FUJITSU THE POSSIBILITIES ARE INFINITE

POWER RELAY

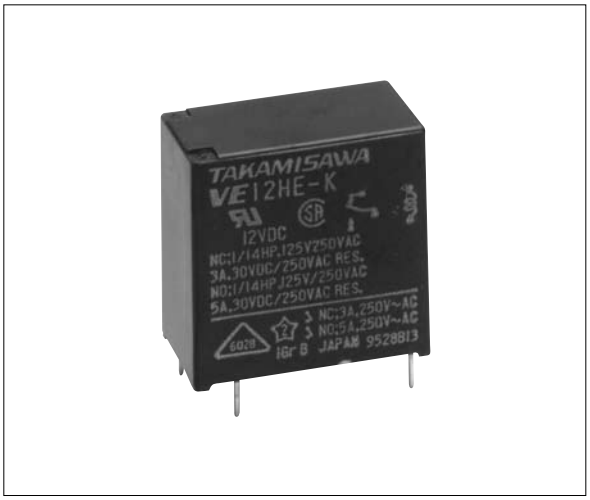
1 POLE—5 A (MEDIUM LOAD CONTROL)

VE SERIES

RoHS compliant

■ FEATURES

- UL, CSA, VDE, CQC recognized
- 1 form A (SPST-NO) or 1 form C (SPDT) contact
- Low cost, miniature relay with big performance in small package
  —Higher surge voltage type is available (6,000 V)
  —2,000 VAC between coil and contacts
- 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
- RoHS compliant since date code: 0434R
  Please see page 8 for more information
- Crepage min. 3.2 mm



■ ORDERING INFORMATION

[Example] VE – 12 H M S E – K – HV – VD
(a) (*) (b) (c) (d) (e) (f) (g) (h) (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 (*)

■ COIL DATA CHART

	MODEL		Nominal voltage	Coil resistance (±10%)	Must operate voltage*	Must release voltage*	Nominal power
	VE-( ) HM VE-( ) HME VE-( ) H VE-( ) HE	VE-( ) HM5 VE-( ) H5					
Standard Type	VE- 5H (M) (E)-K	VE- 5H (M) 5-K	5 VDC	69 Ω	3.5 VDC	0.25 VDC	360 mW
	VE- 6H (M) (E)-K	VE- 6H (M) 5-K	6 VDC	100 Ω	4.2 VDC	0.3 VDC	360 mW
	VE- 9H (M) (E)-K	VE- 9H (M) 5-K	9 VDC	225 Ω	6.3 VDC	0.45 VDC	360 mW
	VE 12H (M) (E)-K	VE-12H (M) 5-K	12 VDC	400 Ω	8.4 VDC	0.6 VDC	360 mW
	VE-18H (M) (E)-K	VE-18H (M) 5-K	18 VDC	900 Ω	12.6 VDC	0.9 VDC	360 mW
	VE-24H (M) (E)-K	VE-24H (M) 5-K	24 VDC	1,600 Ω	16.8 VDC	1.2 VDC	360 mW
	VE-48H (M) (E)-K	VE-48H (M) 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.

*: Specified values are subject to pulse voltage.

■ 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: 360 mW. High sensitivity type: 250 mW			
	Operate Power (at 20°C)		Standard type: 177 mW. High sensitivity type: 130 mW			
	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			
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.

■ INSULATION

Item		VE - ( ) HME VE - ( ) HM	VE - ( ) HE VE - ( ) H	VE - ( ) HM5	VE - ( ) H5	Note
Resistance (initial)		Minimum 1,000 MΩ 1 min.				at 500 VDC
Dielectric Strength	open contacts	1,000 VAC 1 min.	750 VAC 1 min.	1,000 VAC 1 min.	750 VAC 1 min.	
	coil and contacts	2,000 VAC 1 min.				
Surge Voltage (coil and contact)		Standard: 4,000 V, High Sensitive: 6,000V				1.2 x 50μs standard wave

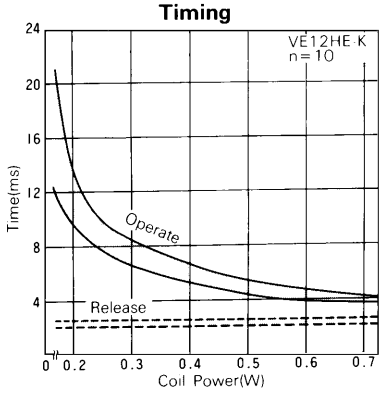
■ SAFETY STANDARDS

Type	Compliance	Contact rating
UL	UL 508 E56140	Flammability: UL 94-V0 (plastics) VE-( )-H: 5A, 250VA/30VDC (N.O. resistive) 3A, 250VAC (N.C. resistive) 5A, 30VDC (N.C. resistive) 1/14 HP, 250VAC /125VAC VE-( )-HM 5A, 250VAC/30VDC (resistive) 1/12 HP, 250VAC /125VAC VE-( )-H5 5A, 250VAC/30VDC (N.O. resistive) 1/10 HP, 250VAC /125VAC (N.O. resistive) 5A, 250VAC/30VDC (N.C. resistive) 1/14 HP, 250VAC /125VAC (N.C. resistive) VE-( )-HM5 5A, 250VAC/30VDC (resistive) 1/10 HP, 250VAC /125VAC
CSA	C22.2 No. 14 LR 35579	
VDE		

