



## Specification

|                   |                    | PM-021N-2                                        | PM-021N-2-1                                              | PM-021N-2-3                                                        |
|-------------------|--------------------|--------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------|
| Power Supply      |                    | 115VAC ±15% 50-60Hz                              |                                                          |                                                                    |
|                   |                    | 230VAC ±15% 50-60Hz                              |                                                          |                                                                    |
| Power Consumption |                    | 2.5 VA                                           |                                                          |                                                                    |
| Display           |                    | LED Status,<br>Level,<br>O.F, S.F,<br>Output, AL | LED Status,<br>Level, O.F,<br>S.F, OV, UV,<br>Output, AL | LED Status,<br>Level, O.F,<br>S.F, OV,<br>UV, PL,PS,<br>Output, AL |
| Input             | Voltage Protection | -                                                | 1 Phase                                                  | 3 Phase                                                            |
|                   |                    |                                                  | 110, 220VAC                                              | 190, 380VAC                                                        |
|                   |                    |                                                  | %Over Voltage 105-120%                                   |                                                                    |
|                   |                    |                                                  | %Under Voltage 80-95%                                    |                                                                    |
|                   | Probe              | 6 Electrode Switch<br>(2 Float Switch)           |                                                          |                                                                    |
|                   |                    | Voltage Detector 2VAC, 50Hz                      |                                                          |                                                                    |
| Output            |                    | Sensitive 0-100%                                 |                                                          |                                                                    |
|                   |                    | Pump SPST 5A 250VAC                              |                                                          |                                                                    |
|                   |                    | Alarm SPDT 5A 250VAC                             |                                                          |                                                                    |
| Ambient Operation | Temperature        | -10 °C to 60 °C                                  |                                                          |                                                                    |
|                   | Humidity           | 85% RH Non-Condensing                            |                                                          |                                                                    |
| Ambient Storage   | Temperature        | -20 °C to 80 °C                                  |                                                          |                                                                    |
|                   | Humidity           | 85% RH Non-Condensing                            |                                                          |                                                                    |
| Protection Degree |                    | IP30                                             |                                                          |                                                                    |
| Installation      |                    | DIN-RAIL                                         |                                                          |                                                                    |
| Material          |                    | ABS-VO                                           |                                                          |                                                                    |
| Size (mm.)        |                    | 89.5 x 74.6 x 61.5                               |                                                          |                                                                    |
| Weight (kg.)      |                    | 355                                              |                                                          |                                                                    |

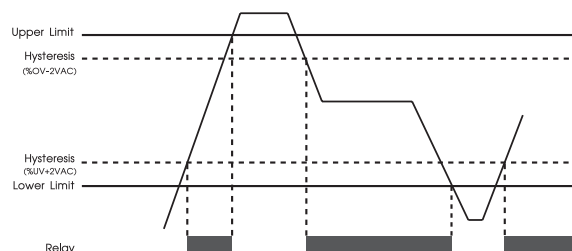
## Description

- Single Pump Relay : PM-021N-2 is a device for controlling the operation of one pump in single-phase and three-phase electrical systems.
- The operating mode can be selected as Water Supply and Drainage (Charging and Discharging).
- Capable of level checking for both Water Well and Water Tank applications.
- Level sensors supported: Electrode / Float Switch / Pressure Switch.
- Alarm output for Over Flow condition or abnormal supply voltage.
- LED indicators display Level Sensor Fault (S.F.) status of the Water Well and Water Tank.
- Over and Under Voltage Protection, the relay output will stop operating if the supply voltage exceeds the preset limits.
- 1 Phase System: Over and Under Voltage, range 80-120% of Nominal Voltage.
- 3 Phase System: Over and Under Voltage, Phase Sequence, Phase Loss, range 80-120% of Nominal Voltage.

