POWER RELAY

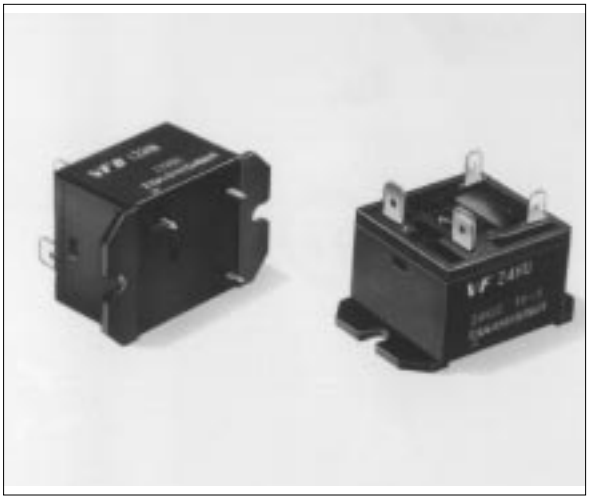
1 POLE—20, 25, 30 A

(HEAVY POWER CONTROL)

VF SERIES

RoHS compliant

■ FEATURES



- UL, CSA, VDE recognized TV-15 rated
- 1 Form A (SPST-NO) contact
- Heavy duty 20 to 30 A small power relay
- High inrush current and high surge voltage
  —Inrush current 65 A
  —Surge strength 10,000 V
- Printed circuit coil terminals type available
- Small package meets high density mounting requirement
- RoHS compliant since date code: 0435L2
  Please see page 7 for more information

■ ORDERING INFORMATION

[Example] VF (a) B (b) – (*) 6 (c) H (d) U (e)

(a)	Series Name	VF : VF Series
(b)	Terminal	Nil : Top ·····All tab-terminal B : Top ·····Tab-terminal (contacts) : Bottom···PCB-terminal (coil and movable contact) D : Top ·····Tab-terminal (coil) Screw tight terminal (contacts) P : Top ·····Screw tight terminal (contacts) : Bottom···PCB terminal (coil and movable contact)
(c)	Nominal Voltage	Refer to the COIL DATA CHARAT
(d)	Contact Rating	H : 30 A M : 25 A L : 20 A
(e)	Standard	U : UL, CSA, VDE rating acquired

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

■ SAFETY STANDARD AND FILE NUMBERS

UL508, 873 (File No. E56140)
C22.2 No. 1, No. 14 (File No. LR35579)
VDE 0435 (File No. 11039-4940-1016)
Please note that UL/CSA rating may differ from the standard rating.

Type	Nominal voltage	Contact rating
VF- ( ) L	3 to 60 VDC	TV-15 120 VAC 1 HP 125 VAC/250 VAC 20 A 250 VAC resistive 15A 250 VAC inductive (PF=0.7)
VF- ( ) M	3 to 60 VDC	TV-15 120 VAC 1.5 HP250 VAC 25 A 250 VAC resistive
VF- ( ) H	3 to 60 VDC	TV-15 120 VAC 2 HP 250 VAC 30 A 250 VAC resistive 22.5A 250 VAC inductive (PF=0.7)