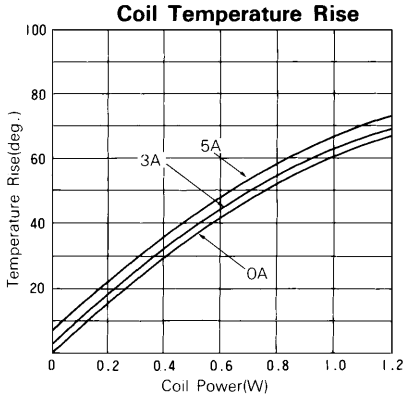
Complies with CQC

■ REFERENCE DATA

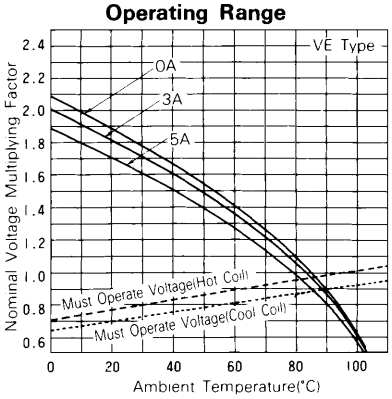
Timing



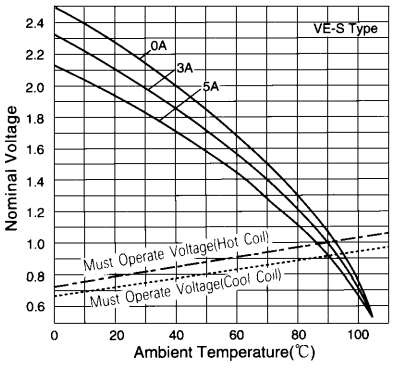
Coil Temperature Rise



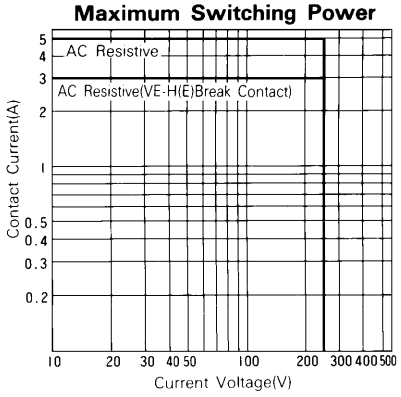
Operating Range



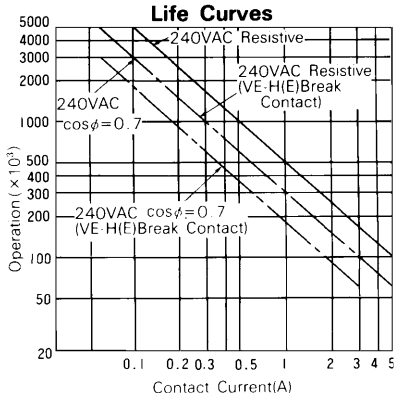
Operating Range



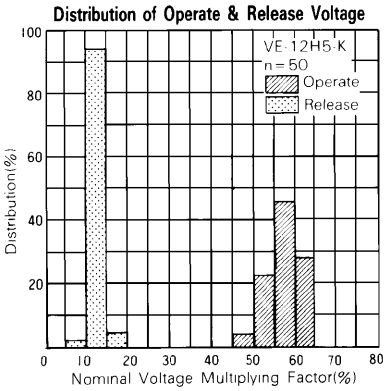
Maximum Switching Power



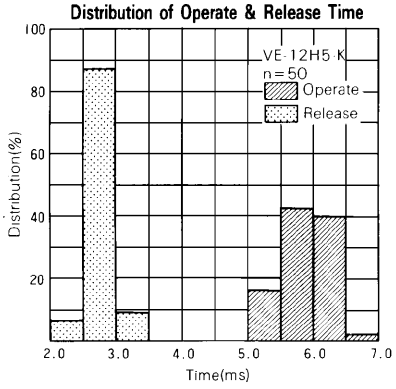
Life Curves



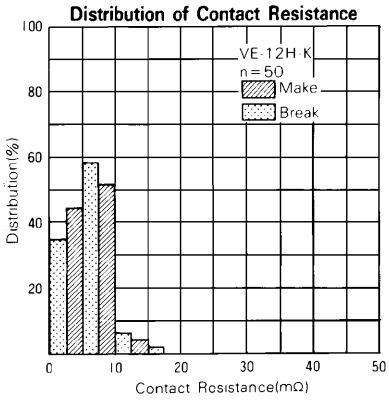
Distribution of Operate & Release Voltage



