

POWER RELAY

1 POLE—5 A (MEDIUM LOAD CONTROL)

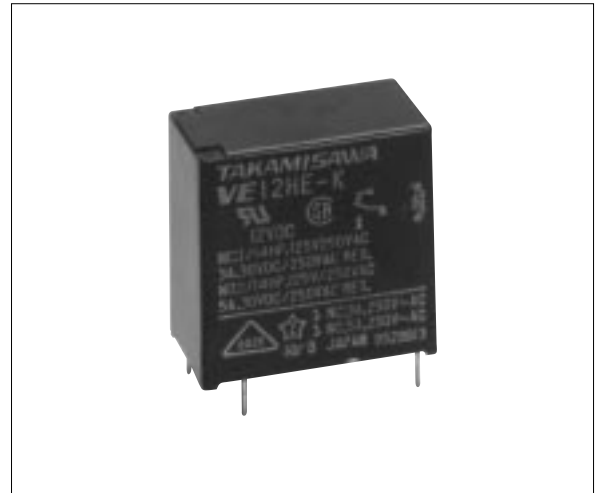
VE SERIES

Lead Free / RoHS compliant*

■ FEATURES

- UL, CSA, VDE recognized
- 1 form A (SPST-NO) or 1 form C (SPDT) contact
- Low cost, miniature relay with big performance in small package
—Surge strength: 4,000 V or 6,000 V
- Slim type—meets high density mounting requirement
- Wide operating range
- Easy circuit design with completely separated terminal arrangement (coil and contact terminals)
- Plastic sealed type
- Lead free since date code: 0434R
Please see page 7 for more information

* some part numbers still contain cadmium and are not RoHS compliant



■ ORDERING INFORMATION

[Example] $\frac{VE}{(a) (*)}$ - $\frac{12}{(b)}$ $\frac{H}{(c)}$ $\frac{M}{(d)}$ $\frac{S}{(e)}$ $\frac{E}{(f)}$ - $\frac{K}{(g)}$ - $\frac{HV}{(h)}$ - $\frac{VD}{(i)}$

| | | |
|-----|---------------------------|--|
| (a) | Series Name | VE: VE Series |
| (b) | Nominal Voltage | Refer to the COIL DATA CHART |
| (c) | Contact Rating | H : Heavy duty type |
| (d) | Contact Arrangement | Nil : 1 form C (SPDT) M : 1 form A (SPST-NO) |
| (e) | Coil Type | Nil : Standard type (360 mW) S : High sensitivity type (250 mW) |
| (f) | Contact Material (Rating) | Nil : Gold overlay silver-nickel (N.C.: 3 A, N.O.: 5 A) E : Silver-nickel (N.C.: 3 A, N.O.: 5 A) 5 : Silver cadmium oxide (N.C.: 5 A, N.O.: 5 A) |
| (g) | Enclosure | K : Plastic sealed type |
| (h) | Surge Strength | Nil : Standard type (4,000 V) HV: High dielectric strength type (6,000 V) |
| (i) | Standard | VD: UL, CSA, VDE approved type |

Note: Actual marking omits the hyphen (-) of (*)

■ SAFETY STANDARD AND FILE NUMBERS

UL508 (File No. E56140)

C22.2 No. 14 (File No. LR35579)

VDE 0435 (File No. 11039-4940-1011)

Please note that UL/CSA ratings may differ from the standard ratings.

| Type | Nominal voltage | Contact rating |
|-----------------|-----------------|---|
| VE-H | 5 to 48 VDC | Normally open: 1/14 HP 125 VAC/250 VAC 5 A 30 VDC/250 VAC, resistive Pilot duty D300 Normally close: 1/14 HP 125 VAC/250 VAC 3 A 30 VDC/250 VAC, resistive Pilot duty D150 |
| VE-HM | 5 to 48 VDC | 1/12 HP 125 VAC/250 VAC 5 A 30 VDC/250 VAC, resistive Pilot duty D300 |
| VE-H5 VE-HM5 | 5 to 48 VDC | Normally open: 1/10 HP 125 VAC/250 VAC 5 A 30 VDC/250 VAC, resistive Pilot duty D300 Normally close: 1/14 HP 125 VAC/250 VAC 5 A 30 VDC/250 VAC, resistive |

