

Power Relay F4 / VF4



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 part 1
- Standardized dimensions
- 24 V versions with contact gap > 0.8 mm
- Plug-in or PCB terminals
- ELV/RoHS/WEEE compliant

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).

For general precautions please refer to our Application Notes and especially to *Storage* in the "Glossary" at <http://relays.tycoelectronics.com/appnotes/>

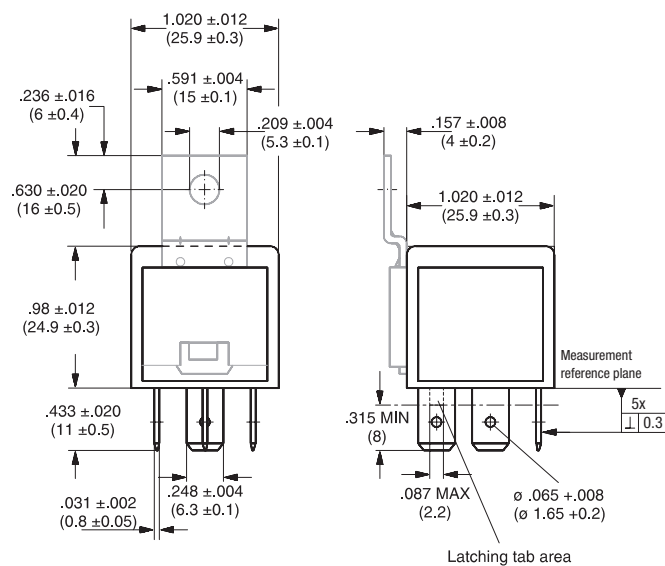
Disclaimer

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 are reserved.

Power Relay F4 / VF4

Dimensional drawing

Version with quick connect terminals

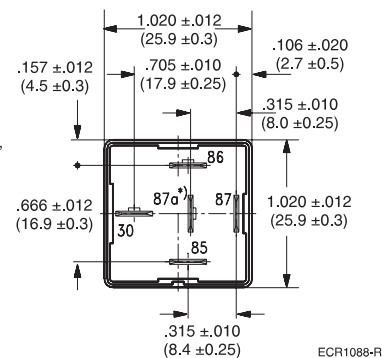


Quick connect terminal similar to ISO 8092-1

Tyco1093-S

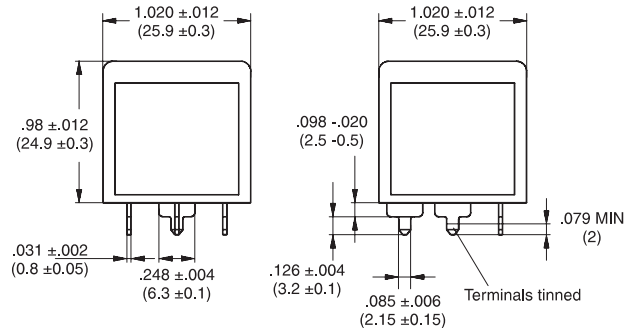
View of the terminals (bottom view)

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



ECR1088-R

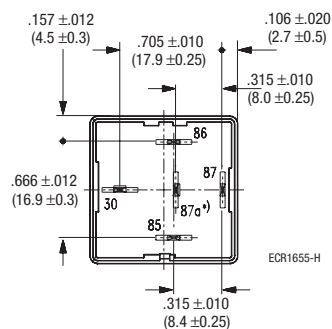
Version with PCB terminals



ECR1654-9

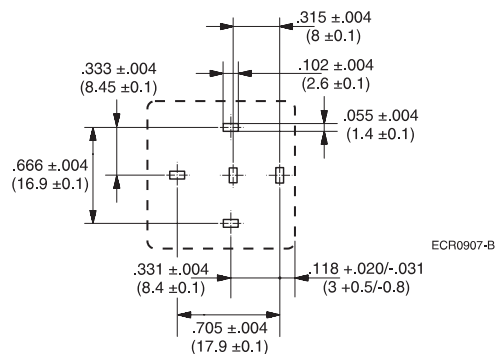
View of the terminals (bottom view)

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



ECR1655-H

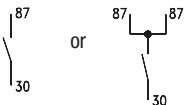
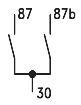
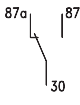
Mounting hole layout



