

Micro power relay A / VFM



Features

- Limiting continuous currents 25/15 A at the NO / NC contacts
- Pin assignment to ISO 7588 part 3
- Positions of quick connect terminals to ISO 7588 part 3
- Compact dimensions

Typical applications

- Heaters (seat, front/rear windows)
- Motors (fan, pump, wiper)
- Valves, lifting magnets, interlocks
- Headlights, lighting systems



74_kop1



Design

Dustproof: protection class IP 54 to IEC 529 (EN 60 529)
Optional cover markings:
color-coded

Weight

Approx. 0.5 - 0.7 oz. (16 - 20 g)
depending on contact

Nominal voltage

12 V or 24 V
other nominal voltages available
on request

Terminals

Quick connect terminals similar
to ISO 8092-1
Coil and break contact
4.8 x 0.8 mm,
other load terminals
6.3 x 0.8 mm;
surfaces tin-plated

Accessories

Connectors see page 520

Special models on request

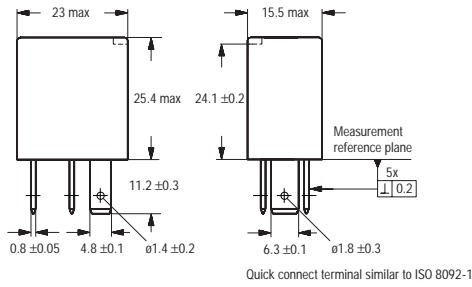
- One integrated component: diode or varistor in parallel to the coil
- Special labels

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).

Micro power relay A / VFM

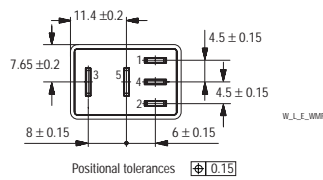
Dimensional drawing



Micro A: Terminals without holes
VFM: Terminals with holes
(other versions available on request)

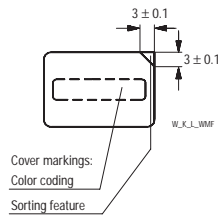
Terminal arrangement

View of the terminals (bottom view)



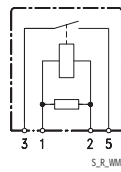
Cover marking

Only available for Micro power relay A on request

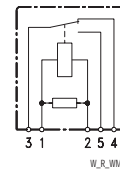


Pin assignment

1 make contact/
1 form A



1 changeover contact/
1 form C



Value of resistor see ordering information
Other components (diode or varistor)
in parallel to the coil available on request

Micro power relay A / VFM

Contact data 12 (test voltage 13.5 VDC)		V23074-A1001-A***/VFM-***F**	
Contact configuration	Make contact/ Form A		Changeover contact/ Form C
Contact material ¹⁾	AgSnO ₂		
Circuit symbol (see also Pin assignment)			
Max. switching voltage	See load limit curve		
Max. switching power	See load limit curve		
Max. switching current ²⁾			NC/NO
On ³⁾	120 A		40/120 A
Off	30 A		15/30 A
Limiting continuous current			
at 23 °C	30 A		15/30 A
at 85 °C	20 A		10/20 A
Min. recommended current	1 A		
Voltage drop (initial) at 20 A on NO contact	Typ. 30 mV, max. 200 mV		
at 10 A on NO contact	Typ. 20 mV, max. 250 mV		
Increase in coil temperature at 10 A load	Typ. 5 °C		
Mechanical endurance (without load)	>10 ⁶ operations		
Electrical endurance	See page 419		
Max. switching rate at nominal load	6 operations per minute (0.1 Hz)		

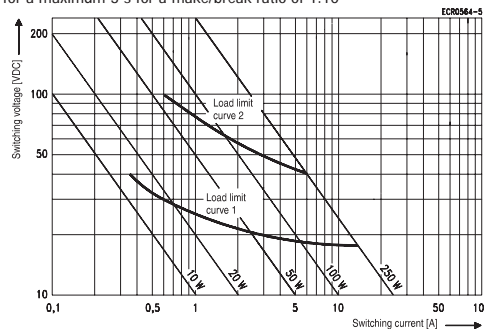
Contact data 24 (test voltage 27 VDC)		V23074-A1002-A***, contact gap ≥ 0.6 mm	
Contact configuration	Make contact/ Form A		Changeover contact/ Form C
Contact material ¹⁾	AgSnO ₂		
Circuit symbol (see also Pin assignment)			
Max. switching voltage	See load limit curve		
Max. switching power	See load limit curve		
Max. switching current ²⁾			NC/NO
On ³⁾	80 A		20/80 A
Off	20 A		10/20 A
Limiting continuous current			
at 23 °C	30 A		15/30 A
at 85 °C	20 A		10/20 A
Min. recommended current	1 A		
Voltage drop (initial) at 20 A on NO contact	Typ. 30 mV, max. 200 mV		
at 10 A on NO contact	Typ. 20 mV, max. 250 mV		
Increase in coil temperature at 10 A load	Typ. 5 °C		
Mechanical endurance (without load)	>10 ⁷ operations		
Electrical endurance	See page 419		
Max. switching rate at nominal load	6 operations per minute (0.1 Hz)		

