Floatless Level Controller (Compact, Plug-in Type)

61F-GP-N□

Space-saving Design Ideal for Control Panel Downsizing. Easy Maintenance.

- Compact: 49.4 × 38 × 84 mm (H×W×D).
- Easy identification of operating status with LED operation indicator.
- Independent DPDT contacts on 11-Pin Models.
- CE marking (N and N8 models) and UL/CSA compliance (N8 models).

⚠ Refer to *Safety Precautions for Floatless Level Controllers*.

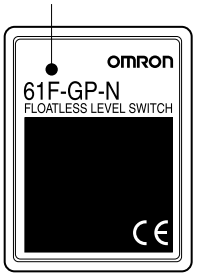
■ Model Number Legend

61F-GP-□□
1 2

1. No. of Pins
- N: 11 pins
- N8: 8 pins

2. Type
- Blank: General-purpose
- L 2KM: Long-distance (for 2 km)
- L 4KM: Long-distance (for 4 km)
- H: High-sensitivity
- D: Low-sensitivity
- R: Two-wire
- T: High-temperature

Position of LED indicator



■ Ordering Information

Type	General-purpose	Long-distance (for 2 km)	Long-distance (for 4 km)
	Model	Model	Model
11-pin	61F-GP-N	61F-GP-NL 2KM	61F-GP-NL 4KM

Type	High-sensitivity	Low-sensitivity	Two-wire
	Model	Model	Model
11-pin	61F-GP-NH	61F-GP-ND	61F-GP-NR

Type	Tropical environments	High-temperature
	Model	Model
8-pin	61F-GP-N-TDL	61F-GP-NT

Note: Ask your OMRON representative about power supply voltages.

Type	General-purpose	Long-distance (for 2 km)	Long-distance (for 4 km)
	Model	Model	Model
8-pin	61F-GP-N8	61F-GP-N8L 2KM	61F-GP-N8L 4KM

Type	High-sensitivity	Low-sensitivity	Two-wire
	Model	Model	Model
8-pin	61F-GP-N8H	61F-GP-N8D	61F-GP-N8R
	61F-GP-N8HY		

Note: Ask your OMRON representative about power supply voltages.

■ Compact Plug-in Models (11-pin Type)

Specifications

Item	General-purpose Controller 61F-GP-N	High-temperature Controller 61F-GP-NT	Long-distance Controllers 61F-GP-NL 2KM (for 2 km) 61F-GP-NL 4KM (for 4 km)	High-sensitivity Controller 61F-GP-NH (see note 1)	Low-sensitivity Controller 61F-GP-ND	Two-wire Controller 61F-GP-NR
Controlling materials and operating conditions	For control of ordinary purified water or sewage water	For control of ordinary purified water or sewage where operating ambient temperature is high.	For control of ordinary purified water in cases where the distance between sewage pumps and water tanks or between receiver tanks and supply tanks is long or where remote control is required.	For control of liquids with high specific resistance such as distilled water	For control of liquids with low specific resistance such as salt water, sewage water, acid chemicals, alkali chemicals	For control of ordinary purified water or sewage water used in combination with Two-wire Electrode Holder (incorporating a resistor of 6.8 kΩ)
Supply voltage	24, 100, 110, 120, 200, 220, 230 or 240 VAC; 50/60 Hz					
Operating voltage range	85% to 110% of rated voltage					
Interelectrode voltage	8 VAC					
Interelectrode current	Approx. 1 mA AC max.			Approx. 0.12 mA AC max.	Approx. 1 mA AC max.	
Power consumption	Approx. 3.5 VA max.					
Interelectrode operate resistance	0 to approx. 4 kΩ	0 to approx. 4 kΩ	0 to approx. 1.3 kΩ (for 2 km) 0 to approx. 0.5 kΩ (for 4 km)	Approx. 10 kΩ to approx. 40 kΩ (see note 4)	0 to approx. 1.3 kΩ	0 to approx. 2 kΩ
Interelectrode release resistance	Approx. 15 k to ∞ Ω	Approx. 15 k to ∞ Ω	4 k to ∞ Ω (for 2 km) 2.5 k to ∞ Ω (for 4 km)	Approx. 100 k to ∞ Ω	Approx. 4 k to ∞ Ω	Approx. 15 k to ∞ Ω
Response time	Operate:80 ms max. Release:160 ms max.					
Cable length (see note 2)	1 km max.	600 m max.	2 km max. 4 km max.	50 m max.	1 km max.	800 m max.
Control output	1 A, 250 VAC (Inductive load: cosϕ = 0.4) 3 A, 250 VAC (Resistive load)					
Ambient temperature	Operating:–10°C to 55°C (–10°C to 70°C for high-temperature controller)					
Ambient humidity	Operating:45% to 85% RH					
Insulation resistance (see note 3)	100 MΩ min. (at 500 VDC)					
Dielectric strength (see note 3)	2000 VAC, 50/60 Hz for 1 min.					
Life expectancy	Electrical: 100,000 operations min. Mechanical: 5,000,000 operations min.					
Weight	Approx. 155 g					

Note: 1. The relay in the 61F-GP-NH de-energizes when there is water present across the Electrodes, whereas the relay in the 61F-GP-N8HY energizes when there is water present across the Electrodes.

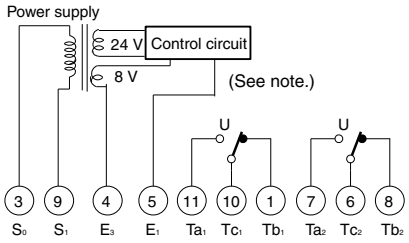
2. The length when using completely insulated, 600-V, 3-conductor (0.75 mm^2) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of conductors becomes larger.

3. The insulation resistance and dielectric strength indicate values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals.

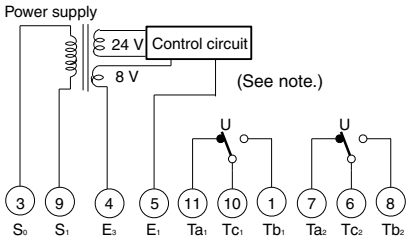
4. Possible to use with 10 kΩ or less, however, this may cause reset failure.

