PM-021N-B

BOOSTER PUMP CONTROLLER



PM-021N-B2



PM-021N-B4

Specification

Model		PM-021N-B2	PM-021N-B4
Power Supply		90-250VAC 50/60Hz	
Display		LED Status, Size 3 mm.	
Power Consumption		3VA	
Input Analog Overload	Voltage Range	100-250VAC	
Input Analog Sensitive	Water Well	Level Low, Hi, Overflow	
	Pressure Switch	2 Channels	4 Channels
Input Digital Switch	Reset Alarm	External Dry Contact	
	Flow Switch	External Dry Contact 2 Channels	
Input DIP Switch	Pump Enable	2 Channels	4 Channels
	Delay Flow Switch	60/180 Seconds.	
	Delay On Pump	5/10 Seconds.	
	Delay Sequence Pump	1/3 Hours	
	Address ID Modbus RTU	ID 1-15	
Output Pump	Channel	2 Channels	4 Channels
	Relay Contact	250VAC/5A, 30 VDC/5A	
Output Status	-	Alarm, Lo, Hi, Dryrun	
	Relay Contact	250VAC/5A, 30VDC/5A	
Communi-cation	Protocol	Modbus RTU	
	Baud Rate	9600, 19200, 38400, 57600 bps.	
	Parity	None, Even, Odd	
	Stop Bit	1,2	
	Data Bits	8	
Ambient Operation	Temperatune	-10°C to 60°C	
	Humidiy	<85 % RH Non-Condensing	
Ambient Storage	Temperatune	-20°C to 80°C	
	Humidiy	<85 % RH Non-Condensing	
Protection Degree		IP20	
Installation		DIN RAIL Maunting	
Material		ABS-VO	
Size (mm.)		105 x 90 x 61.5	
Weight (kg.)		350	360

Description

- Booster Pump Controller: PM-021N-B is a booster pump controller for controlling the operation of 2 to 4 booster pumps.
- To allow the pumps to boost pressure into the piping system, increasing water pressure in the pipes and enabling water delivery over longer distances.
- Can check the level of the water storage tank (Water Tank) for use.
- Level sensors for the water tank can be Electrode / Float Switch.
- Equipped with Latching Function with Memory, which retains values during power failure, for alternating the operation of each pump.
- Equipped with DIP switches to disable a pump from the system in case a pump is damaged or overloaded, allowing other pumps to operate instead.
- Equipped with Reinforce Operation to increase the number of operating pumps when system pressure drops significantly.
- Alarm Output for various fault conditions.
- Over and Under Voltage Protection, where the controller will stop operating if the supply voltage is abnormal beyond the set value (for models with voltage protection).
- 3-phase system protection: Over and Under Voltage, Phase Sequence, Phase Loss, range 80–120% of nominal voltage.
- Equipped with RS-485 communication, Modbus RTU Protocol for connection to a computer.
- Includes a minimum pump run time delay of 5 or 10 seconds to prevent frequent on/off switching.
- Includes a limit on continuous pump operation time of no more than 1 or 3 hours (to prevent one pump from operating too long by switching operation to another pump).
- Equipped with Flow Switch input to check water flow in the system, preventing dry run operation.
- Equipped with Overload input; if any pump experiences overload, that pump is disconnected from the system and bypassed so other pumps can operate instead.
- LED indicators display the operating status of outputs, level, and alarms.
- LED indicators display the operating status of Level Sensor Fault.

Operation

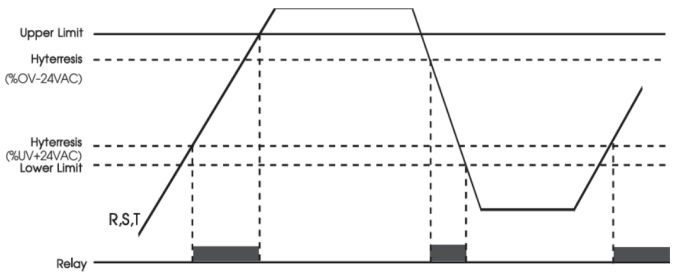
PM-021N-B is a device capable of controlling booster pumps in a water piping system to provide the required pressure. There are two models available: a 2-pump model and a 4-pump model (can be used with either 3 or 4 pumps). The operation alternates the running of each pump so that their operating hours are kept as close to each other as possible.

In addition, there is an extra function, Voltage Protection, which monitors abnormalities in the supply voltage that could cause pump damage. This function is available for models PM-021N-B-2-3 and PM-021N-B-4-3. The operation of the Voltage Protection is as follows.

