

VF4 A (Standard, Shrouded and Weatherproof)



Features

- Limiting continuous current 40 A
- Pin assignment according to ISO 7588 part 1
- Plug-in terminals

Customized Versions on Request

- Integrated components (e.g. resistor, diode)
- Customized marking
- Special covers (e.g. brackets, shrouded)
- For latching (bistable) version refer to Mini Relay Latching

Typical Applications

- Cross carline up to 40 A for example:
- ABS control
 - Blower fans
 - Car alarm
 - Cooling fan
 - Electric Power Steering
 - Energy management
 - Engine control
 - Fuel pump
 - Heated front screen
 - Ignition
 - Immobilizer
 - Lamps front, rear, fog light
 - Main switch/supply relay
 - Seatbelt pretensioner
 - Trunk lock
 - Valves
 - Window lifter
 - Wiper control

Please contact Tyco Electronics for relay application support.



VF4_3D1

Design

- ELV compliant
- Dustproof; protection class IP54 to IEC 529 (EN 60 529)
- Sealed: protection class IP67 to IEC 529 (EN 60 529)
- Shrouded: protection class IP67 to IEC 529 (EN 60 529) if used with special connector

Weight

Approx. 35 g (1.2 oz.)

Nominal Voltage

12 V or 24 V

Terminals

Quick connect terminals similar to ISO 8092-1, coil and load 6.3 x 0.8 mm; surfaces tin plated

Accessories

Connectors see page 233 ff

Conditions

All parametric, environmental and endurance tests are performed according to EIA Standard RS-407-A at standard test conditions unless otherwise noted: 23°C ambient temperature, 20 - 50% RH, 998.9 ±33.9 hPa.

For general storage and processing recommendations please refer to our Application Notes and especially to *Storage* in the "Glossary" page 23 or at <http://relays.tycoelectronics.com/appnotes/>

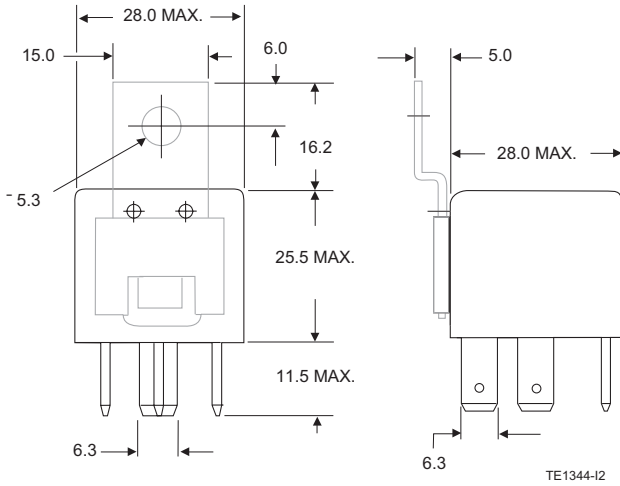
Disclaimer

All technical performance data apply to the relay as such, specific conditions of the individual application are not considered. Please always check the suitability of the relay for your intended purpose. We do not assume any responsibility or liability for not complying herewith. We recommend to complete our questionnaire and to request our technical service. Any responsibility for the application of the product remains with the customer only. All specifications are subject to change without notification. All rights of Tyco Electronics are reserved.

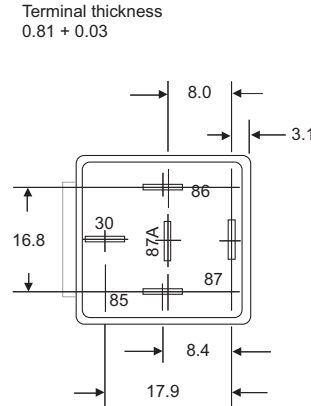
VF4 A (Standard, Shrouded and Weatherproof)

