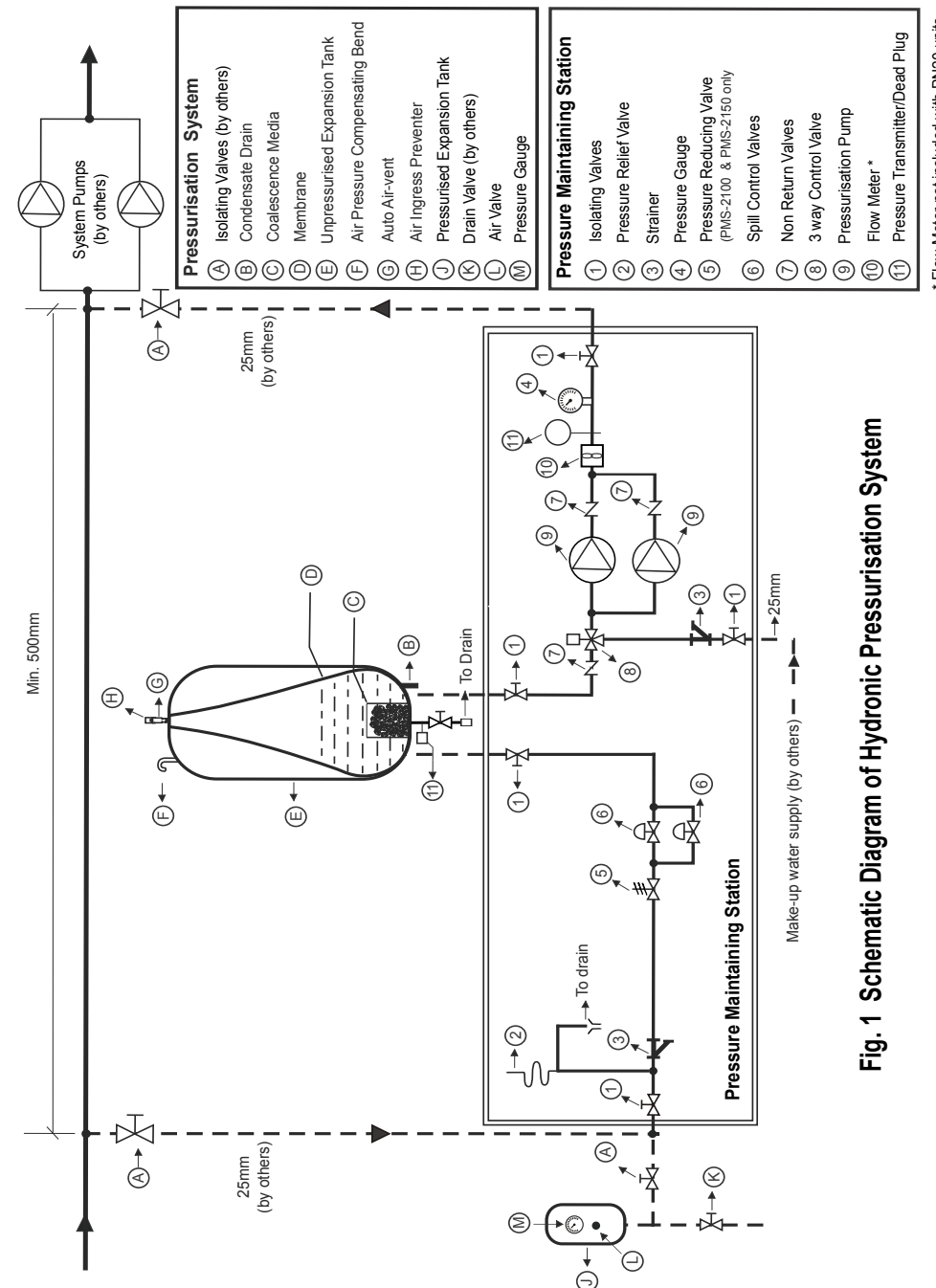
Type of Failure		Type of Indication	
		Screen	LED
Pump 1 -	Fail	Pump 1- Fail *	ON
Pump 2 -	Fail	Pump 2- Fail *	ON
High Pressure	-	High Pressure *	ON
Low Pressure	-	Low Pressure *	ON
SCV 1-	Fail	SCV 1- Fail *	ON
SCV 2-	Fail	SCV 2- Fail *	ON
Excessive Make-up Water Intake		EPRUN *	ON
Pressure Transmitter Sensor		Sensor Fault *	ON

## Set Points

Set Pressure  
EPRUN - Hour  
Degas - Hour

- NOTES:**
- Alarm can be reset only after the fault is removed.
  - Excessive Make-up Water Intake Pump Run (**EPRUN**).
  - Spill Control Valve (**SCV**).
  - Make-up Valve (**MUPVLV**).
  - Deaeration Mode:**

This function is used to remove gases from system water.  
This function can be programmed by setting of Degas hours in the control panel.