## Operation

PM-021N-2 is a control device capable of controlling one water pump to operate in relation to the water level of the Water Well and the Water Tank. In addition, it is equipped with a Voltage Protection function to detect abnormalities in the supply voltage, which may cause pump damage. Both functions operate in conjunction with each other, meaning the supply voltage must be normal for the pump to operate (Relay ON). It is available for both 1-Phase and 3-Phase systems.

1-Phase, Over and Under Voltage: If the voltage is within the preset Lower Limit and Upper Limit, the Relay Output will be ON and command the pump to operate. However, if the voltage is lower than the preset Lower Limit or higher than the preset Upper Limit, the Relay Output will be OFF and the LED will indicate the abnormal voltage status.

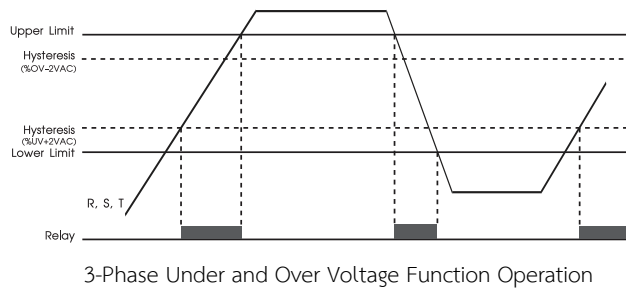


1-Phase Under and Over Voltage Protection Operation

3-Phase, Over and Under Voltage, Phase Sequence, and Phase Loss:

When the voltage is in a normal condition, that is, within the preset Lower Limit and Upper Limit, with correct phase sequence and all phases present (R, S, T), the Relay Output will be ON and command the pump to operate. However, if the voltage is lower than the Lower Limit, higher than the Upper Limit, the phase sequence is incorrect, or any phase is missing (Phase Loss) before the load operates, the Relay Output will be OFF and the LED will indicate the abnormal voltage status.

**Operation[Continue]**



**Water Supply System Operation**

When the water level in the Water Tank drops to the level of Probe L of Electrode B (Float Switch B = Low level, ON state; Pressure Switch = Normally Closed (NC), indicating pressure lower than the set point), the Output Relay operates and commands the pump to start. After the pump operates, the water level in the Water Tank increases until it reaches Probe H of Electrode B (Float Switch B = High level, OFF state; Pressure Switch = Normally Open (NO), indicating pressure higher than the set point). The Output Relay then stops operating and commands the pump to stop.

In the case where the water level in the Water Well is lower than Probe L of Electrode A (Float Switch A = Low level, OFF state), the Output Relay will also be OFF to prevent the pump from dry running without water. For Water Supply system applications, the sensors can be connected using Electrode, Float Switch, or Pressure Switch, as follows.

