



VF4 series

40 Amp Relay With PC Board or 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

- 40A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in or PC board terminals.
- Optional mounting bracket.
- Various enclosure options.

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 (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	60A	60A	40A
Max. Make Current ⁽²⁾	120A	120A	45A
Max. Break Current ⁽¹⁾	60A	60A	40A

Max. Switching Power: 50-500 watts DC (voltage dependent)⁽¹⁾.
Min. Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 40 amp contact load.
 250 millivolts, maximum, for normally closed contacts @ 30 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 40 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 6, 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage.):
 1.6W, un-suppressed.
 1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Coil Data

Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable ⁽³⁾ Overdrive (VDC)	
						@ 23°C	@ 85°C
D	6	22.5	0.2	3.6	0.6	10.1	7.9
F	12	90	0.8	7.2	1.2	20.2	15.7
H	24	360	2.7	14.4	2.4	40.5	31.5

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
 Technical support:
 Refer to inside back cover.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 7 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for un-suppressed 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: 20g, 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., 5 g's constant.
 70-100 Hz., 0.5mm double amplitude.
 100-500 Hz., 10 g's constant.

Mechanical Data

Termination: 0.250" quick connect and printed circuit terminals.
Enclosures:
Dust Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Shrouded Dust Cover: Protects relay and relay connector (order separately) from dust and splash.
Weatherproof Cover: Mates with a connector (order separately) to seal relay from salt spray etc. Recommended for under hood application.
Cover Retention: Dust cover will withstand a 33.7 pound (150 Newton) force (axially applied) without detachment. Ultrasonic cover: 50 pound (220 Newton).
Weight: 31g (1.1 oz.) approximately (dust cover model).

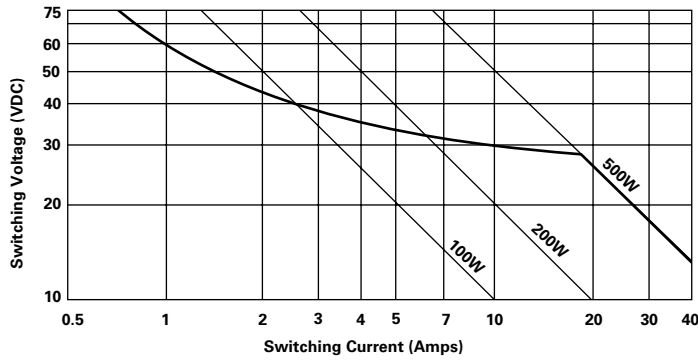
Abnormal Operation

Overload Current: Consult factory.
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.
Flammability: UL94V-0 external; UL94-HB or better, internal parts (meets FMVSS 302).

Notes

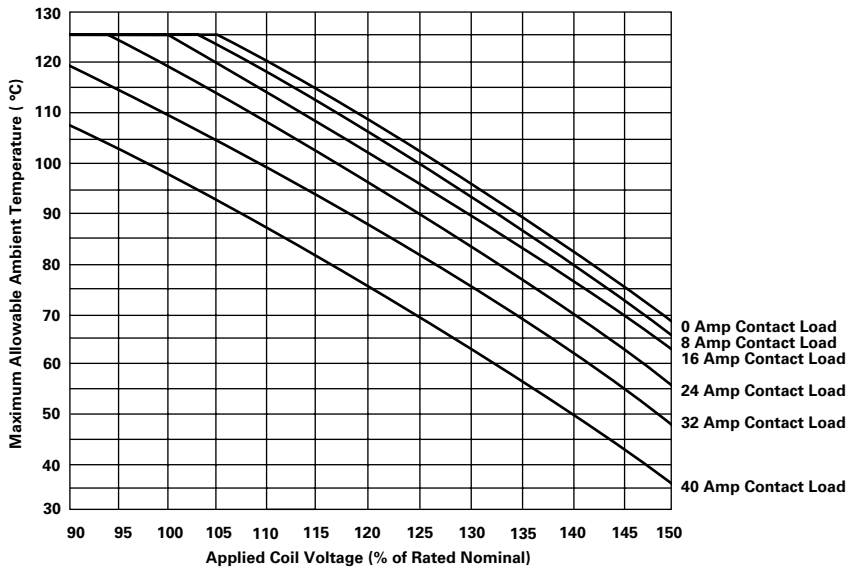
- (1) See Figure 1.
- (2) Inrush current for lamp load.
- (3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.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