¹⁾ AgNi0.15 available on request

²⁾ The values apply to a resistive load or inductive load with suitable spark suppression

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

Load limit curve



Load limit curve 1 ≙ safe shutdown,
no stationary arc (make contact)

Load limit curve 2 ≙ arc extinguishes,
during transit time (changeover contact)

Micro power relay A / VFM

Coil data	12 VDC		24 VDC	
	Micro A	VFM	Micro A	VFM
Available for nominal voltages				
Nominal coil resistance	124 Ω	90 Ω	441 Ω	360 Ω
Resistor parallel to coil	680 Ω	680 Ω	1800 Ω	2700 Ω
Nominal power consumption	1.4 W	1.8 W	1.6 W	1.8 W
Test voltage winding/contact and contact/contact	500 VAC _{rms}			
Ambient temperature range ¹⁾	- 40 to + 125 °C			
Upper limit temperature for the coil	180 °C			
Max. switching rate without current	20 Hz			
Operate time ²⁾	Typ. 5 msec			
Release time ³⁾	Typ. 2 msec			

¹⁾ See also operating voltage range diagram and temperature vs. coil voltage for continuous load diagram

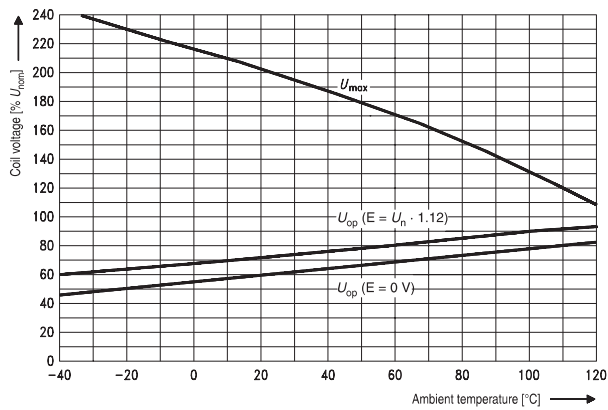
²⁾ Measured at nominal voltage without

³⁾ Measured with 0 V applied (for unsuppressed relays after having been energized at nominal voltage)

N.B.

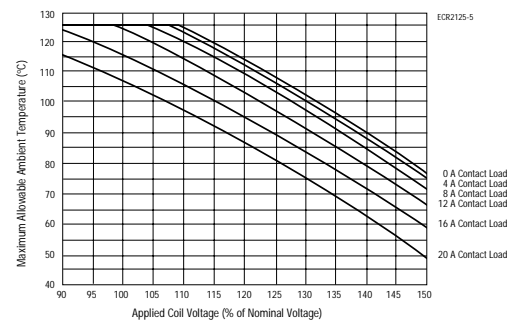
A low resistive device in parallel to the relay coil slows the armature movement down and reduces the lifetime caused by increased erosion and/or higher risk of contact tack welding.

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 load



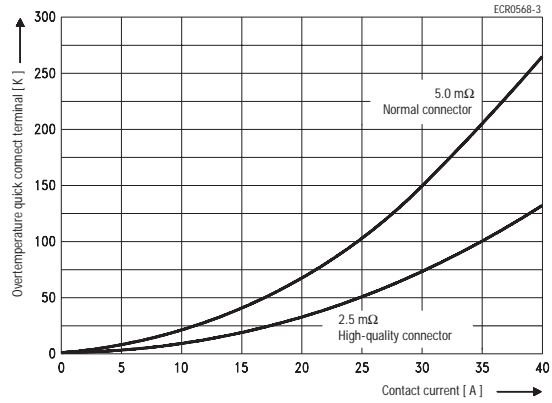
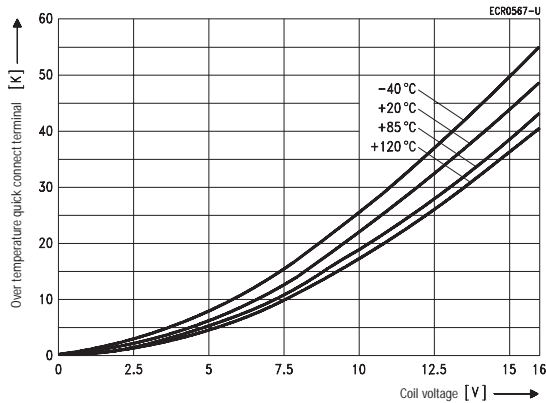
Assumptions:

