

## Power relay F4



### Description

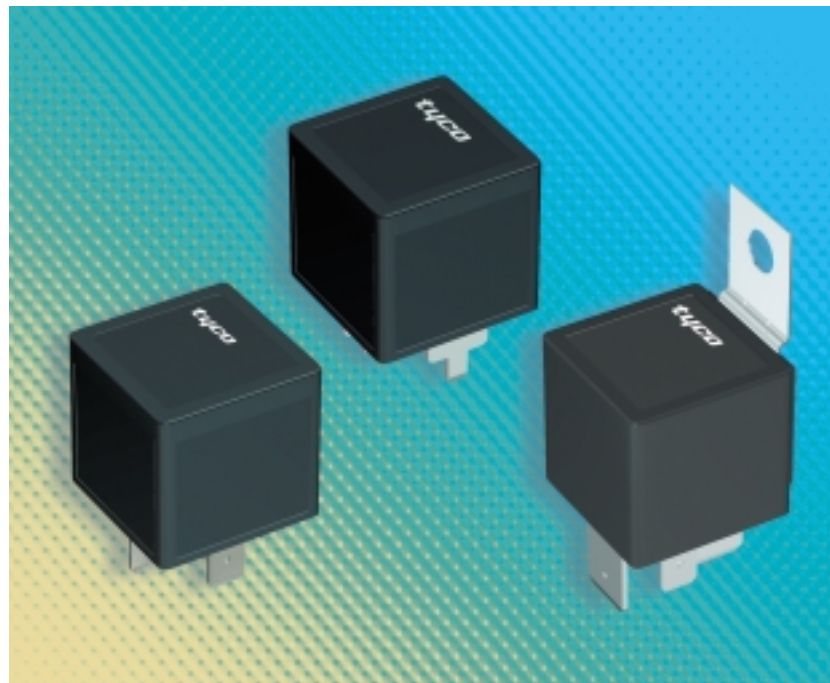
#### Features

- Limiting continuous currents 60/40 A at the NO / NC contacts
- Dimensional characteristics and the functional allocations of the plug-in terminals to ISO 7588
- Standardized dimensions
- 24 V versions with contact gap > 0.8 mm
- Plug-in or PCB terminals

#### Typical applications

- Ignition lock
- Lamp load (headlights)
- Cooling fan
- ABS
- Exhaust emission control
- Cross carline up to 60 A
- Fuel pump
- Engine cooling fan
- A/C blower
- A/C compressor clutch
- Also available for 42 V applications

Please contact Tyco Electronics for relay application support.



134\_kop1



#### Design

Dustproof; protection class IP 54 to IEC 529 (EN 60 529); with either mounting bracket or mounting clip

#### Options

Shrouded and weatherproof covers

#### Weight

Approx. 1.2 oz. (35 g)

#### Nominal voltage

12 V or 24 V;  
other nominal voltages available on request

#### Terminals

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

#### Accessories

Connectors see page 188

#### Special models on request

- Integrated components: resistor, varistor, diode
- Special labels
- Special cover shapes

#### 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.

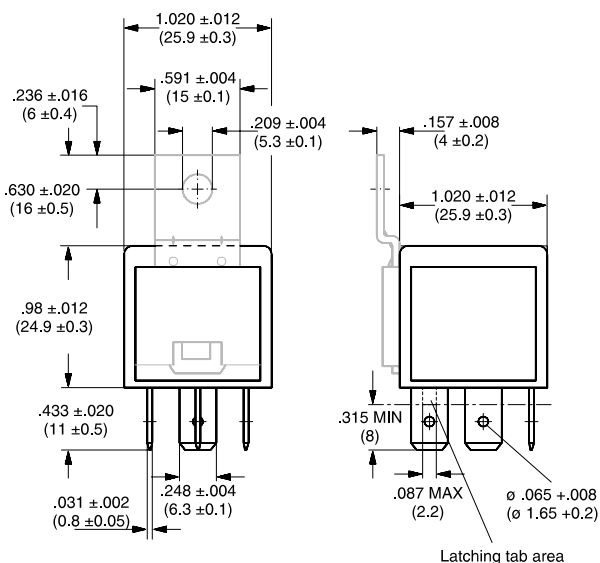
### Disclaimer

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.