■ SPECIFICATIONS

Item			30 A Type	25 A Type	20 A Type
			VFD, VFP- ( ) H	VF ( ) - ( ) M	VF ( ) - ( ) L
Contact	Arrangement		1 form A (SPST-NO)		
	Material		Silver alloy		
	Style		Single		
	Resistance (initial)		Maximum 30m Ω (at 1 A 6 VDC)		
	Rating	Resistive	30 A 250 VAC	25 A 250 VAC	20 A 250 VAC
		Motor	2 HP 250 VAC	1.5 HP 250 VAC	1 HP 250 VAC
	Maximum Carrying Current		30 A	25 A	20 A
	Maximum Switching Power		7,500 VA	6,250 VA	5,000 VA
	Maximum Switching Voltage		250 VAC		
	Maximum Switching Current		30 A	25 A	20 A
	Minimum Switching Load*1		100 mA 5 VDC		
Coil	Nominal Power (at 20°C)		1.20 to 1.25 W		
	Operate Power (at 20°C)		1.59 to 0.62 W		
	Operating Temperature		–30°C to +65°C (no frost) (refer to the CHARACTERISTIC DATA)		
Time Value	Operate (at nominal voltage)		Maximum 20 ms		
	Release (at nominal voltage)		Maximum 5 ms		
Insulation	Resistance (at 500 VDC)		Minimum 1,000 MΩ		
	Dielectric Strength	between open contacts	1,200 VAC 1 minute		
		between coil and contacts	4,000 VAC 1 minute		
	Surge Strength		10,000 V (at 1.2 x 50 μs)		
Life	Mechanical		5×10^6 operations minimum		
	Electrical (at contact rating)		1×10^5 operations minimum (resistive load)		
			2×10^5 operations minimum (motor load)		
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 1.5 mm)		
		Endurance	10 to 55 Hz (double amplitude of 1.5 mm)		
	Shock Resistance	Misoperation	200 m/s^2 (11 ±1 ms)		
		Endurance	1,000 m/s^2 (6 ±1 ms)		
	Weight		Approximately 55 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.

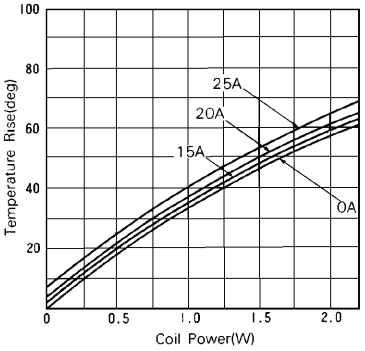
■ COIL DATA CHART

MODEL			Nominal voltage	Coil resistance (±10%)	Must operate voltage	Must release voltage	Nominal power
30 A Type	25 A Type	20 A Type					
VF (D or P) - 3H	VF ( ) - 3M	VF ( ) - 3L	3 VDC	7.5Ω	2.1 VDC	0.3 VDC	1.2 W
VF (D or P) - 5H	VF ( ) - 5M	VF ( ) - 5L	5 VDC	20 Ω	3.5 VDC	0.5 VDC	1.25 W
VF (D or P) - 6H	VF ( ) - 6M	VF ( ) - 6L	6 VDC	30 Ω	4.2 VDC	0.6 VDC	1.2 W
VF (D or P) - 9H	VF ( ) - 9M	VF ( ) - 9L	9 VDC	67 Ω	6.3 VDC	0.9 VDC	1.2 W
VF (D or P) -12H	VF ( ) -12M	VF ( ) -12L	12 VDC	120 Ω	8.4 VDC	1.2 VDC	1.2 W
VF (D or P) -18H	VF ( ) -18M	VF ( ) -18L	18 VDC	270 Ω	12.6 VDC	1.8 VDC	1.2 W
VF (D or P) -24H	VF ( ) -24M	VF ( ) -24L	24 VDC	480 Ω	16.8 VDC	2.4 VDC	1.2 W
VF (D or P) -48H	VF ( ) -48M	VF ( ) -48L	48 VDC	1,920 Ω	33.6 VDC	4.8 VDC	1.2 W
VF (D or P) -60H	VF ( ) -60M	VF ( ) -60L	60 VDC	3,000 Ω	42.0 VDC	6.0 VDC	1.2 W

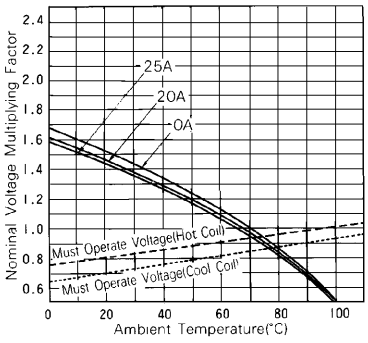
Note: All values in the table are measured at 20°C