1. Still air
2. Nominal coil resistance
3. Maximum mean coil temperature = 180 °C
4. Coil temperature rise due to load = 1 °C at 4 A
= 4.5 °C at 8 A
= 9.5 °C at 12 A
= 18 °C at 16 A
= 26.5 °C at 20 A
5. Thermal resistance and power dissipation based on coil resistance at 180 °C
6. Curves are based on 1.5 W at 23 °C
7. When full lifetime is at high ambient and high load current, subtract 25 °C from maximum allowable ambient temperature.

Micro power relay A / VFM

Temperature curves for the quick connect terminals

Parameter
Ambient temperature contact circuit release incl. connector



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	Db, Variant 1	6 cycles	Upper air temperature 55 °C
	IEC 68-2-3	Ca	10 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)		10-500 Hz, min. 5 g	No change in the switching state > 10 µsec Valid for NC contacts. NO contacts are significantly higher
Shock resistance	IEC 68-2-27 (half sine pulse form)		min. 20 g	
Load dump	ISO 7637	DIN 40 839 Part 1		
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)			
Overload current			40 A, 36 sec 80 A, 10 sec 200 A, 2.5 sec	

¹⁾ Current and time are compatible with circuit protection by a typical 20 A automotive circuit breaker. Relay will make, carry and break the specified current.

Mechanical data	
Cover retention	
Pull	150 N (33.8 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)
Resistance to bending, force applied to side	10 N (2.25 lbs)
Torsion	0.3 Nm
Enclosures	
Dust cover	Protects relay from dust. For use in passenger compartment or enclosures.

Micro power relay A / VFM

Electrical endurance 12 V nominal voltage, test voltage 13 V			
	Make contact	Break contact	
Motor load			
Make current	40 A	20 A	
Break current	20 A	10 A	
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		
Resistive load			
Nominal load current	20 A	10 A	
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		
Lamp load (bounce free coil control circuit)			
Max. make current	120 A	40 A	
Break current	20 A	10 A	
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		
24 V nominal voltage, test voltage 27 V ¹⁾			
	Make contact	Break contact	
Motor load			
Make current	38 A	28 A	
Break current	15 A	6 A	
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		
Resistive load			
Nominal load current	20 A	10 A	
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		
Lamp load, 2 H4 lamps (bounce free coil control circuit)			
Max. make current	70 A		
Break current	7 A		
Duty cycle <i>t_{on}/t_{off}</i>	2 sec/2 sec		
Operations	> 10 ⁵		

¹⁾ Data only valid for Micro power relay A, V23074-A1002-A***, contact gap ≥ 0.6 mm.
For further information on VFM 24 V endurance test contact Tyco Electronics in USA.

Micro power relay A / VFM

Ordering information

Part number (Replace * with „Coil designator“) VFM ¹⁾		Contact arrangement	Contact material	Enclosure	Terminals
	Micro A ¹⁾				
VFM-11*41-Snn ²⁾	V23074-A1*-A402	1 Form A	AgSnO ₂	Dust cover, black	Quick connect
VFM-15*41-Snn ²⁾	V23074-A1*-A403	1 Form C	AgSnO ₂	Dust cover, black	Quick connect

¹⁾ Versions with diode or varistor parallel to coil on request. Versions with special labels or color shapes on request

²⁾ Coil suppression (add suffix): - S01 for 12 VDC (680 Ω parallel resistor)
- S08 for 24 VDC (2,700 Ω parallel resistor)

Coil versions

Coil designator		Rated coil voltage (V)	Coil resistance ± 10% (Ω)	Must operate voltage (VDC)	Must release voltage (VDC)	Allowable overdrive (VDC)	
VFM (without Resistor)	Micro A (with Resistor)					at 23 °C	at 85 °C ¹⁾
F		12	90	7,2	1,2	20	15
H		24	360	14,4	2,4	40	30
	001	12	124	7,2	1,8	24	18
	002	24	441	14,4	3,6	45	33

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)

VFM: 600 pieces
Micro power relay A: 480 pieces

Remarks

VFM: Production in USA only.
Micro power relay A: Production in Europe, Asia