Dimensional Drawing

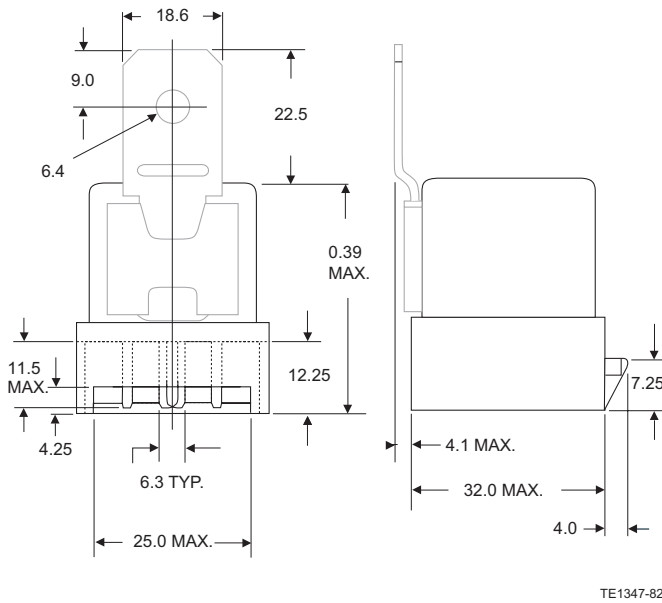
VF4 A with Dust Cover
VF4-1** (without bracket) and VF4-4**** (with bracket)**



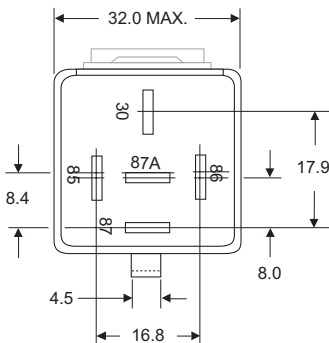
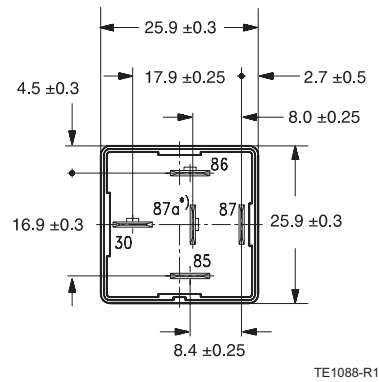
View of the Terminals (bottom view)



VF4 A with Shrouded Dust Cover
VF4-2** (without bracket) and VF4-5**** (with bracket)**



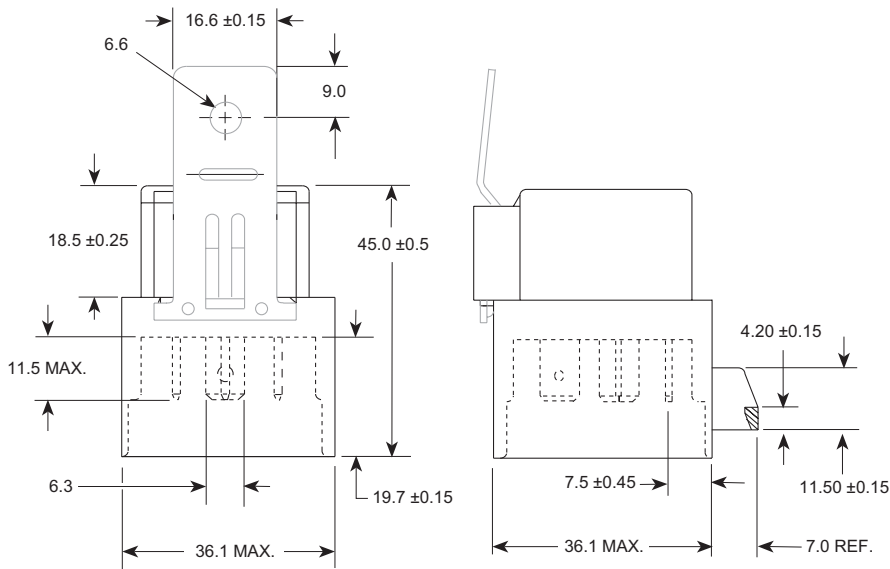
View of the Terminals (bottom view)