VE SERIES

■ SPECIFICATIONS

| Item | | VE-() HM(S)E-K VE-() HM(S)-K | VE-() H(S)E-K VE-() H(S)-K | VE-() HM(S)5-K | VE-() H(S)5-K | |
|----------------|--|---|--|----------------------------|--------------------|------------------|
| Contact | Arrangement | 1 form A (SPST-NO) | 1 form C (SPDT) | 1 form A (SPST-NO) | 1 form C (SPDT) | |
| | Material | Gold overlay silver nickel, silver nickel | | Silver-cadmium oxide alloy | | |
| | Style | Single | | | | |
| | Resistance (initial) (at 1 A 6 VDC) | Maximum 70 mΩ (VE-HM, H) Maximum 100 mΩ (VE-HME, HE) | | Maximum 200 mΩ | | |
| | Rating (resistive) | 5 A 250 VAC | 5 A 250 VAC (N.O.) 3 A 250 VAC (N.C.) | 5 A 250 VAC | | |
| | Maximum Carrying Current | 7 A | | | | |
| | Maximum Switching Power | 1,250 VA | 1,250 VA (N.O.) 750 VA (N.C.) | 1,250 VA | | |
| | Maximum Switching Voltage | 250 VAC, 150 VDC | | | | |
| | Maximum Switching Current | 5 A | 5 A (N.O.) 3 A (N.C.) | 5 A | | |
| | Minimum Switching Load*1 | 10 mA, 5 VDC (VE-HM, H), 100 mA 5 VDC (VE-HME, HE, HM5, H5) | | | | |
| Coil | Nominal Power (at 20°C) | Standard type: 0.36 W. High sensitivity type: 0.25 W | | | | |
| | Operate Power (at 20°C) | Standard type: 0.177 W. High sensitivity type: 0.13 W | | | | |
| | Operating Temperature | Standard: -40°C to +85°C. High sensitivity: -40°C to +90°C (no frost) | | | | |
| Time Value | Operate (at nominal voltage) | Maximum 10 ms | | | | |
| | Release (at nominal voltage) | Maximum 5 ms | | | | |
| Insulation | Resistance (at 500 VDC) | Minimum 1,000 MΩ | | | | |
| | Dielectric Strength | between open contacts | 1,000 VAC 1 minute | 750 VAC 1 minute | 1,000 VAC 1 minute | 750 VAC 1 minute |
| | | between coil and contacts | 2,000 VAC 1 minute | | | |
| Surge Strength | Standard type: 4,000 V (at 2 x 10 μs) High dielectric strength type: 6,000 V (at 2 x 10 μs) | | | | | |
| Life | Mechanical | 1 × 10 ⁷ operations minimum | | | | |
| | Electrical (at Rating) | Standard Type: 1 × 10 ⁵ ops. min. High sensitivity type: 5 × 10 ⁴ ops. min. | | | | |
| Other | Vibration Resistance | Misoperation | 10 to 55 Hz (double amplitude of 3.3 mm) | | | |
| | | Endurance | 10 to 55 Hz (double amplitude of 3.3 mm) | | | |
| | Shock Resistance | Misoperation | 100 m/s ² (11 ±1 ms) | | | |
| | | Endurance | 500 m/s ² (6 ±1 ms) | | | |
| | Weight | Approximately 8 g | | | | |