Internal Circuit Diagrams

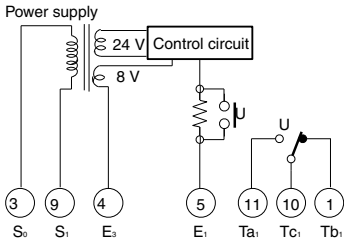
61F-GP-N/-NT/-NL/-ND



61F-GP-NH



61F-GP-NR



Note: When applying a self-holding circuit, short between terminals 5 and 6 and use terminal 7 as E_2.

■ Connections

Automatic Water Supply and Drainage Control

Compact, Plug-in Type
61F-GP-N

Dimensions:
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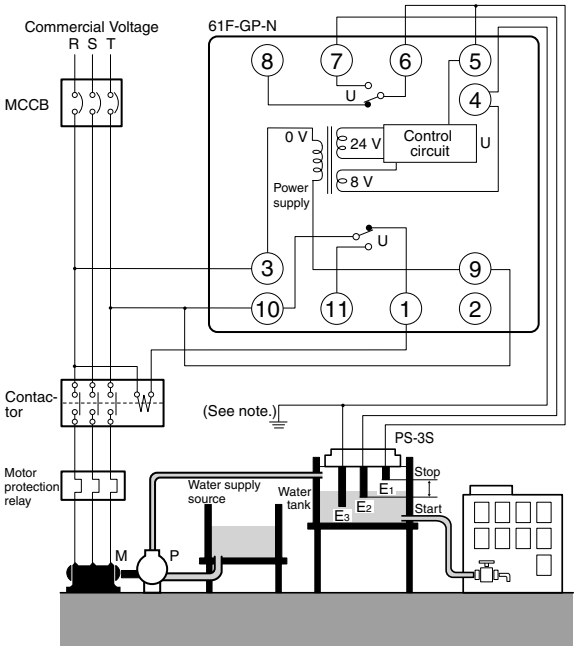
Automatic Water Supply Control

Connections



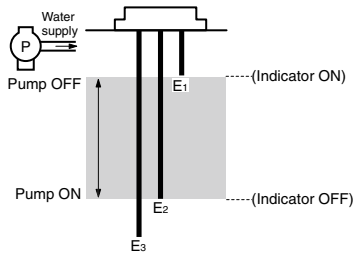
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

Connection Sockets
PF113A (Front-connecting)
PL11 (Rear-connecting)

Connect terminal 1 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

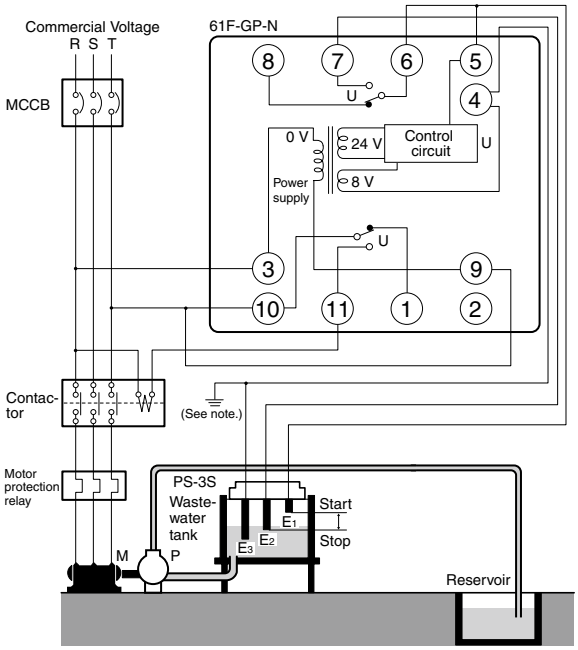
Principles of Operation



The pump stops when the water level reaches E_1 (indicator ON) and starts when the water level drops below E_2 (indicator OFF).

Automatic Drainage Control

Connections



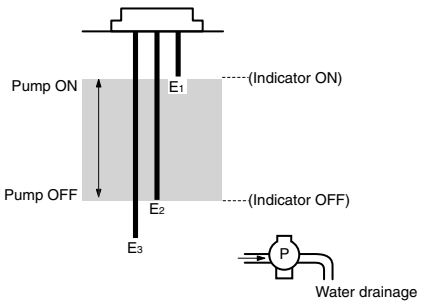
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

Connection Sockets
PF113A (Front-connecting)
PL11 (Rear-connecting)

Connect terminal 1 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

Principles of Operation



The pump starts when the water level reaches E_1 (indicator ON) and stops when the water level drops below E_2 (indicator OFF).

Liquid Level Indication (Connection Example)

