Floatless Level Controller (Compact Type)
61F-G□N

Improved Design for a More Lightweight Construction and Reduced Standby Power Consumption.

- Standby power reduced to 85% or less of previous models. (Applicable to 61F-GN.)
- Weighs only 85% or less of previous models. (Applicable to 61F-G3N/-G4N.)
- Easy identification of operating status with LED operation indicator.
- Increased reliability of internal relay (micro load: 5 VDC, 1 mA) to enable PLC input.
- Electrode terminals and other wiring terminals are separated for easy wiring.
- Select from three mounting methods: JEM, DIN rail mounting, or screw mounting.

Note: LED operation indicator is provided on Controllers manufactured in August 1999 or later.

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

Model Number Structure

■ Model Number Legend

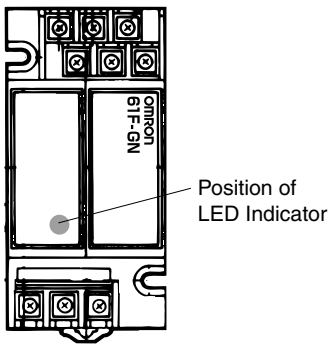
61F-□N□
1 2

1. Controller Application

- G: Automatic water supply and drainage
- G1: Automatic water supply with idling prevention or water shortage alarm
- G2: Automatic water supply and drainage with abnormal water increase alarm
- G3: Automatic water supply and drainage with full tank and water shortage alarm
- G4: Automatic water supply with water level indicator for water supply tank and water receiving tank and prevention of idling due to water shortage
- I: Liquid level indication and alarm (no two-wire models)

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



Note: LED indicator is provided on Controllers manufactured in August 1999 or later.
It is not mounted on the case surface. It can be seen through the case.

Ordering Information

Classification by control purpose		Classification by application	General-purpose	Long-distance (between Controller and Electrodes) (See note 2.)	High-sensitivity (for high specific resistance)	Low-sensitivity (for low specific resistance)	Two wire
Controller	GN Models	◆	61F-GN	61F-GNL	61F-GNH	61F-GND	61F-GNR
	G1N Models	▲ w/pump idling prevention	61F-G1N	61F-G1NL	61F-G1NH	61F-G1ND	61F-G1NR
		▲ w/alarm for abnormally low level					
	G2N Models	◆ w/alarm for abnormally high level	61F-G2N	61F-G2NL	61F-G2NH	61F-G2ND	61F-G2NR
	G3N Models	◆ w/alarm for abnormally high and low levels	61F-G3N	61F-G3NL	61F-G3NH	61F-G3ND	61F-G3NR
	G4N Models	▲ w/level display of water soruce and tank	61F-G4N	61F-G4NL	61F-G4NH	61F-G4ND	61F-G4NR
	IN Models	Level indication with alarm	61F-IN	61F-INL	61F-INH	61F-IND	61F-INR
Relay unit			61F-11N	61F-11NL	61F-11NH	61F-11ND	61F-11NR

Note: 1. ◆: Automatic water supply and drainage control, ▲: Automatic water supply control

2. Subclassified into 2 km and 4 km models according to the model of relay unit used. Specify 2 km or 4 km when ordering.

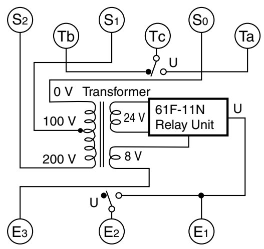
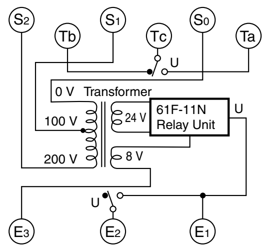
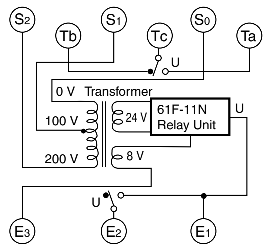
3. When ordering, specify the desired operating voltage at the end of the model number.

Example: 61F-GN[110/220 VAC]
└——— Desired supply voltage

4. Contact your OMRON representative for products with voltages other than those listed above.

Specifications

Standard Models

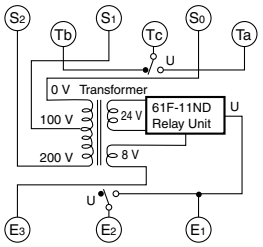
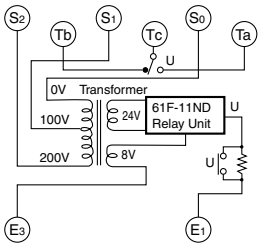
Type / Items	General-purpose Controllers 61F-□N	Long-distance Controllers 61F-□NL 2KM (2 km) 61F-□NL 4KM (4 km)	High-sensitivity Controllers 61F-□NH
Controlling materials and operating conditions	For control of ordinary purified water and wastewater	For control of ordinary purified water and wastewater. Particularly in cases where the distance between the pumps and water tanks or between supply and receiver tanks are far apart or where remote control is required.	For control of liquids with high specific resistance, such as distilled water
Rated voltage	100/200, 110/220 or 120/240 VAC, 50/60 Hz (both supported on same model)		
Allowable voltage fluctuation range	85% to 110% of rated voltage		
Inter-electrode voltage	8 VAC		
Inter-electrode current	Approx. 1 mA AC max.		
Power consumption	GN□: 3 VA max., G1N□, G2N□, IN□: 4 VA max., G3N□: 5.5 VA max., G4N□: 8.5 VA max.		
Inter-electrode operation resistance (recommended values)	0 to approx. 4 kΩ	0 to 1.8 kΩ (for 2 km) 0 to 0.7 kΩ (for 4 km)	Approx. 10 kΩ to 40 kΩ (See note 4.)
Inter-electrode release resistance (recommended values)	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
Cable length (See note 2.)	1 km max.	2 km max. 4 km max.	50 m max.
Output	3 A, 200 VAC (Resistive load)		
Ambient operating temperature	−10 to 55°C		
Ambient operating humidity	45% to 85%		
Insulation resistance (See note 3.)	100 MΩ min. (at 500 VDC)		
Dielectric strength (See note 3.)	2,000 VAC, 50/60 Hz for 1 min.		
Life expectancy	Electrical: 250,000 operations min. Mechanical: 10,000,000 operations min.		
Weight	GN models: 315 g; G1N, G2N, IN models: 410 g; G3N models: 625g; G4N models: 870 g		
Internal Circuit Diagrams	Example: 61F-GN 	Example: 61F-GNL 	Example: 61F-GNH 

Note: 1. The □ in the model name represents G, G1, G2, G3, G4, or I.

2. The length when using completely insulated, 600-V, 3-core (0.75 mm^2) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of cores becomes larger due to increased floating capacity. Refer to *Safety Precautions for Floatless Level Controllers*.

3. The insulation resistance and dielectric strength are the values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals. Refer to *Safety Precautions for Floatless Level Controllers*.

4. Application is possible with 10 kΩ or less, however, this may cause reset failures.

Type / Items	Low-sensitivity Controller 61F-□ND	Two-wire Controller 61F-□NR
Controlling materials and operating conditions	For control of liquids with low specific resistance, such as salt water, wastewater, acid chemicals, or alkaline chemicals	For control of ordinary purified water or wastewater. Used with a Two-wire Electrode Holder (incorporating a resistor of 6.8 kΩ)
Rated voltage	100/200, 110/220 or 120/240 VAC, 50/60 Hz (supported by the same model)	
Allowable Voltage Fluctuation	85% to 110% of rated voltage	
Inter-electrode voltage	8 VAC	
Inter-electrode current	Approx. 1 mA AC max.	
Power consumption	GN□: 3 VA max., G1N□, G2N□, IN□: 4 VA max., G3N□: 5.5 VA max., G4N□: 8.5 VA max.	
Inter-electrode operation resistance (recommended values)	0 to approx. 1.8 kΩ	Approx. 0 to 1.1 kΩ
Inter-electrode release resistance (recommended values)	Approx. 5 k to ∞ Ω	Approx. 15 k to ∞ Ω
Cable length (See note 2.)	1 km max.	800 m max.
Output	3 A, 200 VAC (Resistive load)	
Ambient operating temperature	−10 to 55°C	
Ambient operating humidity	45% to 85%	
Insulation resistance (See note 3.)	100 MΩ min. (at 500 VDC)	
Dielectric strength (See note 3.)	2,000 VAC, 50/60 Hz for 1 min.	
Life expectancy	Electrical: 250,000 operations min. Mechanical: 10,000,000 operations min.	
Weight	GN models: 315 g; G1N, G2N, IN models: 410 g; G3N models: 625g; G4N models: 870 g	
Internal Circuit Diagrams	Example: 61F-GND 	Example: 61F-GNR 

Note: 1. The □ in the model name represents G, G1, G2, G3, G4, or I.

