New Product

OMRON

# Single-phase Overvoltage/Undervoltage Relay
## K8DT-VW

## Detect abnormal voltages applies to equipment to protect against equipment failure. Monitor for overvoltages and undervoltages simultaneously with one Relay.

- Monitor AC or DC voltages with one Relay.
- Settings for the operating value, hysteresis, and operating time.
- Width of 17.5 mm to reduce space required in panels.
- Push-In Plus Terminal that reduce wiring work.
  The use of cage clamps enables wiring with bare stranded wires.
  Double-insertion holes for crossover wiring (all terminals).
- UL listed for easy shipping to North America.
- Models added with transistor outputs for superior contact reliability.

⚠ Refer to *Safety Precautions* on page 8.
Refer to page 7 for commonly asked questions.

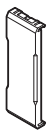
For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

# Ordering Information

## Single-phase Overvoltage/Undervoltage Relay

| Setting range | Power supply voltage | Output | Model |
|---|---|---|---|
| 1 to 10 V AC/DC<br>3 to 30 V AC/DC<br>15 to 150 V AC/DC | 24 VAC/DC | Relay: SPDT contact output | **K8DT-VW2CD** |
| | | Transistor | **K8DT-VW2TD** |
| | 100 to 240 VAC | Relay: SPDT contact output | **K8DT-VW2CA** |
| | | Transistor | **K8DT-VW2TA** |
| 20 to 200 V AC/DC<br>30 to 300 V AC/DC<br>60 to 600 V AC/DC | 24 VAC/DC | Relay: SPDT contact output | **K8DT-VW3CD** |
| | | Transistor | **K8DT-VW3TD** |
| | 100 to 240 VAC | Relay: SPDT contact output | **K8DT-VW3CA** |
| | | Transistor | **K8DT-VW3TA** |

## Options (Order Separately)
### Front Cover

| Appearance | Model |
|---|---|
|  | **Y92A-D1A** |

# Ratings and Specifications

## Input Range

| Model | Range ✻ | Connection terminal | Setting range | Input impedance | Overload capacity |
|---|---|---|---|---|---|
| **K8AK-VW2□□** | 0 to 10 V AC/DC | V1-COM | 1 to 10 V AC/DC | Approx. 120 kΩ | Continuous input at 115% of maximum input.<br>10 s at 125%<br>(up to 600 VAC) |
| | 0 to 30 V AC/DC | V2-COM | 3 to 30 V AC/DC | Approx. 320 kΩ | |
| | 0 to 150 V AC/DC | V3-COM | 15 to 150 V AC/DC | Approx. 1.6 MΩ | |
| **K8AK-VW3□□** | 0 to 200 V AC/DC | V1-COM | 20 to 200 V AC/DC | Approx. 1.2 MΩ | |
| | 0 to 300 V AC/DC | V2-COM | 30 to 300 V AC/DC | Approx. 1.7 MΩ | |
| | 0 to 600 V AC/DC | V3-COM | 60 to 600 V AC/DC | Approx. 3.1 MΩ | |

✻ The range is selected using connected terminals.

