

## Micro power relay A / VFM



**Powertrain Systems**



**Chassis Systems**



**Safety**



**Security**



**Body**



**Driver Information**



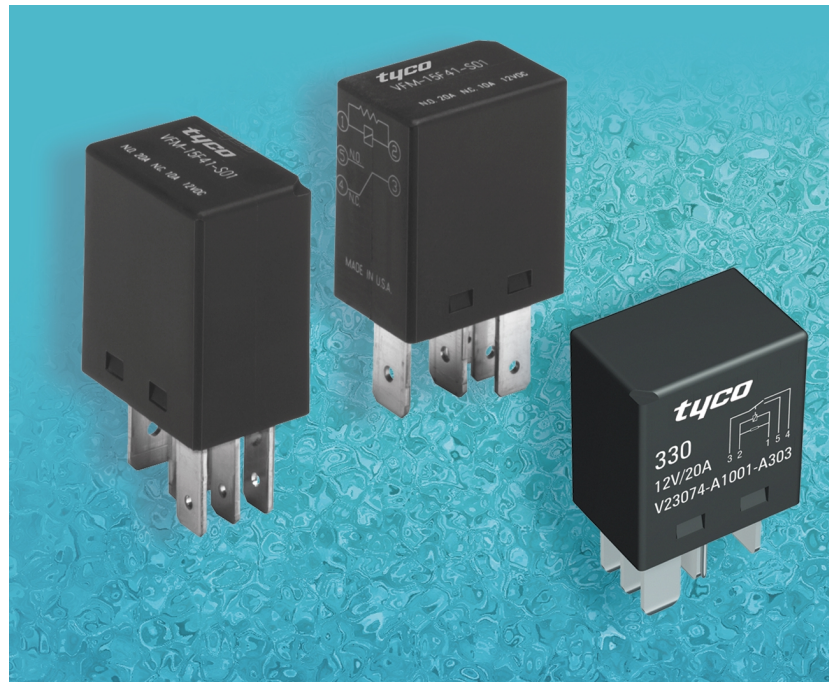
**Convenience**

### 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



**Car Industry**



**Truck Industry**



**Other Industry**

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  
Version with PCB terminals on  
request

### Accessories

Connectors see page 190

### 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:

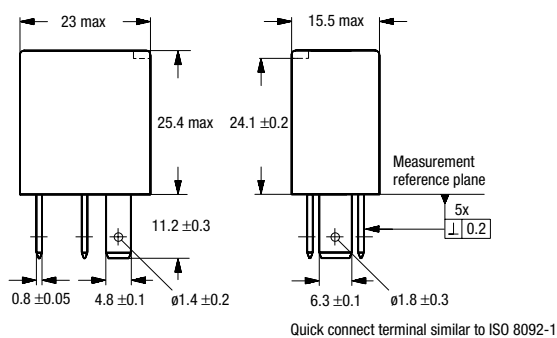
23 °C ambient temperature,  
20-50% RH, 29.5 ± 1.0" Hg  
(998.9 ± 33.9 hPa).

Please also refer to the Application Recommendations in this catalog for general precautions.

## Micro power relay A / VFM

### Dimensional drawing

Micro power relay A / VFM



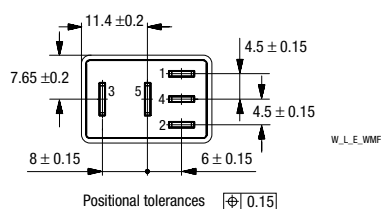
Micro A: Terminals without holes

VFM: Terminals with holes

(other versions available on request)

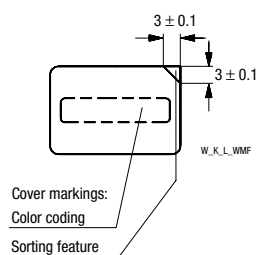
### Terminal arrangement

View of the terminals (bottom view)



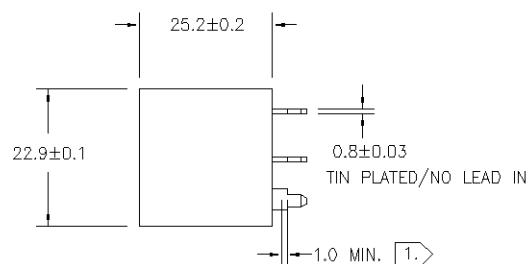
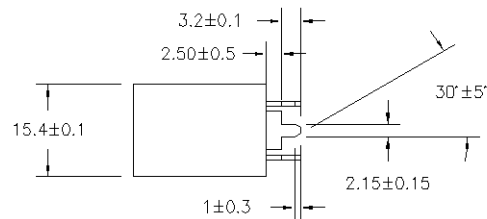
### Cover marking