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
 - = 2°C @ 8 amps
 - = 5°C @ 16 amps
 - = 11°C @ 24 amps
 - = 20°C @ 32 amps
 - = 32°C @ 40 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.6 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	Contact Material	Enclosure	Terminals
VF4-11 * 11	1 Form A	AgNi0.15	Dust cover	Quick connect
VF4-11 * 13	1 Form A	AgNi0.15	Dust cover	Printed circuit
VF4-15 * 11	1 Form C	AgNi0.15	Dust cover	Quick connect
VF4-15 * 13	1 Form C	AgNi0.15	Dust cover	Printed circuit
VF4-25 * 11	1 Form C	AgNi0.15	Shrouded dust cover	Quick connect
VF435 * 11	1 Form C	AgNi0.15	Weatherproof cover	Quick connect
VF4-41 * 11	1 Form A	AgNi0.15	Dust cover with bracket	Quick connect
VF4-45 * 11	1 Form C	AgNi0.15	Dust cover with bracket	Quick connect
VF4-45 * 21	1 Form C	AgSnO	Dust cover with bracket	Quick connect
VF4-51 * 11	1 Form A	AgNi0.15	Shrouded dust cover with bracket	Quick connect
VF4-55 * 11	1 Form C	AgNi0.15	Shrouded dust cover with bracket	Quick connect
VF4-61 * 11	1 Form A	AgNi0.15	Weatherproof cover with bracket	Quick connect
VF4-65 * 11	1 Form C	AgNi0.15	Weatherproof cover with bracket	Quick connect
VF4-81 * 11	1 Form A	AgNi0.15	Dust cover with molded bracket	Quick connect
VF4-85 * 11	1 Form C	AgNi0.15	Dust cover with molded bracket	Quick connect

*Standard Coil Voltages: D = 6VDC (Consult factory for availability).
F = 12VDC
H = 24VDC (Consult factory for availability).

Optional Coil Suppression

Add suffix -S07 for 180 ohm resistor in parallel with 6VDC coil.
Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.
Add suffix -S08 for 2,700 ohm resistor in parallel with 24VDC coil.

Epoxy Sealed Construction

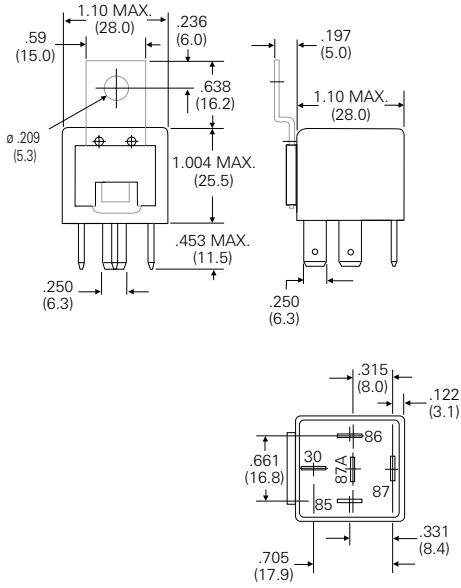
Add suffix -C01 for epoxy sealed unit.
Add suffix -C05 for epoxy sealed unit with resistor.