VF4 A (Standard, Shrouded and Weatherproof)

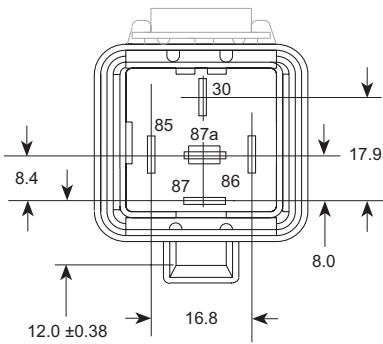
Dimensional Drawing

VF4 A with Weatherproof Cover
VF4-3** (without bracket) and VF4-6**** (with bracket)**




TE1348-91

View of the Terminals (bottom view)

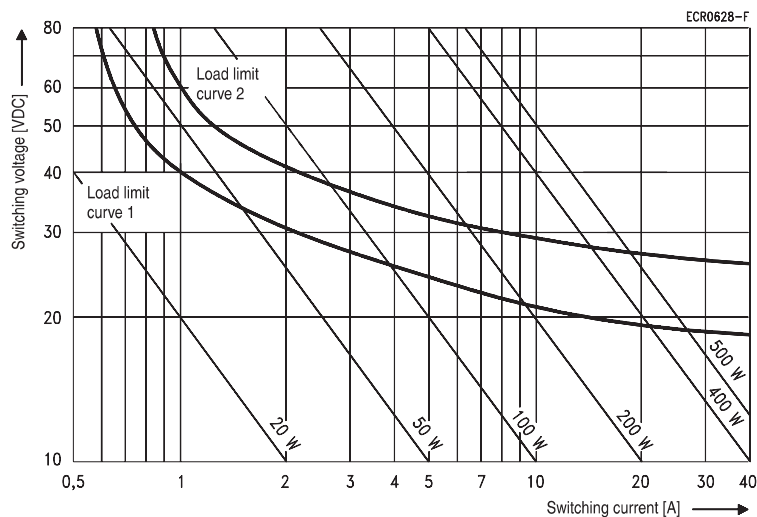


VF4 A (Standard, Shrouded and Weatherproof)

| Contact Data | |
|--|--|
| Contact configuration | 1 Changeover contact/ 1 Form C |
| Circuit symbol |  |
| Rated voltage | 12 V |
| Rated current | 20/14 A |
| Limiting continuous current | NC/NO |
| 23°C | 45/60 A |
| 85°C | 30/40 A |
| 125°C | 12/17 A |
| Contact material | Silver based |
| Max. switching voltage/power | See load limit curve |
| Max. switching current ¹⁾ | NC/NO |
| On ²⁾ | 45/120 A |
| Off | 40/60 A |
| Min. recommended load ³⁾ | 1 A at 12 V/0.5 at 24 V |
| Voltage drop (initial) | |
| NO contact | Typ. 60 mV, 200 mV max. at 40 A |
| NC contact | Typ. 60 mV, 250 mV max. at 30 A |
| Mechanical endurance (without load) | Typ. 10 ⁶ operations |
| Electrical endurance (example of resistive load, further information on request) | > 1 x 10 ⁵ operations 40 A, 13.5 V (NO contact) > 1 x 10 ⁵ operations 30 A, 13.5 V (NC contact) |
| Max. switching rate at nominal load | 6 operations per minute (0.1 Hz) |

¹⁾ The values apply to a resistive or inductive load with suitable spark suppression and at maximum 13.5 V for 12 V or 27 V for 24 V load voltages.
²⁾ For a load current duration of maximum 3 s for a make/break ratio of 1:10.
³⁾ See chapter Diagnostics of Relays in our Application Notes page 31 or consult the internet at <http://relays.tycoelectronics.com/appnotes/>