Compact, Plug-in Type
61F-GP-N

Dimensions:
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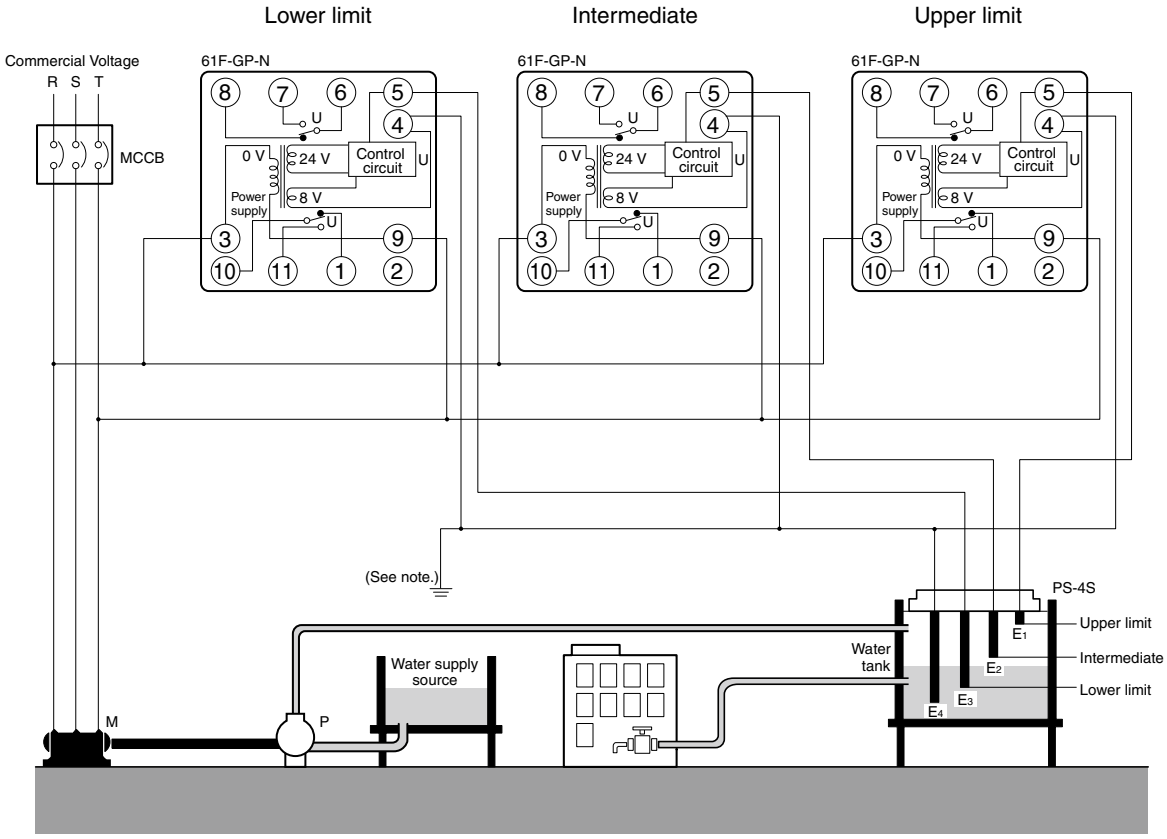
Liquid Level Indication

Connections



Note: The power supply phases (terminals 3 to 9) can be matched to use the same ground for the common Electrode (the longest Electrode, terminal 4).

Principles of Operation

- Terminals 6 and 7, and terminals 10 and 11 on the lower -limit 61F-GP-N are shorted when the water level reaches E_3 (indicator ON).
- Terminals 6 and 7, and terminals 10 and 11 on the intermediate 61F-GP-N are shorted when the water level reaches E_2 (indicator ON).
- Terminals 6 and 7, and terminals 10 and 11 on the upper-limit 61F-GP-N are shorted when the water level reaches E_1 (indicator ON).

Replacing 61F-G3N Functions (Automatic Water Supply Control with Abnormal Water Increase and Water Shortage Alarms)

Compact, Plug-in Type
61F-GP-N

Dimensions:
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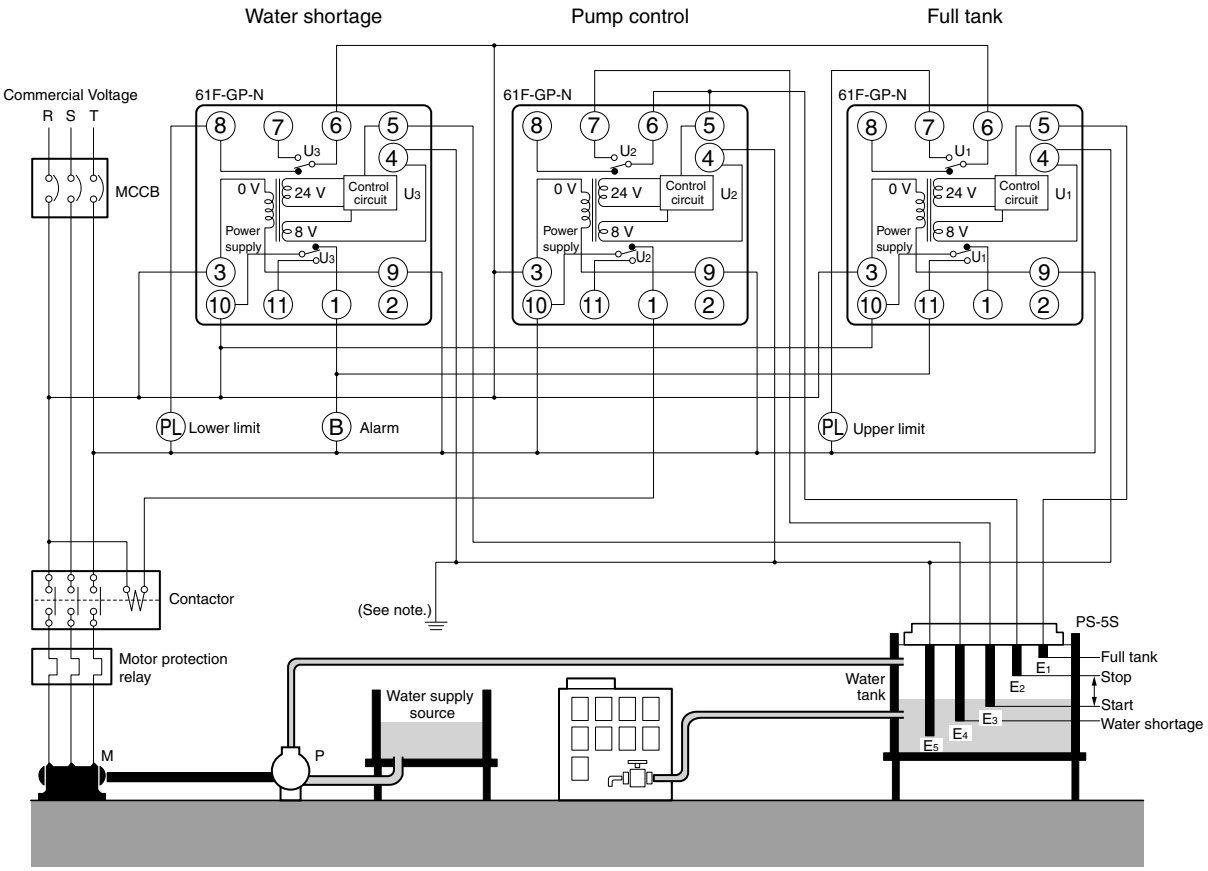
Replacing 61F-G3N Functions

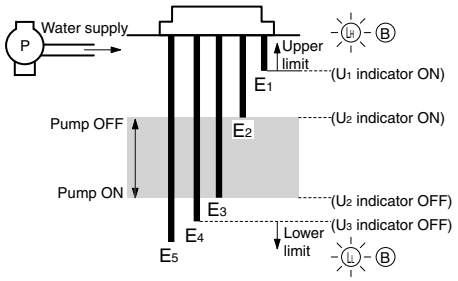
Connections



Note: The power supply phases (terminals 3 to 9) can be matched to use the same ground for the common Electrode (the longest Electrode, terminal 4).