Only available for Micro power relay A on request



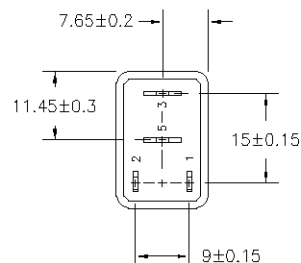
### Dimensional drawing

Micro power relay VFM A (PCB version on request)





### Terminal arrangement

View of the terminals (bottom view)



## Micro power relay A / VFM

### Contact data

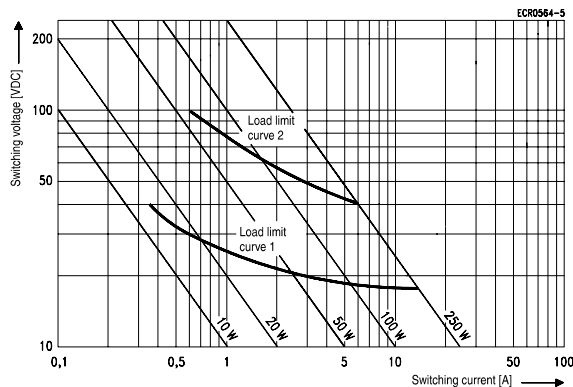
Contact configuration	Make contact/ Form A		Changeover contact/ Form C	
Circuit symbol				
Rated voltage	12 V	24 V	12 V	24 V
Rated current at 85 °C	25 A	15 A	15/25 A	10/15 A
Contact material	AgSnO <sub>2</sub>			
Max. switching voltage/power	See load limit curve			
Max. switching current <sup>1)</sup>			NC/NO	NC/NO
On <sup>2)</sup>	120 A	120 A	40/120 A	20/120 A
Off	30 A	20 A	15/30 A	10/20 A
Min. recommended load <sup>3)</sup>	1 A at 5 V			
Voltage drop at 10 A (initial)	Typ. 15 mV, 200 mV max.		Typ. 15 mV, 200 mV max.	
NO contact			Typ. 15 mV, 200 mV max.	
NC contact			Typ. 20 mV, 250 mV max.	
Mechanical endurance (without load)	Typ. 10 <sup>7</sup> operations			
Electrical endurance (example of resistive load, further information on request)	> 1 x 10 <sup>5</sup> operations 25 A, 14 V	> 1 x 10 <sup>5</sup> operations 15 A, 28 V	> 1 x 10 <sup>5</sup> operations 25 A, 14 V (NO contact) > 1 x 10 <sup>5</sup> operations 15 A, 14 V (NC contact)	> 1 x 10 <sup>5</sup> operations 15 A, 28 V (NO contact) > 1 x 10 <sup>5</sup> operations 10 A, 28 V (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> See chapter Diagnostics in our Application Recommendations on page 18.

### Load limit curve



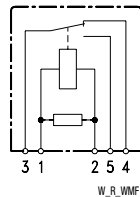
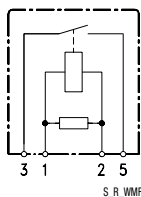
Load limit curve 1  $\triangleq$  arc extinguishes,  
during transit time (changeover contact)

Load limit curve 2  $\triangleq$  safe shutdown,  
no stationary arc (make contact)

### Pin assignment

1 make contact/  
1 form A

1 changeover contact/  
1 form C



Value of resistor see ordering information  
Other components in parallel to the coil  
available on request

## Micro power relay A / VFM

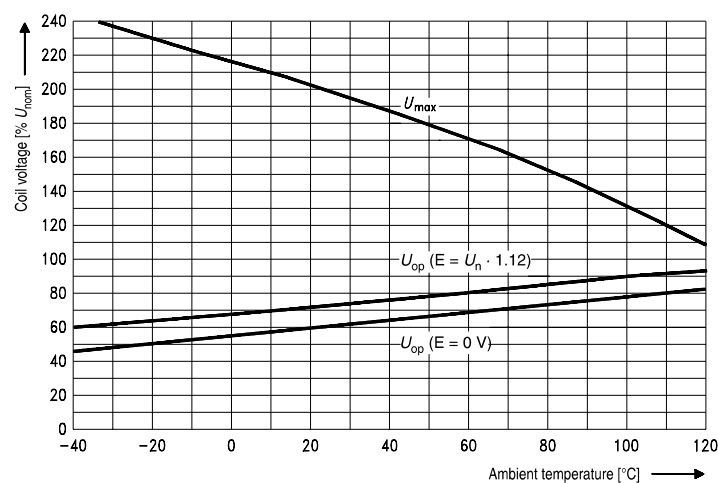
### Coil data

Available for nominal voltages	12, 24 V		
Nominal power consumption at nominal voltage with suppression resistor	Micro A 12 V 1.4 W	Micro A 24 V 1.6 W	VFM 12, 24 V 1.8 W
Test voltage winding/contact	500 VAC <sub>rms</sub>		
Ambient temperature range	- 40 to + 125 °C		
Max. switching rate without contact loading	20 Hz		
Operate time at nominal voltage	Typ. 5 ms		
Release time at nominal voltage	Typ. 3 ms		

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.