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

## Dimensional drawing

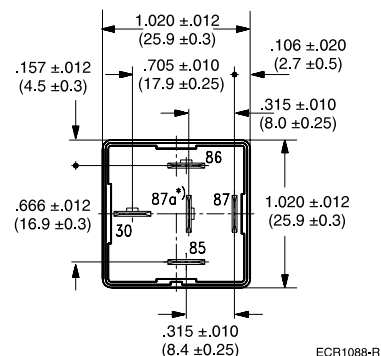
### Version with quick connect terminals



Quick connect terminal similar to ISO 8092-1

ECR1093-S

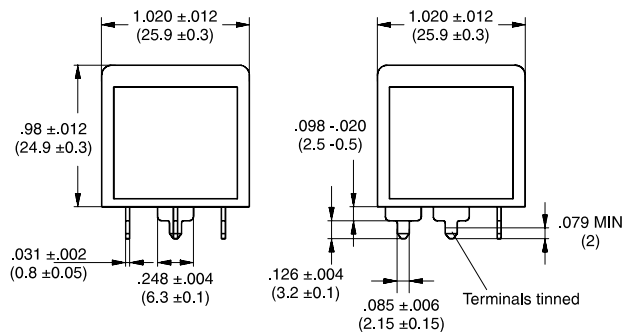
**View of the terminals** (bottom view)



\*) For the make contact (2 x pin 87),  
pin 87a = 87.  
For the twin make contact,  
pin 87a = 87b.

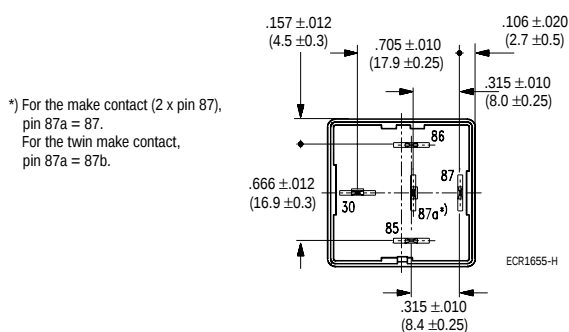
ECR1088-R

### Version with PCB terminals



ECR1654-9

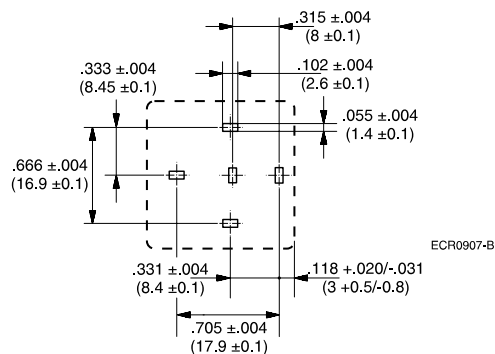
**View of the terminals** (bottom view)



\*) For the make contact (2 x pin 87),  
pin 87a = 87.  
For the twin make contact,  
pin 87a = 87b.