Principles of Operation

- The pump stops when the water level reaches E_2 (U_2 indicator ON) and starts when the water level drops below E_3 (U_2 indicator OFF).
- If the water level rises to E_1 for any reason, the upper-limit indicator turns ON and the alarm sounds (U_1 indicator ON).
  If the water level drops below E_4 for any reason, the lower-limit indicator turns ON and the alarm sounds (U_3 indicator OFF).



Two-Wire Connections
Automatic Water Supply and Drainage Control

Compact, Plug-in Type
61F-GP-NR

Dimensions:
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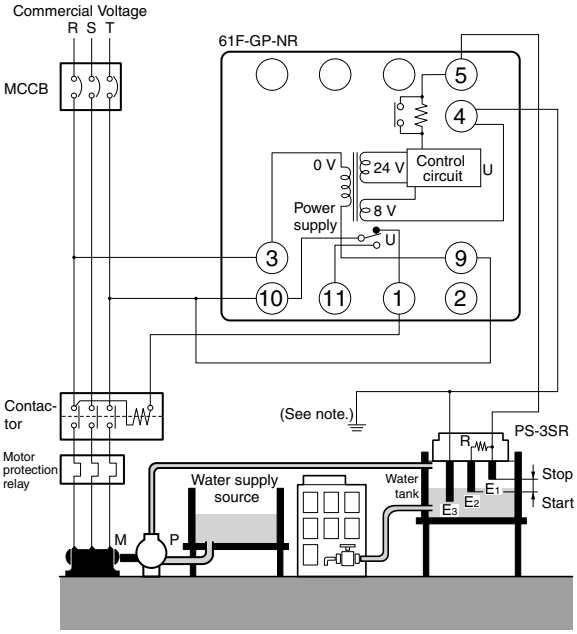
Automatic Water Supply Control

Connections



Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

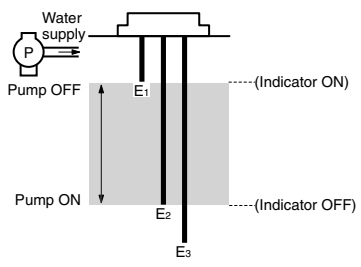
Connection Sockets
PF113 (Front-connecting)
PL11 (Rear-connecting)

- Connect terminal 1 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

- With 2-wire connections, only two wires are required between the 61F-GP-NR and Electrode Holder, but three wires are required for the Electrodes.
- The Electrode Holder must be specified for 2-wire connections. (Resistance R is built into Electrode Holders for 2-Wire Connections.)

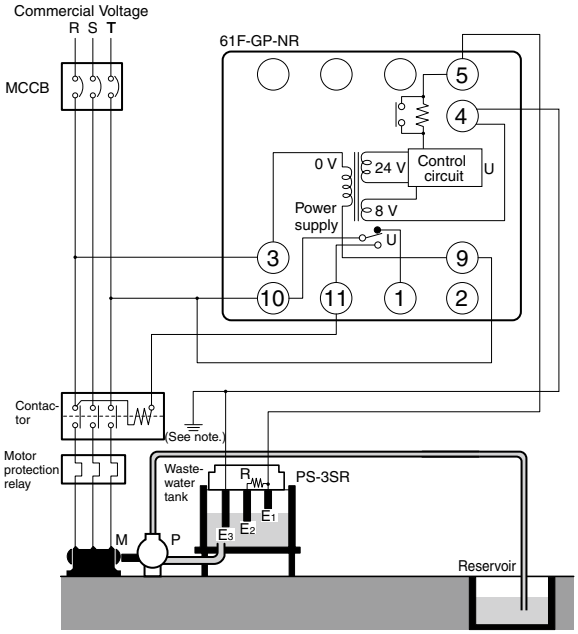
Principles of Operation



The pump stops when the water level reaches E_1 (indicator ON) and starts when the water level drops below E_2 (indicator OFF).

Automatic Drainage Control

Connections



Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

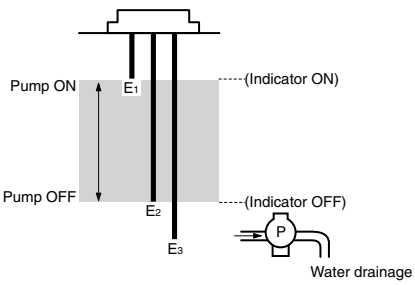
Connection Sockets
PF113 (Front-connecting)
PL11 (Rear-connecting)

- Connect terminal 11 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

- With 2-wire connections, only two wires are required between the 61F-GP-NR and Electrode Holder, but three wires are required for the Electrodes.
- The Electrode Holder must be specified for 2-wire connections. (Resistance R is built into Electrode Holders for 2-Wire Connections.)