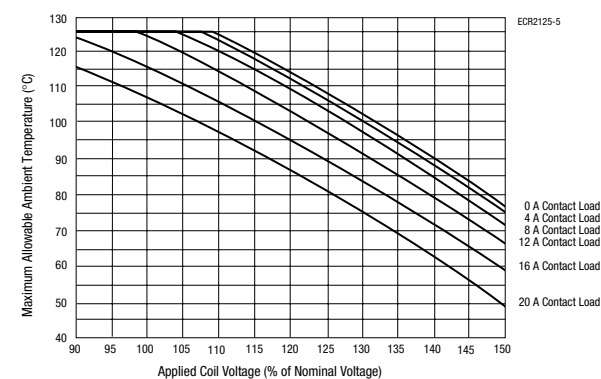
### Operating voltage range



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

ECR0702-S

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



### Mechanical data

Cover retention	
Axial force	150 N (33.8 lbs)
Pull force	150 N (33.8 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.

<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.

## Micro power relay A / VFM

### 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 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 pulse form)		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) <sup>1)</sup>			
Overload current <sup>2)</sup>	34 A, 1800 s 50 A, 5 s 87.5 A, 0.5 s 150 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 25 A automotive fuse. Relay will make, carry and break the specified current.

### Ordering information (Production in Europe and Asia)

Part numbers (see table below for coil data)		Contact arrangement	Contact material	Enclosure	Terminals
Relay part number	Tyco order number				
12 V plug-in relays <sup>1)</sup>					
V23074-A1001-A402	1393292-5	1 Form A	AgSnO2	Dust cover	Quick connect
V23074-A1001-A403	8-1393292-4	1 Form C	AgSnO2	Dust cover	Quick connect
24 V plug-in relays <sup>1)</sup>					
V23074-A1002-A402	8-1393292-9	1 Form A	AgSnO2	Dust cover	Quick connect
V23074-A1002-A403	3-1393292-8	1 Form C	AgSnO2	Dust cover	Quick connect

<sup>1)</sup> Versions with diode or varistor in parallel to the coil on request. Versions with special labels or color shapes on request

### Coil versions

Coil designator Micro A (with Resistor)	Rated coil voltage (V)	Coil resistance <sup>2)</sup> ± 10% (Ω)	Must operate voltage (V)	Must release voltage (V)	Allowable overdrive <sup>1)</sup> voltage (V)	
					at 23 °C	at 85 °C
V23074-**001-****	12	105	7.2	1.8	24	18
V23074-**002-****	24	354	14.4	3.6	45	33

<sup>1)</sup> Allowable overdrive is stated with no load applied and minimum coil resistance..

<sup>2)</sup> Including parallel resistor.

### Standard delivery packs (orders in multiples of delivery pack)

Micro power relay A: 480 pieces

## Micro power relay A / VFM

Ordering information (Production in USA only)

Part numbers (see table below for coil data)		Contact arrangement	Contact material	Enclosure	Terminals
Relay part number	Tyco order number				
VFM-11F41-S01	9-1393292-9	1 Form A	AgSn02	Dust cover	Quick connect
VFM-15F41-S01	1393293-8	1 Form C	AgSn02	Dust cover	Quick connect
VFM-21F41-S01	1432503-1	1 Form A	AgSn02	Dust cover, Sealed	Quick connect
VFM-25F41-S01	1432506-1	1 Form C	AgSn02	Dust cover, Sealed	Quick connect
VFM-21F42-S01	1432502-1	1 Form A	AgSn02	Dust cover, Sealed	Printed circuit

### Coil versions

Coil designator VFM (without resistor)	Rated coil voltage (V)	Coil resistance ± 10% (Ω)	Must operate voltage (V)	Must release voltage (V)	Allowable overdrive <sup>1)</sup> voltage (V)	
					at 23 °C	at 85 °C
VFM-**F**-S01 <sup>2)</sup>	12	80	7.2	1.2	20	15
VFM-**H**-S02 <sup>2)</sup>	24	318	14.4	2.4	40	30

<sup>1)</sup> Allowable overdrive is stated with no load applied and minimum coil resistance.

<sup>2)</sup> Coil suppression suffix: S01 for 12 V (680 Ω parallel resistor), S08 for 24 V (2700 Ω parallel resistor).

### Standard delivery packs (orders in multiples of delivery pack)

VFM: 600 pieces