

D E S C R I P T I O N

PRODUCT COVERED:

Model Series VF, may be followed by B, D, or P, followed by one or two digits 3 through 60, followed by L, M or H, may be followed by 5, may be followed by B, followed by U, may be followed by hyphen, may be followed by three digits 300 through 699.

GENERAL:

These components are one-pole, single-throw, magnetic motor controllers with normally opened contact, and DC operating coils. These devices are provided with quick connect terminals. Some of them have three or four terminals for direct printed circuit mounting. The components are for use in Industrial applications, and/or temperature - Indicating and - Regulating applications.

CONTACT RATINGS:

Type VF ( ) L ( ):  
20 A, 250 VAC, resistive 6000 cycles  
1 HP, 125 VAC/250 VAC, 6000 cycles  
TV-15, 120 VAC  
\*  
A150 pilot duty  
Type VF ( ) M ( ):  
25A, 250 VAC, resistive cycles  
1.5 HP, 250 VAC, 600 cycles  
TV-15, 120 VAC  
\*  
B150 pilot duty  
Type VF ( ) H ( ):  
30 A, 250 VAC, resistive, 6000 cycles  
2 HP, 250 VAC, 6000 cycles  
24 A, 270 VAC, resistive, 6000 cycles  
2 HP 270 VAC, 6000 cycles  
TV-15, 120 VAC  
\*  
B150 pilot duty

FOR USE IN TEMPERATURE-INDICATING AND-REGULATING APPLICATIONS:

Type VF ( ) L ( ):  
15A, 250 VAC, resistive 100,000 cycles  
1/4 HP, 125 VAC, 100,000 cycles  
1/3 HP, 250 VAC, 100,000 cycles

Type VF ( ) M ( ):

20 A, 250 VAC, resistive, 100,000 cycles  
1/3 HP, 125 VAC, 100,000 cycles  
1/2 HP, 250 VAC, 100,000 cycles

Type VF ( ) H ( ):

25A, 250 VAC, resistive, 100,000 cycles  
 1/2 HP, 125 VAC, 100,000 cycles  
 3/4 HP, 250 VAC, 100,000 cycles

COIL VOLTAGE:

3 through 60 VDC

NOMENCLATURE:

Part No.	<u>VF</u>	<u>B</u>	<u>12</u>	<u>L</u>	<u>5</u>	<u>B</u>	<u>U</u>	-	<u>300</u>	
	1		2	3	4	5	6	7		8

\* Note: Part No. may be split and appear on two lines.

1. Indicates relay type. 2. Indicated terminal form.

None - All terminals are quick connect type.

B - Stationary contact terminal is quick connect type. Coil terminals are printed circuit terminals. Movable contact terminal is quick connect and printed circuit terminal.

D - Stationary contact arm terminal and movable contact arm terminal are screen connection terminals; and coil terminals are fasten tabs.

P - Stationary contact arm terminal and movable contract arm terminal are screw connection terminal and printed circuit terminal; and coil terminals are printed circuit terminal.

3. Indicates coil voltage.

These are many kinds of coil voltage rated within 3 through 60 V DC. There are nine kinds of standard coil voltage as below:

3 - 3 VDC	5 - 5 VDC	6 - 6 VDC
9 - 9 VDC	12 - 12 VDC	18 - 18 VDC
24 - 24 VDC	48 - 48 VDC	60 - 60 VDC

4. Indicates contact rating.

L - See Page 1. M - See Page 1. H - See Page 1

5. Indicates contact material.

None - Silver-tin oxide or silver-tin oxide-indium oxide contact.

5 - Silver-cadmium oxide contact.

6. Indicates assembly form of frame and base block. None - They are assembled by staking only. B - They are assembled by staking and adhesive.
7. Indicates field for use. U - Use for television receivers, radio products and use for magnetic motor controllers.
8. Indicates minor constructive variations.  
300 - 699 - Additional three digits used for special variations of construction as below.
  - A) Variations of pick-up voltage, non-plic-up voltage, drop out voltage or hold voltage.
  - B) Variations of coil resistance.
  - C) Variations of operate time or release time.