## Ratings

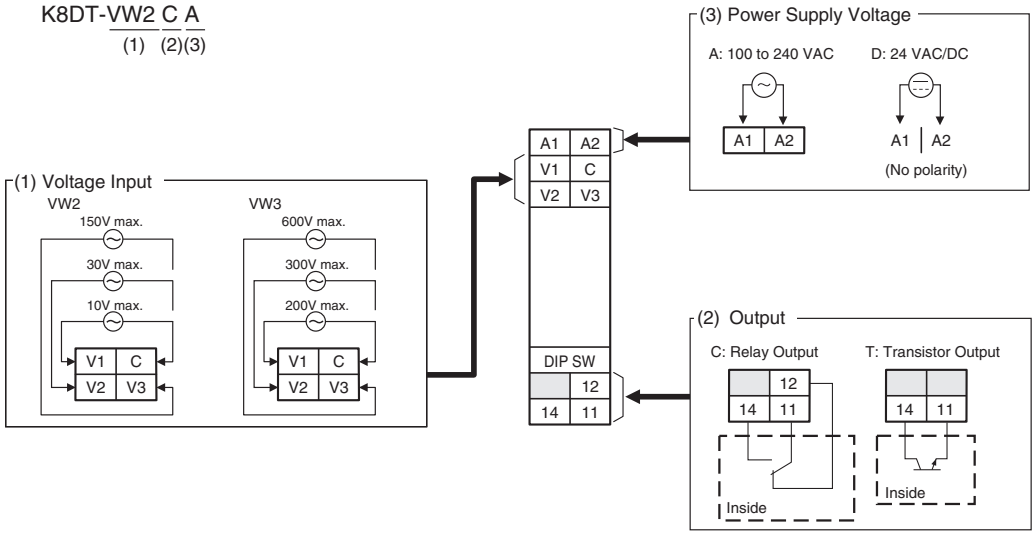
| | |
|---|---|
| **Power supply voltage** | K8DT-VW□□D: 24 VAC 50/60 Hz, 24 VDC<br>K8DT-VW□□A: 100 to 240 VAC 50/60 Hz |
| **Power consumption** | 24 VAC/DC: 1.8 VA/1 W max.<br>100 to 240 VAC: 2.5 VA max. |
| **Rated insulation voltage** | 600 VAC |
| **Operating value setting range (AL1 and AL2)** | 10% to 100% of the maximum value of the setting range<br>K8DT-VW2: 1 to 10 V AC/DC<br>3 to 30 V AC/DC<br>15 to 150 V AC/DC<br>K8DT-VW3: 20 to 200 V AC/DC<br>30 to 300 V AC/DC<br>60 to 600 V AC/DC |
| **Operating value** | 100% operation at set value |
| **Reset value** | 5% of operating value (fixed) |
| **Reset method** | Manual reset/automatic reset (switchable)<br>Manual reset: Turn OFF power supply for 1 s or longer. |
| **Operating time setting range (T)** | 0.1 to 30 s |
| **Power ON lock time** | 1 s or 5 s (Switched using DIP switch.) |
| **Indicators** | Power (PWR): Green, Relay output (RY): Yellow,<br>Alarm output1 (AL1): Red,<br>Alarm output2 (AL2): Red |
| **Input impedance** | Refer to *Input Range* on page 1. |
| **Output form** | Relay Output: SPDT contact<br>Transistor Output: 1 |
| **Output relay ratings** | Rated load<br>5 A at 250 VAC (Resistive load)<br>5 A at 30 VDC (Resistive load)<br>1 A at 250 VAC (Inductive load)<br>0.2 A at 48 VDC (Inductive load)<br>Minimum load: 5 VDC, 10 mA (reference values)<br>Mechanical life: 10 million operations min.<br>Electrical life: 5 A at 250 VAC or 30 VDC: 50,000 operations<br>3 A at 250 VAC or 30 VDC: 100,000 operations |
| **Transistor output ratings** | Rated voltage: 24 VDC (maximum voltage: 26.4 VDC)<br>Maximum current: 50 mA DC |
| **Ambient operating temperature** | −20 to 60°C (with no condensation or icing) |
| **Storage temperature** | −25 to 65°C (with no condensation or icing) |
| **Ambient operating humidity** | 25% to 85% RH (with no condensation) |
| **Storage humidity** | 25% to 85% RH (with no condensation) |
| **Altitude** | 2,000 m max. |
| **Applicable wires** | Stranded wires, solid wires, or ferrules |
| **Applicable wire size** | 0.25 to 1.5 $mm^2$ (AWG24 to AWG16) |
| **Wire insertion force** | 8 N max. for AWG20 wire |
| **Screwdriver insertion force** | 15 N max. |
| **Wire stripping length** | 8 mm |
| **Ferrule length** | 8 mm |
| **Recommended flat-blade screwdriver** | XW4Z-00B (Omron)<br>SZF 0.4 × 2.5 (Phoenix Contact)<br>210-719 (Wago)<br>SDI 0.4 × 2.5 × 75 (Weidmuller) |
| **Current capacity** | 10 A (per pole) |
| **Number of insertions** | 50 times |
| **Case color** | N1.5 |
| **Case material** | PC, UL 94 V-0 |
| **Weight** | Approx. 100 g |
| **Mounting** | Mounts to DIN Track, or screw mounting |
| **Dimensions** | 17.5 × 90 × 90 mm (W×H×D) |