Operation[Continue]

Operation of Voltage Protection

3-Phase, Over and Under Voltage, Phase Sequence and Phase Loss
When the voltage is in a normal condition, that is, within the set Lower Limit and Upper Limit, the phase sequence is correct, and all phases (R, S, T) are present, the Relay Output will turn ON and command the pumps to operate. However, if the voltage is lower than the Lower Limit or higher than the Upper Limit, or if the phase sequence is incorrect, or if not all phases are present (Phase Loss), before the load operates the Relay Output will turn OFF, and the LED will indicate the voltage abnormal status.



3-Phase Under and Over Voltage Protection Operation

PM-021N-B can be connected with Level Sensor both Electrode type and Float Switch to check the water level in the Water Tank at 3 levels: Low (L), High (H), and Over Flow (OF).

Operation of the Booster Pump Controller

The pumps operate when the water level in the Water Tank is between High (H) and Low (L), but will stop operating when the water level is lower than Low (L). After that, the pumps can operate again only when the water level in the tank increases to High (H) again.

Every time the pumps start operating, the Flow Switch checks the water flow in the system after a delay time of 60 or 180 seconds. If it is ON, it indicates that there is no water in the system. The pumps will stop operating to prevent Dry Run.

Operation of Sensor Fault (S.F)

The system detects the input of the Sensor Probes. In the case that a probe located at a higher level, such as Probe H, operates before Probe L, the system will command the Alarm Output to operate.

Operation of PM-021N-B-2

This device controls 2 pumps to boost water pressure in the piping system. Two Pressure Switches are installed in the piping system, and the pressure settings of Pressure Switch 1 (PS1) are set higher than Pressure Switch 2 (PS2). For example, PS1 is set to ON at 3 Bar and OFF at 3.5 Bar.

PS2 is set to ON at 2 Bar and OFF at 2.5 Bar (Hysteresis).

When the Level Sensor checks that there is water in the Water Tank and the system pressure decreases to 3 Bar, PS1 will turn ON and Pump 1 will start operating, increasing the system pressure until it reaches 3.5 Bar. Then PS1 will turn OFF and Pump 1 will stop operating.

When the system pressure decreases again to 3 Bar, PS1 will turn ON and switch operation to Pump 2 to operate and increase the system pressure until the pressure rises to 3.5 Bar. Then PS1 will turn OFF and Pump 2 will stop operating. Both pumps will alternate operation continuously according to the increase and decrease of the pressure level.

Reinforce Operation

In the case that one pump is already operating (main pump) but the system pressure level still decreases to 2 Bar, PS2 will turn ON and cause the other pump to operate as a reinforcing pump to increase the system pressure until the pressure rises to 2.5 Bar. Then PS2 will turn OFF and the reinforcing pump will stop operating, allowing the pump that is already operating (main pump) to continue operating until the system pressure rises to 3.5 Bar. Then PS1 will turn OFF and the main pump will stop operating.

Operation of PM-021N-B-4

This device controls 3–4 pumps to boost water pressure in the piping system by installing 4 Pressure Switches in the piping system. The pressure settings are arranged so that Pressure Switch 1 (PS1) is higher than Pressure Switches 2, 3, and 4 (PS2, PS3, PS4), respectively. For example:

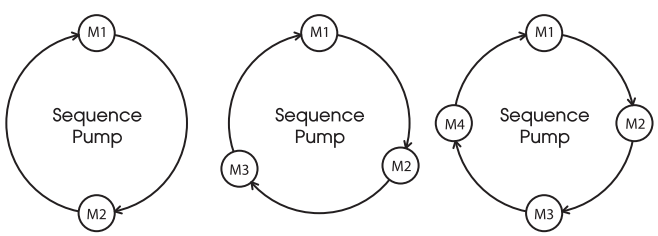
- PS1 is set to ON at 4 Bar and OFF at 4.5 Bar.
- PS2 is set to ON at 3 Bar and OFF at 3.5 Bar.
- PS3 is set to ON at 2 Bar and OFF at 2.5 Bar.
- PS4 is set to ON at 1 Bar and OFF at 1.5 Bar.

When the Level Sensor checks that there is water in the Water Tank and the system pressure decreases to 4 Bar, PS1 will turn ON and Pump 1 will start operating, increasing the system pressure until it reaches 4.5 Bar. Then PS1 will turn OFF and Pump 1 will stop operating. When the system pressure decreases again to 4 Bar, PS1 will turn ON and switch operation to Pump 2 to operate and increase the system pressure until the pressure rises to . 4.5 Bar. Then PS1 will turn OFF and Pump 2 will stop operating. This operation will continue in the same manner for Pumps 3 and 4, and then cycle back to Pump 1 and the other pumps continuously, according to the order of pressure increase and decrease.