2. The length when using completely insulated, 600-V, 3-core (0.75 mm^2) cabtire cables. Usable cable lengths will become shorter as the cable diameter or number of cores becomes larger due to increased floating capacity. Refer to *Safety Precautions for Floatless Level Controllers*.

3. The insulation resistance and dielectric strength are the values between power terminals and Electrode terminals, between power terminals and contact terminals, and between Electrode terminals and contact terminals. Refer to *Safety Precautions for Floatless Level Controllers*.

4. Application is possible with 10 kΩ or less, however, this may cause reset failures.

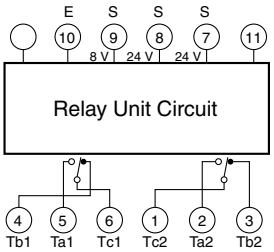
■ Relay Unit

The Relay Unit can be replaced without removing the wires for maintenance inspections. It can also be replaced with other Relay Units.

Compatibility with General Purpose Model (61F-11N)

General-purpose Controller	**61F-11N**	---
Long-distance Controllers	**61F-11NL (for 2 km)** **61F-11NL (for 4 km)**	Provided
High-sensitivity Controllers	**61F-11NH**	
Low-sensitivity Controller	**61F-11ND**	
Two-wire Controller	**61F-11NR**	Not provided

Terminal Arrangement



Ordering Example

If you order the components listed above, the corresponding Relay Unit will be supplied with the Controller.

Example: If a 61F-GN Controller is ordered, a 61F-11N Relay Unit will also be included.

■ Connections

Automatic Water Supply Control

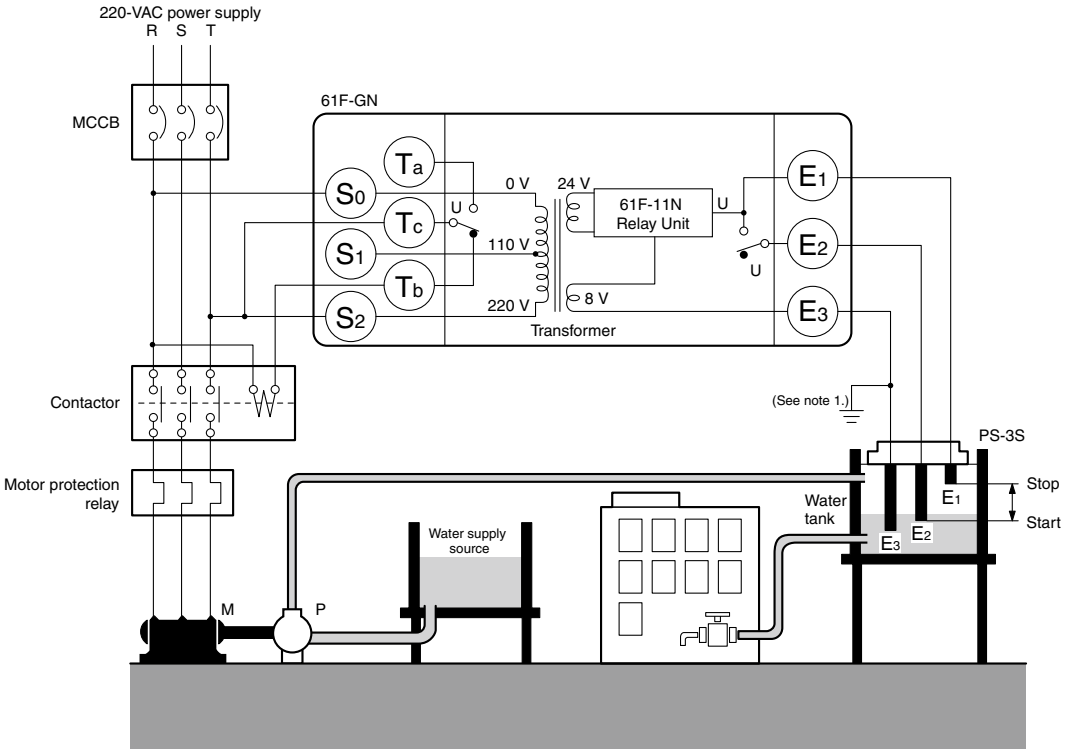
Compact Model
61F-GN

Dimensions
page 16

Automatic Water Supply Control

Connections

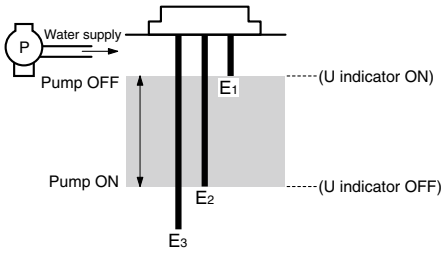
- Connect contactor coil terminal to Tb.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



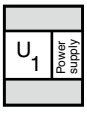
Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

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



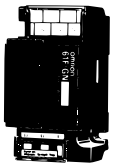
Relay Unit Layout



Automatic Drainage Control

Compact Model
61F-GN

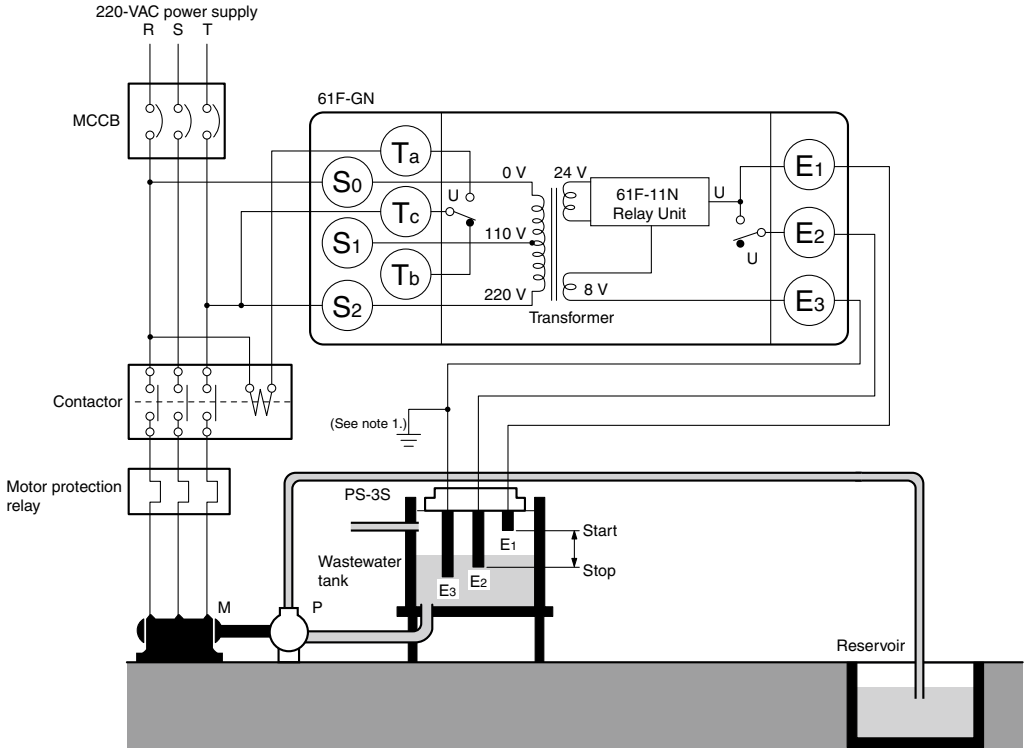
Dimensions
page 16



Automatic Drainage Control

Connections

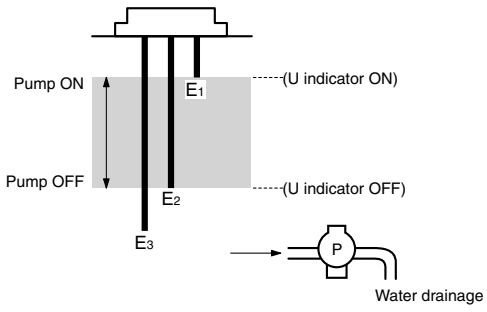
- Connect the contactor coil terminal to Ta.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