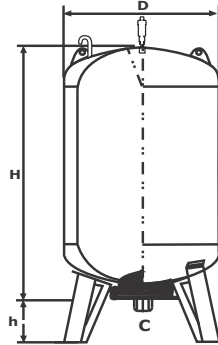
\* Flow Meter not included with PN20 units.

**Fig. 1 Schematic Diagram of Hydronic Pressurisation System**

## Unpressurised Expansion Tank

Model Type	Capacity Liters	Conn. Size 'C'	H	h	D	Approx. Weight Kgs. (empty)
CET-U-1000	1000	1"	2100	400	780	340
CET-U-1500	1500	1"	2100	400	940	390
CET-U-2000	2000	1"	2100	400	1100	475
CET-U-3000	3000	1"	2300	400	1300	565
CET-U-4000	4000	1"	2800	400	1350	690

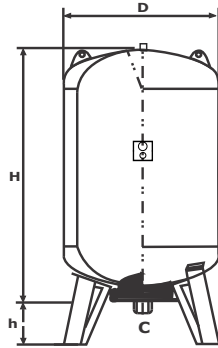
All dimensions are in mm.  
Tanks as per IS: 2825-1969 / EN: 97/23/EC



## Pressurised Expansion Tank

Model Type	Capacity Liters	Conn. Size 'C'	H	h	D	Approx. Weight Kgs. (empty)
CET - 100	100	1"	760	120	460	15
CET - 300	300	1 1/4"	1130	120	650	45
CET - 500	500	1 1/4"	1400	200	750	70
CET - 750	750	2"	1740	180	740	100
CET-1000	1000	2"	1995	175	850	140

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



## Technical Data

**Model** : PMS-225 PMS-260 PMS-2100 PMS-2150

### Pump

Type	Multistage, Centrifugal			
Power (KW)	0.75	1.1	1.5	2.2
Power supply (AC, 50Hz)	415V, 3Ph			
Max. flow rate (CMH)	2	2	2	2
Max. head (mWC)	25	60	100	150
Pressure rating	PN16		PN20	
Max. fluid temperature	70°C			
Protection	IP55			

### Controls

Pressure range	0 to 10 bar	0 to 25 bar
Pressure differential	1 bar	
Control panel protection	IP55	
Dimensions LxWxH (in mm)	1050x700x900	1050x700x1000

## Customer Menu

### Procedure for setting parameters

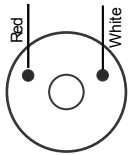
Parameters	Steps
1. Set Pressure	Scroll to <b>Mode 1</b>
	Feed Password
	Scroll to <b>Set Points</b>
	Scroll <b>Set Pressure.</b>
	Select <b>Pressure</b>
	<b>Set Pressure</b>
Back	
2. Daily on pump duration for alarm purpose only.	Scroll to <b>Mode 1</b>
	Feed Password
	Scroll to <b>Set Points</b>
	Scroll to <b>EPRUN</b>
	Select <b>EPRUN</b> hours
	Set <b>EPRUN</b> hours
Back	
3. Deaeration Cycle	Scroll to <b>Mode 1</b>
	Scroll down to <b>Set Points</b>
	Scroll down to <b>Degas</b>
	Select <b>Degas</b> hours
	Set <b>Degas</b> hours
	Back

**NOTE :** 1. Excessive Make-up Water Intake Pump Run (**EPRUN**).  
2. For System Deaeration (**Degas**).

## Control Panel Operation

### Key Functions

- Esc - To quit from any function or to revert back to previous menu
- UP - Scroll to increase parameters value
- Down - Scroll to decrease the parameter menu
- Enter - To set the function/parameter



Level Transmitter

- Connect Red wire of level transmitter with terminal ⑬ of control panel as shown in **fig. 5** and connect white wire of level transmitter with ⑫ of wired pressure transmitter is supplied loose with control panel.