Reinforce Operation

In the case that one pump is already operating (main pump) but the system pressure level still decreases to 3 Bar, PS2 will turn ON, causing Pump 2 to operate as a reinforcing pump to increase the system pressure until the pressure rises to 3.5 Bar. Then PS2 will turn OFF and Pump 2 will stop operating.

Case of operating 2 pumps	Case of operating 3 pumps	Case of operating 4 pumps

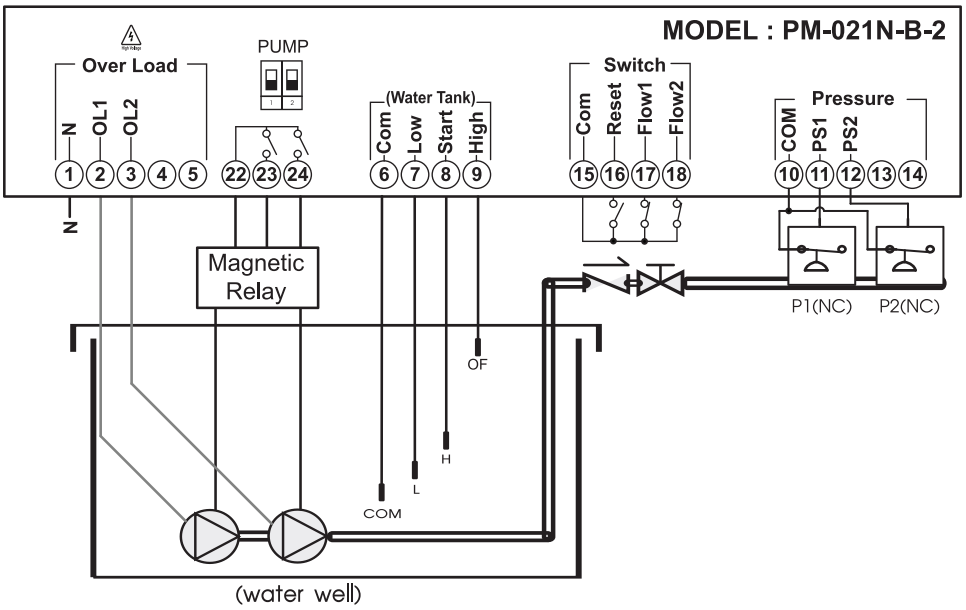


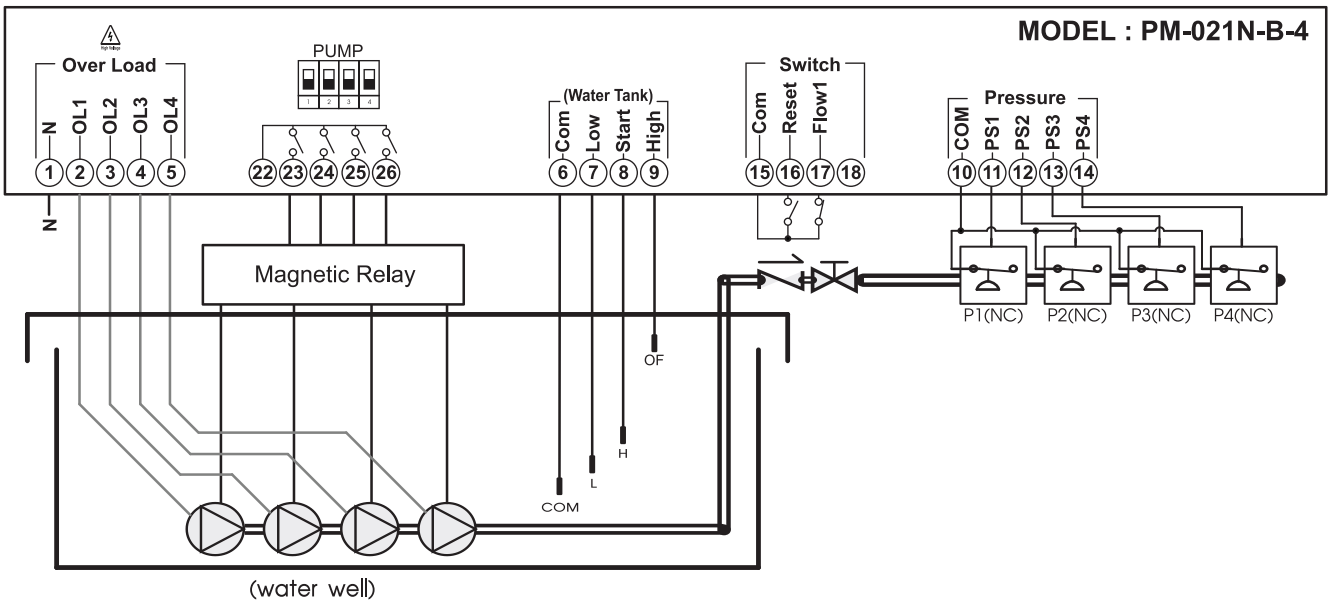
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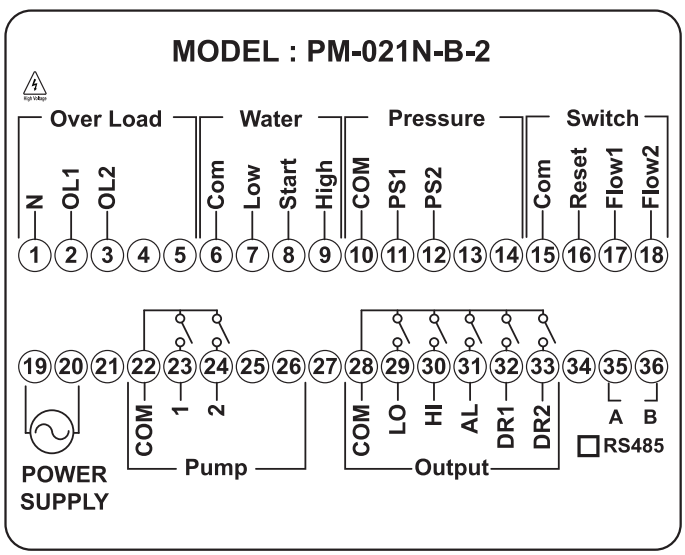
BOOSTER PUMP CONTROLLER

