



VFM series

20 Amp Relay With Quick Connect Terminals for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 20A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in terminals.
- Plastic enclosure.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 and AgSnO (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
 6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC⁽¹⁾.
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C	
		NO	NC
Max. Continuous Current	20A	20A	10A
Max. Make Current	120A(2)	120A(2)	40A
Max. Break Current ⁽¹⁾	30A	30A	15A

Max. Switching Power: 35-250 watts DC (voltage dependent⁽¹⁾).
Min. Recommended Current: 1.0 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 15 amp contact load.
 250 millivolts, maximum, for normally closed contacts @ 10 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 20 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage.):
 1.6W, unswitched.
 1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Coil Data (@ 23°C Coil Temperature)

Coil Designator (VDC)	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable ⁽³⁾ Overdrive	
						@ 23°C	@ 85°C
F	12	90	0.5	7.2	1.2	20.4	14.9

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 4 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 1.5 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage).

Environmental Data

Temperature Range: **Storage:** -40°C to +155°C.
Operating: -40°C to +125°C⁽⁴⁾.
Shock: 10g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
 10-40 Hz., 1.27mm double amplitude.
 40-70 Hz., 5g's constant.
 70-100 Hz., 0.5mm double amplitude.
 100-500 Hz., 10g's constant.

Mechanical Data

Termination: Quick connect.
Enclosure: Plastic dust cover.
Weight: With QC terminals: 20g (0.7 oz.) approximately.

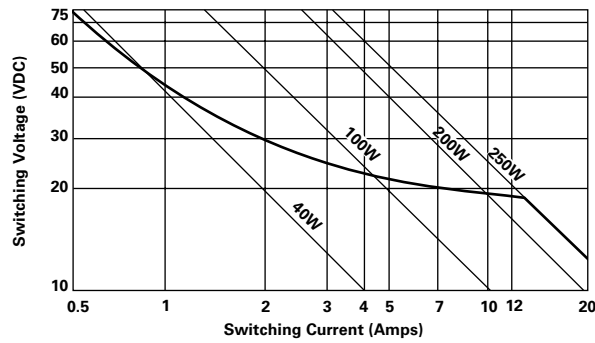
Abnormal Operation

Overload Current: 40A, 36 sec.⁽⁵⁾
 80A, 10 sec.
 200A, 2.5 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

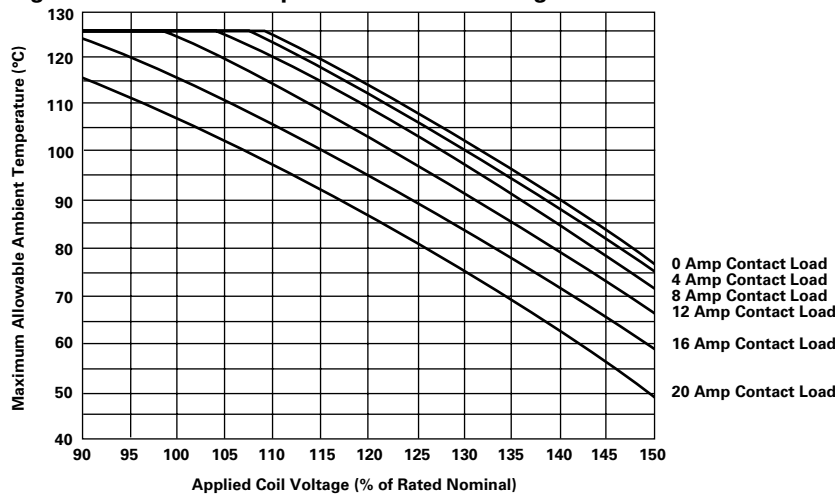
- (1) See Figure 1.
- (2) Inrush current for lamp load.
- (3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
- (4) See Figure 2.
- (5) Current and times are compatible with circuit protection by a typical 20A automotive circuit breaker. Relay will make, carry and break the specified current.

