FUJITSU

POWER RELAY
1 POLE - 5A Medium Load Control
VE Series

■ 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 smal package
  - Higher surge voltage type is available (6,000 V)
  - 2,000 VAC between coil and contacts
- Slim type—meets high density mounting requirements
- Wide operating range
- Easy circuit design with completely separated terminal arrangement (coil and contact terminals)
- Plastic sealed type, RTIII
- Creepage min. 3.2 mm
- RoHS compliant.
  Please see page 6 for more information



■ PARTNUMBER INFORMATION

[Example]

VE	-	12	H	M	S	E	-	K	-	HV	-	VD
(a)	(*)	(b)	(c)	(d)	(e)	(f)		(g)		(h)		(i)

(a)	Relay type	VE	: VE Series
(b)	Coil rated voltage	12	: 5....48VDC Coil rating table at page 3
(c)	Contact rating	H	: Heavy duty type
(d)	Contact configuration	Nil M	: 1 form C (SPDT) : 1 form A (SPST-NO)
(e)	Coil type	Nil S	: Standard type (360mW) : High sensitive type (250mW)
(f)	Contact material	Nil E 5	: Gold overlay silver-nickel (N.C.: 3A, N.O.: 5A) : Silver-nickel (N.C.: 3A, N.O.: 5A) : Silver cadmium oxide (N.C.: 5A, N.O.: 5A)
(g)	Enclosure	K	: Plastic sealed type, RTIII
(h)	Surge strength	Nil HV	: Standard type (4,000V) : High dielectric strength type (6,000V)
(i)	Approvals	VD	: UL, CSA, VDE approved type

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

■ SPECIFICATION

			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 Data	Configuration		1 form A (SPST-NO)	1 form C (SPDT)	1 form A (SPST-NO)	1 form C (SPDT)
	Construction		Single			
	Material		Gold overlay silver nickel, silver nickel, silver-cadmium oxide alloy (AgNi + Au, AgNi, AgCd)			
	Resistance (initial) (at 6 VDC, 1A)		Max. 70mOhm (VE-HM, H) Max. 100mOhm (VE-HME, HE)		Max. 200mOhm	
	Contact rating (resistive)		5A, 250VAC	5A, 250VAC (N.O.) 3A, 250VAC (N.C.)	5A, 250VAC	
	Max. carrying current		7A			
	Max. switching voltage		250VAC, 150 VDC			
	Max. switching power		1,250VA	1,250VA (N.O.) 750VA (N.C.)	1,250VA	
	Max. switching current		5A	5A (N.O.) 3A (N.C.)	5A	
	Min. switching load *		10 mA, 5 VDC (VE-HM, H), 100 mA 5 VDC (VE-HME, HE, HM5, H5)			
Life	Mechanical		Min. 10 x 10^6 operations			
	Electrical (at rating)		Min. 100 x 10^3 operations Standard type		Min. 50 x 10^3 operations High sensitive type	
Coil Data	Rated power (at 20 °C)		360 mW standard type, 250 mW high sensitive type			
	Operate power (at 20 °C)		177 mW standard type, 130 mW high sensitive type			
	Operating temperature range		Standard: -40 °C to +85 °C High sensitivity: -40 °C to +90 °C (no frost)			
Timing Data	Operate (at nominal voltage)		Max. 10 ms (without bounce)			
	Release (at nominal voltage)		Max. 5 ms (no diode)			
Insulation	Resistance (initial)		Min. 1,000MOhm at 500VDC			
	Dielectric strength	Open contacts	1,000VAC 1min.	750VAC 1min.	1,000VAC 1min.	750VAC 1min.
		Contacts to coil	2,000VAC, 1min			
	Surge strength	Coil to contacts	Standard: 4,000V / High sensitive: 6,000V, 1.2 x 50μs standard wave			
Other	Vibration resistance	Misoperation	10 to 55Hz double amplitude 3.3 mm			
		Endurance	10 to 55Hz double amplitude 3.3 mm			
	Shock	Misoperation	Min. 100m/s² (11 ± 1ms)			
		Endurance	Min. 500m/s² (6 ± 1ms)			
	Weight		Approximately 8 g			
	Sealing		Plastic sealed RTIII			