FCR1655-H

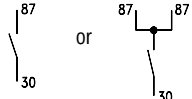
### Mounting hole layout



ECR0907-B

## Power relay F4

### Contact data

| Contact configuration                               | Make contact/<br>Form A or Form A (2x87)                                          |                                                   | Double make contact/<br>Form U                                                     |                                                       | Changeover contact/<br>Form C                                                       |                                                                   |                                                                                                                                            |
|-----------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Circuit symbol<br>(see also Pin assignment)         |  |                                                   |  |                                                       |  |                                                                   |                                                                                                                                            |
| Rated voltage                                       | 12 V                                                                              | 24 V                                              | 12 V                                                                               | 24 V                                                  | 12 V                                                                                | 24 V                                                              | 24 V <sup>3)</sup>                                                                                                                         |
| Rated current at 85 °C                              | 40 A                                                                              | 20 A                                              | 2 x 25 A                                                                           | 2 x 15 A                                              | 30/40 A                                                                             | 15/20 A                                                           | 20/30 A                                                                                                                                    |
| Contact material                                    | AgNi0.15                                                                          |                                                   | AgNi0.15                                                                           |                                                       | AgNi0.15                                                                            |                                                                   | AgSnO <sub>2</sub>                                                                                                                         |
| Max. switching voltage/power                        | See load limit curve                                                              |                                                   |                                                                                    |                                                       |                                                                                     |                                                                   |                                                                                                                                            |
| Max. switching current <sup>1)</sup>                |                                                                                   |                                                   |                                                                                    |                                                       | NC/NO                                                                               | NC/NO                                                             | NC/NO                                                                                                                                      |
| On <sup>2)</sup>                                    | 120 A                                                                             | 120 A                                             | 2 x 100 A                                                                          | 2 x 100 A                                             | 45/120A                                                                             | 45/120A                                                           | 45/120A                                                                                                                                    |
| Off                                                 | 60 A                                                                              | 20 A                                              | 2 x 40 A                                                                           | 2 x 15 A                                              | 40/60A                                                                              | 15/20A                                                            | 20/30A                                                                                                                                     |
| Min. recommended load <sup>4)</sup>                 | 1 A at 5 V                                                                        |                                                   |                                                                                    |                                                       |                                                                                     |                                                                   |                                                                                                                                            |
| Voltage drop at 10 A (initial)                      | Typ. 15 mV, 200 mV max.                                                           |                                                   | Typ. 2 x 15 mV, 200 mV max.                                                        |                                                       | Typ. 15 mV, 200 mV max.<br>Typ. 20 mV, 250 mV max.                                  |                                                                   |                                                                                                                                            |
|                                                     | NO contact<br>NC contact                                                          |                                                   |                                                                                    |                                                       |                                                                                     |                                                                   |                                                                                                                                            |
| Mechanical endurance (without load)                 | > 10 <sup>7</sup> operations                                                      |                                                   |                                                                                    |                                                       |                                                                                     |                                                                   |                                                                                                                                            |
| Electrical endurance<br>(example of resistive load) | > 2 x 10 <sup>5</sup><br>operations<br>40 A, 14 V                                 | > 1 x 10 <sup>5</sup><br>operations<br>20 A, 28 V | > 2 x 10 <sup>5</sup><br>operations<br>2 x 25 A, 14 V                              | > 1 x 10 <sup>5</sup><br>operations<br>2 x 15 A, 28 V | > 2 x 10 <sup>5</sup><br>operations<br>40 A, 14 V<br>(NO contact)                   | > 1 x 10 <sup>5</sup><br>operations<br>20 A, 28 V<br>(NO contact) | > 1 x 10 <sup>5</sup><br>operations<br>30 A, 28 V<br>(NO contact)<br><br>> 5 x 10 <sup>5</sup><br>operations<br>10 A, 28 V<br>(NC contact) |
| Max switching rate at nominal load                  | 6 operations per minute (0.1 Hz)                                                  |                                                   |                                                                                    |                                                       |                                                                                     |                                                                   |                                                                                                                                            |

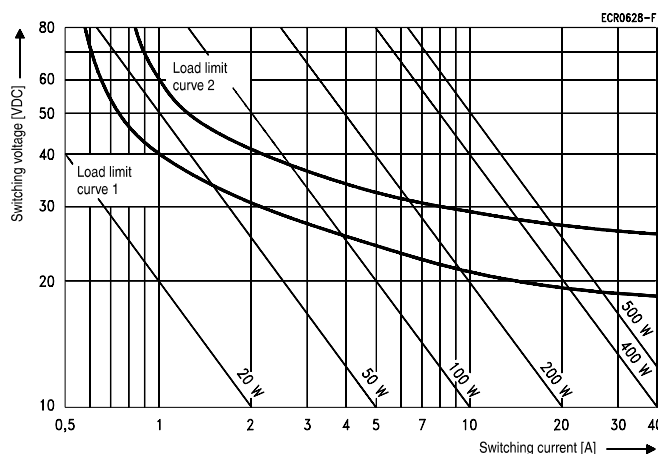
<sup>1)</sup> The values apply to a resistive or inductive load with suitable spark suppression and at maximum 13.5 V for 12 V or 27 V for 24 V load voltages.

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

<sup>3)</sup> Special high performance 24 V version with contact gap > 0.8 mm, part number V23134-A0056-X432/-X433 (see ordering information).

<sup>4)</sup> See chapter Diagnostics in our Application Recommendations on page 18.