Figure 1 – Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 – Ambient Temperature vs. Coil Voltage for Continuous Load



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
 - = 1°C @ 4 amps
 - = 4.5°C @ 8 amps
 - = 9.5°C @ 12 amps
 - = 18°C @ 16 amps
 - = 26.5°C @ 20 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.5 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Terminals	Contact Material
VFM-11F21	1 Form A	Quick connect	AgNi 0.15
VFM-11F41	1 Form A	Quick connect	AgSnO
VFM-15F21	1 Form C	Quick connect	AgNi 0.15
VFM-15F41	1 Form C	Quick connect	AgSnO

*Standard Coil Voltages: F = 12VDC

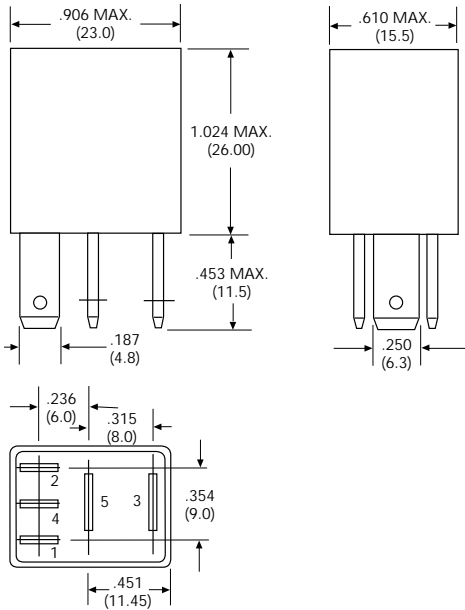
Optional Coil Suppression

Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.

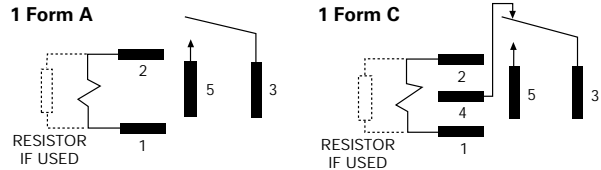
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present..

Outline Dimensions



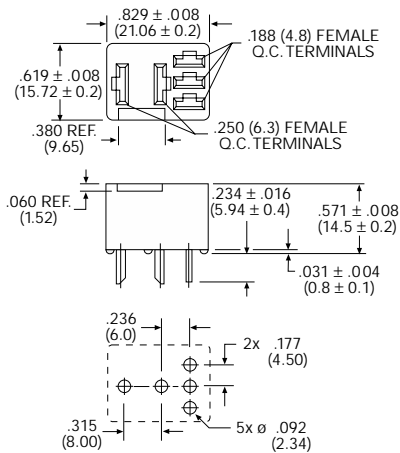
Wiring Diagrams (Bottom Views)



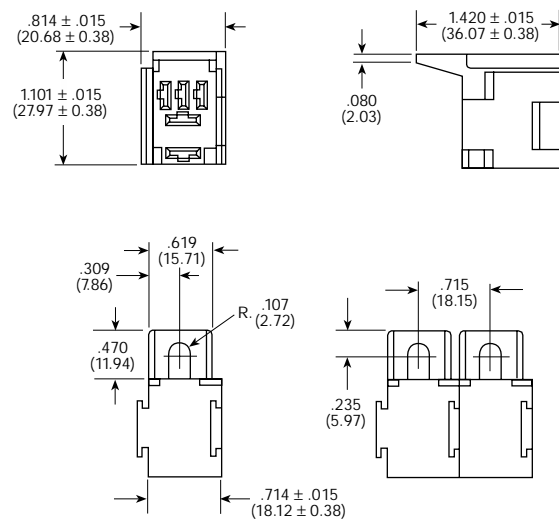
Connector

Connectors For Use With VFM Relays

**PC Board Socket
VCFM-1000**



**Wire Harness Style, Bracket Mount Socket (Order Terminals Separately)
VCFM-1002**



Connector/Terminal Usage Chart - Boldface items are stocked.

Connector	Terminal P/N	Required Crimp Terminals (Order Separately)					
		Alternate P/N	Wire AWG	Qty. Required		Use in Cavities	
				Form A	Form C	Form A	Form C
VCFM-1000	None	None	N/A	N/A	N/A	N/A	N/A
VCFM-1002	26A1349A	AMP 60249-1	12-16				
	26A1349B	AMP 42281-1	14-18	2	2	3 & 5	3 & 5
	26A1492A	G&H K26313	15-20				
	26A1492B	G&H K26312	14-16	2	3	1 & 2	1, 2 & 4