*1 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

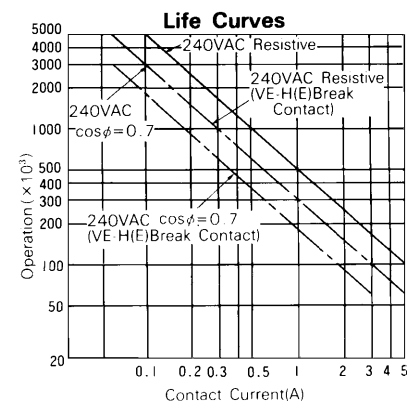
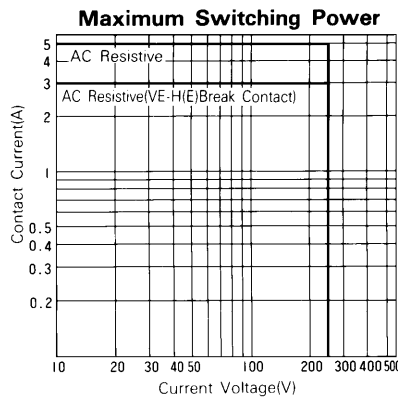
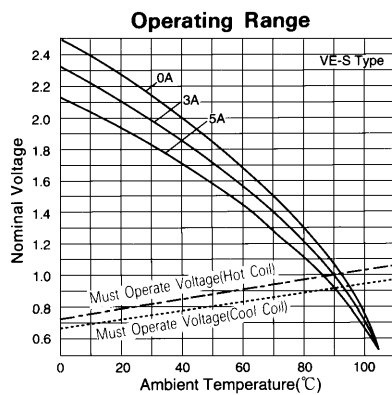
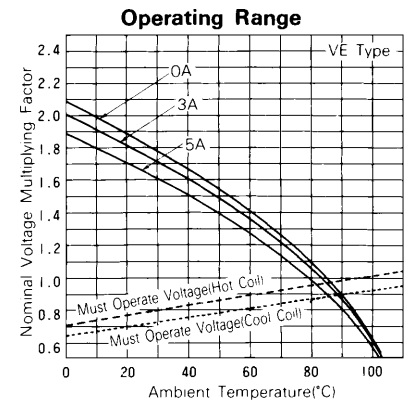
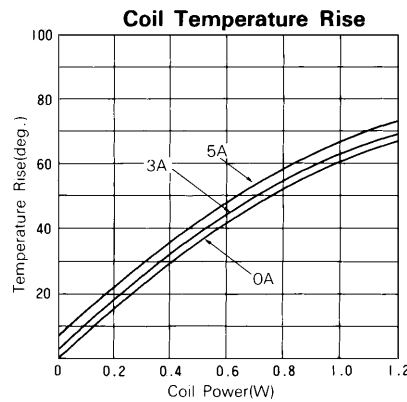
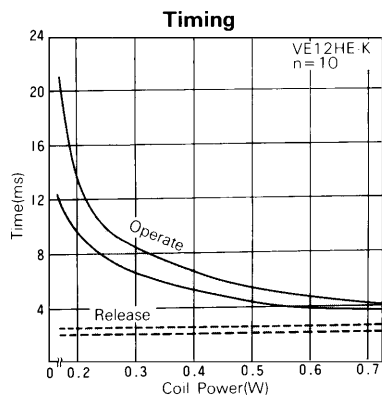
VE SERIES