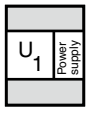
Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

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

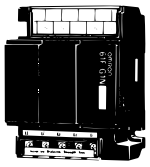


Relay Unit Layout



Automatic Water Supply Control with Pump Idling Prevention

Compact Model
61F-G1N



Dimensions
page 16

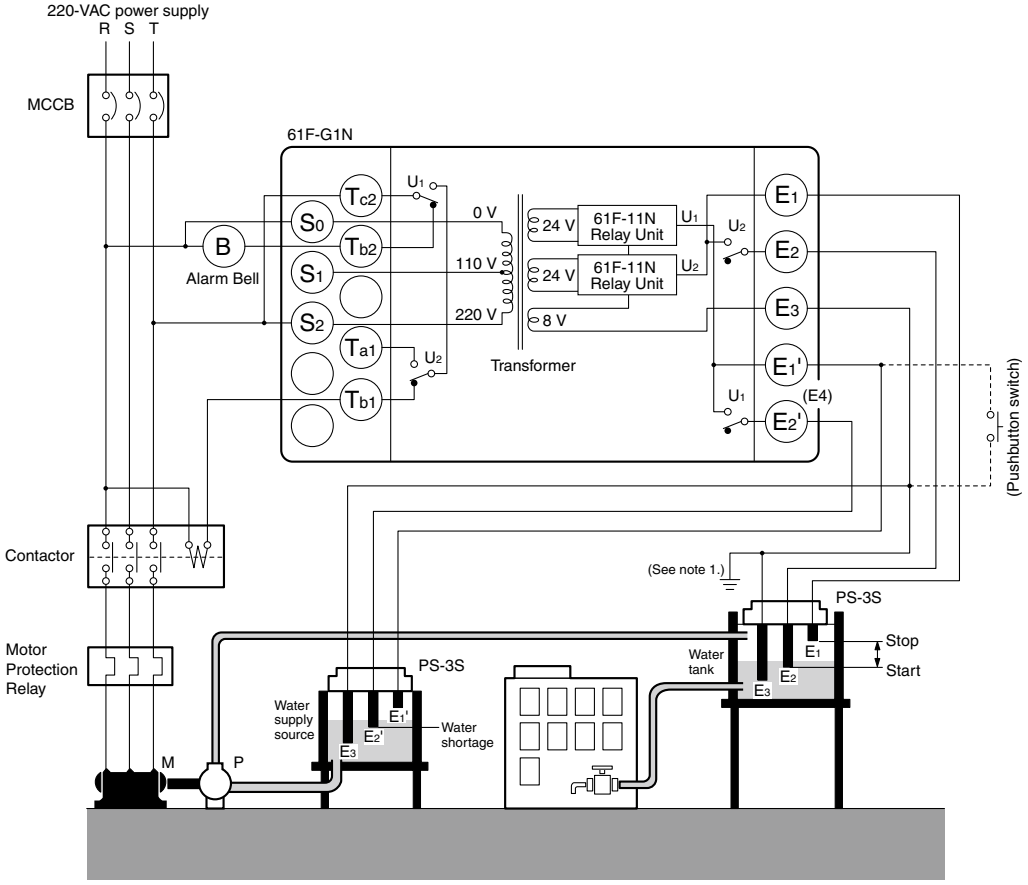
Automatic Water Supply Control with Pump Idling Prevention

Connections

- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC
- Insert a pushbutton switch (NO contact) between E_1' and E_3 as shown by the dotted line.
- Do not press the pushbutton switch if the pump stops (U_1 indicator OFF) during normal operation after an alarm is given for a low water level (e.g., the water level does not reach E_2').

Test Operation/ Recovering from Power Interruptions

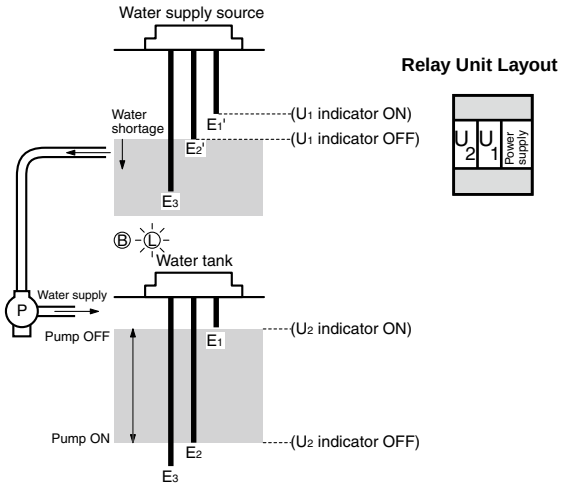
If the water supply source level has not yet reached E_1' when starting the pump or after recovering from a power interruption, press the pushbutton switch to start the pump (U_1 indicator ON) by momentarily short-circuiting E_1' and E_3.



Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

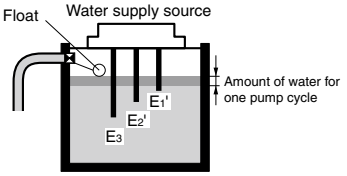
- The pump starts (U_2 indicator OFF) when the water level drops below E_2 and stops (U_2 indicator ON) when water level reaches E_1.
- The pump is forced to stop when the water supply source level drops below E_2' (U_1 indicator OFF) to prevent the pump from idling and gives an alarm.



Relay Unit Layout

Note

- Length of Electrode E_1'
  When installing the Controller in locations where there is a possibility of momentary power interrupts or blackouts, the length of E_1' should be made so that the amount of water corresponding to one pump cycle does not expose the Electrodes. This will prevent the E_2' self-holding circuit from failing.



Automatic Water Supply Control with Abnormal Water Shortage Alarm

Compact Model
61F-G1N

Dimensions
page 16

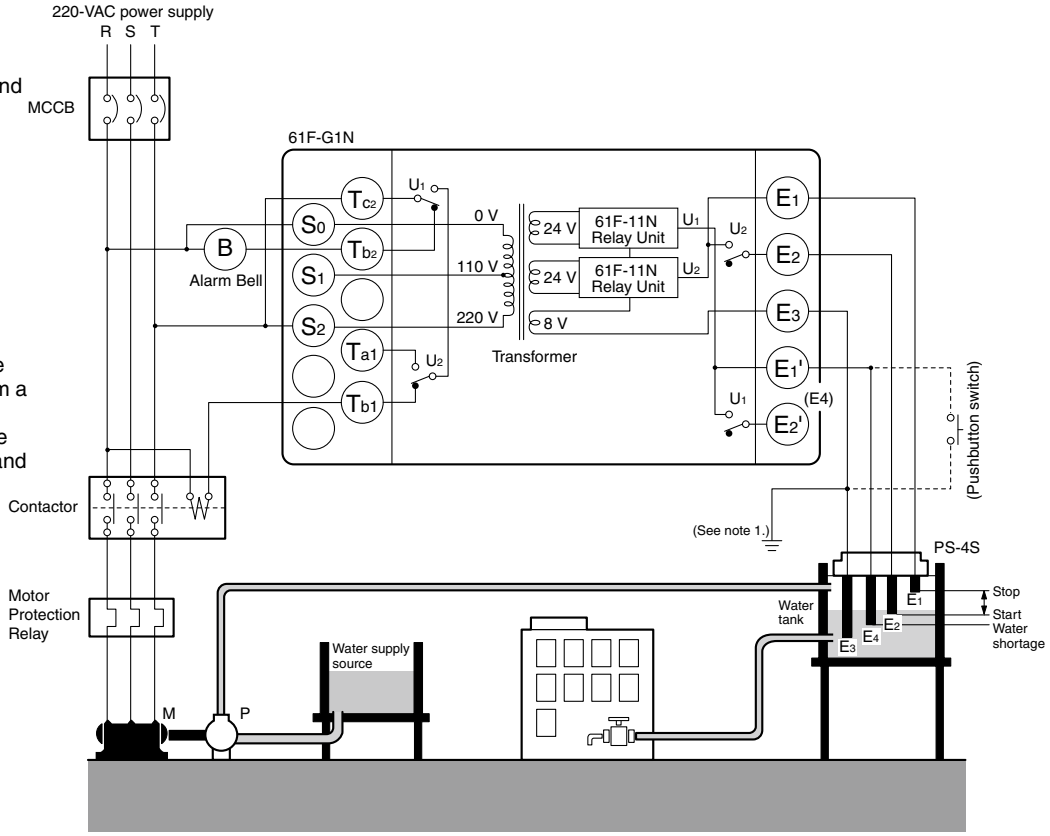
Automatic Water Supply Control with Abnormal Water Shortage Alarm