ENGINEERING CONSIDERATIONS (NOT FOR INSPECTOR USE):

Use - For use only with equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Spacings - These components have been judged on the basis of the required spacings in the Standard for Industrial Control Equipment (UL 508) and Standard for temperature indicating and Regulating Equipment (UL 873) which covers the Regulating Equipment product if submitted for unrestricted Listing.

Conditions of Acceptability -

1. These devices should be used within the Recognized ratings as specified above.
2. These devices should be mounted in the intended manner in enclosures having adequate strength and thickness and with acceptable spacings being provided.
3. The terminals are to be factory wired only and the suitability of the connection (including spacings between factory conductors) shall be determined.
4. Only relays using contact material silver-tin oxide or silver-tin oxide-indium oxide have been determined to be acceptable at the specified ratings for the 100,000 cycles Endurance Test. See Page 2 for Nomenclature.
5. \*Since these devices are rated greater than 1HP, short circuit tests shall be considered in the end-product evaluation. No short circuit tests were conducted n these units.

TYPE VF SERIES - FIG. 1 (S81-10164)  
(Represents all VF Series Relays)

General - The general design, shape, and arrangement shall be as illustrated, except where variations are specifically described.

1. Cover - Dimensions 50.0 mm long by 32.2 mm wide by 24.1 mm high, overall. 0.9 mm thick. See ILL. 1. Recognized Component, Plastics, QMFZ2, may be any of the following:
  - A. General Electric Co., Type Lexan, 3412 or 3413.
  - B. Mitsubishi Engineering-Plastics Corp. Type Iupilon, GSN2020R2, GSV2020R2, GS-2020M, -2020MR2, or GS-2030M, -2030MR2.
  - C. Teijin Chemicals, Ltd., Type G-3130 or G-3120.
  - D. Idemitsu Petrochemical Co., Ltd., Type G-2530 or G-2520.
  - E. Toray Industries Inc., Type 1184G-30.
  - F. Union Carbide Corp., Type B-322.
- \*1A. Cover - (For Type VFP Series relay only). Dimensions 50.0 mm long by 32.2 mm wide by 24.1 mm high, overall 0.9 mm thick. See ILL. 1 A. Recognized Component Plastics, QMFZ2, may be one of the following:
  - A. Polyplastics Co., Ltd., Type 330EP.
  - B. Nan Ya Plastics Corp., Type 1403G6.
2. Base - Approximate dimensions 32 mm long by 35 mm wide by 21.7 mm high, overall. Minimum 0.8 mm thick. See ILL. 2. Recognized Component, Plastics, QMFZ2, may be any of the following:
  - A. General Electric Co., Type Lexan, 3412 or 3413.
  - B. Mitsubishi Engineering-Plastics Corp. Type Iupilon, GSN2020R2, GSV2020R2, GS-2020M, -2020MR2, or GS-2030M, -2030MR2.
  - C. Teijin Chemicals, Ltd., Type G-3130 or G03120.
  - D. Idemitsu Petrochemical Co., Ltd., Type G-2530 or G-2520.

- E. Asahi Yukizai Kogyo Co., Ltd. Diallyl phthalate material, Type AV-Lite DP990NJ.
- F. Sumikon Bakelite Co., Ltd., diallyl phthalate material, Type AM113.
- G. Fundow Chemical Co., Ltd., unsaturated polyester material, Type FP100F.
- H. Matsushita Electric Works Ltd., alkyd resin material, Type CE-3110.
- I. Phillips Petroleum Co., Type R-4.
- J. General Electric Co., Specialty Plastics Div., Ultem Products Section, Type 2200.3.

