

VF28



~~Powertrain  
Systems~~



~~Chassis  
Systems~~



~~Safety~~



~~Security~~



~~Body~~



~~Driver  
Information~~



~~Convenience~~

**Description**

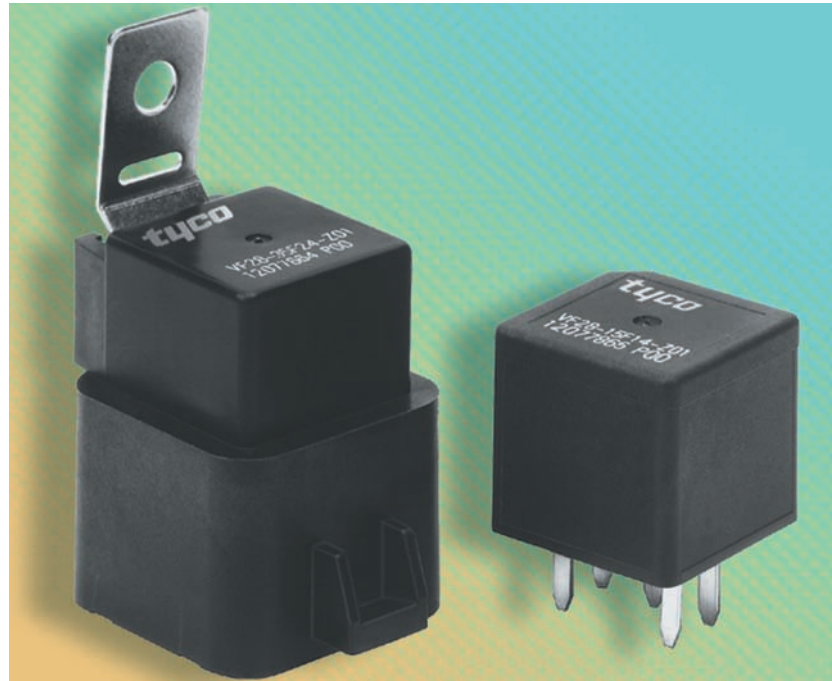
**Features**

- 30 A continuous contact rating at 85 °C
- Various enclosure options

**Typical applications**

- Fuel pump
- A/C compressor clutch
- Horn
- Lighting systems

Please contact Tyco Electronics for relay application support.



VF28\_3d1



~~Car Industry~~



~~Truck  
Industry~~



~~Other  
Industry~~

**Design**

Various enclosure options (dust cover, shrouded/weatherproof cover); optional mounting bracket

**Weight**

Approx. 1.2 oz. (34 g) dust cover model

**Nominal voltage**

12 V, 24 V

**Terminals**

2.8 mm dual in-line quick connect terminals

**Accessories**

Connectors see page 191

**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, 29.5 ± 1.0" Hg (998.9 ± 33.9 hPa).

Please also refer to the Application Recommendations in this catalog for general precautions.

**Disclaimer**

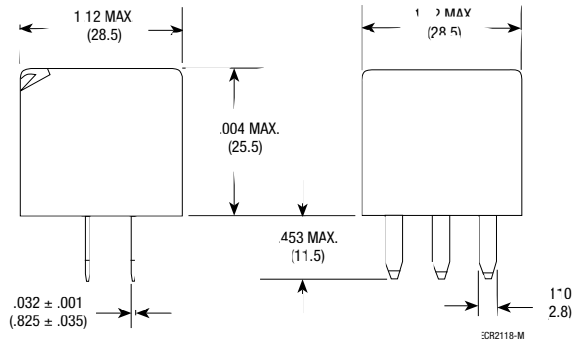
All technical performance data apply to the relay as such, specific conditions of the individual application are not considered. Please always check the suitability of the relay for your intended purpose. We do not assume any responsibility or liability for not complying herewith. We recommend to complete 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 are reserved.