Principles of Operation

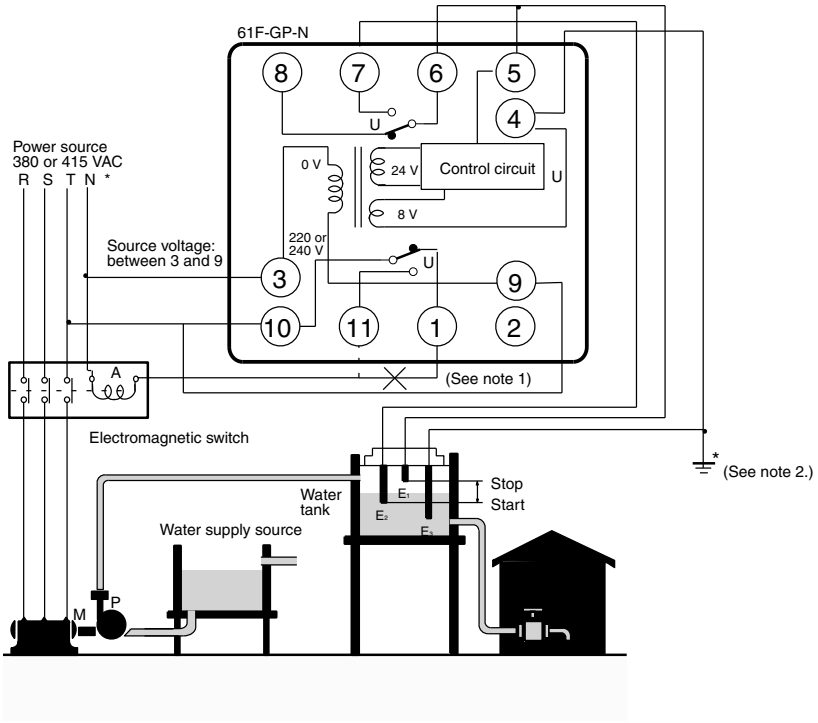


The pump starts when the water level reaches E_1 (indicator ON) and stops when the water level drops below E_2 (indicator OFF).

■ Connection with Three-phase Four-line Circuit

When supplying power from N-phase to the Controller in three-phase four-line circuit, refer to the following diagrams.
Line voltage (R-S, S-T, or R-T): 380 or 415 VAC
Phase voltage (N-R, N-S, or N-T): 220 or 240 VAC

61F-GP-N□ 220 or 240 VAC



Note: 1. The diagram shows the connections for the water supply. When draining, change the connection from terminal 1 to terminal 11.

2. Be sure to ground terminal 4.

■ Compact Plug-in Models (8-pin Type)

Specifications

Item	General-purpose Controller 61F-GP-N8 61F-GP-N8Y (see note 1)	Long-distance Controllers 61F-GP-N8L 2KM (for 2 km) 61F-GP-N8L 4KM (for 4 km)	High-sensitivity Controllers 61F-GP-N8H 61F-GP-N8HY (see note 1)	Low-sensitivity Controller 61F-GP-N8D	Two-wire Controller 61F-GP-N8R	Variable Sensitivity Controller 61F-GP-N8-V50
Controlling materials and operating conditions	For control of ordinary purified water or sewage water	For control of ordinary purified water in cases where the distance between sewage pumps and water tanks or between receiver tanks and supply tanks is long or where remote control is required.	For control of liquids with high specific resistance such as distilled water	For control of liquids with low specific resistance such as salt water, sewage water, acid chemicals, alkali chemicals	For control of ordinary purified water or sewage water used in combination with Two-wire Electrode Holder (incorporating a resistor of 6.8 kΩ)	For control of cases where variable sensitivity control is required such as detection of froth on the surface of a liquid, control of soil moisture content, or detection of degree of water pollution
Supply voltage	24, 100, 110, 120, 200, 220, 230 or 240 VAC; 50/60 Hz					24, 110, 220 or 240 VAC; 50/60 Hz
Operating voltage range	85% to 110% of rated voltage					
Interelectrode voltage	8 VAC		24 VAC	8 VAC		24 VAC
Interelectrode current	Approx. 1 mA AC max.		Approx. 0.4 mA AC max.	Approx. 1 mA AC max.		Approx. 3 mA AC max.
Power consumption	Approx. 3.5 VA max.					
Interelectrode operate resistance	0 to approx. 4 kΩ	0 to 1.3 kΩ (for 2 km) 0 to 0.5 kΩ (for 4 km)	Approx. 15 kΩ to approx. 70 kΩ (see note 4)	0 to approx. 1.3 kΩ	0 to approx. 2 kΩ	0 to 50 kΩ (Variable)
Interelectrode release resistance	Approx. 15 k to ∞ Ω	4 k to ∞ Ω (for 2 km) 2.5 k to ∞ Ω (for 4 km)	Approx. 300 k to ∞ Ω	Approx. 4 k to ∞ Ω	Approx. 15 k to ∞ Ω	Operating resistance +50 kΩ max.
Response time	Operate: 80 ms max. Release: 160 ms max.					
Cable length (see note 2)	1 km max.	2 km max. 4 km max.	50 m max.	1 km max.	800 m max.	50 m max.
Control output	1 A, 250 VAC (Inductive load: cosϕ = 0.4) 3 A, 250 VAC (Resistive load)					
Ambient temperature	Operating: –10°C to 55°C					
Ambient humidity	Operating: 45% to 85% RH					
Insulation resistance (see note 3)	100 MΩ min. (at 500 VDC)					
Dielectric strength (see note 3)	2000 VAC, 50/60 Hz for 1 min.					
Life expectancy	Electrical: 100,000 operations min. Mechanical: 5,000,000 operations min.					
Weight	Approx. 155 g					

Note: 1. The relay in the 61F-GP-N8H/-N8Y de-energizes when there is water present across the Electrodes, whereas the relay in the 61F-GP-N8HY energizes when there is water present across the Electrodes.

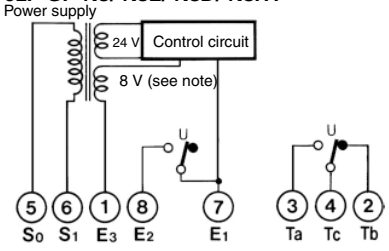
2. The length when using completely-insulated, 600-V, 3-conductor (0.75 mm^2) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of conductors becomes larger.

3. The insulation resistance and dielectric strength indicate values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals.

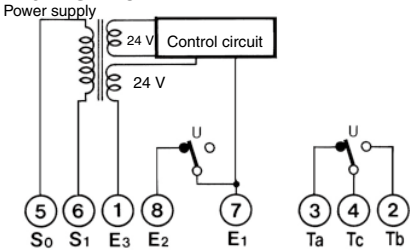
4. Possible to use with 10 kΩ or less, however, this may cause reset failure.