## Specifications

| | | |
|---|---|---|
| **Allowable operating voltage range** | | 85% to 110% of rated power supply voltage |
| **Allowable operating frequency range** | | 50/60 Hz ±5 Hz |
| **Input frequency range** | | 40 to 500 Hz |
| **Overload capacity** | | Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC). |
| **Repeat accuracy** | **Operating value** | ±0.5% full scale (at 25°C and 65% humidity, rated power supply voltage) |
| | **Operating time** | ±50 ms (at 25°C and 65% humidity, rated power supply voltage) |
| **Applicable standards** | **Conforming standards** | EN 60947-5-1<br>Installation environment (pollution level 2, Overvoltage category III) |
| | **EMC** | EN 60947-5-1 |
| | **Safety standards** | UL 60947-5-1 (Listing), Korean Radio Waves Act (Act 10564), CCC (GB/T 14048.5) |
| **Insulation resistance** | | 20 MΩ min.<br>Between all external terminals and the case<br>Between all power supply terminals and all input terminals<br>Between all power supply terminals and all output terminals<br>Between all input terminals and all output terminals |
| **Dielectric strength** | | 2,000 VAC for 1 min<br>Between all external terminals and the case<br>Between all power supply terminals and all input terminals<br>Between all power supply terminals and all output terminals<br>Between all input terminals and all output terminals |
| **Impulse withstand voltage** | | 6 kV (between live terminals and exposed, non-charged metal parts) |
| **Noise immunity** | | Square-wave noise of 1 μs/100-ns pulse width with 1-ns rise time<br>100 to 240 VAC: 1,500 V power supply terminal common/normal mode<br>24 VAC: 1,500 V power supply terminal common/normal mode<br>24 VDC: 480 V power supply terminal common |
| **Vibration resistance** | | Frequency: 10 to 55 Hz, 0.35-mm single amplitude<br>10 sweeps of 5 min each in X,Y, and Z directions |
| **Shock resistance** | | 100 $m/s^2$, 3 times each in 6 directions along 3 axes |
| **Degree of protection** | | Terminals: IP20 |

# Connections

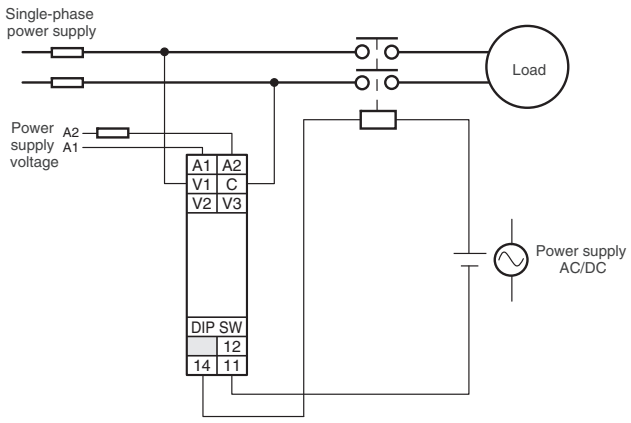
## Terminal Diagram



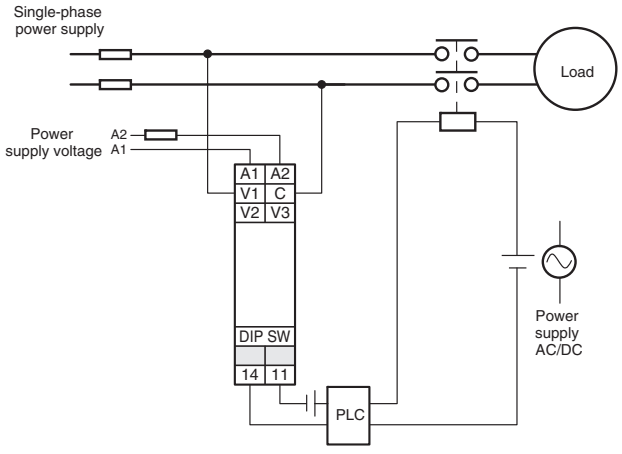

**Note: 1.** Do not connect anything to terminals that are shaded in gray.
**2.** There is no polarity for the DC power supply input.
**3.** For the voltage input, you can input only from the C terminal and one other terminal.
**4.** Refer to *Setting Ranges and Wiring Connections* for information on the V1, V2, and V3 voltage input terminals.