Load Limit Curve

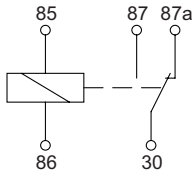


Load limit curve 1 $\hat{=}$ arc extinguishes during transit time (changeover contact)
 Load limit curve 2 $\hat{=}$ safe shutdown, no stationary arc (make contact)

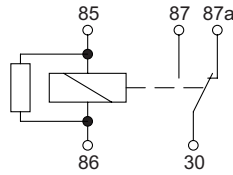
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Circuit Diagram

C0
1 Changeover contact/1 Form C



CR
1 Changeover contact/1 Form C
with Resistor



Coil Data

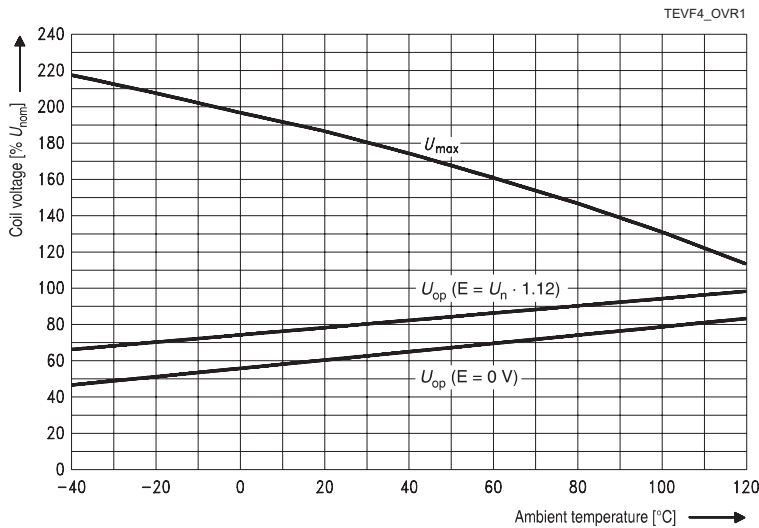
| | |
|--|--|
| Available for nominal voltages | 12 V / 24 V |
| Nominal power consumption of the unsuppressed coil at nominal voltage | 1.6 W |
| Nominal power consumption at nominal voltage with suppression resistor | 1.8 W / 2.1 W (standard/high performance 24 V) |
| Test voltage winding/contact | 500 VAC _{rms} |
| Ambient temperature range | -40 to +125°C |
| Operate time at nominal voltage | Typ. 7 ms |
| Release time at nominal voltage ¹⁾ | Typ. 2 ms |

¹⁾ For unsuppressed relay coil.

Note:

A low resistive suppression device in parallel to the relay coil increases the release time and reduces the lifetime caused by increased erosion and/or higher risk of contact tack welding.

Operating Voltage Range



Does not take into account the temperature rise due to the contact current
E = pre-energization

VF4 A (Standard, Shrouded and Weatherproof)

| Mechanical Data | |
|---|--|
| Cover retention | |
| Axial force | 150 N |
| Pull force | 200 N |
| Push force | 200 N |
| Terminals | |
| Pull force | 100 N |
| Push force | 100 N |
| Resistance to bending, force applied to front | 10 N ¹⁾ |
| Resistance to bending, force applied to side | 10 N ¹⁾ |
| Torsion | 0.3 Nm |
| 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 |

¹⁾ Values apply 2 mm from the end of the terminal. When the force is removed, the terminal must not have moved by more than 0.3 mm.

