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Power relay F7 / VF7


Powertrain Systems


Chassis Systems


Safety


Security


Body


Driver Information

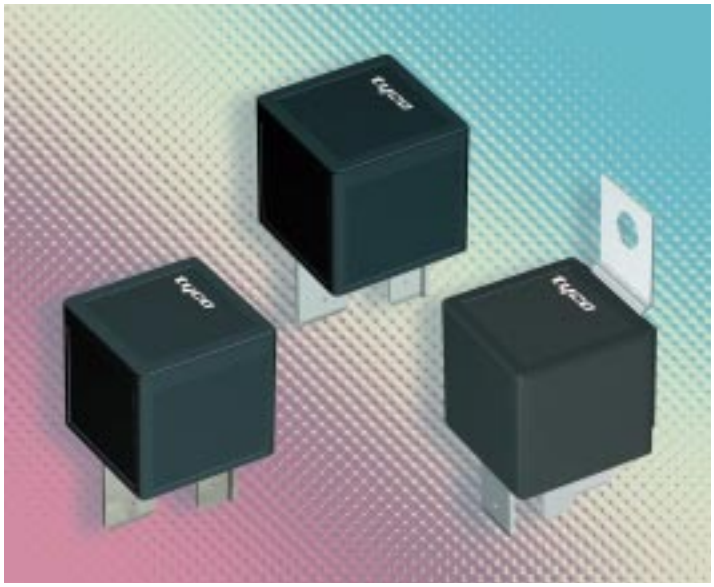

Convenience

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)



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Car Industry


Truck Industry


Other Industry

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).

All specifications subject to change. Consult Tyco Electronics AMP GmbH for latest specifications.

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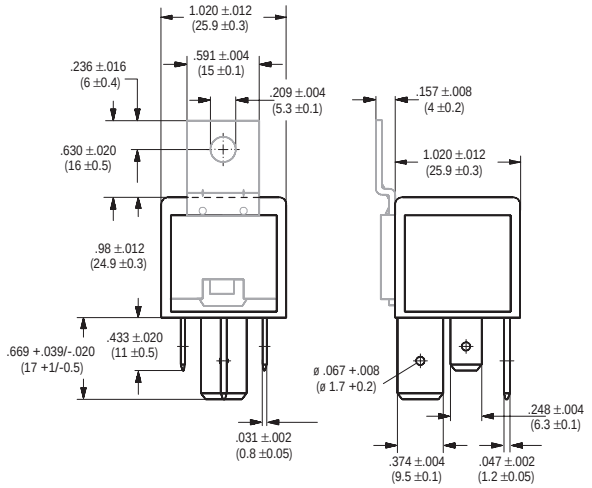
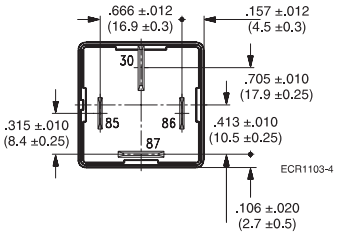
Dimensional drawing



Quick connect terminal similar to ISO 8092-1

View of the terminals (bottom view)



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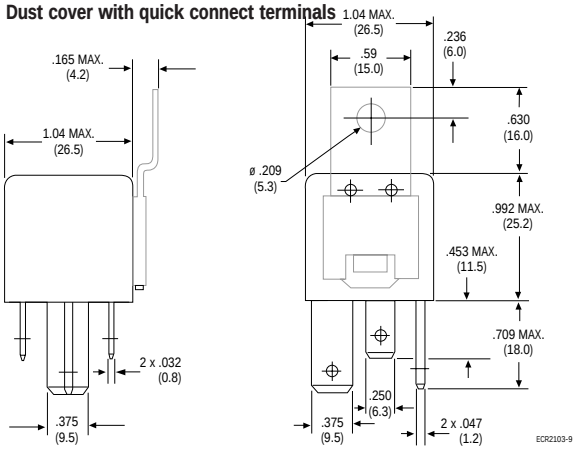
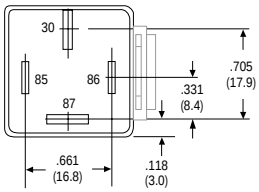
Dimensional drawing