## Wiring Example

### Relay Output




### Transistor Output

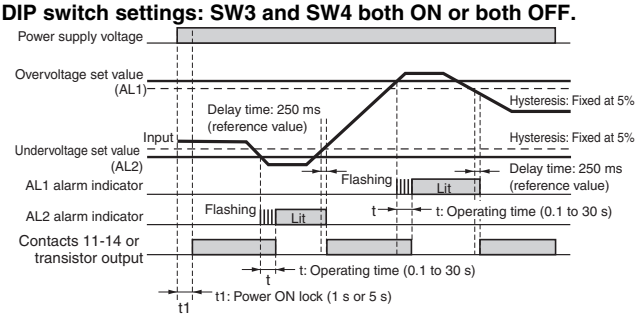



**Note:** Use copper wires with a rating of 75°C or an equivalent rating.

# Timing Charts

## Overvoltage and Undervoltage Operation Diagram

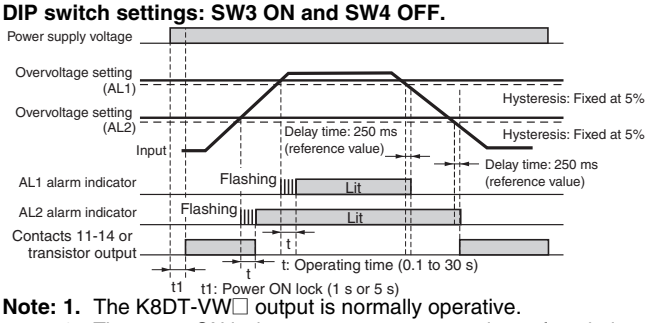
**DIP switch settings: SW3 and SW4 both ON or both OFF.**




**Note: 1.** The K8DT-VW□ output is normally operative.
**2.** The power ON lock prevents unnecessary alarms from being generated during the instable period when the power is first turned on. There is no relay output during timer operation.

## Overvoltage and Overvoltage Operation Diagram

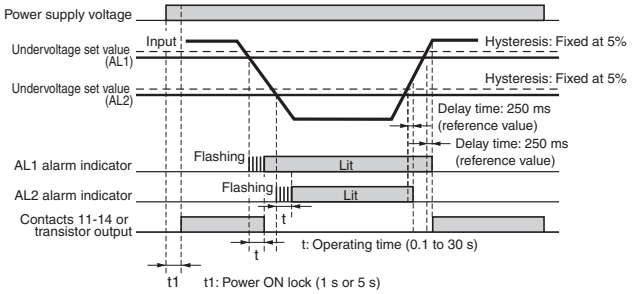
**DIP switch settings: SW3 ON and SW4 OFF.**




**Note: 1.** The K8DT-VW□ output is normally operative.
**2.** The power ON lock prevents unnecessary alarms from being generated during the instable period when the power is first turned on. There is no relay output during timer operation.

## Undervoltage and Undervoltage Operation Diagram

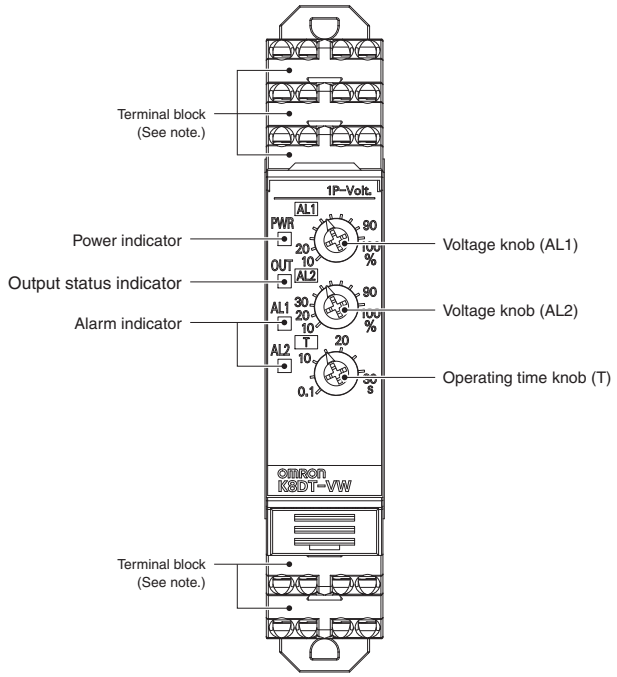
**DIP switch settings: SW3 OFF and SW4 ON.**