Internal Circuit Diagrams

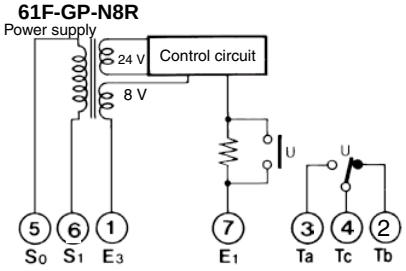
61F-GP-N8/-N8L/-N8D/-N8HY



61F-GP-N8H

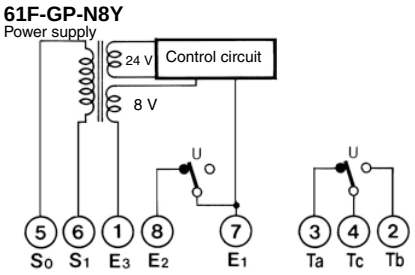


61F-GP-N8R

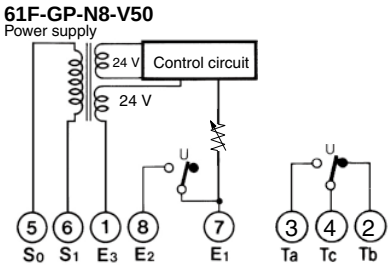


Note: 24 V for the 61F-GP-N8HY.

61F-GP-N8Y



61F-GP-N8-V50



Automatic Water Supply and Drainage Control

Compact, Plug-in Type
61F-GP-N8

Dimensions:
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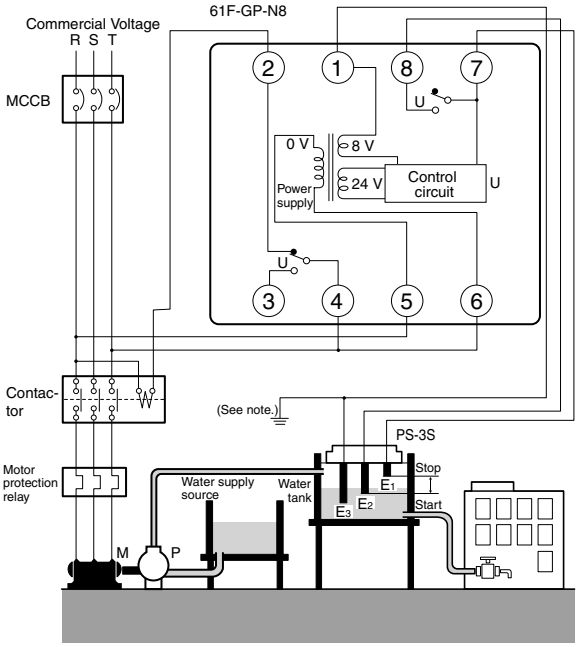
Automatic Water Supply Control

Connections



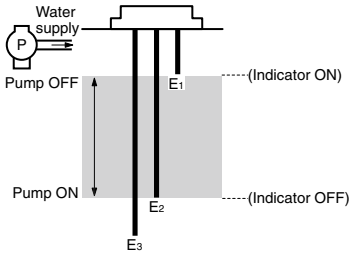
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

Connection Sockets
PF083A (Front-connecting)
PL08 (Rear-connecting)

- Connect terminal 2 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

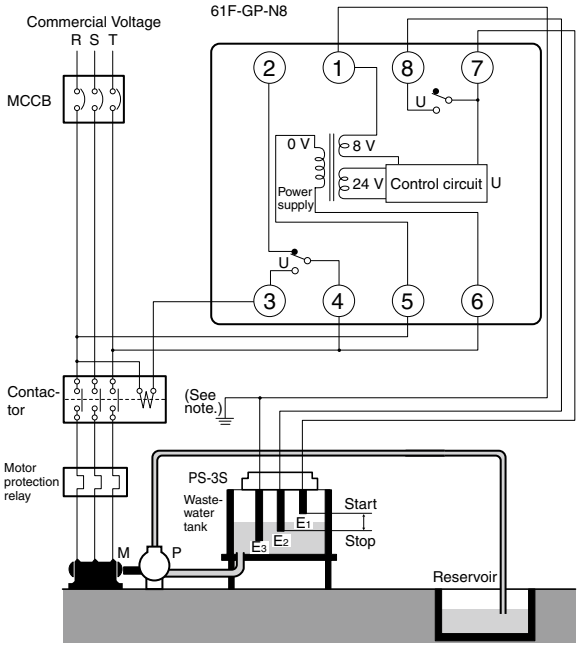
Principles of Operation



The pump stops when the water level reaches E_1 (indicator ON) and starts when the water level drops below E_2 (indicator OFF).

Automatic Drainage Control

Connections



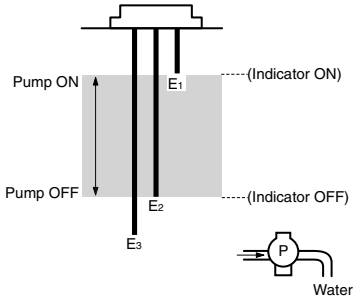
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

Connection Sockets
PF083A (Front-connecting)
PL08 (Rear-connecting)

- Connect terminal 3 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

Principles of Operation



The pump starts when the water level reaches E_1 (indicator ON) and stops when the water level drops below E_2 (indicator OFF).

Two-Wire Connections
Automatic Water Supply and Drainage Control

Compact, Plug-in Type
61F-GP-N8R

Dimensions:
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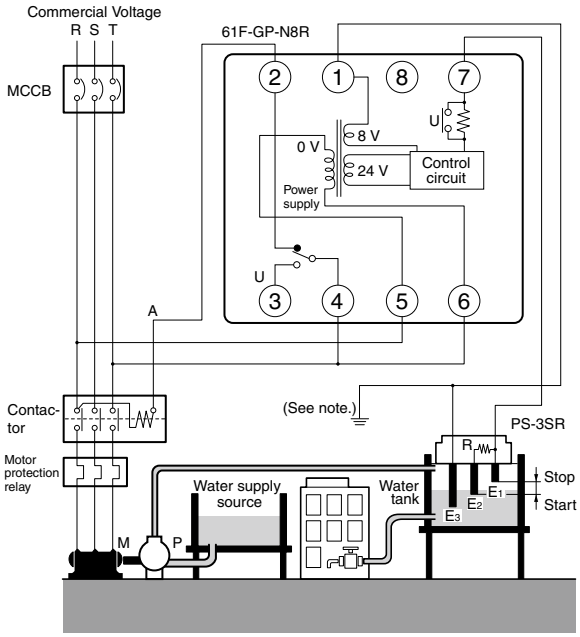
Water Supply

Connections



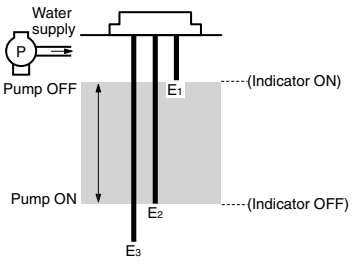
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

- Connect terminal 2 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

- With 2-wire connections, only two wires are required between the 61F-GP-N8R and Electrode Holder, but three wires are required for the Electrodes.
- The Electrode Holder must be specified for 2-wire connections. (Resistance R is built into Electrode Holders for 2-Wire Connections.)