■ CHARACTERISTIC DATA

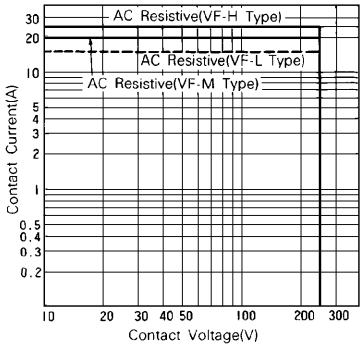
Coil Temperature Rise



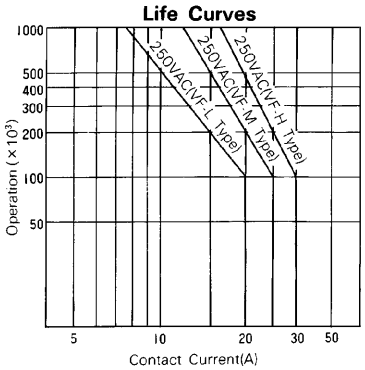
Operating Range



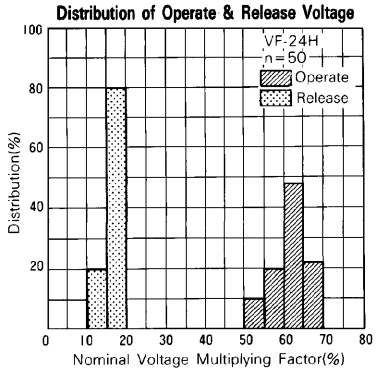
Maximum Switching Power

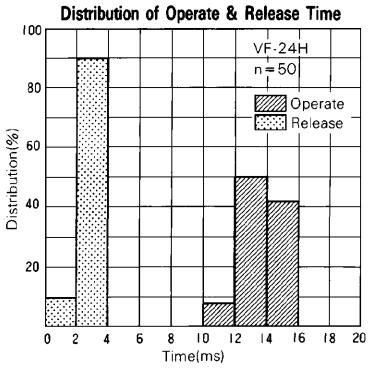


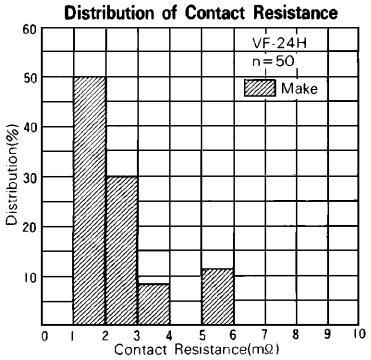
Life Curves

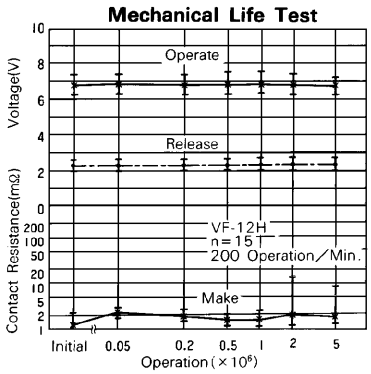


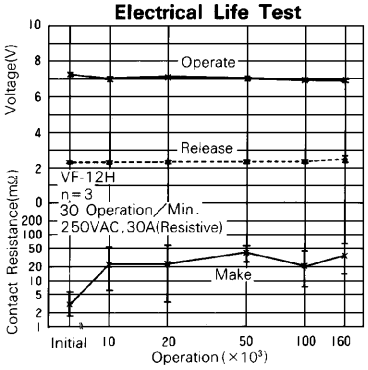
■ REFERENCE DATA







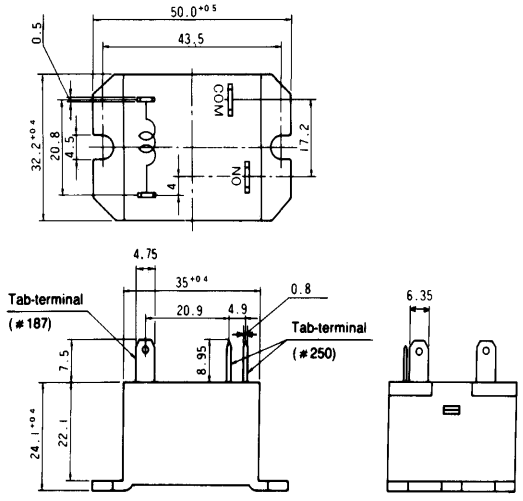




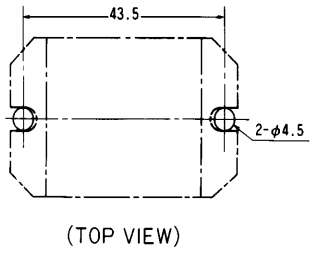
■ DIMENSIONS

●Dimensions

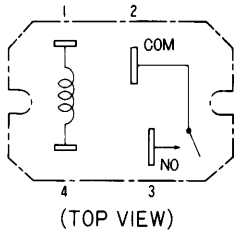