## Typical PMS and Multiple Tanks Piping Diagram

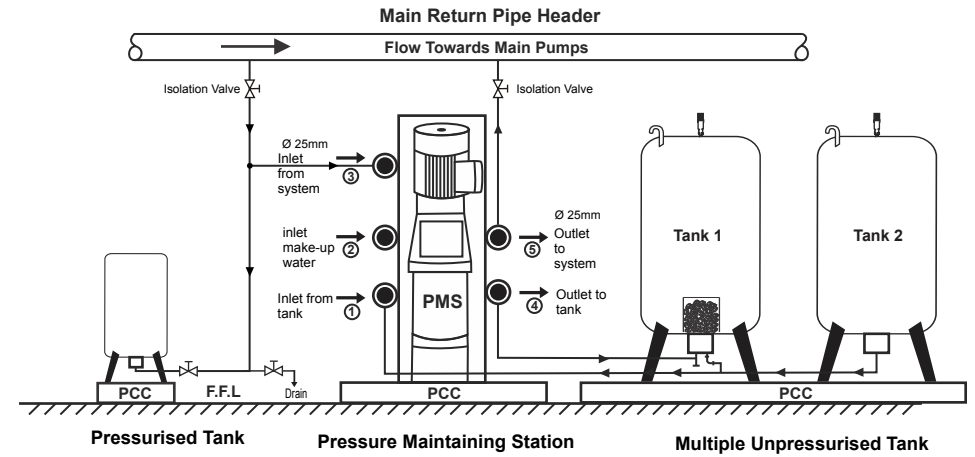


Fig. 2

## Unpressurised Expansion Tank Connections

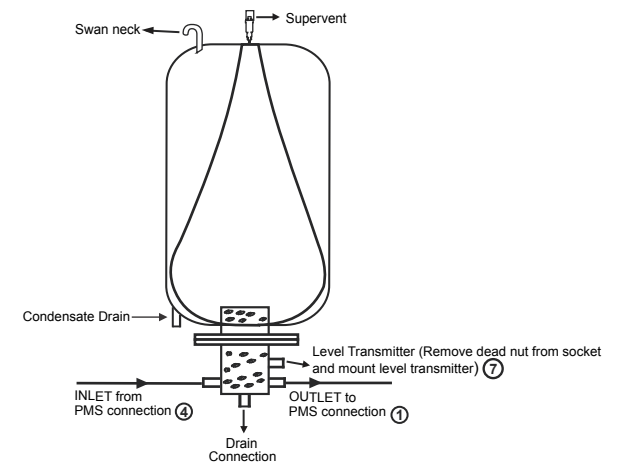


Fig. 3 Typical Connection of Unpressurised Tank

# Installation Procedure

No.	Description	Tick if OK
1.	Only trained person should carry out installation.	<input type="checkbox"/>
2.	Mount the expansion tank and unpressurised tank on PCC foundation/floor at same level as shown in Fig.2 on page 7.	<input type="checkbox"/>
3.	Insert connection pipe in chilled water return header as show in Fig.4.	<input type="checkbox"/>
4.	a. Connect Ø 25mm outlet from chilled water return header to connection ③ of PMS and also provide isolation valves as shown in Fig.2. b. Connect Ø 25mm inlet to chilled water return header to connection ⑤ of PMS and also provide isolation valves as shown in Fig.2.	<input type="checkbox"/>
5.	Connect outlet of unpressurised tank to connection ① of PMS.	<input type="checkbox"/>
6.	Connect inlet of unpressurised tank to connection ④ of PMS.	<input type="checkbox"/>
7.	Connect auto air vent (supplied loose) after removing dead plug on top of unpressurised tank.	<input type="checkbox"/>
8.	Connect swan neck (supplied loose) after removing dead plug on top of unpressurised tank.	<input type="checkbox"/>
9.	Level/Pressure Transmitter is provided loose in the control panel, it should be installed at the bottom of the tank after removing dead-plug ⑦. Wire from control panel is connected to level transmitter as shown on page 10.	<input type="checkbox"/>
10.	For multiple expansion tanks connect piping and tanks as shown in Fig.2.	<input type="checkbox"/>
11.	Connect pressurised tank with isolation valves as shown in Fig.2.	<input type="checkbox"/>
12.	Connect power wiring at terminal L1, L2, L3 & N of MCB as shown in Fig.5.	<input type="checkbox"/>