COIL DATA CHART

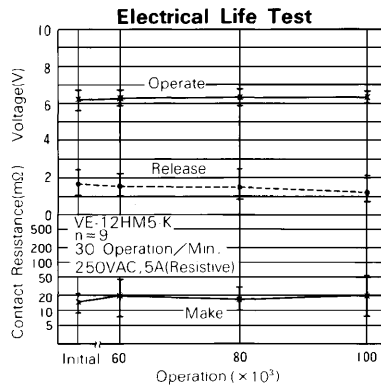
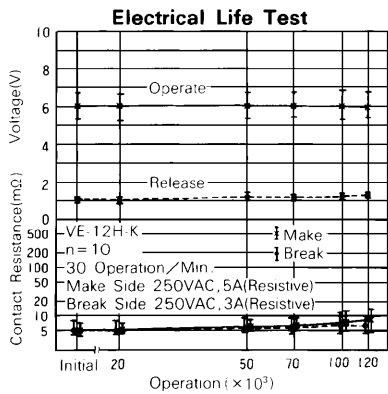
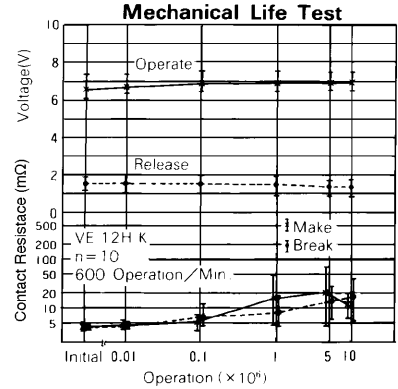
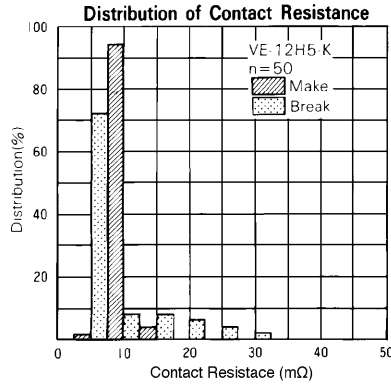
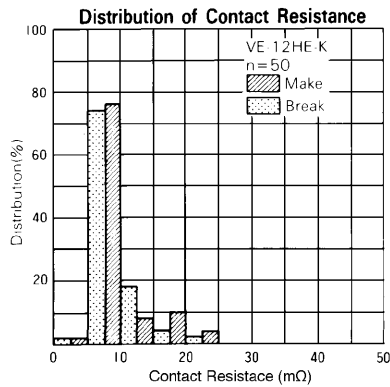
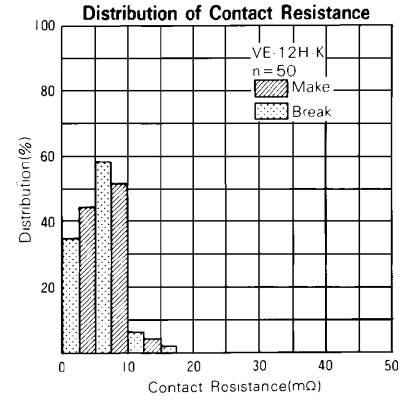
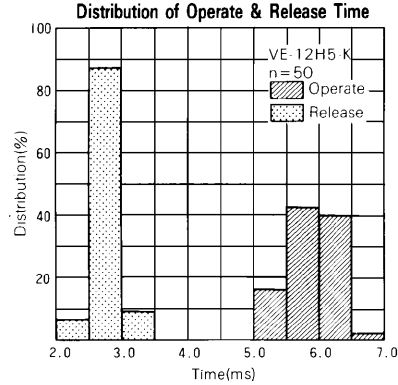
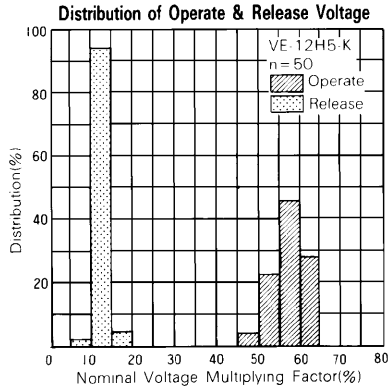
| | MODEL | | Nominal voltage | Coil resistance ($\pm 10\%$) | Must operate voltage | Must release voltage | Nominal power |
|---------------------|-----------------------|-------------------------|-----------------|--------------------------------|----------------------|----------------------|---------------|
| | VE-() HM VE-() H | VE-() HME VE-() HE | | | | | |
| Standard Type | VE- 5H (M) (E)-K | VE- 5H (M) (E) 5-K | 5 VDC | 69 Ω | 3.5 VDC | 0.25 VDC | 360 mW |
| | VE- 6H (M) (E)-K | VE- 6H (M) (E) 5-K | 6 VDC | 100 Ω | 4.2 VDC | 0.3 VDC | 360 mW |
| | VE- 9H (M) (E)-K | VE- 9H (M) (E) 5-K | 9 VDC | 225 Ω | 6.3 VDC | 0.45 VDC | 360 mW |
| | VE-12H (M) (E)-K | VE-12H (M) (E) 5-K | 12 VDC | 400 Ω | 8.4 VDC | 0.6 VDC | 360 mW |
| | VE-18H (M) (E)-K | VE-18H (M) (E) 5-K | 18 VDC | 900 Ω | 12.6 VDC | 0.9 VDC | 360 mW |
| | VE-24H (M) (E)-K | VE-24H (M) (E) 5-K | 24 VDC | 1,600 Ω | 16.8 VDC | 1.2 VDC | 360 mW |
| | VE-48H (M) (E)-K | VE-48H (M) (E) 5-K | 48 VDC | 6,400 Ω | 33.6 VDC | 2.4 VDC | 360 mW |
| High Sensitive Type | VE- 5H (M) S (E)-K | VE- 5H (M) S5-K | 5 VDC | 100 Ω | 3.6 VDC | 0.25 VDC | 250 mW |
| | VE- 6H (M) S (E)-K | VE- 6H (M) S5-K | 6 VDC | 145 Ω | 4.3 VDC | 0.3 VDC | 250 mW |
| | VE- 9H (M) S (E)-K | VE- 9H (M) S5-K | 9 VDC | 325 Ω | 6.5 VDC | 0.45 VDC | 250 mW |
| | VE-12H (M) S (E)-K | VE-12H (M) S5-K | 12 VDC | 575 Ω | 8.6 VDC | 0.6 VDC | 250 mW |
| | VE-18H (M) S (E)-K | VE-18H (M) S5-K | 18 VDC | 1,300 Ω | 13.0 VDC | 0.9 VDC | 250 mW |
| | VE-24H (M) S (E)-K | VE-24H (M) S5-K | 24 VDC | 2,310 Ω | 17.3 VDC | 1.2 VDC | 250 mW |
| | VE-48H (M) S (E)-K | VE-48H (M) S5-K | 48 VDC | 9,220 Ω | 34.7 VDC | 2.4 VDC | 250 mW |

Note: All values in the table are measured at 20 °C.