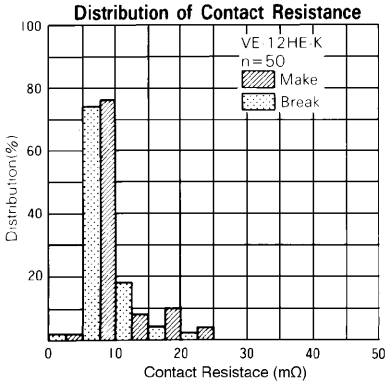
Distribution of Operate & Release Time



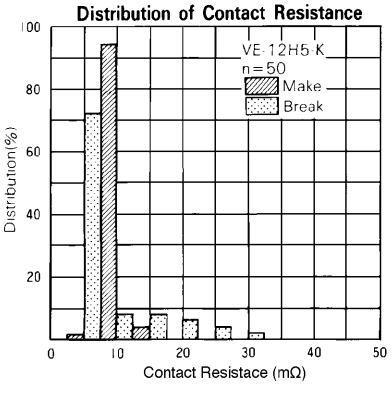
Distribution of Contact Resistance



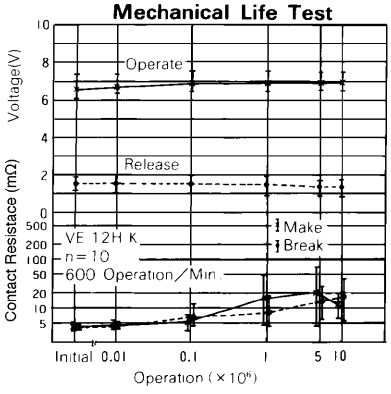
Distribution of Contact Resistance

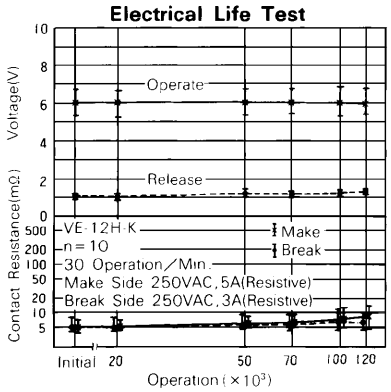


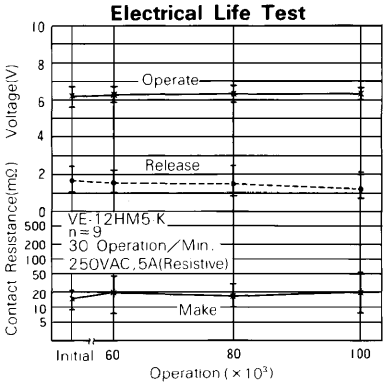
Distribution of Contact Resistance



Mechanical Life Test



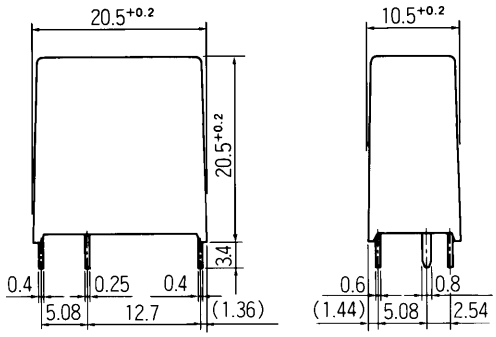




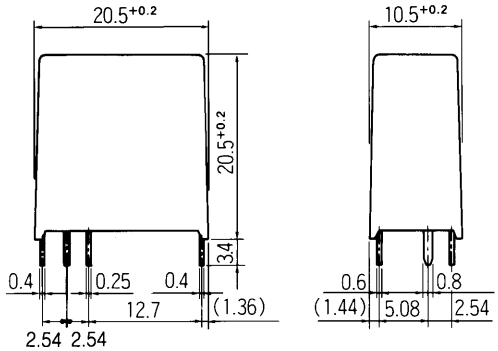
■ DIMENSIONS

- **Dimensions**

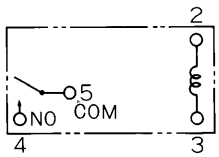
VE-M type

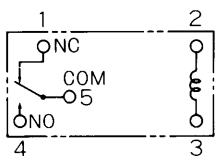


VE type

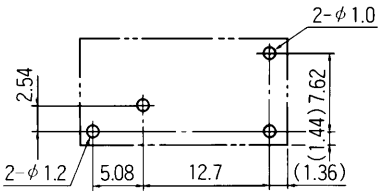


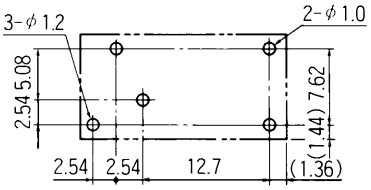
- **Schematics** (BOTTOM VIEW)





- **PC board mounting hole layout** (BOTTOM VIEW)





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. All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded 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.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C soler 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 realys.

4. Tin Whisker

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

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