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

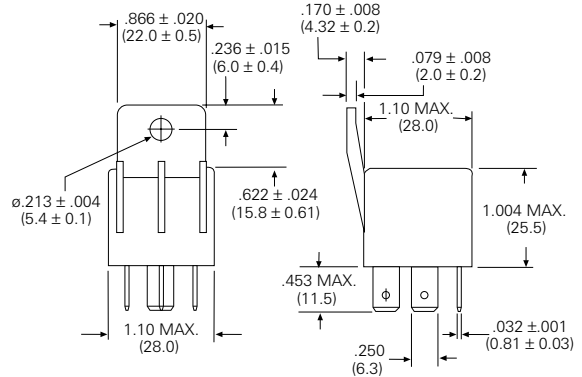
- VF4-15F11 VF4-15H11
- VF4-15F13 VF4-15H13
- VF4-45F11 VF4-65F11-S01

Outline Dimensions

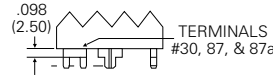
Dust Cover With Quick Connect Terminals
VF4-1_ (Without Bracket) & VF4-4_ (With Bracket)



Plastic Bracket Cover With Quick Connect Terminals
VF4-8_



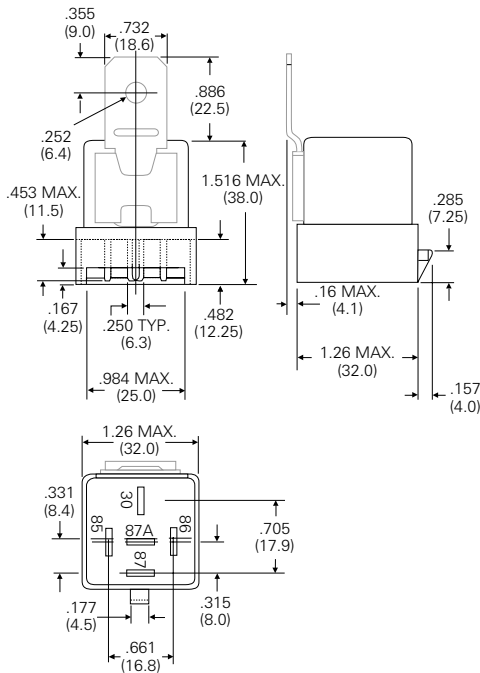
Printed Circuit Board Terminals
Clinchable Power



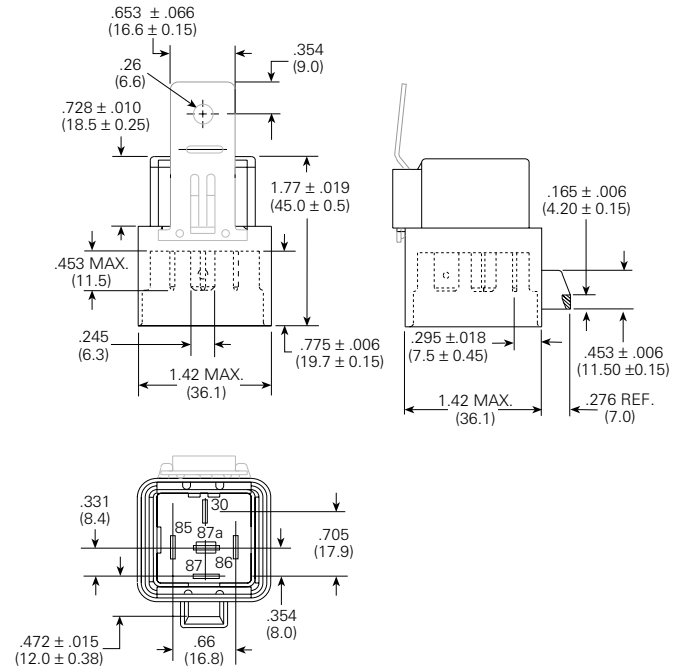
Single Pin



Shrouded Dust Cover With Quick Connect Terminals
VF4-2_ (Without Bracket) & VF4-5_ (With Bracket)

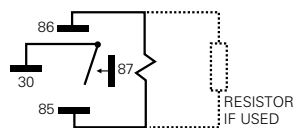


Weatherproof Cover With Quick Connect Terminals
VF4-3_ (Without Bracket) & VF4-6_ (With Bracket)