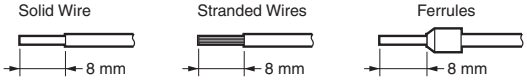

**Note: 1.** The K8DT-VW□ output is normally operative.
**2.** The power ON lock prevents unnecessary alarms from being generated during the instable period when the power is first turned on. There is no relay output during timer operation.

# Nomenclature

## Front




**Note:** Use solid wires, stranded wires, or ferrules to connect to the terminals.
To maintain the withstand voltage after connecting the terminals, insert 8 mm of exposed conductor into the terminal.




### Indicators

| Item | Meaning |
|---|---|
| **Power indicator (PWR: Green)** | Lit when power is being supplied. |
| **Output status indicator (Output: Yellow)** | Lights for output (lit for normal operation) |
| **Alarm indicators (AL1 and AL2: Red)** | Lit when there is an overvoltage or undervoltage. The indicator flashes to indicate the error status after the input has exceeded the set value while the operating time is being clocked. |

### Setting Knobs

| Item | Usage |
|---|---|
| **Voltage knob (AL1)** | Used to set the voltage to 10% to 100% of maximum setting range. |
| **Voltage knob (AL2)** | Used to set the voltage to 10% to 100% of maximum setting range. |
| **Operating time knob (T)** | Used to set the operating time to 0.1 to 30 s. |

# Operation Methods

## Setting Ranges and Wiring Connections

| Model | Setting range | Wiring connection |
|---|---|---|
| K8DT-VW2 | 1 to 10 V AC/DC | V1-COM |
| | 3 to 30 V AC/DC | V2-COM |
| | 15 to 150 V AC/DC | V3-COM |
| K8DT-VW3 | 20 to 200 V AC/DC | V1-COM |
| | 30 to 300 V AC/DC | V2-COM |
| | 60 to 600 V AC/DC | V3-COM |

## Connections

### Input

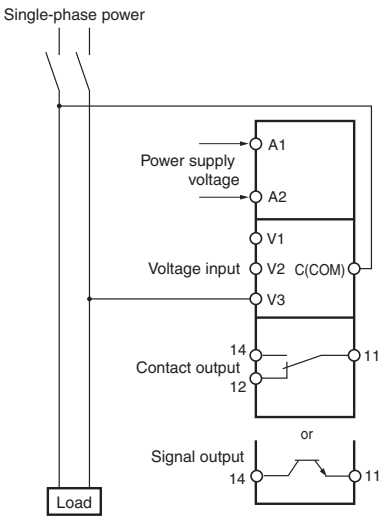
Connect the input between terminals V1-COM, V2-COM, or V3-COM, depending on the input voltage.
Malfunctions may occur if the input is connected to unused terminals and the Unit will not operate correctly.

### Power Supply

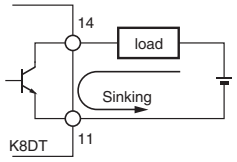
Connect the power supply to terminals A1 and A2.

### Outputs

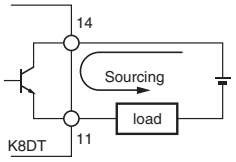
For a relay output, the SPDT contacts are output on terminals 11, 12, and 14. For a transistor output, the output is on terminals 11 and 14.
The internal circuit of the transistor output is NPN, but application is possible for either a sinking or sourcing output.