Connections

- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC
- Insert a pushbutton switch (NO contact) between E_3 and E_4.
- If the pump stops upon releasing the pushbutton switch, keep pressing the pushbutton switch.

Test Operation/ Recovering from Power Interruptions

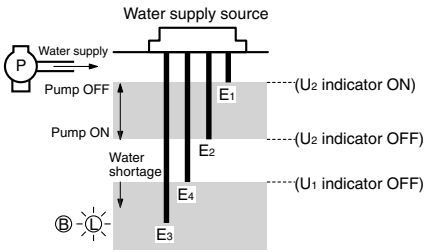
If the water level has not yet reached E_4 when starting the pump or after recovering from a power interruption, press the pushbutton switch to start the pump by short-circuiting E_3 and E_4 (U_1 indicator ON).



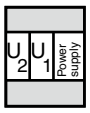
Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump stops (U_2 indicator ON) when the water level reaches E_1 and starts (U_2 indicator OFF) when water level drops below E_2.
- If the water level drops below E_4 for any reason, an alarm is given (U_1 indicator OFF).



Relay Unit Layout



Automatic Water Supply with Abnormal Water Increase Alarm

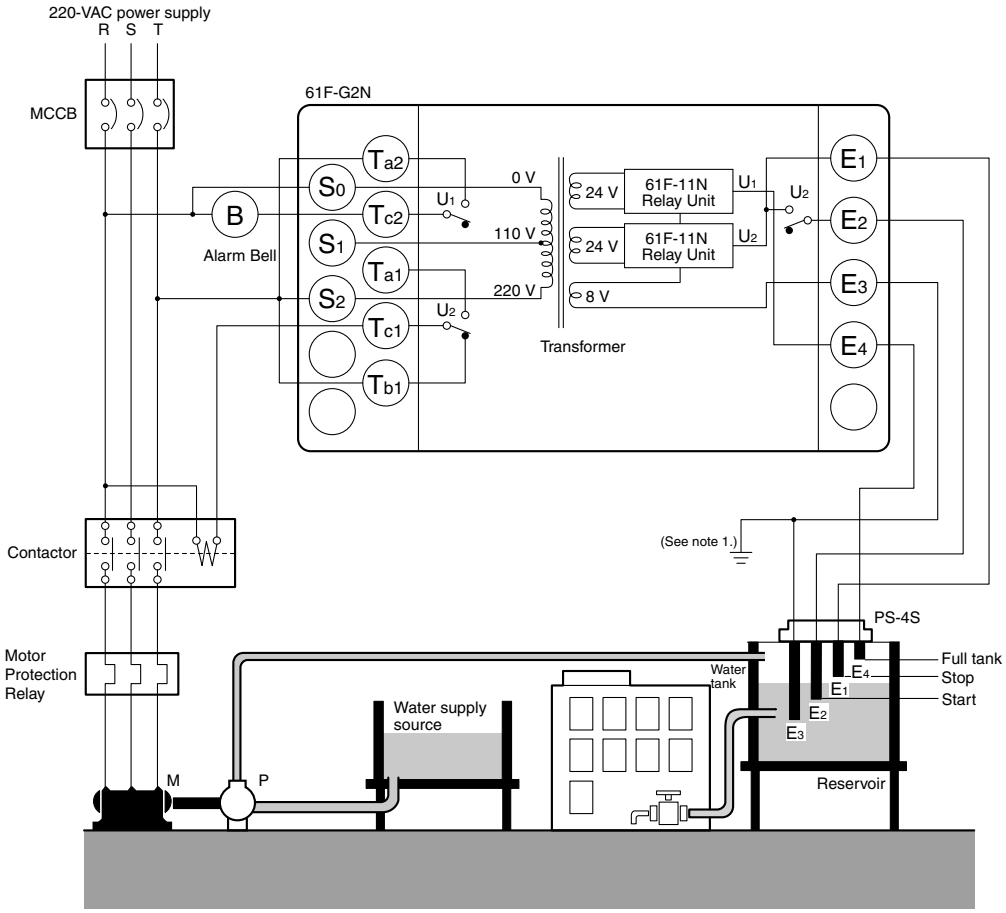
Compact Model 61F-G2N

Dimensions page 16

Automatic Water Supply with Abnormal Water Increase Alarm

Connections

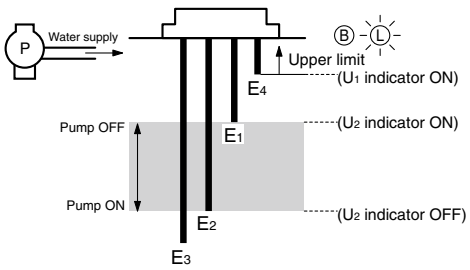
- Connect power supply terminal S_2 to terminal Tb_1.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



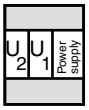
Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U_2 indicator OFF) when the water level reaches E_2 and stops (U_2 indicator ON) when the water level rises above E_1.
- If the water level reaches E_4 for any reason, an alarm is given (U_1 indicator ON).