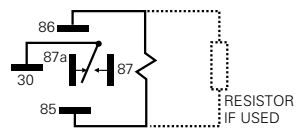


Wiring Diagrams (Bottom Views)

1 Form A

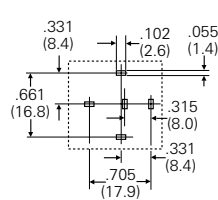


1 Form C

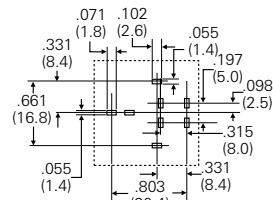


Suggested PC Board Layouts (Bottom Views)

VF4-XXX13



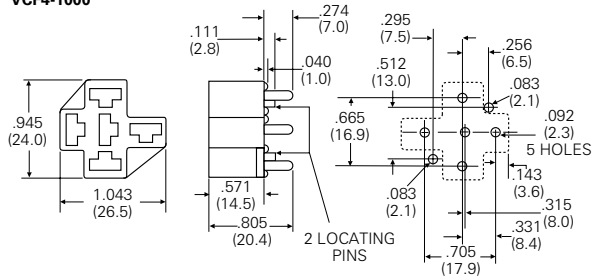
VF4-XXX12



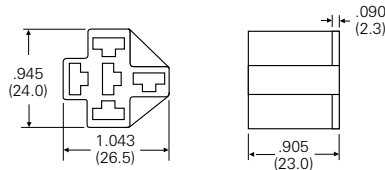
Connectors

Connectors For Use With Quick Connect Terminal VF4-1, VF4-4 And VF4-8 Relays

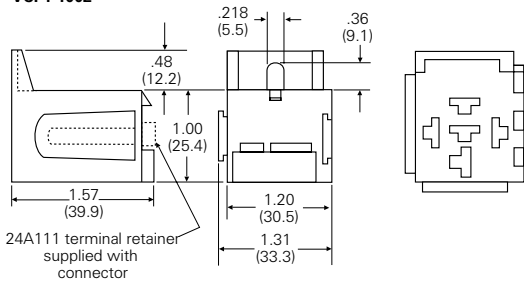
**PC Board Socket
VCF4-1000**



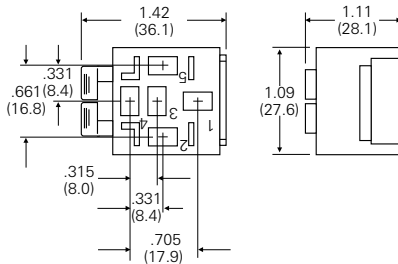
**Wiring Harness Style Connector (order terminals separately)
VCF4-1001**



**Wiring Harness Style, Bracket Mount Socket (order terminals separately)
(Mount individually or can be interlocked)
VCF4-1002**



**Connector For Use With VF4-2 or VF4-5 Relays With Shrouded Dust Cover (order terminals separately)
VCF4-1003**



Connector For Use With VF4-3 or VF4-6 Relays With Weatherproof Cover
Connectors to mate with the weatherproof cover relays are available from Delphi Packard (1-800-PACKARD).
(Typical Delphi Packard part number: 12065685).

Connector/Terminal Usage Chart - Our authorized distributors are more likely to stock boldface items.

Connector	Terminal P/N	Required Crimp Terminals (Order Separately)			
		Alternate P/N	Wire AWG	Qty. Required	
				Form A	Form C
VCF4-1000	None	None	N/A	0	0
VCF4-1001	26A1349A	AMP 60249-1	12-16	4	5
	26A1349B	AMP 42281-1	14-18		
VCF4-1002 VCF4-1003	26A1348A	Packard 12015864	18-20	4	5
	26A1348B	Packard 12015865	14-16		
	26A1348C	Packard 12084588	10-12		