CHARACTERISTIC DATA



REFERENCE DATA

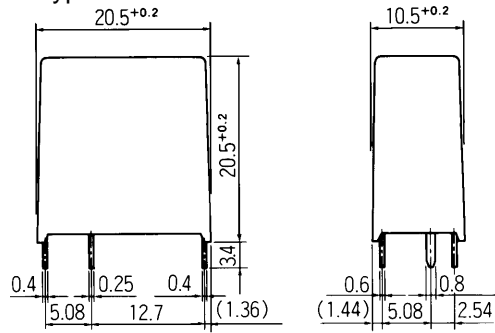


VE SERIES

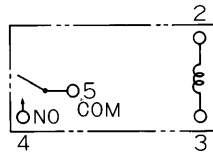
■ DIMENSIONS

● Dimensions

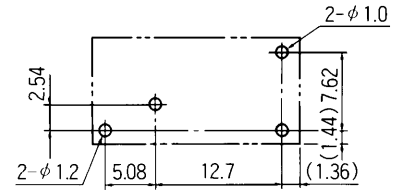
VE-M type



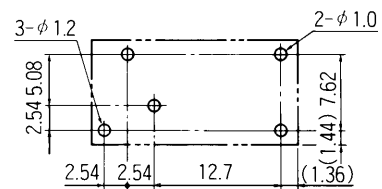
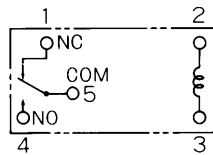
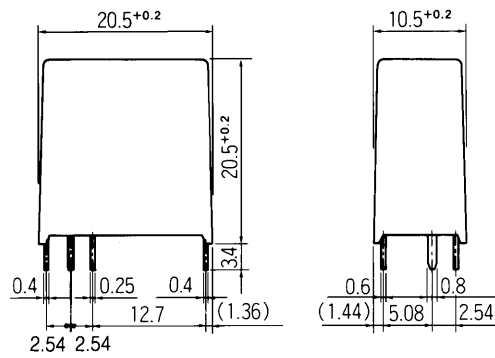
● Schematics (BOTTOM VIEW)



● PC board mounting hole layout (BOTTOM VIEW)



VE type



Unit: mm

RoHS Compliance and Lead Free Relay Information

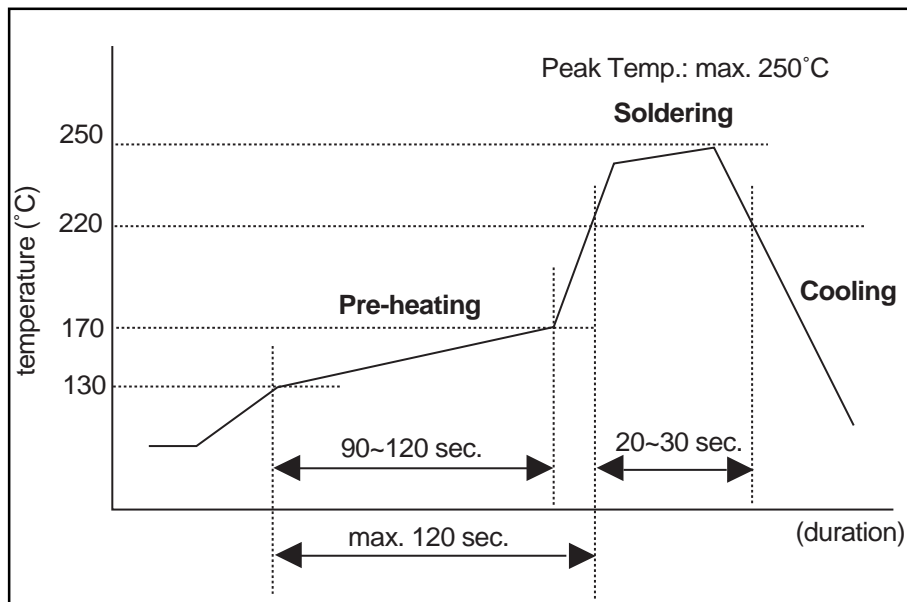
1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. From February 2005 forward Sn-3.0Cu-Ni will be used for FTRB3 and FTR-B4 series relays.
- Most signal and some power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 6 hazardous materials that are restricted by RoHS directive (lead, mercury, cadmium, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in lead assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office. We will ship leaded relays as long as the leaded relay inventory exists.

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu and Sn-3.0 Cu-Ni (only FTR-B3 and FTR-B4 from February 2005)

Reflow Solder condition



Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at 260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 360°C
Duration: maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

4. Tin Whisker

- SnAgCu solder is known as low risk of tin whisker. No considerable length whisker was found by our in-house test.

5. Solid State Relays

- Each lead terminal will be changed from solder plating to Sn plating and Nickel plating. A layer of Nickel plating is between the terminal and the Sn plating to avoid whisker.

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