ECR0907-B

Power Relay F4 /VF4

Contact data

Contact configuration	Make contact/ Form A or Form A (2x87)		Double make contact/ Form U		Changeover contact/ Form C		
Circuit symbol (see also Pin assignment)							
Rated voltage	12 V	24 V	12 V	24 V	12 V	24 V	24 V ³⁾
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 ₂
Max. switching voltage/power	See load limit curve						
Max. switching current ¹⁾					NC/NO	NC/NO	NC/NO
On ²⁾	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 ⁴⁾	1 A at 5 V						
Voltage drop at 10 A (initial)	NO contact NC contact						
	Typ. 15 mV, 200 mV max.		Typ. 2 x 15 mV, 200 mV max.		Typ. 15 mV, 200 mV max. Typ. 20 mV, 250 mV max.		
Mechanical endurance (without load)	> 10 ⁷ operations						
Electrical endurance (example of resistive load without component in parralel to the coil)	> 2 x 10 ⁵ operations 40 A, 14 V	> 1 x 10 ⁵ operations 20 A, 28 V	> 2 x 10 ⁵ operations 2 x 25 A, 14 V	> 1 x 10 ⁵ operations 2 x 15 A, 28 V	> 2 x 10 ⁵ operations 40 A, 14 V (NO contact)	> 1 x 10 ⁵ operations 20 A, 28 V (NO contact)	> 1 x 10 ⁵ operations 30 A, 28 V (NO contact) > 5 x 10 ⁵ operations 10 A, 28 V (NC contact)
Max switching rate at nominal load	6 operations per minute (0.1 Hz)						

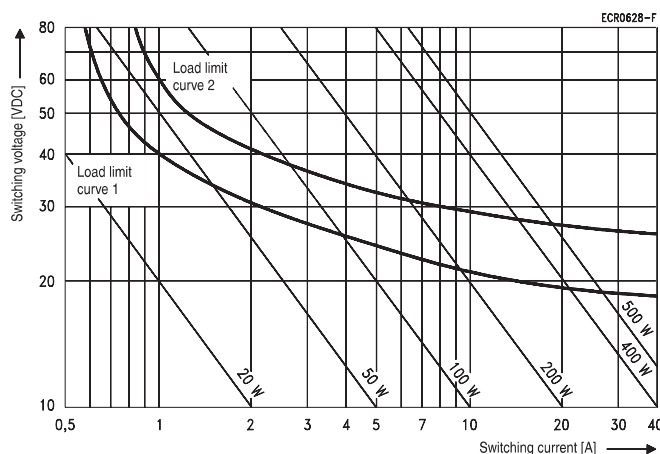
¹⁾ The values apply to a resistive or inductive load with suitable spark suppression and at maximum 14 V for 12 V or 28 V for 24 V load voltages.

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

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

⁴⁾ See Diagnostic Routines in our Application Notes at <http://relays.tycoelectronics.com/appnotes/>

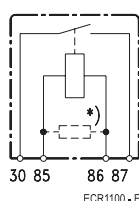
Load limit curve



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

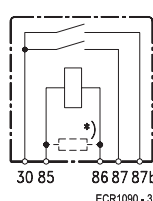
Pin assignment

1 make contact/
1 form A



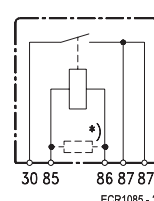
*) Models with resistor or diode in parallel to the coil on request.

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



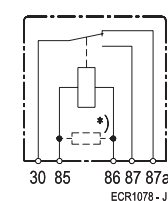
*) Models with resistor or diode in parallel to the coil on request.

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



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

1 changeover contact/
1 form C



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

Power Relay F4 / VF4

Coil data

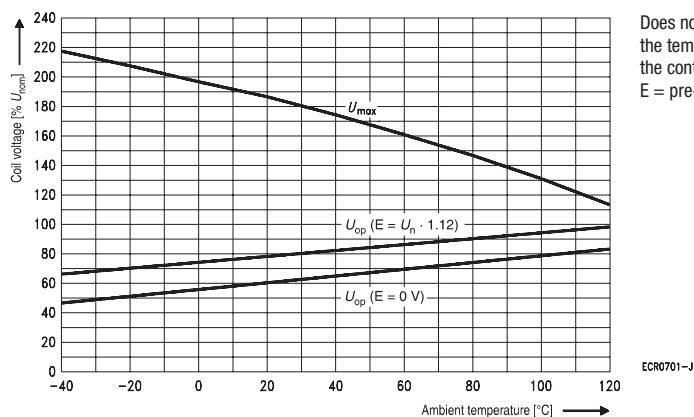
Available for nominal voltages	12, 24 V
Nominal power consumption of the unsuppressed coil at nominal voltage	1.6 W
Nominal power consumption at nominal voltage with suppression resistor	1.8/2.1 W (standard/high performance 24 V)
Test voltage winding/contact	500 VAC _{rms}
Ambient temperature range	- 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

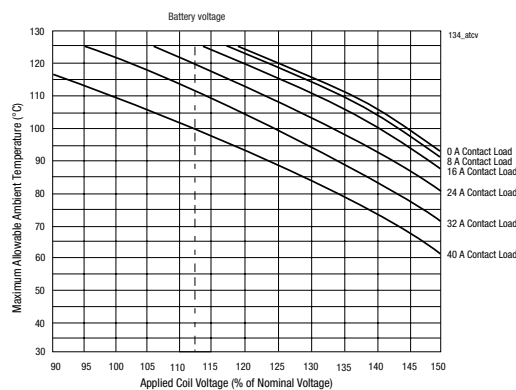
N.B.