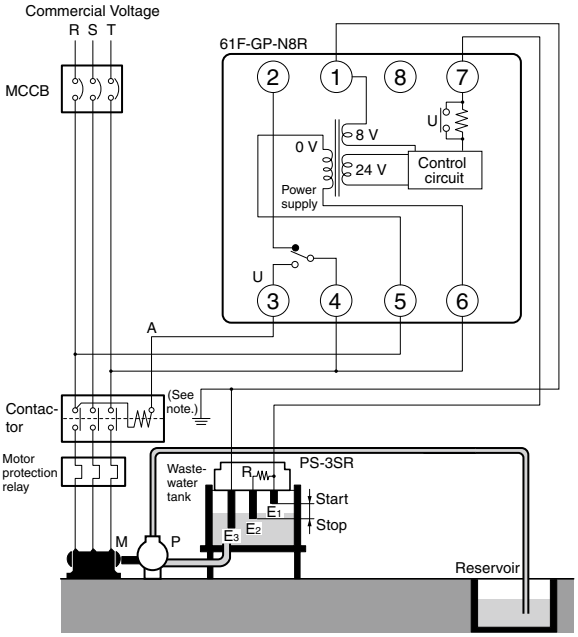
Principles of Operation



The pump stops when the water level reaches E_1 (indicator ON) and starts when the water level drops below E_2 (indicator OFF).

Automatic Drainage

Connections



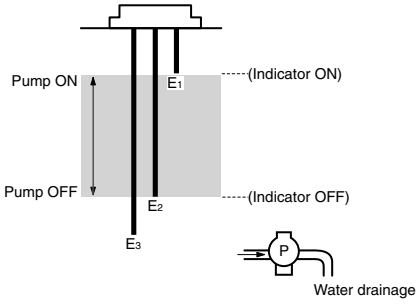
Note: Be sure to ground the common Electrode E_3 (the longest Electrode).

- Connect terminal 3 to the contactor's coil terminal.

Note: The power supply depends on the specifications of the model.

- With 2-wire connections, only two wires are required between the 61F-GP-N8R and Electrode Holder, but three wires are required for the Electrodes.
- The Electrode Holder must be specified for 2-wire connections. (Resistance R is built into Electrode Holders for 2-Wire Connections.)

Principles of Operation

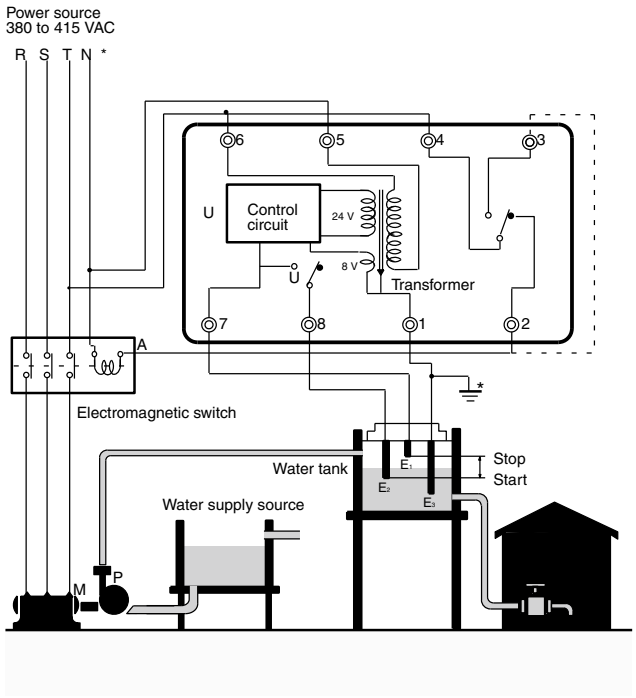


The pump starts when the water level reaches E_1 (indicator ON) and stops when the water level drops below E_2 (indicator OFF).

■ Connection with Three-phase Four-line Circuit

When supplying power from N-phase to the Controller in three-phase four-line circuit, refer to the following diagrams.
Line voltage (R-S, S-T, or R-T): 380 or 415 VAC
Phase voltage (N-R, N-S, or N-T): 220 or 240 VAC

61F-GP-N8□, 220 or 240 VAC

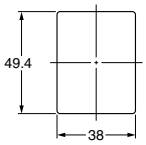


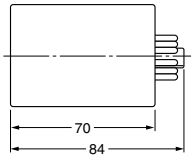
Note: Be sure to ground terminal 1.

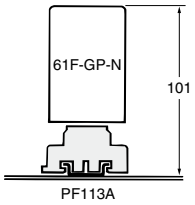
Dimensions

Note: All units are in millimeters unless otherwise indicated.

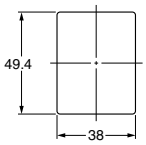
61F-GP-N, -NT, -NL, -NH, -ND, -NR, -N -TDL, -N14, -N15, -NH3

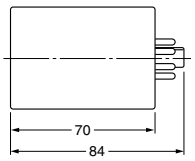


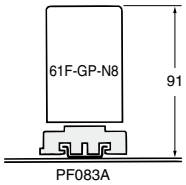




61F-GP-N8, -N8L, -N8H, -N8HY, -N8D, -N8R







■ Safety Precautions

Refer to *Safety Precautions for All Level Controllers*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Safety Precautions for Floatless Level Controllers

⚠ WARNING

Do not touch the terminals while power is being supplied. Doing so may occasionally result in electric shock.