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

■ COIL RATING

Standard type (360 mW)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release-Voltage (VDC) *	Rated Power (mW)
5	5	69	3.5	0.25	360
6	6	100	4.2	0.3	
9	9	225	6.3	0.45	
12	12	400	8.4	0.6	
18	18	900	12.6	0.9	
24	24	1,600	16.8	1.2	
48	48	6,400	33.6	2.4	

High sensitive type (250 mW)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release-Voltage (VDC) *	Rated Power (mW)
5	5	100	3.6	0.25	250
6	6	145	4.3	0.3	
9	9	325	6.5	0.45	
12	12	575	8.6	0.6	
18	18	1,300	13	0.9	
24	24	2,310	17.3	1.2	
48	48	9,220	34.7	2.4	

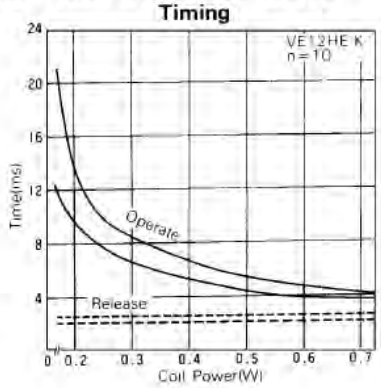
Note: All values in the table are valid for 20°C and zero contact current.
* Specified operate values are valid for pulse wave voltage.

■ SAFETY STANDARDS

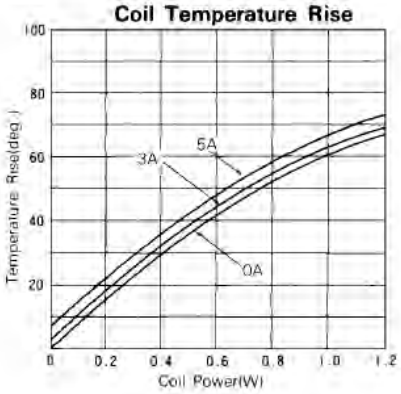
Type	Compliance	Contact rating
UL	UL 508 E 56149, E 45026	Flammability: UL 94-V0 (plastics) VE-( )-H: 5A, 250VA/30VDC (N.O. resistive) 3A, 250VAC (N.C. resistive) 5A, 30VDC (N.C. resistive) 1/14 HP, 250VAC /125VAC VE-( )-HM 5A, 250VAC/30VDC (resistive) 1/12 HP, 250VAC /125VAC VE-( )-H5 5A, 250VAC/30VDC (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	0435 part 201 40017070	5A, 250VAC, cos φ 1 3A, 250VAC, cos φ 1