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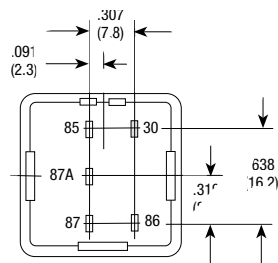
**Dimensional drawing**

**Dust cover with quick connect terminals**

**VF28-1\*\*\*\***

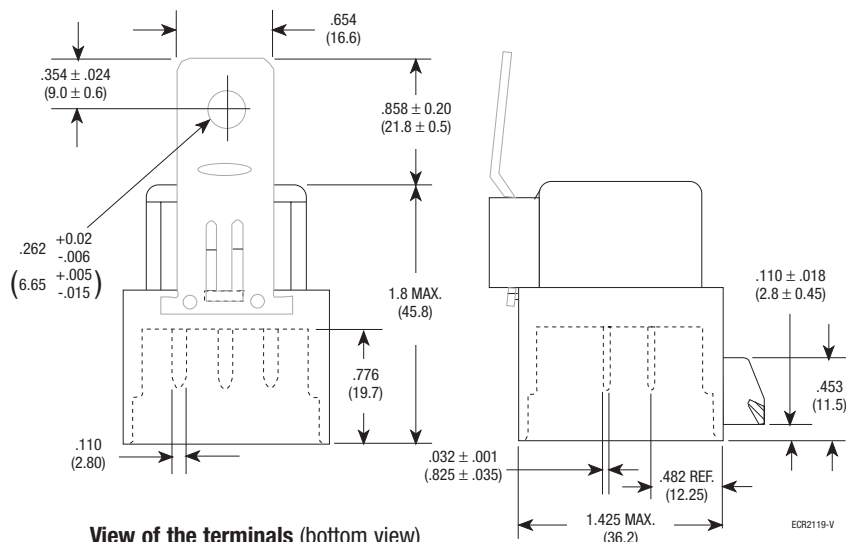


**View of the terminals (bottom view)**

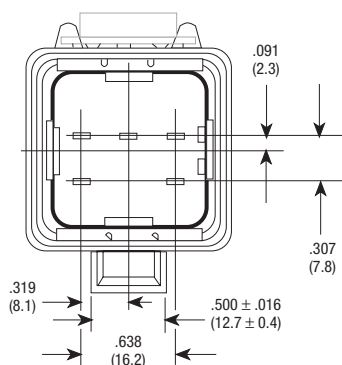


**Shrouded/weatherproof cover with quick connect terminals**

**VF28-3\*\*\*\* and VF28-6\*\*\*\***



**View of the terminals (bottom view)**




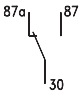
TOLERANCE UNLESS  
OTHERWISE NOTED:

2 DECIMAL:  $\pm .004$   
( $\pm 0.1$ )

1 DECIMAL:  $\pm .006$   
( $\pm 0.15$ )

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**Contact data**

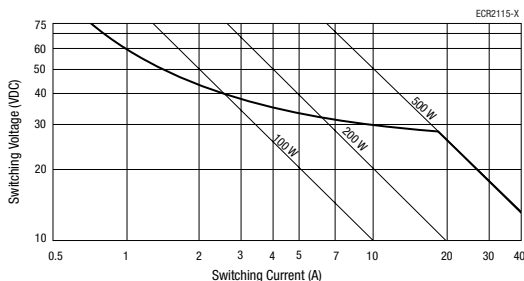
| Contact configuration  | Make contact/<br>Form A   | Changeover contact/<br>Form C   |
|--|---|---|
| Circuit symbol   |  |  |
| Rated voltage  | 12 V  | 12 V  |
| Rated current at 85 °C   | 30 A  | 20/30 A   |
| Contact material   | AgNi0.15  | Stationary and NO movable: AgNi0.15, NC movable: A                                  |
| Max. switching voltage/power   | See load limit curve  |   |
| Max. switching current <sup>1)</sup>   |   | NC/NO   |
| On <sup>2)</sup>   | 120 A   | 45/120 A  |
| Off  | 40 A  | 30/45 A   |
| Min. recommended load <sup>3)</sup>  | 1 A at 5 V  |   |
| Voltage drop A (initial)   |   |   |
| NO contact at 35 A   | 200 mV max.   | 200 mV max.   |
| NC contact at 20 A   |   | 250 mV max.   |
| Mechanical endurance (without load)  | Typ. 10 <sup>7</sup> operations   |   |
| Electrical endurance<br>(example of resistive load,<br>further information on request) | > 1 x 10 <sup>5</sup> operations<br>30 A, 14 V                                    | > 1 x 10 <sup>5</sup> operations<br>30 A, 14 V<br>(NO contact)                      |
| Max. switching rate at nominal load  | 6 operations per minute (0.1 Hz)  |   |

<sup>1)</sup> The values apply to a resistive or inductive load with suitable spark suppression and at maximum 13.5 V for 12 V.

<sup>2)</sup> For a load current duration of maximum 3 s for a make/break ratio of 1:10.