Relay Unit Layout



Automatic Drainage Control with Abnormal Water Increase Alarm

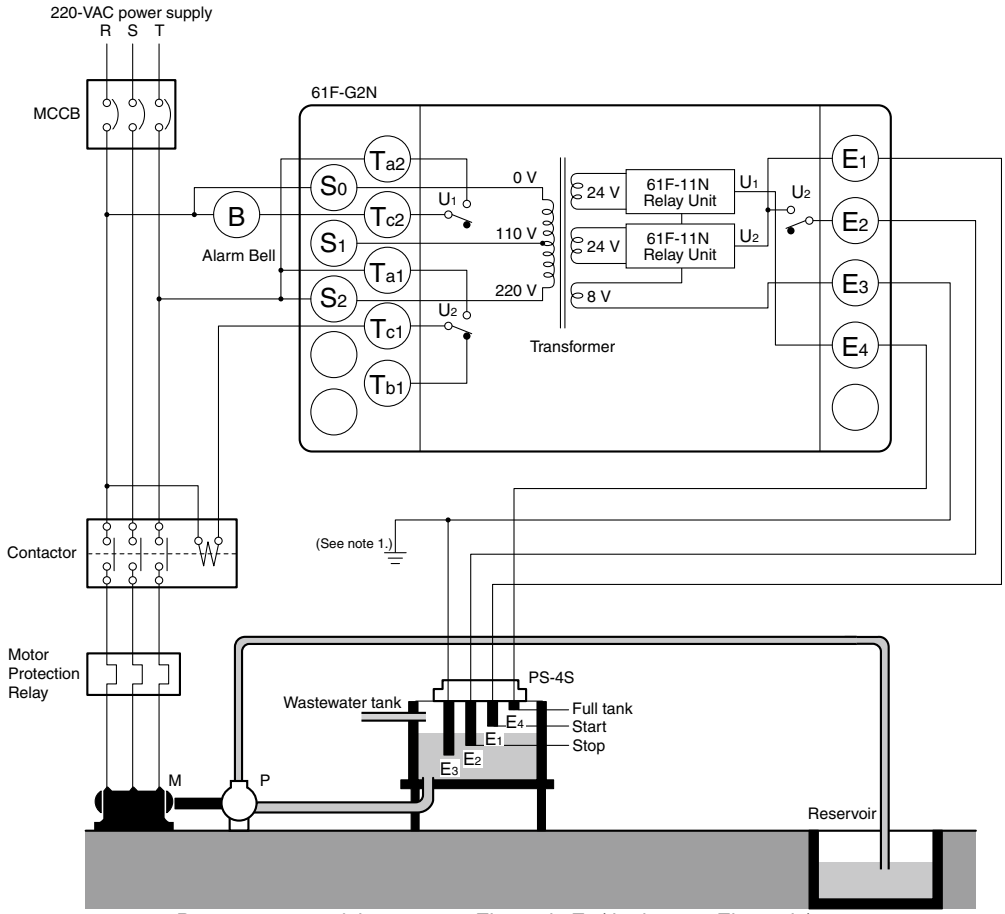
Compact Model 61F-G2N

Dimensions page 16

Automatic Drainage Control with Abnormal Water Increase Alarm

Connections

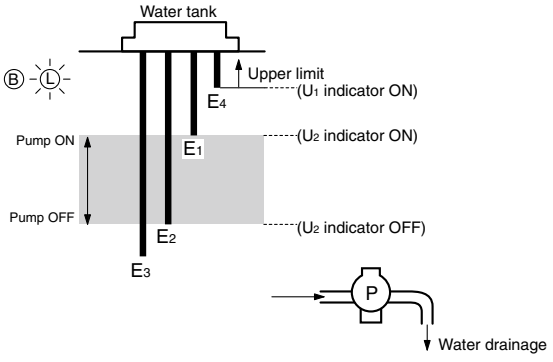
- Connect power supply S_2 to terminal Ta_1.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



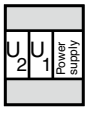
Note: 1. Be sure to ground the common Electrode E_5 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- The pump starts (U_2 indicator ON) when the water level reaches E_1 and stops (U_2 indicator OFF) when the water level drops below E_2.
- If the water level reaches E_4 for any reason, an alarm is given (U_1 indicator ON).

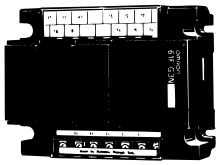


Relay Unit Layout



Automatic Water Supply Control with Full Tank and Water Shortage Alarm

Compact Model
61F-G3N

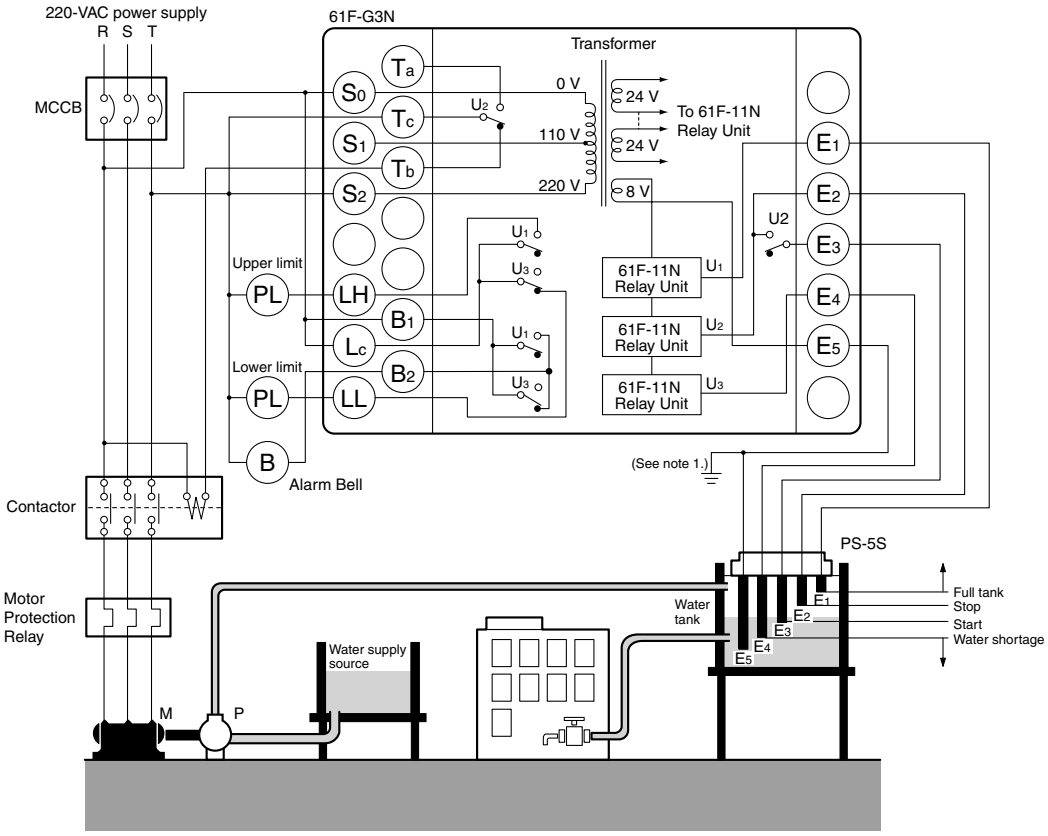


Dimensions
page 17

Automatic Water Supply Control with Full Tank and Water Shortage Alarm

Connections

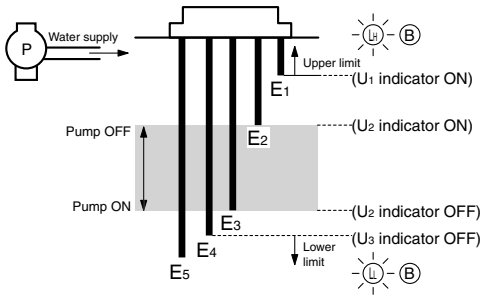
- Connect contactor coil terminal to Tb.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



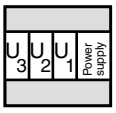
Note: 1. Be sure to ground the common Electrode E_5 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