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



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) ¹⁾
Resistance to bending, force applied to side	10 N (2.25 lbs) 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.

Power Relay F4/VF4

Environmental conditions

Temperature range, storage	Refer to <i>Storage</i> in the "Glossary"			
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 ₂	10 days	
	IEC 68-2-43	1 ± 0.3 cm³/m³ H ₂ S	10 days	
Vibration resistance	IEC 68-2-6 (sine sweep)		10-500 Hz min. 5 g	No change in the switching state > 10 µs Valid for NC contacts, NO contact values significantly higher
Shock resistance	IEC 68-2-27 (half-sine form single pulses)		min. 20 g 11 ms	
Load dump	ISO 7637-1 (12 V) ISO 7637-2 (24 V)	Test pulse 5 Test pulse 5	Vs =+ 86.5 V 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) ¹⁾			
Overload current for relays with rated currents as shown in contact data table ²⁾	1.35 x I _{rated} 1800 s 2.00 x I _{rated} 5 s 3.50 x I _{rated} 0.5 s 6.00 x I _{rated} 0.1 s			

¹⁾ FMVSS: Federal Motor Vehicle Safety Standard.

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

Ordering information

Part numbers for Power Relay F4/VF4 (see table below for coil data)		Tyco order number	Contact arrangement	Contact material	Enclosure	Special features
Relay part number	Internal reference					
6 V Plug-In Relays						
VF4-45D11	V23134-A1051-X826	7-1393305-2	1 Form C	AgNi0.15	Dust cover	Bracket
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 (cathode at 86)
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
VF4-45F11-C05	V23134-A1052-X828	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
VF4-41F11-S01	V23134-B1052-X824	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
V23134-B0052-X269		9-1393302-6	1 Form A	AgNi0.15	Dust cover	Resistor 560 Ω
V23134-B0052-X270		1-1414099-0	1 Form A	AgSnO2	Dust cover	Resistor 680 Ω
12 V PCB Relays						
V23134-A0052-G243		2-1393302-3	1 Form C	AgNi0.15	Dust cover	
VF4-15F13-C01	V23134-A0052-X812	4-1393305-5	1 Form C	AgNi0.15	Sealed	
VF4-15F13-C05	V23134-A0052-X813	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	
VF4-11F13-C01	V23134-B0052-X802	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	
VF4-11F13	V23134-B0052-X801	2-1393305-1	1 Form A	AgNi0.15	Dust cover	
VF4-15F13	V23134-A0052-X811	1393302-6	1 Form C	AgNi0.15	Dust cover	

Power Relay F4/VF4

Ordering information

Part numbers for Power Relay F4/VF4 (see table below for coil data)		Tyco order number	Contact arrangement	Contact material	Enclosure	Special features
Relay part number	Internal reference					
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	AgSn02	Dust cover	Contact gap > 0.8mm, diode (cathode at 86)
V23134-A0056-X433		1-1414168-0	1 Form C	AgSn02	Dust cover	Contact gap > 0.8mm, resistor 1.2 kΩ
VF4-15H11-C05	V23134-A0064-X816	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
VF4-45H11-C05	V23134-A1064-X829	1432219-1	1 Form C	AgNi0.15	Sealed	Bracket, resistor 2.7 kΩ
VF4-15H11-S05	V23134-A1064-X830	8-1393305-4	1 Form C	AgNi0.15	Dust cover	Bracket, diode (cathode at 86)
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
VF4-41H11	V23134-B1064-X825	7-1393305-0	1 Form A	AgNi0.15	Dust cover	Bracket
VF4-41H11-S08	V23134-A1064-X831	7-1393305-1	1 Form A	AgNi0.15	Dust cover	Bracket, resistor 2.7 kΩ
24 V PCB Relays						
V23134-A0053-G243		5-1393302-2	1 Form C	AgNi0.15	Dust cover	
VF4-15H13-C01	V23134-A0064-X820	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	
VF4-11H13	V23134-B0064-X804	2-1393305-6	1 Form A	AgNi0.15	Dust cover	
VF4-15H13	V23134-A0064-X819	0-1393302-8	1 Form C	AgNi0.15	Dust cover	

Coil versions

Coil data for Power Relay F4/VF4	Rated coil voltage (V)	Coil resistance +/- 10% (Ω)	Must operate voltage (V)	Must release voltage (V)	Allowable overdrive ¹⁾ voltage (V)	
					at 23 °C	at 85 °C
VF4-**D**-**	6	22	3.6	0.6	11	8
VF4-**F**-**	12	90	7.2	1.2	22	17
V23134-**052-****	12	90	7.2	1.6	22	17
VF4-**H**-**	24	360	14.4	2.4	44	35
V23134-**053-****	24	324	14.4	3.2	41	32
V23134-**056-****	24	268	16.0	4.0	38	29
V23134-**064-****	24	360	14.4	2.4	44	35

¹⁾ 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
VF4-1, VF4-4		300 pieces
VF4-2, VF4-3		165 pieces
VF4-5, VF4-6		110 pieces