

Power relay F7 / VF7

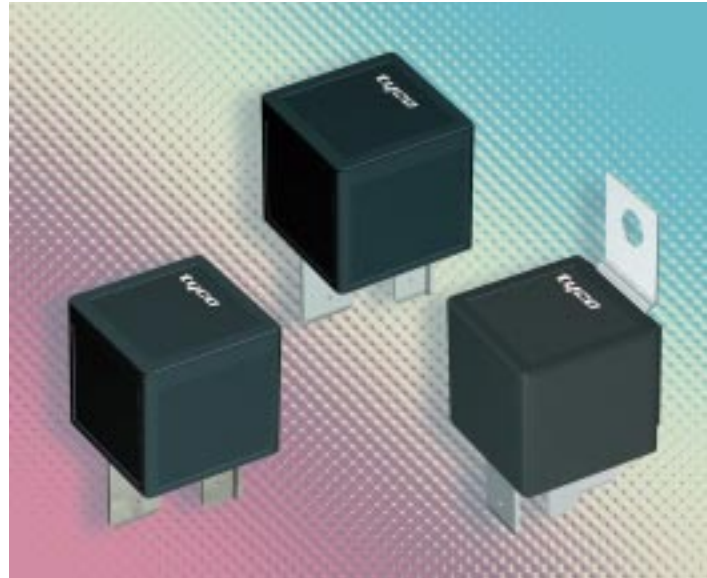


Features

- Limiting continuous current 70 A
- Dimensional characteristics and the functional allocation of the plug-in terminals to ISO 7588
- Standardized dimensions
- 24 V versions with contact gap > 0.8 mm on request
- Plug-in or PCB terminals

Typical applications

- Rear window defogger
- Battery disconnection
- Power distribution (clamp 15)



134_kop2



Design

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

Weight

Approx. 1.3 oz. (38 g)

Nominal voltage

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

Terminals

Quick connect terminals similar to ISO 8092-1
coil 6.3 x 0.8 mm,
load 9.5 x 1.2 mm;
surfaces tin-plated
or
PCB terminals

Accessories

Connectors see page 519

Special models on request

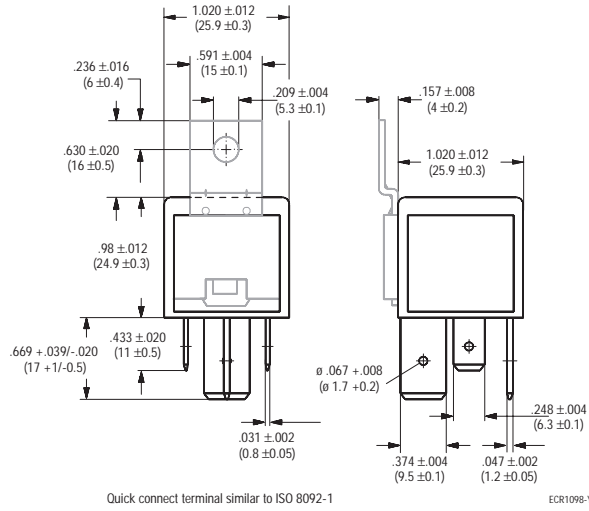
- Integrated components: resistor, varistor, diode
- Special labels
- Special cover shapes

Conditions

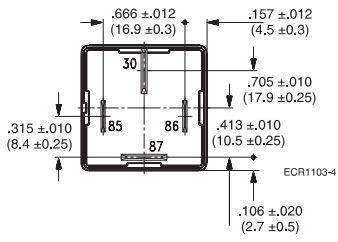
All parametric, environmental and endurance tests are performed according to EIA Standard RS-407-A at standard test conditions unless otherwise noted:
23 °C ambient temperature,
20-50% RH, 29.5 ± 1.0" Hg (998.9 ± 33.9 hPa).

Power relay F7

Dimensional drawing



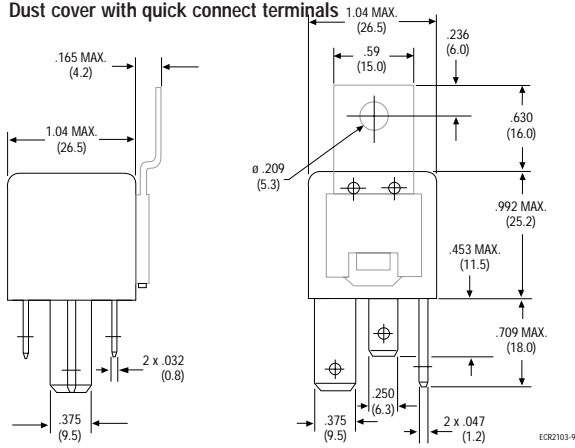
View of the terminals (bottom view)