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

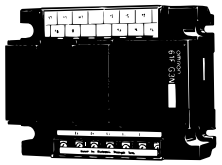


Relay Unit Layout



Automatic Drainage Control with Full Tank and Water Shortage Alarm

Compact Model
61F-G3N

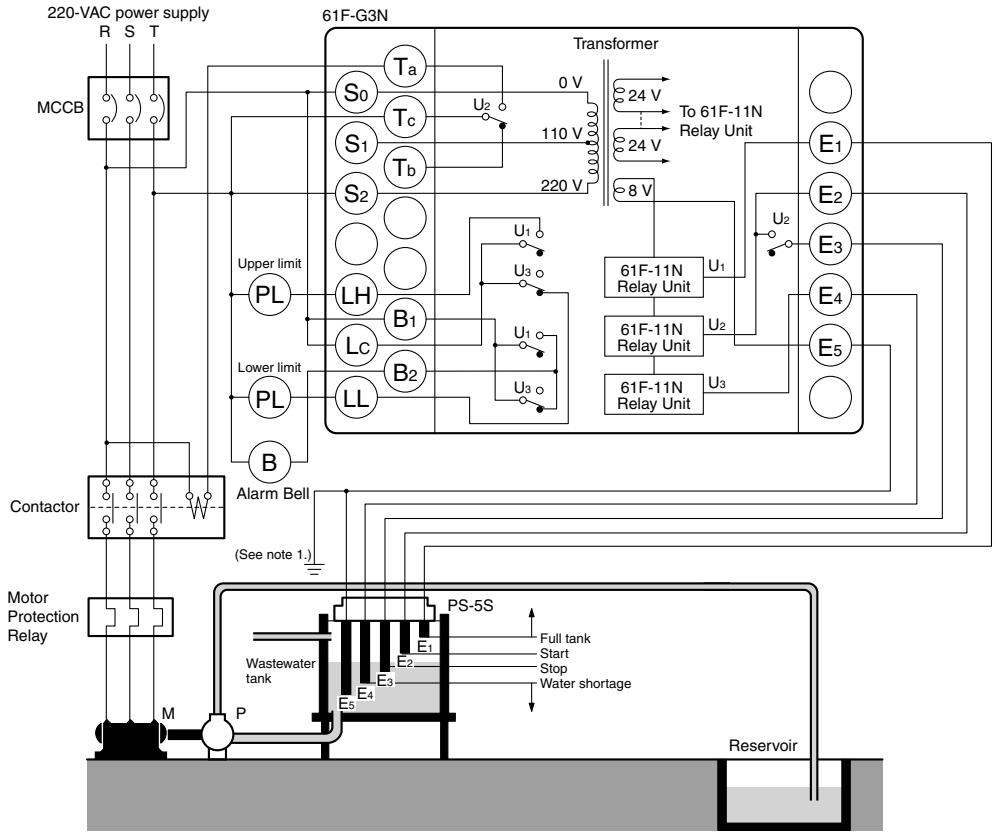


Dimensions
page 17

Automatic Drainage Control with Full Tank and Water Shortage Alarm

Connections

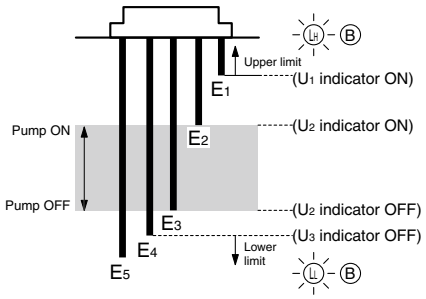
- Connect contactor coil terminal to Ta.
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



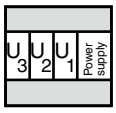
Note: 1. Be sure to ground the common Electrode E_5 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

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

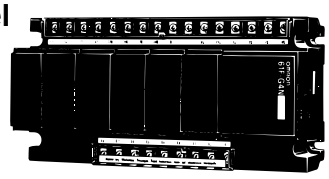


Relay Unit Layout



Water Source Level Indication with Prevention of Pump Idling Due to Water Shortage, and Automatic Water Supply Control with Indication of Water Level in Elevated Tank

Compact Model
61F-G4N



Dimensions
page 17

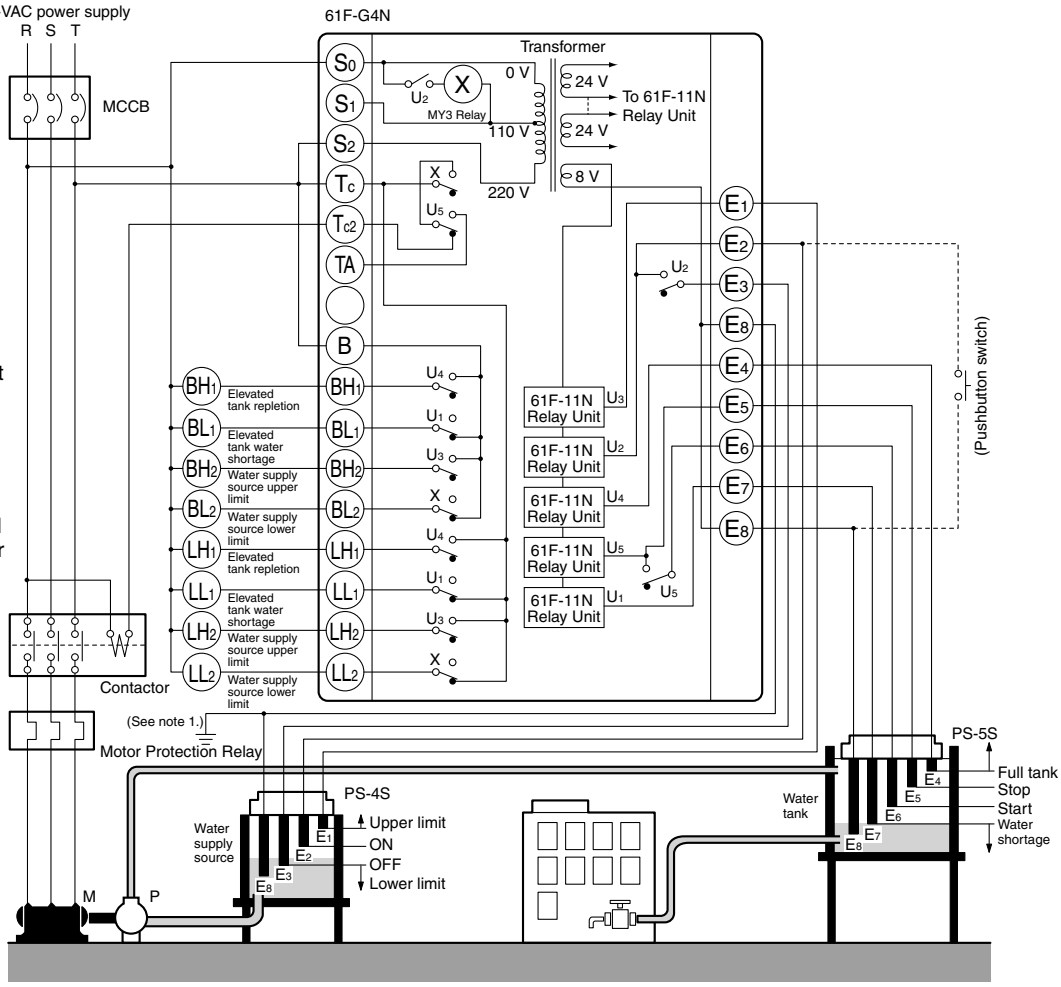
Water Source Level Indication with Prevention of Pump Idling Due to Water Shortage, and Automatic Water Supply Control with Indication of Water Level in Elevated Tank

Connections

- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC
- Insert a pushbutton switch (NO contact) between E_2 and E_8 as shown by the dotted line.
- Do not press the pushbutton switch if the pump stops during normal operation after an alarm is given for low water level (i.e., the water level has not reached E_3).

Test Operation/ Recovering from Power Interruptions

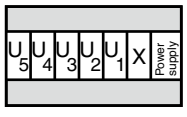
When starting the pump and after recovering from a power interruption, if the water source level has not yet reached E_2 (U_2 indicator OFF), press the pushbutton switch to start the pump by momentarily short-circuiting E_2 and E_8.



Note: 1. Be sure to ground the common Electrode E_8 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

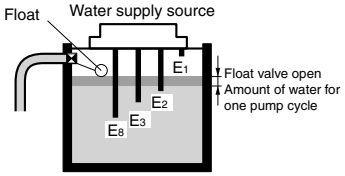
Relay Unit Layout



- Insert four Electrodes in the water supply source and five Electrodes in the elevated water tank.
- The lower-limit indicator for the water supply source remains ON while the water source level is below E_3 (U_2 indicator OFF).
- When the water level rises to E_2, the lower-limit indicator turns OFF (U_2 indicator ON) and the pump is ready for operation.
- When the water level reaches E_1, the upper-limit indicator turns ON (U_3 indicator ON).
- The water-shortage indicator for the elevated tank remains ON while the water level in the elevated tank is below E_7. The indicator turns OFF (U_1 indicator ON) when the water level rises to E_7.
- The pump stops (U_5 indicator ON) when the water level reaches E_5 and starts (U_5 indicator OFF) when the water level drops below E_6.
- If the water level reaches E_4 for any reason, the tank repletion indicator for the elevated tank turns ON (U_4 indicator ON).

Precaution

- Length of Electrode E_2
  When installing the Controller in locations where there is a possibility of momentary power interruptions or blackouts, the length of E_2 should be made so that the amount of water corresponding to one pump cycle does not expose the Electrodes. This will prevent the E_3 self-holding circuit from failing.