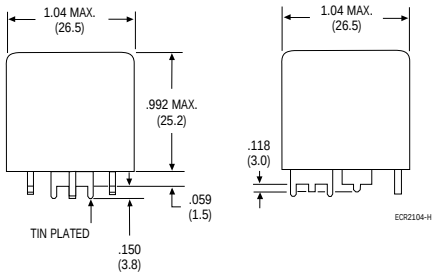
Dust cover with quick connect terminals



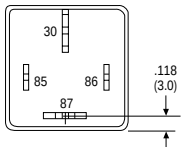
View of the terminals (bottom view)



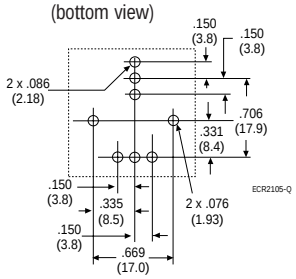
PCB terminals



View of the terminals (bottom view)



Mounting holes (bottom view)



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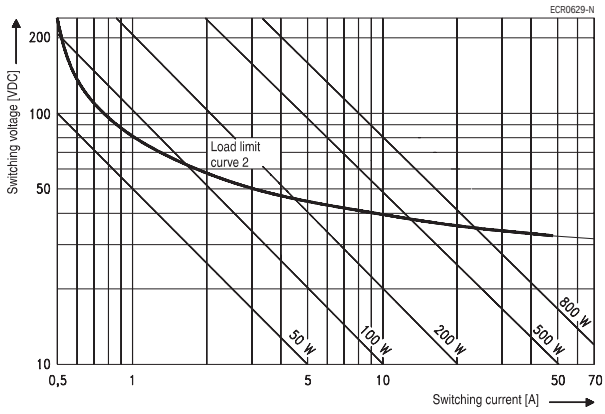
Power relay F7 / VF7

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] Off		 Tested: USA 120 A / Europe up to 240 A 70 A
Limiting continuous current	at 23 °C at 85 °C	70 A 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.

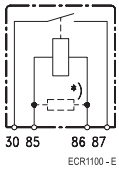
Load limit curve



Load limit curve 2 ≙ 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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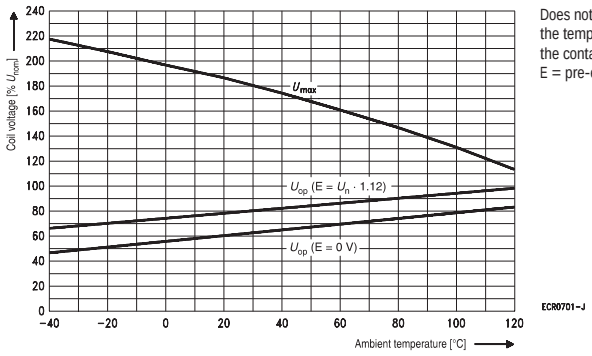
Power relay F7 / VF7

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				

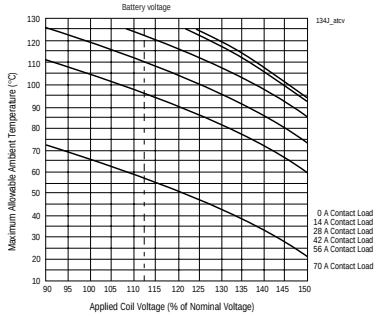
[1] Power relay VF7 available with and without resistor (see ordering information), parallel devices on power relay F7 on request
[2] See also operating voltage range diagramm and temperature vs. coil voltage for continuous load diagram
[3] Measured at nominal voltage without coil suppression device
[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 constant	 IEC 68-2-30 IEC 68-2-3	 Db, Variant 1 Ca	 6 cycles 56 days	 Upper air temperature 55 °C
Corrosive gas	IEC 68-2-42 IEC 68-2-43	10 ± 2 cm^3/m^3 SO_2 1 ± 0.3 cm^3/m^3 H_2S	10 days 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.

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Ordering information

Part number (Replace * with "Coil designator") VF7 [1]	F7 [2]	Contact arrangement	Contact material	Enclosure	Terminals
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

Coil designator VF7	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

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