**Diagram 1. Water Supply System With Electrode Level Switch**

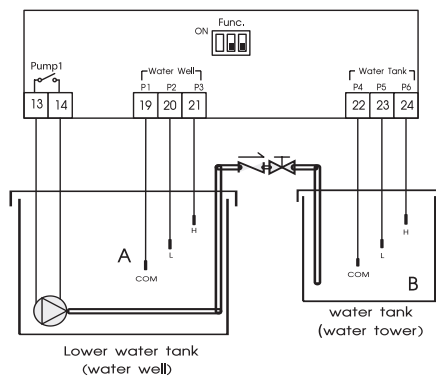


**Diagram 2. Water Supply System With Float Switch & Electrode Level Switch**

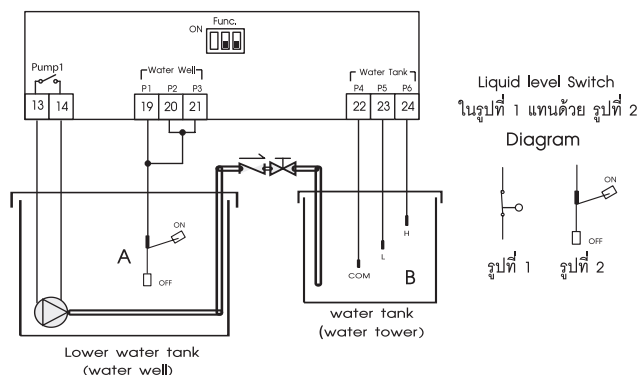


**Diagram 3. Water Supply System With Float Switch**

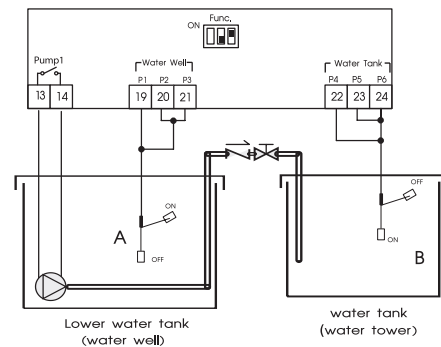


**Diagram 4. Water Supply System With Electrode Level Switch & Float Switch**

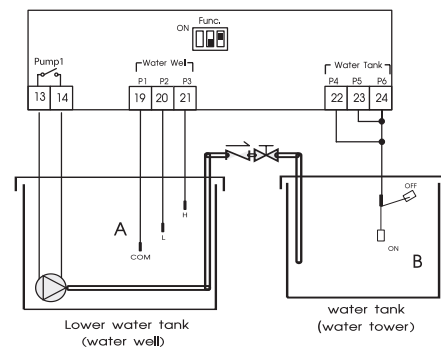


**Diagram 5. Water Supply System With Float Switch & Pressure Switch**

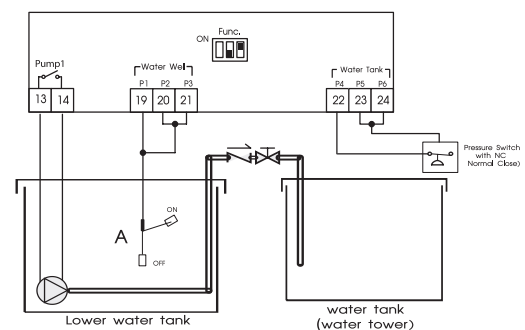
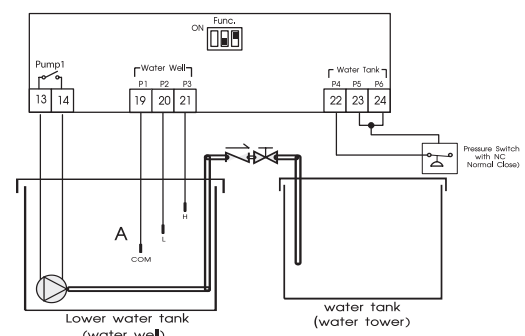


**Diagram 6. Water Supply System With Electrode Level Switch & Pressure Switch**



Operation[Continue]

If the user does not require water level monitoring in the Water Well, it can be implemented by wiring according to the diagram below.

Diagram 7. Water Supply System No Dry Run Protection With Electrode Level Switch

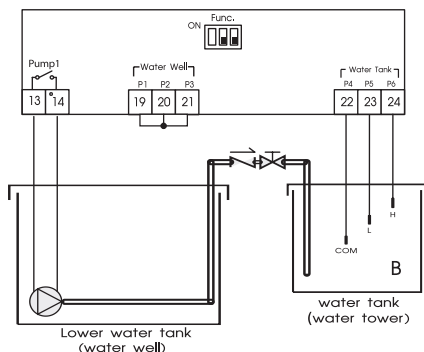
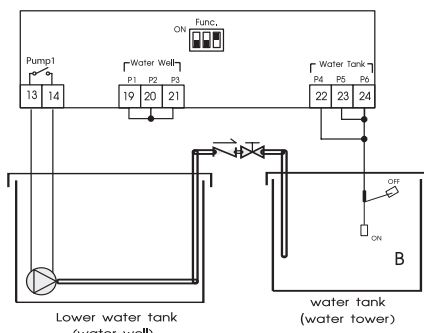