VF type



●Schematics



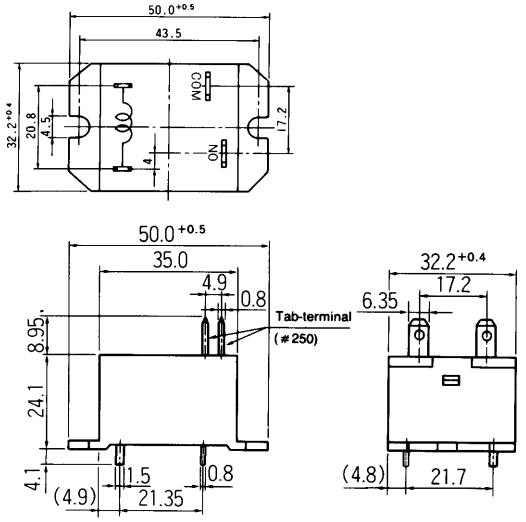
●PC board mounting hole layout



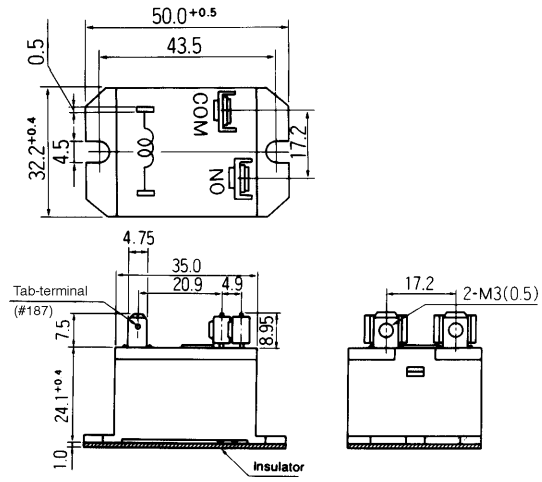
Unit: mm

●Dimensions

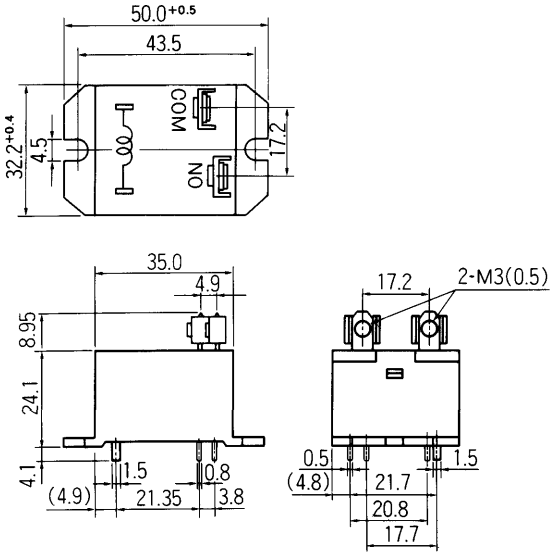
VFB type



VFD type



VFP type



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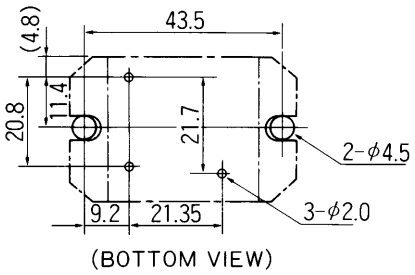
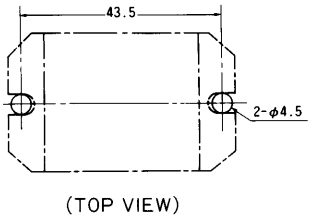
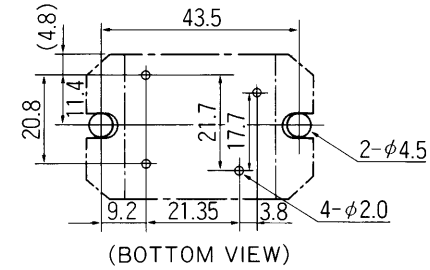
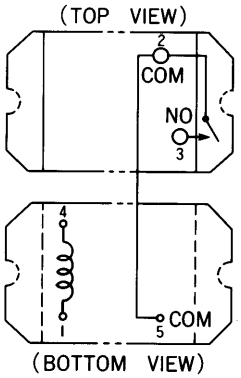
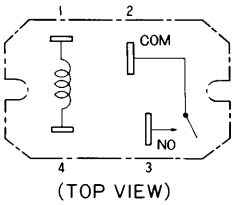


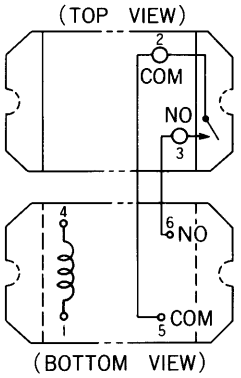