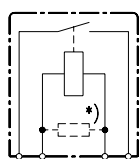
### Load limit curve



Load limit curve 1 ≙ arc extinguishes during transit time (changeover contact)  
Load limit curve 2 ≙ safe shutdown, no stationary arc (make contact)

### Pin assignment

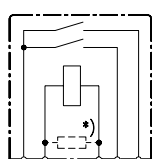
1 make contact/  
1 form A



ECR1100 - E

\*) Models with resistor or diode in parallel to the coil on request.

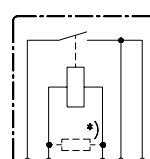
Power relay F4 only  
1 double make contact/  
1 form U



ECR1090 - 3

\*) Models with resistor or diode in parallel to the coil on request.

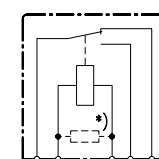
Power relay F4 only  
1 make contact (2 x pin 87)/  
1 form A (2 x pin 87)



ECR1085 - 2

\*) Models with resistor or diode in parallel to the coil on request.

1 changeover contact/  
1 form C



ECR1078 - J

\*) Models with resistor or diode in parallel to the coil on request.

## Power relay F4

### Coil data

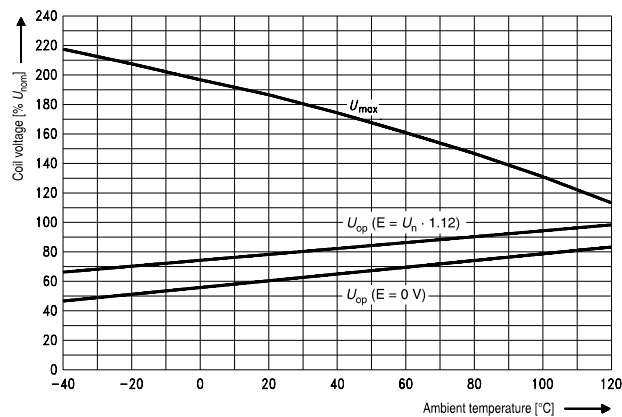
|                                                                        |                                            |
|------------------------------------------------------------------------|--------------------------------------------|
| Available for nominal voltages                                         | 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 | 1.8/2.1 W (standard/high performance 24 V) |
| 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. 2 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.

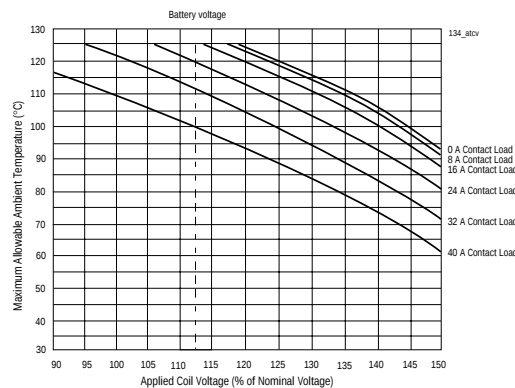
### Operating voltage range



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

ECR0701-J

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



### 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 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.<br>Recommended for under hood application |

<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.

## Power relay F4

| Operating conditions               |                                                                              |                                 |                             |                                                                                                           |
|------------------------------------|------------------------------------------------------------------------------|---------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------|
| Temperature range, storage         | -40 °C to 155 °C                                                             |                                 |                             |                                                                                                           |
| Test                               | Relevant standard                                                            | Testing as per                  | Dimension                   | Comments                                                                                                  |
| Climatic cycling with condensation | EN ISO 6988                                                                  |                                 | 6 cycles                    | Storage 8/16 h                                                                                            |
| Temperature cycling                | IEC 68-2-14                                                                  | Nb                              | 10 cycles                   | - 40/+ 85 °C (5 °C per min.)                                                                              |
| Damp heat                          |                                                                              |                                 |                             |                                                                                                           |
| cyclic                             | IEC 68-2-30                                                                  | Db, Variant 1                   | 6 cycles                    | Upper air temperature 55 °C                                                                               |
| constant                           | IEC 68-2-3                                                                   | Ca                              | 56 days                     |                                                                                                           |
| Corrosive gas                      | IEC 68-2-42                                                                  | 10 ± 2 cm³/m³ SO <sub>2</sub>   | 10 days                     |                                                                                                           |
|                                    | IEC 68-2-43                                                                  | 1 ± 0.3 cm³/m³ H <sub>2</sub> S | 10 days                     |                                                                                                           |
| Vibration resistance               | IEC 68-2-6 (sine sweep)                                                      |                                 | 10-500 Hz<br>min. 5 g       | No change in the switching state > 10 µs<br>Valid for NC contacts, NO contact values significantly higher |
| Shock resistance                   | IEC 68-2-27 (half sine pulse form)                                           |                                 | min. 20 g<br>11 ms          |                                                                                                           |
| Load dump                          | ISO 7637-1 (12 V)<br>ISO 7637-2 (24 V)                                       | Test pulse 5<br>Test pulse 5    | Vs =+ 86.5 V<br>Vs =+ 200 V |                                                                                                           |
| 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 foot) drop onto concrete |                                 |                             |                                                                                                           |
| Flammability                       | UL94-HB or better (meets FMVSS 302) <sup>1)</sup>                            |                                 |                             |                                                                                                           |
| Overload current <sup>2)</sup>     | 54 A, 1800 s<br>80 A, 5 s<br>140 A, 0.5 s<br>240 A, 0.1 s                    |                                 |                             |                                                                                                           |