Diagram 8. Water Supply System No Dry Run Protection With Float Switch



## Water Drainage System Operation

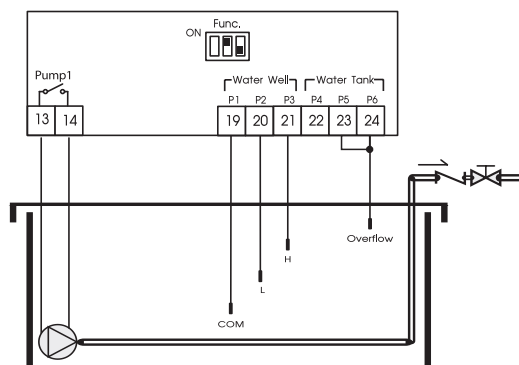
### Normal Operation

When the water level in the water well or wastewater pit rises to Probe H of the Electrode (Float Switch A = High level, ON state), the Output Relay operates and commands the pump to start. After the pump operates, the water level in the water well or wastewater pit decreases until it reaches Probe L of the Electrode (Float Switch A = Low level, OFF state), causing the Output Relay to stop operating and command the pump to stop.

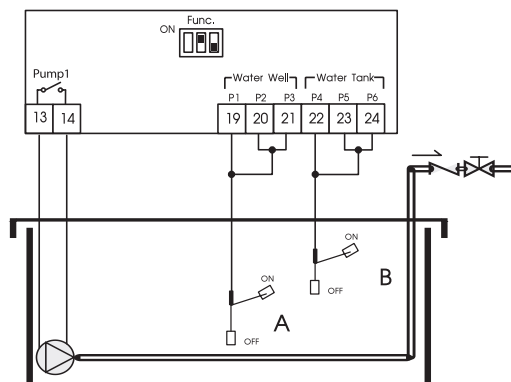
### Overflow Operation

If, in the case that the pump is operating but the water level in the water well or wastewater pit continues to rise until it reaches the Overflow level of the Electrode (Float Switch B = High level, ON state), the Alarm Output will operate and will stop operating when the water level decreases to level H of the Electrode (Float Switch A = Low level, OFF state)

## Drain Water System With Electrode Level Switch



## Drain Water System With Float Switch



## Sensor Fault (S.F.) Operation

The system monitors the Sensor Probe inputs. In the case where a higher probe, such as Probe H, operates before Probe L, the system will command the Alarm Output to operate

## Recommend

### Water Supply System

The Float Switch used for the Water Tank is Normally Closed (NC).

The Pressure Switch used for the Water Tank is Normally Closed (NC).

The Float Switch used for the Water Well is Normally Open (NO).

### Water Drainage System

The Float Switch used is Normally Open (NO).

### When it is required for the pump to operate independently of the Water Tank level sensor

We can do by

Connect Probe L + H of Electrode B together and switch them with Probe Com.

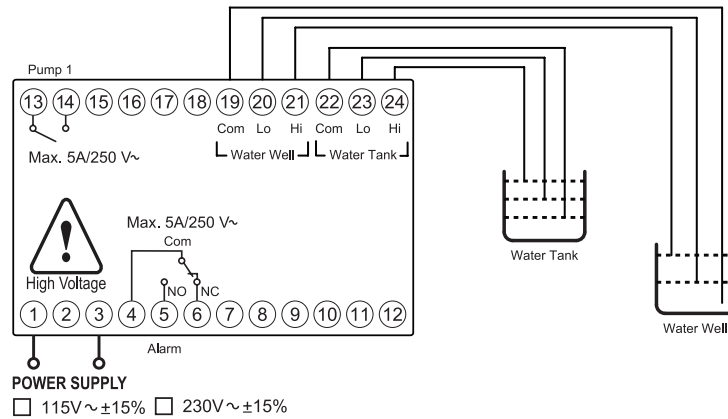
If Probe L + H is connected (Closed) to Probe Com, the pump will stop operating.

