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.

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 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: 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.

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.
Max. Switching Voltage: 75VDC (1).
Max. Load Current (@ 14VDC Load Voltage):

<table>
<thead>
<tr>
<th>Load</th>
<th>Form A (NO)</th>
<th>Form C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Continuous Current</td>
<td>60A</td>
<td>NO</td>
</tr>
<tr>
<td>Max. Make Current (2)</td>
<td>120A</td>
<td>120A</td>
</tr>
<tr>
<td>Max. Break Current (1)</td>
<td>60A</td>
<td>60A</td>
</tr>
</tbody>
</table>

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: (at 23°C coil temp. and rated coil voltage;)
1.6W, unsuppressed.
1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

<table>
<thead>
<tr>
<th>Coil Designator</th>
<th>Rated Coil Voltage (VDC)</th>
<th>Coil Resistance (Ω)</th>
<th>Coil Inductance (H)</th>
<th>Must-Operate Voltage (VDC)</th>
<th>Must-Release Voltage (VDC)</th>
<th>Allowable Overdrive (VDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>6</td>
<td>22.5</td>
<td>0.2</td>
<td>3.8</td>
<td>0.8</td>
<td>10.1</td>
</tr>
<tr>
<td>F</td>
<td>12</td>
<td>90</td>
<td>0.8</td>
<td>7.2</td>
<td>1.2</td>
<td>20.2</td>
</tr>
<tr>
<td>H</td>
<td>24</td>
<td>360</td>
<td>2.7</td>
<td>14.4</td>
<td>2.4</td>
<td>40.5</td>
</tr>
</tbody>
</table>

Thermal Resistance:
50°C per actual coil watt in still air with no contact load current.

Dimensions are shown for reference purposes only. Dimensions are in inches over (millimeters) unless otherwise specified. Specifications and availability subject to change.

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

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.

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Arrangement</th>
<th>Contact Material</th>
<th>Enclosure</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF4-11 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Dust cover</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-11 * 13</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Dust cover</td>
<td>Printed circuit</td>
</tr>
<tr>
<td>VF4-15 * 11</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Dust cover</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-15 * 13</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Dust cover</td>
<td>Printed circuit</td>
</tr>
<tr>
<td>VF4-25 * 11</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Shrouded dust cover</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-45 * 21</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Dust cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-41 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Shrouded dust cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-45 * 21</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Dust cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-41 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Weatherproof cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-45 * 21</td>
<td>1 Form C</td>
<td>AgNi0.15</td>
<td>Dust cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-55 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Weatherproof cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-55 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Weatherproof cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-65 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Weatherproof cover with bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-65 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Dust cover with molded bracket</td>
<td>Quick connect</td>
</tr>
<tr>
<td>VF4-85 * 11</td>
<td>1 Form A</td>
<td>AgNi0.15</td>
<td>Dust cover with molded bracket</td>
<td>Quick connect</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF4-15F11</td>
<td>VF4-15H11</td>
</tr>
<tr>
<td>VF4-15F13</td>
<td>VF4-15H13</td>
</tr>
<tr>
<td>VF4-45F11</td>
<td>VF4-65F11-S01</td>
</tr>
</tbody>
</table>

*Specifications and availability subject to change.*

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Technical support: Refer to inside back cover.
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__

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)

Printed Circuit Board Terminals
Clinchable Power

Single Pin

Wiring Diagrams (Bottom Views)

1 Form A 1 Form C

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

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

<table>
<thead>
<tr>
<th>Connector</th>
<th>Terminal P/N</th>
<th>Required Crimp Terminals (Order Separately)</th>
<th>Alternate P/N</th>
<th>Wire AWG</th>
<th>Qty. Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCF4-1000</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>VCF4-1001</td>
<td>26A1349A</td>
<td>AMP 60249-1</td>
<td>12-16</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>26A1349B</td>
<td>AMP 42281-1</td>
<td>14-18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VCF4-1002</td>
<td>26A1348A</td>
<td>Packard 12015884</td>
<td>18-20</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>VCF4-1003</td>
<td>26A1348B</td>
<td>Packard 12019885</td>
<td>14-16</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>26A1348C</td>
<td>Packard 12084588</td>
<td>10-12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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