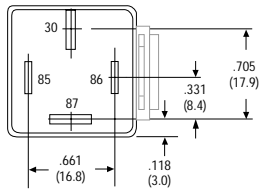
VF7

Dimensional drawing

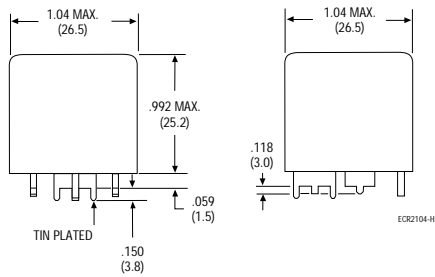
Dust cover with quick connect terminals



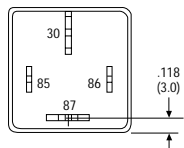
View of the terminals (bottom view)



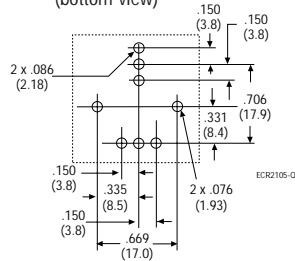
PCB terminals



View of the terminals (bottom view)




Mounting holes (bottom view)



Power relay F7 / VF7

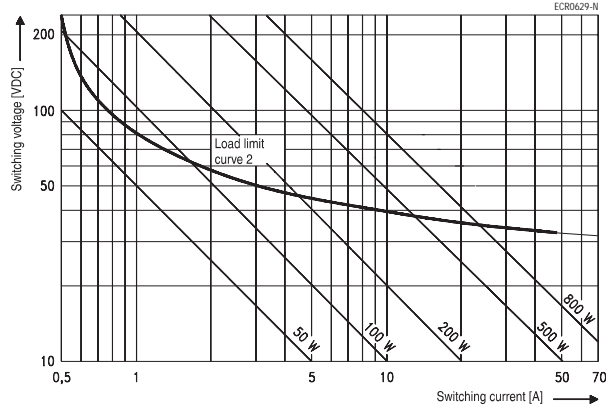
Contact data

Contact configuration	Make contact/ Form A
Contact material	AgNi0.15
Circuit symbol (see also Pin assignment)	
Max. switching voltage	See load limit curve
Max. switching power	See load limit curve
Max. switching current ¹⁾	
On ²⁾	Tested: USA 120 A / Europe up to 240 A
Off	70 A
Limiting continuous current	at 23 °C: 70 A at 85 °C: 50 A
Min. recommended current	1 A at 12 VDC
Voltage drop (initial) at 70 A,	Typ. 70 mV/200 mV max.
Increase in coil temperature at 10 A load	Typ. 2 °C
Mechanical endurance (without load)	> 10 ⁷ operations
Electrical endurance	For resistive load of 70 A, 1 sec make, 1 sec break time, 13.5 V switching voltage, 23 °C > 10 ⁵ operations
Max. switching rate at nominal load	6 operations per minute (0.1 Hz)

¹⁾ The values apply to a resistive load or inductive load with suitable spark suppression at 14 VDC load voltage.

²⁾ This current may flow for a maximum of 3 sec for a make/break ratio 1 : 10.

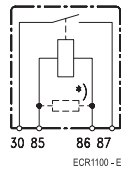
Load limit curve



Load limit curve 2 $\hat{=}$ 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.

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Coil data						
Available for nominal voltages	6 VDC		12 VDC		24 VDC	
	Power F7	Power VF7	Power VF7	Power F7	Power VF7	
Nominal coil resistance	18 Ω	91 Ω	72 Ω	332 Ω	288 Ω	
Resistor parallel to coil ¹⁾	- / 180 Ω	-	-/680 Ω	-	-/2700 Ω	
Nominal power consumption	2.0/2.2 W	1.6 W	2.0/2.2 W	1.7 W	2.0/2.2 W	
Test voltage winding/contact and contact/contact						500 VAC _{rms}
Ambient temperature range ²⁾						- 40 to + 125 °C
Upper limit temperature for the coil						180 °C
Max. switching rate without current						20 Hz
Operate time ³⁾						Typ. 7 msec
Release time ⁴⁾						Typ. 2 msec

¹⁾ Power relay VF7 available with and without resistor (see ordering information), parallel devices on power relay F7 on request

²⁾ See also operating voltage range diagram and temperature vs. coil voltage for continuous load diagram

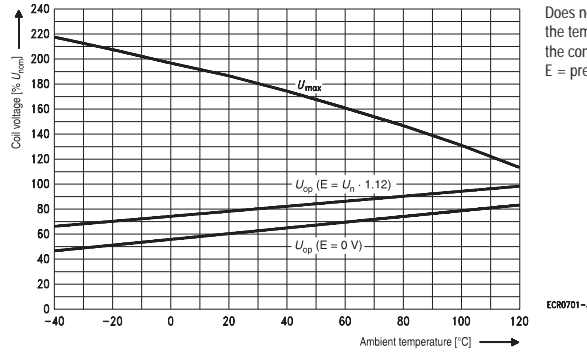
³⁾ Measured at nominal voltage without coil suppression device

⁴⁾ Measured with zero V applied (for unsuppressed relays after having been energized at nominal coil voltage)

N.B.