**In the case of sinking output applications**

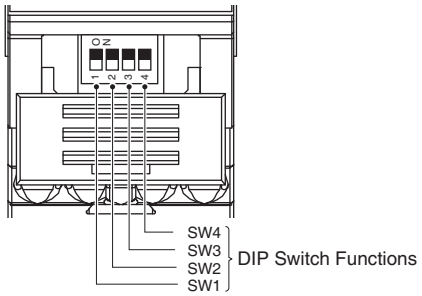



**In the case of sourcing output applications**




## DIP Switch Settings

The power ON lock time, resetting method and operating mode are set using the DIP switch located on the front of the Unit.
**Note:** Open the DIP switch cover to set the DIP switch.
Keep the DIP switch cover closed while the power supply to the Relay is ON.




### DIP Switch Functions

| Pin | ON ❍ ↑ / OFF ● ↓ | | 1 (ON / OFF) | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| Power ON lock time | 5 s | | ❍ | --- | --- | --- |
| | 1 s | | ● | --- | --- | --- |
| Resetting method | Operating mode | | --- | ❍ | --- | --- |
| | Manual reset | | --- | ● | --- | --- |
| Operating mode | AL1 | AL2 | | | | |
| | Over-voltage | Under-voltage | --- | --- | ❍ | ❍ |
| | Under-voltage | Under-voltage | --- | --- | ● | ❍ |
| | Over-voltage | Over-voltage | --- | --- | ❍ | ● |
| | Over-voltage | Under-voltage | --- | --- | ● | ● |

**Note:** All pins are set to OFF at the factory.

## Setting Method

### Setting Voltage

The voltage knob (AL1 and AL2) is used to set the voltage.
The voltage can be set to 10% to 100% of the maximum setting range.
Turn the knob while there is an input to the input terminals until the alarm indicator flashes (when the set value and the input have reached the same level.)
Use this as a guide to set the voltage.
The maximum setting range will differ depending on the model and the input terminal.
Example: K8DT-VW3 Using Input Terminal V3-COM
The maximum setting range will be 600 VAC/VDC and the setting range will be 60 to 600 V.

### Operating Time

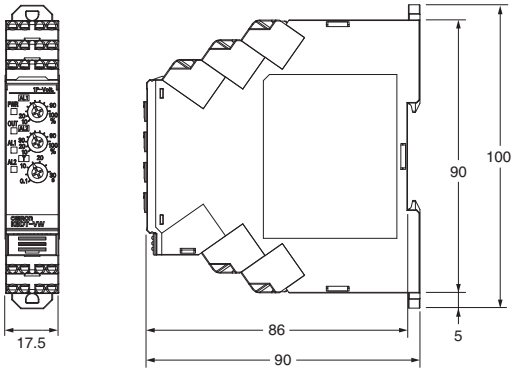
The operating time is set using the operating time knob (T).
The operating time can be set to between 0.1 and 30 s.
If the input exceeds (or drops lower than) the voltage set value, the alarm indicator will start flashing for the set period and then stay lit.

## Dimensions

**(Unit: mm)**

### Single-phase Overvoltage/Undervoltage Relays

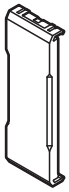
**K8DT-VW2**
**K8DT-VW3**

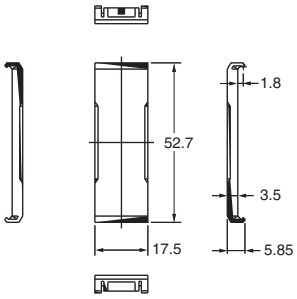



### Options (Order Separately)

#### Front Cover

**Y92A-D1A**

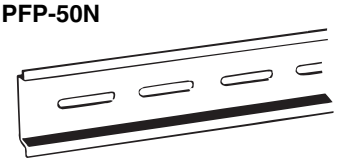


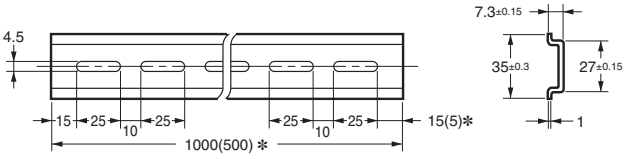



### Optional Parts for DIN Track Mounting

#### DIN Tracks

**PFP-100N**
**PFP-50N**






✻ Dimensions in parentheses are for the PFP-50N.