■ CHARACTERISTIC DATA / REFERENCE DATA

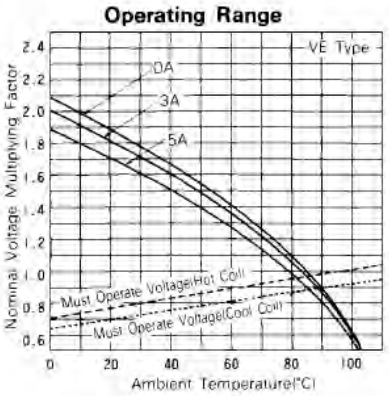
Timing



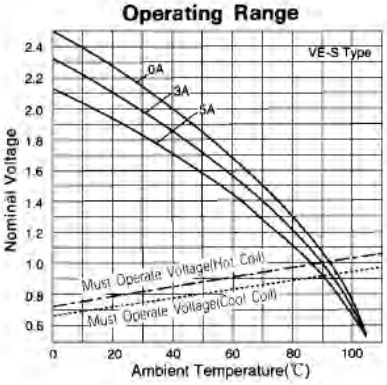
Coil Temperature Rise



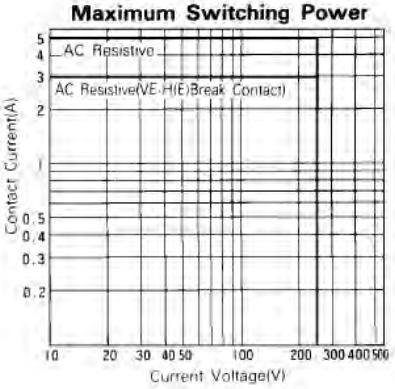
Operating Range



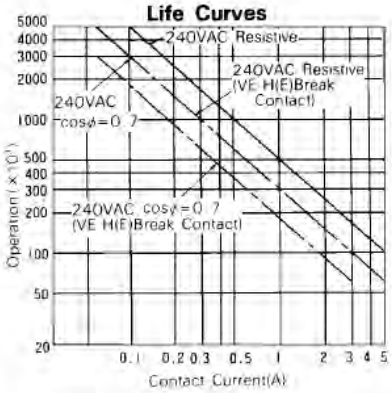
Operating Range



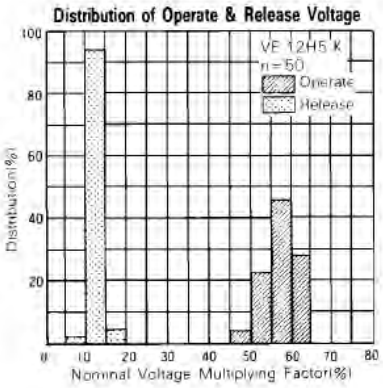
Maximum Switching Power



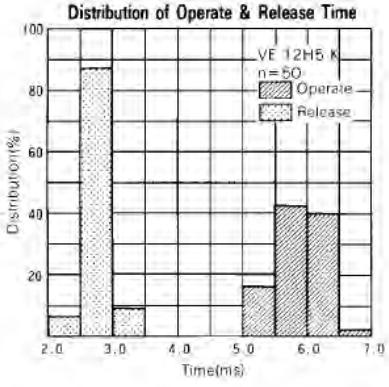
Life Curves



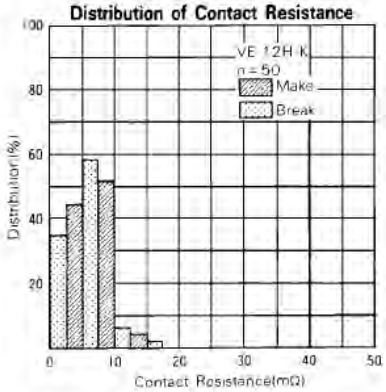
Distribution of Operate & Release Voltage