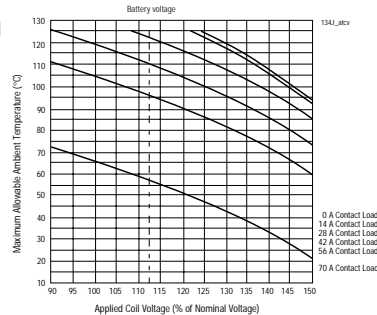
A low resistive device in parallel to the relay coil slows down the armature movement and reduces the lifetime caused by increased erosion and/or higher risk of contact tack welding.

Operating voltage range



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

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 = 2 °C at 14 A
= 4 °C at 28 A
= 26 °C at 42 A
= 40 °C at 56 A
= 78 °C at 70 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
7. When full lifetime is at high ambient and high load current, subtract 25 °C from maximum allowable ambient temperature.

Mechanical data	
Cover retention	
Dust cover (force axially applied)	150 N (33.7 lbs)
Pull	200 N (45 lbs)
Push	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.

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.

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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 cm ³ /m ³ SO ₂	10 days	
	IEC 68-2-43	1 ± 0.3 cm ³ /m ³ H ₂ S	10 days	
Vibration resistance	IEC 68-2-6 (sine pulse form)		20-500 Hz, 18 g	No change in the switching state > 10 µsec
Shock resistance	IEC 68-2-27 (half sine pulse form)		6 msec, 30 g	No change in the switching state > 10 µsec
Load dump	ISO 7637	DIN 40 839 Part 1		
Jump start		5 s 16 V 15 s 28 V 10 s 16 V	3 cycles	
	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			
Overload current ¹⁾			140 A, 60 sec 245 A, 2 sec 420 A, 0.15 sec	

¹⁾ Current and time are compatible with circuit protection by a typical 40 A automotive fuse. Relay will make, carry and break the specified current.

Power relay F7 / VF7

Ordering information

Part number (Replace * with "Coil designator") VF7 ¹⁾ F7 ²⁾		Contact arrangement	Contact material	Enclosure	Terminals
VF7 ¹⁾	F7 ²⁾				
VF7-11*11	V23134-J0*-D642	1 Form A	AgNi0.15	Dust cover	Quick connect
VF7-11*12		1 Form A	AgNi0.15	Dust cover	Printed circuit (clinch)
VF7-41*11	V23134-J1*-D642	1 Form A	AgNi0.15	Dust cover with bracket	Quick connect
	V23134-J0056-X408 ³⁾	1 Form A	AgSnO2	Dust cover	Quick connect

¹⁾ Optional coil suppression: add suffix -S07 for 180 Ω resistor (for 6 VDC),
-S01 for 680 Ω resistor in parallel with 12 VDC coil,
-S08 for 2,700 Ω resistor in parallel with 24 VDC coil.

Epoxy sealed construction: add suffix -C01 for epoxy sealed unit.

²⁾ Versions with resistor or diode in parallel to the coil on request. Versions with other contact materials on request

³⁾ Special high performance 24 V version with contact gap > 0.8 mm, with parallel resistor. For more information contact Tyco Electronics.

Coil versions

VF7	Coil designator F7	Rated coil voltage (V)	Coil resistance +/- 10% (Ω)	Must operate voltage (VDC)	Must release voltage (VDC)	Allowable overdrive (VDC)	
						at 23 °C	at 85 °C ¹⁾
D		6	18	3.6	0.6	9.1	7.0
F		12	72	7.2	1.2	18.1	14.1
H		24	288	14.4	2.4	36.2	28.2
	052	12	91	7.2	1.6	23	18
	053	24	332	14.4	3.2	44	34

¹⁾ Allowable overdrive is stated with no load current flowing through the relay contacts and minimum coil resistance.

Standard delivery packs (orders in multiples of delivery pack)

Power relay F7: Quick connect version: 210 pieces
Quick connect version with bracket: 208 pieces
PCB version: 200 pieces

VF7: 300 pieces

Remarks

VF7: Production in USA only.
Power relay F7: Production in Europe, Asia, South America