| Environmental Conditions | | | | |
|--------------------------------|--|----------------|---|--|
| Temperature range, storage | Refer to <i>Storage</i> in the "Glossary" catalog page 23 or http://relays.tycoelectronics.com/appnotes/ | | | |
| Test | Relevant standard | Testing as per | Dimension | Comments |
| Vibration resistance | 1.27 mm double amplitude 5 g constant 0.5 mm double amplitude 10 g constant | | 10 - 40 Hz 40 - 70 Hz 70 - 100 Hz 100 - 500 Hz | Valid for NC contacts, NO contacts are significantly higher |
| Shock resistance | Half sine wave pulse | | 20 g 11 ms | No change in the switching state > 1 ms |
| Jump start | 24 V for 5 minutes conducting nominal current at 23°C | | | |
| Drop test | Capable of meeting specifications after 1.0 m (3.28 ft) drop onto concrete | | | |
| Flammability | UL94-HB or better (meets FMVSS 302) ¹⁾ | | | internal external |
| Overload Current ²⁾ | 54 A, 1800 s 80 A, 60 s 240 A, 1 s | | | |

¹⁾ FMVSS: Federal Motor Vehicle Safety Standard.

²⁾ Current and time are compatible with circuit protection by a typical 40 A automotive fuse. Relay will make, carry and break the specified current.

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Ordering Information

| Part Numbers (see table below for coil data) | | Circuit/Contact Arrangement | Contact Material | Enclosure | Coil Suppression | Bracket |
|---|-------------|--------------------------------|---------------------|--------------------|---------------------|---------|
| Relay Description | Part Number | | | | | |
| 12 V Plug-In Relays ¹⁾ | | | | | | |
| VF4-15F11 | 6-1393298-0 | C0/1 Form C | AgNi0.15 | Dust cover | | |
| VF4-15F11-C05 | 6-1393298-2 | CR/1 Form C | AgNi0.15 | Sealed | Resistor 680 Ω | |
| VF4-15F11-S01 | 6-1393298-4 | CR/1 Form C | AgNi0.15 | Dust cover | Resistor 680 Ω | |
| VF4-15F21-S01 | 7-1393298-3 | CR/1 Form C | AgSnO ₂ | Dust cover | Resistor 680 Ω | |
| VF4-45F11 | 8-1393298-8 | C0/1 Form C | AgNi0.15 | Dust cover | | Yes |
| VF4-45F11-S01 | 1-1393302-0 | CR/1 Form C | AgNi0.15 | Dust cover | Resistor 680 Ω | Yes |
| VF4-55F11-S01 | 8-1393305-7 | CR/1 Form C | AgNi0.15 | Weatherproof cover | Resistor 680 Ω | Yes |
| VF4-65F11-S01 | 9-1393305-5 | CR/1 Form C | AgNi0.15 | Weatherproof cover | Resistor 680 Ω | Yes |
| 24 V Plug-In Relays ¹⁾ | | | | | | |
| VF4-15H11 | 8-1393298-1 | C0/1 Form C | AgNi0.15 | Dust cover | | |
| VF4-15H11-S08 | 5-1393305-7 | C0/1 Form C | AgNi0.15 | Dust cover | Resistor 2700 kΩ | |
| VF4-45H11 | 1-1393302-1 | C0/1 Form C | AgNi0.15 | Dust cover | | Yes |

¹⁾ Versions with diode or varistor in parallel to the coil on request. Versions with special labels or color shapes on request.

Coil Versions

| Coil Data for VF4 A | Rated Coil Voltage (V) | Coil Resistance ²⁾ ±10% (Ω) | Must Operate Voltage (V) | Must Release Voltage (V) | Allowable Overdrive ¹⁾ Voltage (V) | |
|---------------------------|------------------------------|---|-----------------------------------|-----------------------------------|--|---------|
| | | | | | at 23°C | at 85°C |
| VF4-**F**_** | 12 | 90 | 7.2 | 1.2 | 20.2 | 15.7 |
| VF4-**H**_** | 24 | 360 | 14.4 | 2.4 | 40.5 | 31.5 |

¹⁾ Allowable overdrive is stated with no load applied and minimum coil resistance.

²⁾ Including parallel resistor.

Standard Delivery Packs (orders in multiples of delivery pack)

| | |
|---------------|------------|
| VF4-1: | 357 pieces |
| VF4-2, VF4-3: | 165 pieces |
| VF4-4: | 136 pieces |
| VF4-5, VF4-6: | 110 pieces |