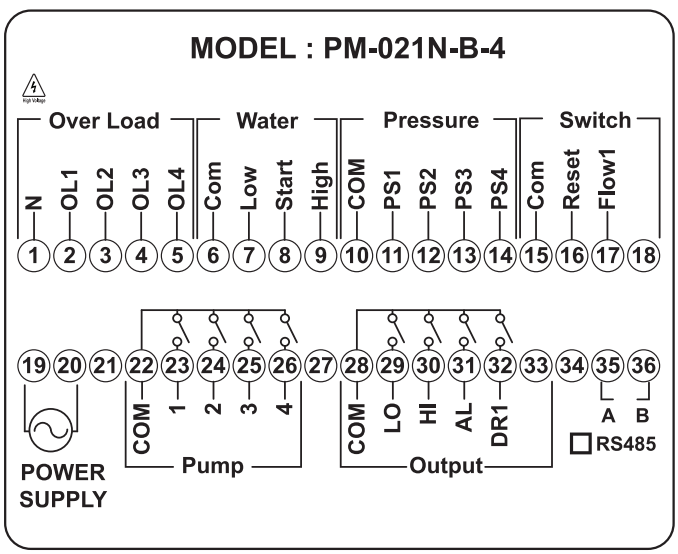
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Wiring Diagram

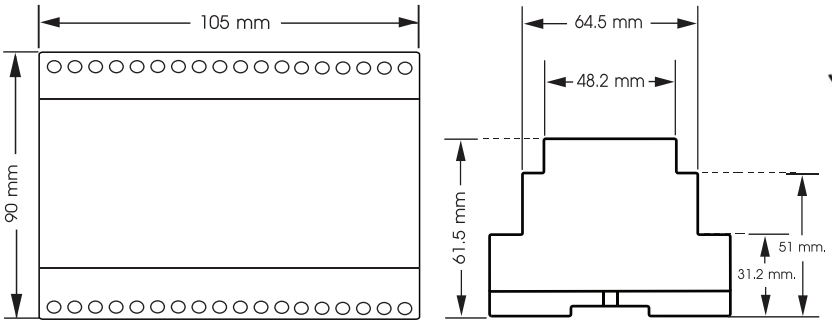




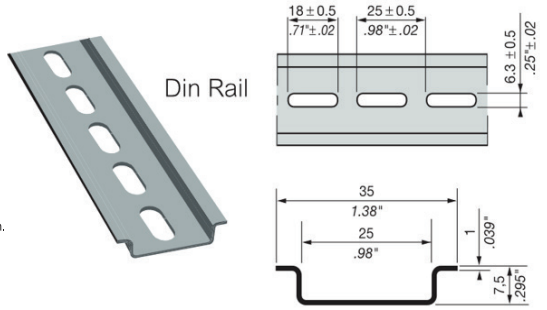




Diamension



Installation



Ordering Code

PM-021N-B [Pump] - [Communication]

Pump	
2	2 Pump
4	4 Pump

Communication	
NONE	NONE
M	RS-485