●PC board mounting hole layout







Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

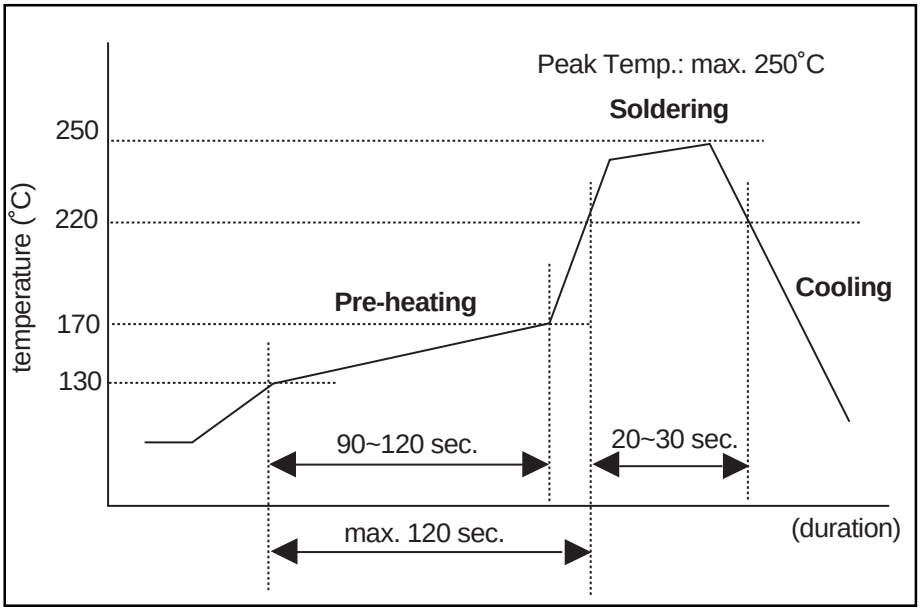
- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. 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 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.

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 condtion



Flow Solder condtion:

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

- SnAgCu solder is known as low riskof 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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