If Probe L + H is disconnected (Open) from Probe Com, the pump will operate.

**Wiring Diagram**

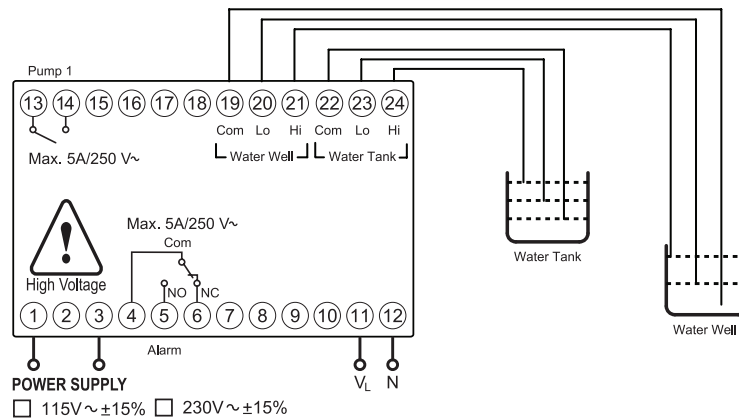
**PM-021N-2**

Single Pump Relay



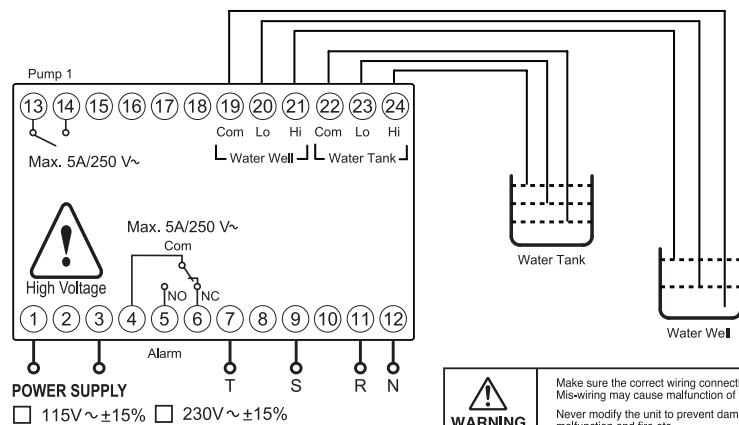
**PM-021N-2-1**

Single Pump Relay With  
Single Phase Protection



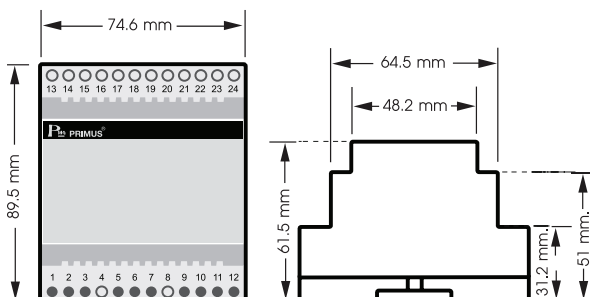
**PM-021N-2-3**

Single Pump Relay With  
3 Phase Protection



**WARNING** Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire. Never modify the unit to prevent damage or incident such as malfunction and fire etc.

**Dimension**



**Ordering Code**

PM-021N-2- Voltage Protection - Power Supply

| Voltage Protection |                                                            | Power Supply |        |
|--------------------|------------------------------------------------------------|--------------|--------|
| None               | None Phase Protection                                      | None         | 230VAC |
| 1                  | 1 Phase, Over&Under Voltage                                | 115          | 115VAC |
| 3                  | 3 Phase, Over&Under Voltage, Phase Sequence and Phase Loss |              |        |