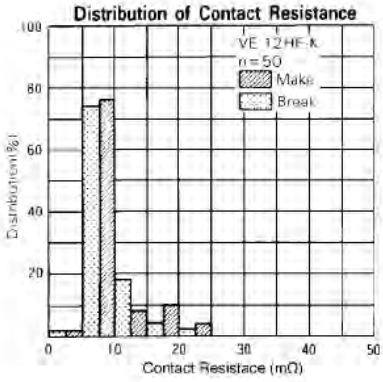
Distribution of Operate & Release Time



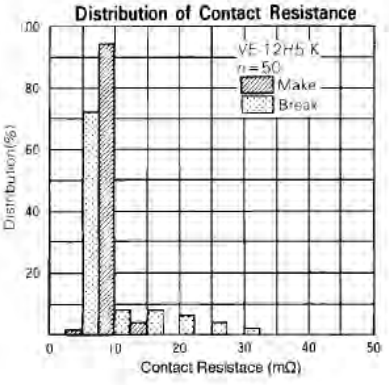
Distribution of Contact Resistance



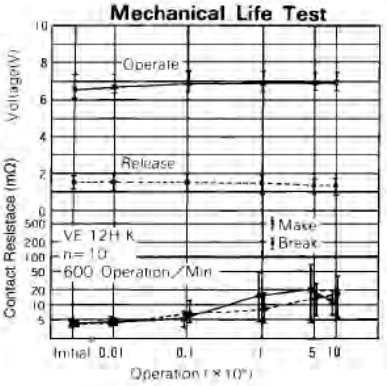
Distribution of Contact Resistance

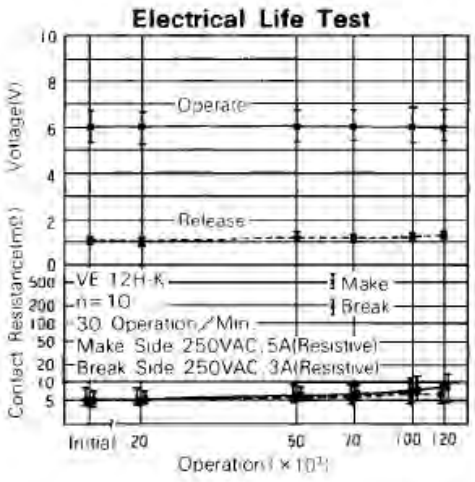


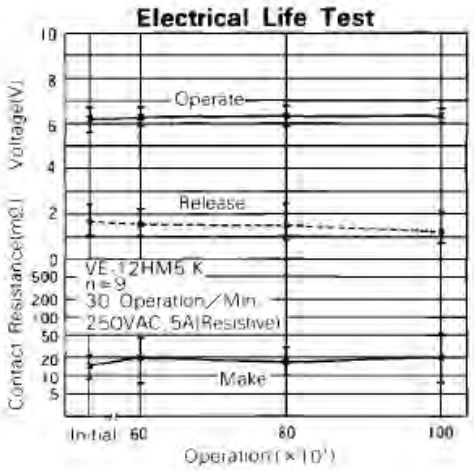
Distribution of Contact Resistance



Mechanical Life Test



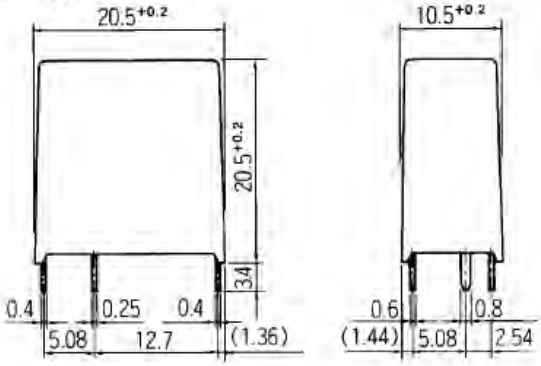




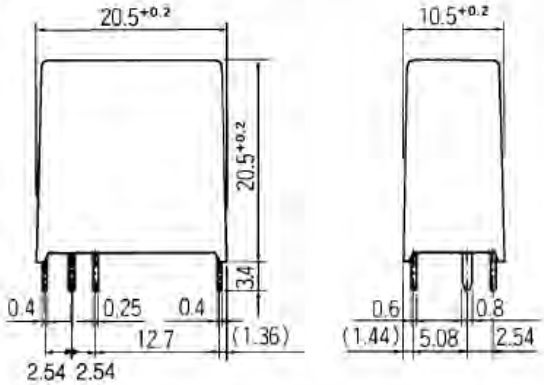
■ DIMENSIONS

● Dimensions

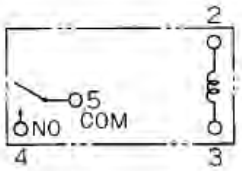
VE-M type

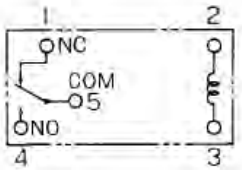


VE type

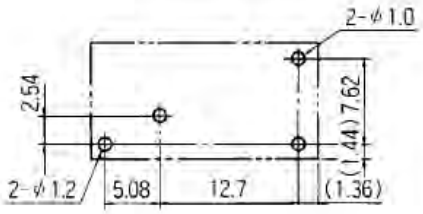


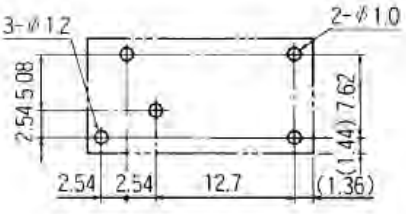
● Schematics (BOTTOM VIEW)





● PC board mounting hole layout (BOTTOM VIEW)





Unit: mm

RoHS Compliance and Lead Free Information

1. General Information

- All signal and power relays produced by Fujitsu Components are compliant with RoHS directive 2002/95EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf
- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.

2. Recommended Lead Free Solder Profile

- Recommended solder Sn-3.0Ag-0.5Cu.

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, unless otherwise indicated.

4. Tin Whiskers

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

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