<sup>1)</sup> FMVSS: Federal Motor Vehicle Safety Standard.

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

## Ordering information (Production in Europe, Asia and South America)

| Part numbers<br>(see table below for coil data) |                   | Contact<br>arrangement | Contact<br>material | Enclosure  | Special<br>features                  |
|-------------------------------------------------|-------------------|------------------------|---------------------|------------|--------------------------------------|
| Relay part number                               | Tyco order number |                        |                     |            |                                      |
| 12 V plug-in relays                             |                   |                        |                     |            |                                      |
| V23134-A0052-C643                               | 2-1393302-2       | 1 Form C               | AgNi0.15            | Dust cover |                                      |
| V23134-A0052-X205                               | 3-1393302-6       | 1 Form C               | AgNi0.15            | Dust cover | Diode                                |
| V23134-A0052-X278                               | 4-1393302-1       | 1 Form C               | AgNi0.15            | Dust cover | Resistor 560 Ω                       |
| V23134-A1052-C643                               | 5-1393302-8       | 1 Form C               | AgNi0.15            | Dust cover | Bracket                              |
| V23134-A1052-X828 <sup>1)</sup>                 | 7-1393305-5       | 1 Form C               | AgNi0.15            | Sealed     | Bracket, resistor 680 Ω              |
| V23134-B0052-C642                               | 7-1393302-5       | 1 Form A               | AgNi0.15            | Dust cover |                                      |
| V23134-B1052-C642                               | 3-1393303-4       | 1 Form A               | AgNi0.15            | Dust cover | Bracket                              |
| V23134-B1052-X824 <sup>1)</sup>                 | 6-1393305-9       | 1 Form A               | AgNi0.15            | Dust cover | Bracket, resistor 680 Ω              |
| V23134-C0052-C642                               | 3-1393303-9       | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover |                                      |
| V23134-C1052-C642                               | 4-1393303-7       | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover | Bracket                              |
| V23134-M0052-C642                               | 5-1393304-6       | 1 Form U               | AgNi0.15            | Dust cover |                                      |
| V23134-M1052-C642                               | 7-1393304-1       | 1 Form U               | AgNi0.15            | Dust cover | Bracket                              |
| 24 V plug-in relays                             |                   |                        |                     |            |                                      |
| V23134-A0053-C643                               | 5-1393302-1       | 1 Form C               | AgNi0.15            | Dust cover |                                      |
| V23134-A0056-X432                               | 1-1414167-0       | 1 Form C               | AgSnO2              | Dust cover | Contact gap > 0.8mm, diode           |
| V23134-A0056-X433                               | 1-1414168-0       | 1 Form C               | AgSnO2              | Dust cover | Contact gap > 0.8mm, resistor 1.2 KΩ |
| V23134-A0064-X816 <sup>1)</sup>                 | 5-1393305-3       | 1 Form C               | AgNi0.15            | Sealed     | Resistor 2.7 KΩ                      |
| V23134-A1053-C643                               | 6-1393302-3       | 1 Form C               | AgNi0.15            | Dust cover | Bracket                              |
| V23134-A1064-X829 <sup>1)</sup>                 | 1432219-1         | 1 Form C               | AgNi0.15            | Sealed     | Bracket, resistor 2.7 KΩ             |
| V23134-A1064-X830 <sup>1)</sup>                 | 8-1393305-4       | 1 Form C               | AgNi0.15            | Dust cover | Bracket, diode                       |
| V23134-B0053-C642                               | 1393303-9         | 1 Form A               | AgNi0.15            | Dust cover |                                      |
| V23134-B1053-C642                               | 3-1393303-7       | 1 Form A               | AgNi0.15            | Dust cover | Bracket                              |
| V23134-C0053-C642                               | 4-1393303-4       | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover |                                      |
| V23134-C1053-C642                               | 5-1393303-0       | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover | Bracket                              |
| V23134-M0053-C642                               | 6-1393304-7       | 1 Form U               | AgNi0.15            | Dust cover |                                      |
| V23134-M1053-C642                               | 7-1393304-4       | 1 Form U               | AgNi0.15            | Dust cover | Bracket                              |