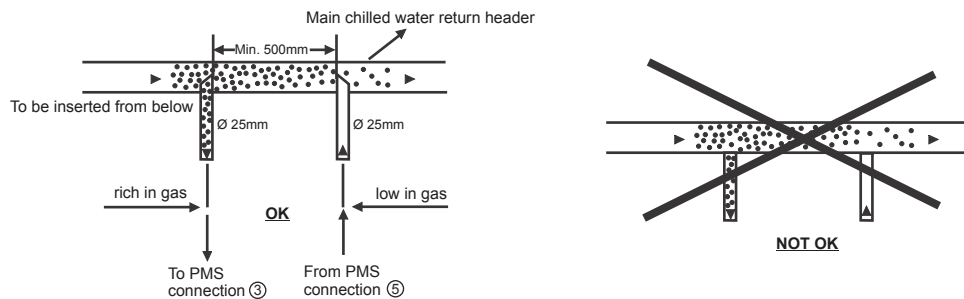


Fig. 4 PMS Connection to Chilled Water Return Header

# Wiring Diagram

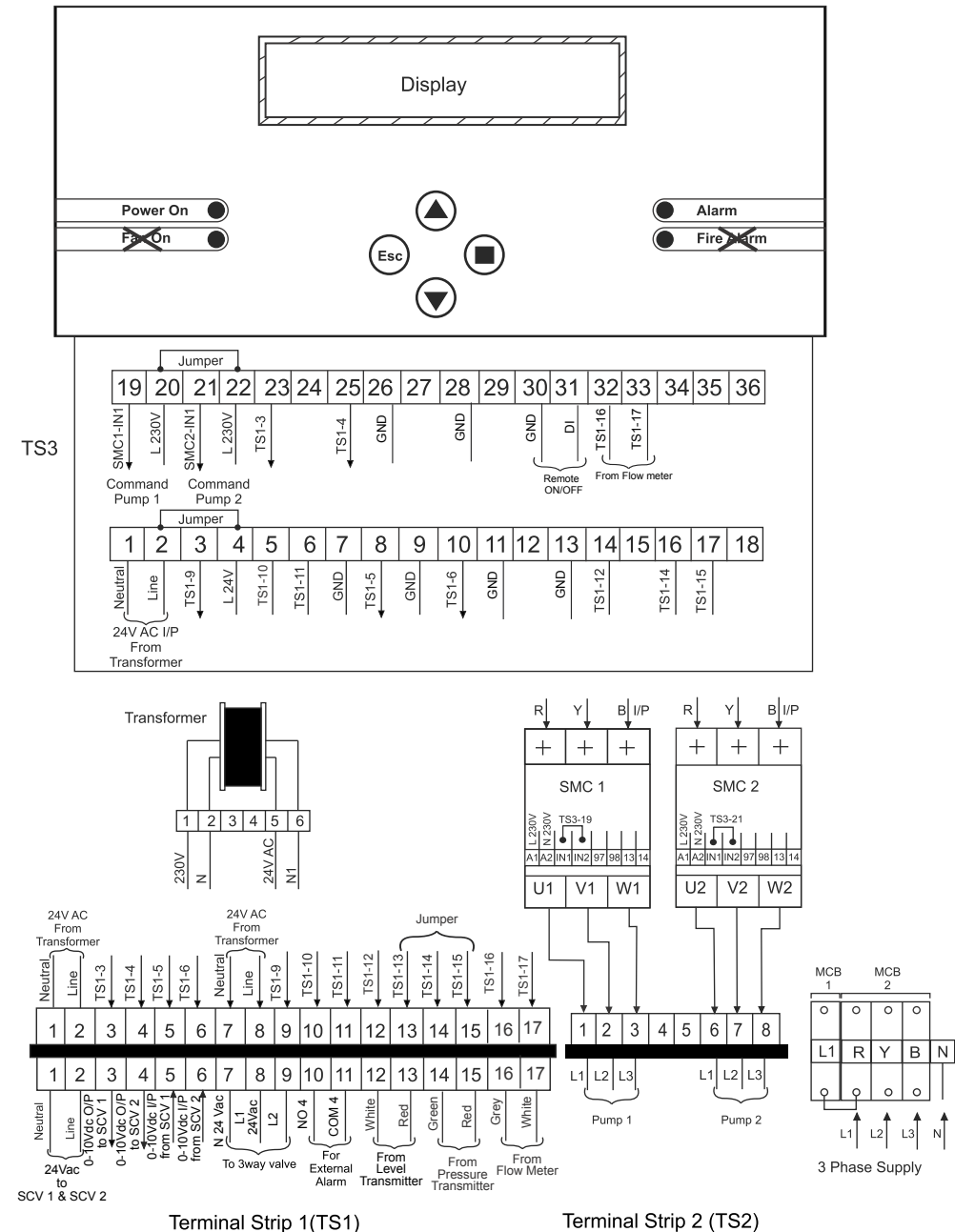


Fig. 5