Alternate - R/C (QMFZ2), manufactured by General Electric, Type ULTEM2200R. Approximate dimensions 32 mm long by 35 mm wide by 23 mm high, overall. Minimum 1.6 mm thick.

- 3. Bobbin - Dimensions 29.7 mm long by 17.1 mm wide by 20.2 mm high, overall 0.9 mm thick. See ILLS. 3 and 3A. Recognized Component, Plastics, QMFZ2, may be any of the following:
  - A. General Electric Co., Type Lexan, 3412 or 3413.
  - \* B. Mitsubishi Engineering-Plastics Corp., Type Iupilon, GSN2020R2, GSV2020R2, GS-2020M, -2020MR2, or GS-2030M, -2030MR2.
  - C. Teijin Chemicals, Ltd., Type G-3130 or G-3120.
  - D. Idemitsu Petrochemical Co., Ltd., Type G-2530 or G-2520.

TYPE VF SERIES - FIG. 2 (S81-10163)

- 1. Terminals - Coil terminals, brass plate. See Ill. 4 for dimensions. Two types available, swaged to base, press-fit to bobbin.

2. Movable Contact Assembly - Combination of movable contact arm and terminal peened together. See Ill. 5, 5A, and 9.

Terminal - Brass or copper alloy, quick connect tab with detent or direct printed circuit mounting tab or screw connection tab. 0.8 mm thick.

Movable Contact Arm - Copper-nickel alloy, copper or copper alloy 0.2 mm thick, 27.5 mm long by 8 mm wide, overall.

Washer - May be provided with copper or copper alloy washer, 7.0 mm diameter, 0.6 mm thick.

3. Contact - Dimensions, for Type VF ( ) L(): 5.0 mm diam; VF ( ) M ( ): 6.0 mm diam; VF ( ) H(): 7.0 mm diam by 1.3 mm thick, overall. Riveted to movable contact arm. Copper base overlaid with silver-tin oxide or silver-tin oxide-indium oxide, 0.3 mm thick.

With number-5: Copperbase overlaid with silver-cadmium oxide, 0.3 mm thick.

- 4.\* Stationary Contact Arm - Brass plate, copper or copper alloy approx dimensions 26 or 37 mm long by 10.4 mm wide, overall, 7.0 mm wide at contact arm, 0.8 mm thick. See Ill. 6, 9; 10 and 11 for dimensions.

5. Coil - Random wound magnet wire, polyurethane enameled.

6. Frame - Plated steel, L-shaped, 19.1 by 26.5 mm and 18 by 12 mm, overall, 2.0 mm thick. Swaged to base.

7. Core - Plated steel with collar, approximate dimensions 26.9 mm long by 5.4 mm diam, overall. Swaged to frame over bobbin.

File E56140 Vol. 1 Sec. 8 Page 8 Issued: 2-23-82  
and Report Revised: 1-17-83

8. Non-Magnetic Plate (Optional) - Pentagonal polyester \* sheet, 12 mm by 15.6 mm, 0.04 mm thick overall.

9. Back Stop - Polyamid piece, crank-shaped or T-shaped. Dimensions 6.5 by 3.2 and 3.0 mm width (crank-shaped \* type); 7.0 by 2.5 and 5.0 mm width (T-shaped type). Press-fit to frame.

10. Hinge Spring - U-shaped stainless steel wire spring, dimensions 0.5 mm diam, 6.0 by 11.3 mm, overall. Clipped to armature and frame.

11. Actuator Card - Phenolic or ceramic plate, 1.0 mm thick, 12.0 by 9.5 mm, overall. Shaped as shown.

12. Balance Spring - Stainless steel plate, 9.0 by 28.5 mm overall, 0.25 mm thick. Shaped as shown. Press-fit to base.

13. Armature - Steel, L-shaped, 1.0 mm thick, 12.0 mm wide \* by 26 and 17.4 mm long, overall. See Ill. 7.

Alternate - Same as above, except shape. See Ill. 8.