Do not attempt to disassemble, repair, or modify the product while the power is being supplied. Doing so may occasionally result in electric shock.

Precautions for Safe Use

Do not use the Controller in locations subject to explosive or combustible dust, combustible gas, flammable vapors, corrosive gas, excessive dust, salt water spray, or water drops.

Precautions for Correct Use

● Operating Environment

- Use and store the Controller within the rated ambient operating temperature, ambient operating humidity, and storage temperature ranges specified for individual models.
- Use the Controller according to the characteristics specified for individual models for vibration, shock, exposure to water, and exposure to oil.
- Install the Controller as far as possible from devices that generate strong high-frequency noise (such as high frequency welders or sewing machines).

● Tighten Terminal Screws to the Specified Torque

When fitting crimping terminals to terminal screws, use a tightening torque of between 0.45 and 0.6 N·m

● Use a Power Supply with Minimal Voltage Fluctuation

Avoid connection to a power supply with a voltage fluctuation greater than or equal to +10% or −15%.

● Consider the Ambient Temperature

Do not install the Controller where it may be exposed to a temperature of 55°C or higher or a humidity of 85% or higher. In particular, install the Controller away from heat-generating equipment incorporating coils or windings. Do not use the Controller outdoors or in locations subject to high humidity, corrosive gases, or direct sunlight.

● Avoid Vibration and Shocks

Do not subject the Controller to vibration or shocks which can cause chattering problems. Do not install the Controller near contactors that generate severe shocks while the contactors are in operation.

● Do Not Test with a Megaohmmeter

During insulation resistance measurements, never apply the megaohmmeter across the Electrode terminals.

● Use Self-holding Electrodes

- Use Self-holding (E2) Electrodes when contactor open/close control is carried out. If E1 Electrodes are used, ripples on the liquid surface can cause incorrect contactor operation and damage to the contacts.
- Be sure to turn OFF the power supply before replacing the plug-in models.

● Short Wiring in Electrode Circuit

- Keep the wires connecting the Controller to Electrode Holders as short as possible. If long leads are used, the floating capacity of the leads, and abnormal surges or noise in the Electrode circuit can cause malfunctions.
- The thicker the cables, the shorter the permitted wiring length. The length of the cable connecting the Controller and Electrode is specified in the Controller datasheet as a guideline assuming that a 600-V VCT 0.75-mm^2, 3-core cabtire cable is used. Test results indicate that the actual wiring length using VCT 3.5-mm^2, 3-core cable laid over the ground is 50% of the specified length for general-purpose applications and 80% of the specified length for long-distance applications. When selecting cable specifications, remember that the wiring length is further decreased for underground cables and larger diameter cables because of the increased floating capacity with the ground.

● Keep Power Cables Separate from the Electrode Circuit

Do not pass the leads for the Electrode circuit through the same duct, or near to, high-tension cables or power cables. This can cause noise which leads to malfunctions.

● Ground Correctly

Ground the common Electrode terminal to reduce the effects of noise.

● Use a Surge Suppressor

Connect a 61F-03B(-04B) Surge Suppressor with the Controller's Electrode terminals to protect the circuit from surges. This is particularly important in lightning-prone areas. To further improve protection, install a commercial surge suppressor in the power supply to eliminate surges in the power system.
(Refer to *61F-03B/-04B*.)

● Consider the Response Times

The Controller requires a response time not exceeding 80 ms for operation or 160 ms for reset. Take these response times into account in cases where precise sequence control is required.

● Consider the Liquids to Be Controlled

- The Controller cannot be used for any liquid that has almost no conductivity such as sewage containing oil.
- The Controller cannot be used for any flammable liquid such as gasoline, kerosene, or heavy oil.

● Do Not Share Electrodes

Do not connect a single Electrode to more than one Controller. If the phases of the 8-VAC Electrode-circuit power supplies are opposite to each other, as shown in Fig. 1, an internal close circuit (return circuit) is created (indicated by the arrows). The Controller may malfunction regardless of the liquid level when the Controller power is turned ON. This problem can be overcome by matching the power supply phases, as shown in Fig. 2, but in this configuration the internal impedance of the Controller calculated from the Electrode will be approximately half as large as the internal impedance of a single Controller. Maintain sufficient clearance between Electrodes connected to separate Controllers so that they do not interfere with each other. Common leads, however, can be connected to the ground Electrode.

Fig. 1 Internal Closed Circuit

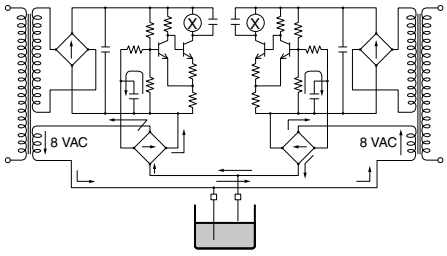
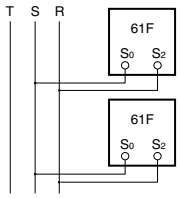


Fig. 2 Match Phases



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In the interest of product improvement, specifications are subject to change without notice.

Safety Precautions for All Level Controllers

Refer to the *Safety Precautions* section for each product for specific precautions applicable to that product.

⚠ WARNING

Do not touch the terminals while power is being supplied. Doing so may possibly result in electric shock.

Do not attempt to disassemble, repair, or modify the product while power is being supplied. Doing so may occasionally result in electric shock.

■ Precautions for Safe Use

In order to ensure safe operation, be sure to observe the following points.

1. Use a power supply voltage within the specified range.
2. Do not use the Controller in locations subject to flammable gases or objects.
3. Insert the Socket until it securely clicks into place.
4. Do not short the load connected to the output terminals.
5. Do not connect the power supply in reverse.
6. Do not use the Controller in locations subject to explosive or combustible dust, combustible gas, flammable vapors, corrosive gas, excessive dust, salt water spray, or water drops.

■ Precautions for Correct Use

For details, refer to *Technical Guide for Level Controllers*.

In the interest of product improvement, specifications are subject to change without notice.

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