<sup>1)</sup> Marking according to VF4 schematic.

## Power relay F4

Ordering information (Production in Europe, Asia and South America)

| Part numbers<br>(see table below for coil data)<br>Relay part number   Tyco order number |             | Contact<br>arrangement | Contact<br>material | Enclosure  | Special<br>features |
|------------------------------------------------------------------------------------------|-------------|------------------------|---------------------|------------|---------------------|
| <b>12 V pcb relays</b>                                                                   |             |                        |                     |            |                     |
| V23134-A0052-G243                                                                        | 2-1393302-3 | 1 Form C               | AgNi0.15            | Dust cover |                     |
| V23134-A0052-X812 <sup>1)</sup>                                                          | 4-1393305-5 | 1 Form C               | AgNi0.15            | Sealed     |                     |
| V23134-A0052-X813 <sup>1)</sup>                                                          | 4-1393305-7 | 1 Form C               | AgNi0.15            | Sealed     | Resistor 680 Ω      |
| V23134-B0052-G242                                                                        | 7-1393302-7 | 1 Form A               | AgNi0.15            | Dust cover |                     |
| V23134-B0052-X802 <sup>1)</sup>                                                          | 2-1393305-2 | 1 Form A               | AgNi0.15            | Sealed     |                     |
| V23134-C0052-G242                                                                        | 4-1393303-0 | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover |                     |
| V23134-M0052-G242                                                                        | 5-1393304-7 | 1 Form U               | AgNi0.15            | Dust cover |                     |
| <b>24 V pcb relays</b>                                                                   |             |                        |                     |            |                     |
| V23134-A0053-G243                                                                        | 5-1393302-2 | 1 Form C               | AgNi0.15            | Dust cover |                     |
| V23134-A0064-X820 <sup>1)</sup>                                                          | 5-1393305-9 | 1 Form C               | AgNi0.15            | Sealed     |                     |
| V23134-B0053-G242                                                                        | 1-1393303-0 | 1 Form A               | AgNi0.15            | Dust cover |                     |
| V23134-C0053-G242                                                                        | 4-1393303-5 | 1 Form A (2 pins 87)   | AgNi0.15            | Dust cover |                     |
| V23134-M0053-G242                                                                        | 6-1393304-8 | 1 Form U               | AgNi0.15            | Dust cover |                     |

<sup>1)</sup> Marking according to VF4 schematic.

### Coil versions

| Coil data<br>for Power relay F4 | Rated coil<br>voltage<br>(V) | Coil<br>resistance<br>+/- 10%<br>(Ω) | Must<br>operate<br>voltage<br>(V) | Must<br>release<br>voltage<br>(V) | Allowable overdrive <sup>1)</sup><br>voltage (V) |          |
|---------------------------------|------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------------------|----------|
|                                 |                              |                                      |                                   |                                   | at 23 °C                                         | at 85 °C |
| V23134-**052-****               | 12                           | 91                                   | 7.2                               | 1.6                               | 23                                               | 18       |
| V23134-**053-****               | 24                           | 332                                  | 14.4                              | 3.2                               | 44                                               | 34       |
| V23134-**056-****               | 24                           | 275                                  | 16.0                              | 4.0                               | 38                                               | 30       |
| V23134-**064-****               | 24                           | 345                                  | 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)

|                |                             |            |
|----------------|-----------------------------|------------|
| Power relay F4 | Quick connect version:      | 315 pieces |
|                | Quick connect with bracket: | 200 pieces |
|                | PCB version:                | 200 pieces |