<sup>3)</sup> See chapter Diagnostics in our Application Recommendations on page 18 of this catalog or consult the internet at <http://relays.tycoelectronics.com/application.asp>

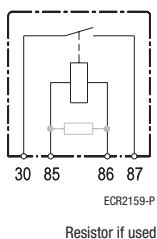
**Load limit curve**



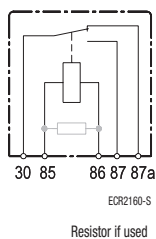
Safe breaking, arc extinguished (normally open contact)  
for resistive loads with resistor suppression.

**Pin assignment**

1 make contact/  
1 form A



1 changeover contact/  
1 form C



## VF28

### Coil data

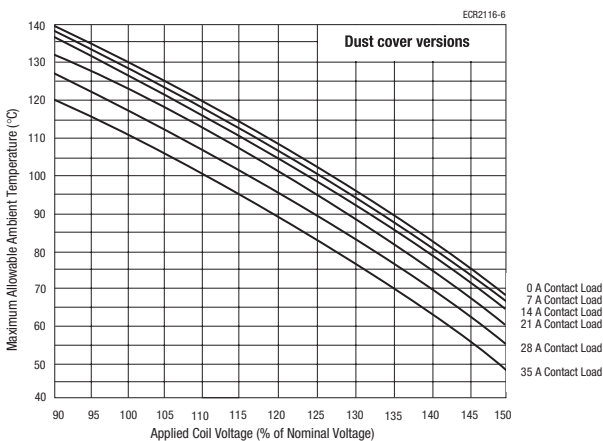
|  |                        |
|--|------------------------|
| Available for nominal voltages   | 12, 24 V               |
| Nominal power consumption of the unsuppressed coil at nominal voltage  | 1.6 W                  |
| Nominal power consumption at nominal voltage with suppression resistor | 1.8 W                  |
| Test voltage winding/contact   | 500 VAC <sub>rms</sub> |
| Ambient temperature range  | - 40 to + 125 °C       |
| Operate time at nominal voltage  | Typ. 7 ms              |
| Release time at nominal voltage <sup>1)</sup>                          | Typ. 4 ms              |

<sup>1)</sup> For unsuppressed relay coil

N.B.

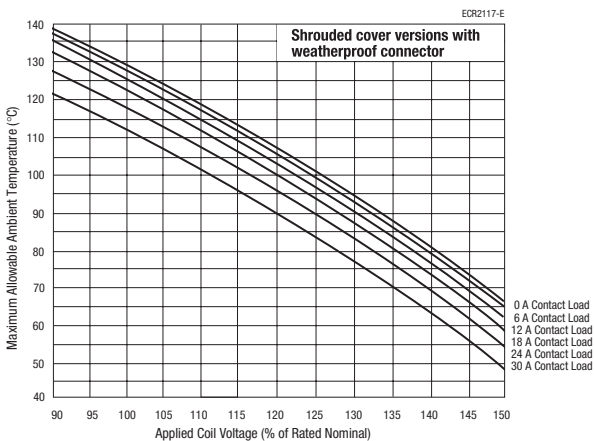
A low resistive suppression device in parallel to the relay coil increases the release time and reduces the lifetime caused by increased erosion and/or higher risk of contact tack welding.

### Ambient temperature vs. coil voltage for continuous duty



Assumptions:

1. Still air
2. Nominal coil resistance
3. Maximum mean coil temperature = 180 °C
4. Coil temperature rise due to load
  - = 1.3 °C at 7 A
  - = 3.1 °C at 14 A
  - = 7.2 °C at 21 A
  - = 12.1 °C at 28 A
  - = 19 °C at 35 A
5. Thermal resistance and power dissipation based on coil resistance at 180 °C
6. Curves are based on 1.6 W at 23 °C



Assumptions:

1. Still air
2. Nominal coil resistance
3. Maximum mean coil temperature = 180 °C
4. Coil temperature rise due to load
  - = 0.8 °C at 6 A
  - = 3.6 °C at 12 A
  - = 6.3 °C at 18 A
  - = 11 °C at 24 A
  - = 16.8 °C at 30 A
5. Thermal resistance and power dissipation based on coil resistance at 180 °C
6. Curves are based on 1.6 W at 23 °C