Liquid Level Indication and Alarm

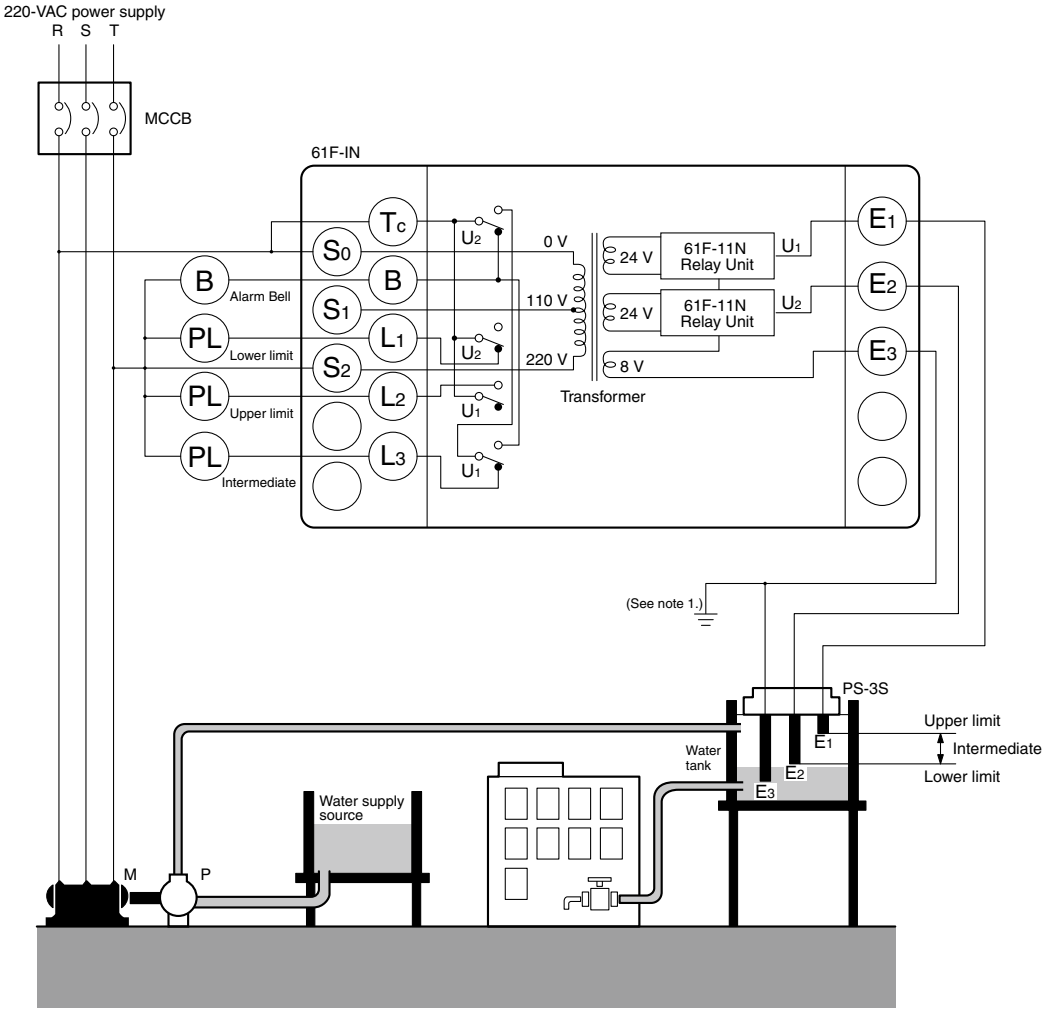
Compact Model
61F-IN

Dimensions
page 16

Liquid Level Indication and Alarm

Connections

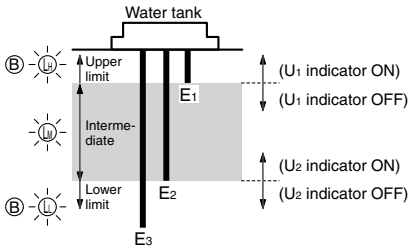
- Connect to power supply terminals.
  S_0-S_1: 110 VAC
  S_0-S_2: 220 VAC



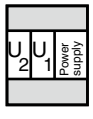
Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).
2. The above wiring diagram is for a rated voltage of 110/220 VAC.

Principles of Operation

- When the water level drops below E_2, the lower-limit indicator turns ON and an alarm is given (U_2 indicator OFF).
- When the water level reaches E_2, the alarm turns OFF and the intermediate indicator turns ON (U_2 indicator ON).
- When the water level rises to E_1, the upper-limit indicator turns ON and an alarm is given (U_1 indicator ON).



Relay Unit Layout



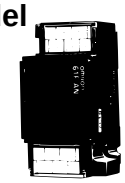
■ Two-wire Connection

The wiring between the 61F Controller and the Electrodes can be reduced by removing the self-hold circuit. This arrangement is called a two-wire connection. Three Electrodes are still required. Both the 61F Controller (including the Relay Unit) and Electrode Holder must be two-wire models.

Two-wire Electrode Holders have an in-built resistor of 6.8 kΩ 1W.

Automatic Water Supply and Drainage Control

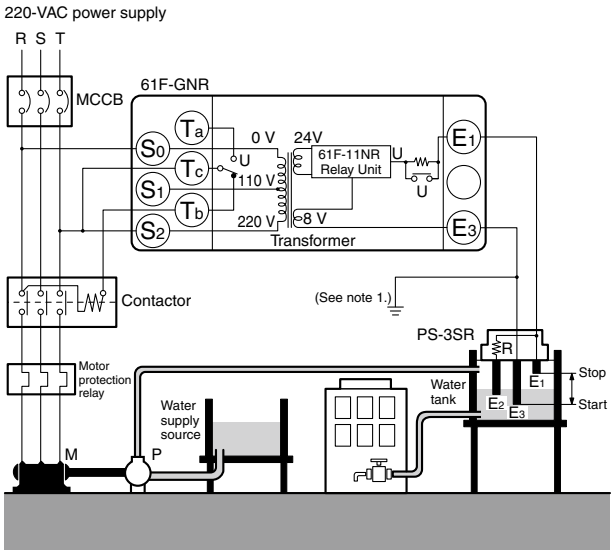
Compact Model
61F-GNR



Dimensions
page 16

Automatic Water Supply Control

Connections

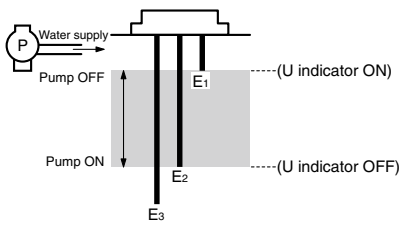


Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).

2. The above wiring diagram is for a rated voltage of 110/220 VAC.

- Connect contactor coil terminal to Tb.
- Connect to power supply terminals.
  S_0-S_1: 100 VAC
  S_0-S_2: 200 VAC
- The two-wire models require only two cables for the connection between the 61F-GNR and the Electrode Holder, but still requires three Electrodes.
- A Two-wire Electrode Holder must be used. (It has an inbuilt resistance R.)
- The Relay Unit must also be for two-wire models.

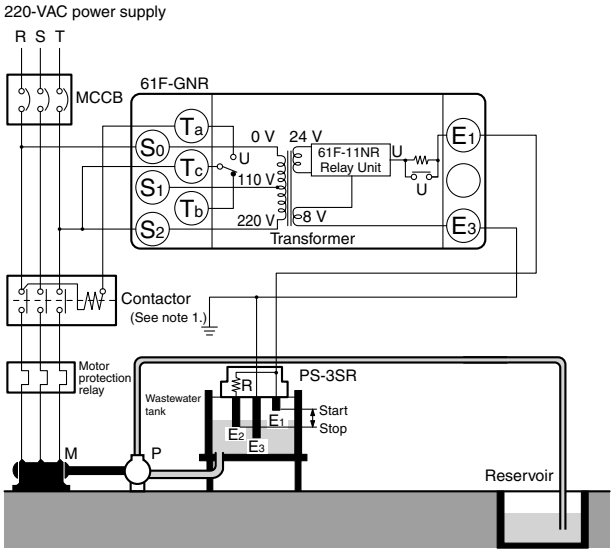
Principles of Operation



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

Automatic Drainage Control

Connections

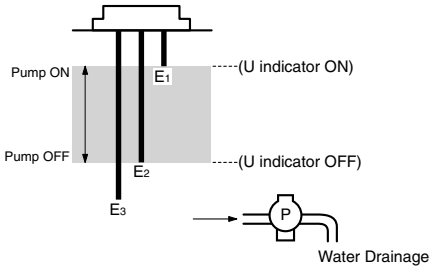


Note: 1. Be sure to ground the common Electrode E_3 (the longest Electrode).

2. The above wiring diagram is for a rated voltage of 110/220 VAC.

- Connect contactor coil terminal to Ta. (Do not connect Tb.)
- Connect to power supply terminals.
  S_0-S_1: 100 VAC
  S_0-S_2: 200 VAC
- The two-wire models require only two cables for the connection between 61F-GNR and the Electrode Holder, but still needs three Electrodes.
- A Two-wire Electrode Holder must be used. (It has an inbuilt resistance R.)
- The Relay Unit must also be for two-wire models.

Principles of Operation

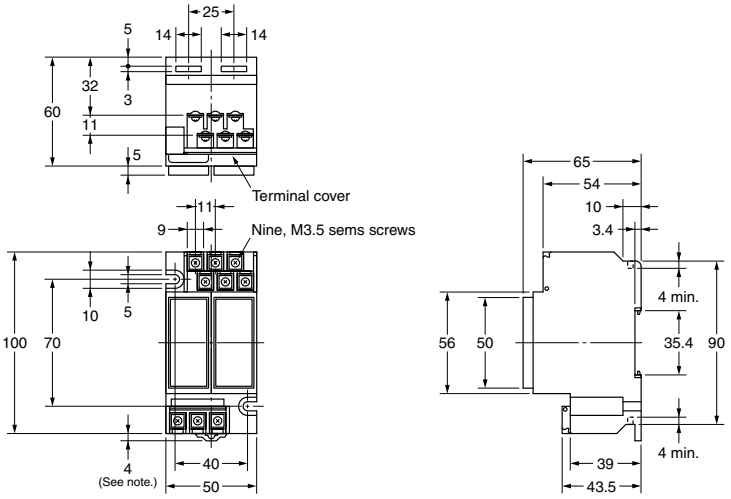


The pump stops (U indicator ON) when the water level reaches E_1 and starts (U indicator OFF) when water level drops below E_2.

Dimensions

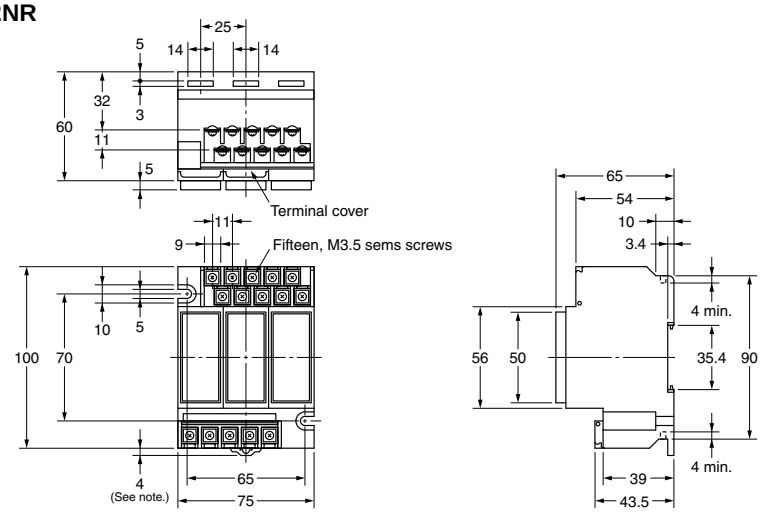
Note: All units are in millimeters unless otherwise indicated.

61F-GN, -GNL, -GNH, -GND, -GNR



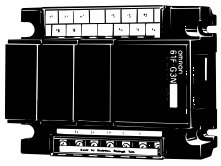
Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

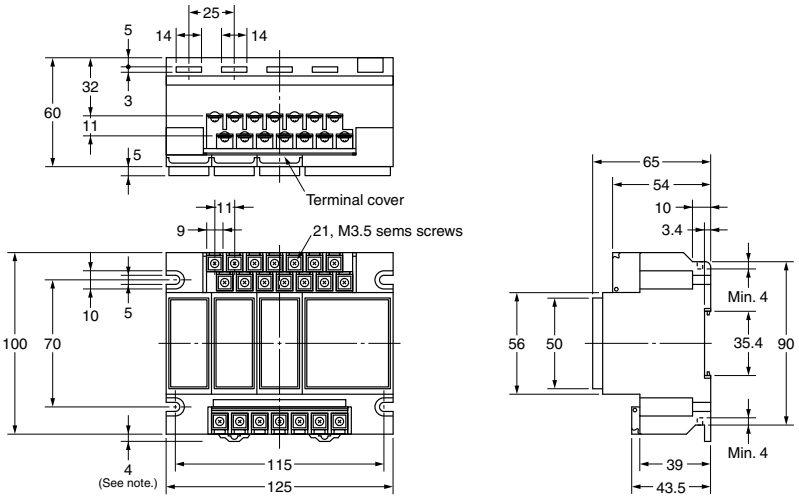
61F-G1N, -G1NL, -G1NH, -G1ND, -G1NR
61F-G2N, -G2NL, -G2NH, -G2ND, G2NR
61F-IN, - NL, -INH, -IND



Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

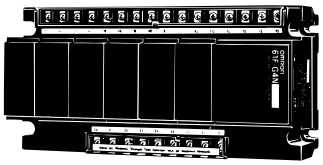
61F-G3N, -G3NL, -G3NH, -G3ND, -G3NR, -G3N-NGD

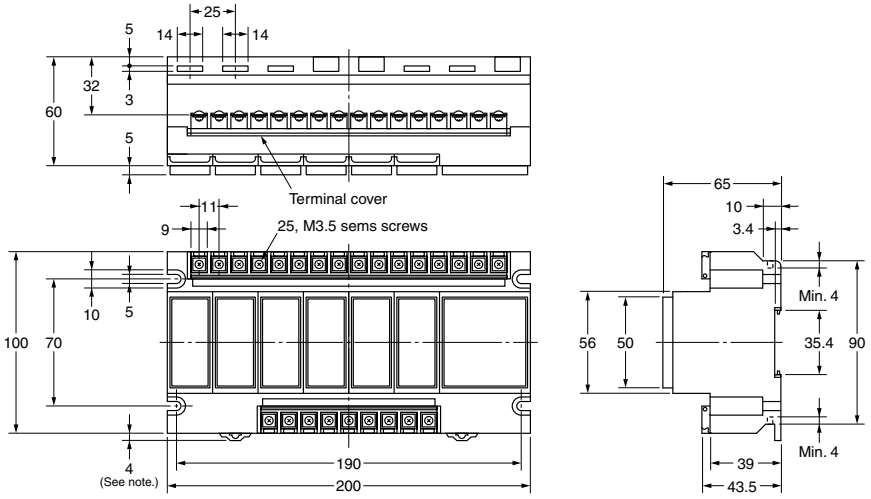




Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

61F-G4N, - G4NL, -G4NH, -G4ND, -G4NR, -G4N-KYD





Note: Dimensions are with the DIN rail mounting (sliding) bracket attached.

■ 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

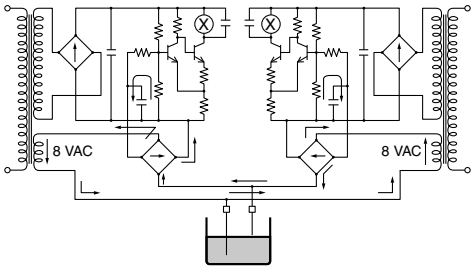
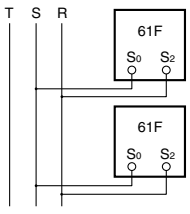


Fig. 2 Match Phases



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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 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.

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

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At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

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Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased product.

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