## VF28

### Mechanical data

|   |   |
|---|---|
| Cover retention                               |   |
| Axial force                                   | 150 N (33.8 lbs)  |
| Pull force                                    | 200 N (45 lbs)  |
| Push force                                    | 200 N (45 lbs)  |
| Terminals                                     |   |
| Pull force                                    | 100 N (22.5 lbs)  |
| Push force                                    | 100 N (22.5 lbs)  |
| Resistance to bending, force applied to front | 10 N (2.25 lbs) <sup>1)</sup>   |
| Resistance to bending, force applied to side  | 10 N (2.25 lbs) <sup>1)</sup>   |
| Torsion                                       | 0.3 Nm  |
| Enclosures                                    |   |
| Dust cover                                    | Protects relay from dust. For use in passenger compartment or enclosures              |
| Shrouded/Weatherproof cover                   | Mates with VC28-1003 connector for application where weather sealing is not required. |

<sup>1)</sup> 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.

### Operating conditions

|                                |  |                |   |  |
|--------------------------------|--|----------------|---|--|
| Temperature range, storage     | Refer to <i>Storage</i> in the "Glossary"  |                |   |  |
| Test                           | Relevant standard  | Testing as per | Dimension                                       | Comments   |
| Vibration resistance           | 1.27 mm double amplitude<br>5 g constant<br>0.5 mm double amplitude<br>10 g constant |                | 10-40 Hz<br>40-70 Hz<br>70-100 Hz<br>100-500 Hz | Valid for NC contacts.<br>NO contacts are significantly higher |
| Shock resistance               | Half sine wave pulse   |                | 20 g<br>11 ms                                   | No change in the switching state > 1 ms                        |
| Jump start                     | 24 VDC for 5 minutes conducting nominal current at 23 °C                             |                |   |  |
| Drop test                      | Capable of meeting specifications after 1.0 m (3.28 foot) drop onto concrete         |                |   |  |
| Flammability                   | UL94-HB or better (meets FMVSS 302)  |                |   | Internal<br>External   |
| Overload Current <sup>1)</sup> | 40.5 A, 1800 s<br>60 A, 30 s<br>105 A, 4 s<br>180 A, 1 s                             |                |   |  |

<sup>1)</sup> Current and time are compatible with circuit protection by a typical 30 A automotive fuse. Relay will make, carry, and break the specified current.

### Ordering information

| Part numbers<br>(see table below for coil data) |                   | Contact arrangement | Contact material | Enclosure                       | Terminals                  |
|---|-------------------|---------------------|------------------|---------------------------------|----------------------------|
| Relay part number                               | Tyco order number |                     |                  |                                 |                            |
| VF28-11F14-S01                                  | 1393297-1         | 1 Form A            | AgNi0.15         | Dust Cover                      | 680 Ω resistor in parallel |
| VF28-11F24-S01                                  | 2-1419084-3       | 1 Form A            | AgSn02           | Dust Cover                      | 680 Ω resistor in parallel |
| VF28-15F14-S01                                  | 1393297-8         | 1 Form C            | AgNi0.15         | Dust Cover                      | 680 Ω resistor in parallel |
| VF28-15F24-S01                                  | 1-1393297-3       | 1 Form C            | AgSn02           | Dust Cover                      | 680 Ω resistor in parallel |
| VF28-61F14-S01                                  | 3-1393297-6       | 1 Form A            | AgNi0.15         | Weatherproof cover with bracket | 680 Ω resistor in parallel |
| VF28-65F14-S01                                  | 4-1393297-5       | 1 Form C            | AgNi0.15         | Weatherproof cover with bracket | 680 Ω resistor in parallel |

### Coil versions

| Coil data for VF28 | Rated coil voltage (V) | Coil resistance +/- 10% (Ω) | Must operate voltage (V) | Must release voltage (V) | Allowable overdrive <sup>1)</sup> voltage (V) |          |
|--------------------|------------------------|-----------------------------|--------------------------|--------------------------|---|----------|
|                    |                        |                             |                          |                          | at 23 °C <sup>1)</sup>                        | at 85 °C |
| VF28-**F**-***     | 12                     | 90                          | 7.2                      | 1.2                      | 20.2  | 15.7     |
| VF28-**H**-***     | 24                     | 360                         | 14.4                     | 2.4                      | 40.5  | 31.5     |

<sup>1)</sup> Allowable overdrive is stated with no load applied and minimum coil resistance.

### Standard delivery packs (orders in multiples of delivery pack)

Dust cover version: 357 pieces  
Weatherproof version with bracket: 110 pieces