June 29, 2023

DATA SHEET

AUTOMOTIVE RELAYS

EM1K SERIES

DESCRIPTION

The NEXEM EM1K series is PC-board mount type and suitable for power supply, fan, pumps, heater, CR circuits controls and other applications for automobiles which require high quality and high performance.

The EM1K series have higher carrying current performance than the current relay like EM1 series.

FEATURE

- Large current capacity (81A 1hour at 20℃)
- High heat resistance
- Flux tight housing
- Pb free
- Through-hole reflow soldering available

APPLICATION

- Power supply
- Motor control such as fan and pumps
- Heater control
- CR circuit control
- Lamp control

For Proper Use of Miniature Relays

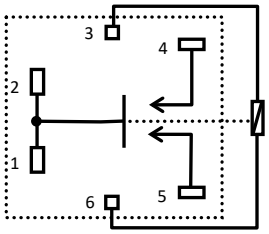
DO NOT EXCEED MAXIMUM RATING

Do not use relay under excessive conditions such as over ambient temperature, over voltage and over current. Incorrect use could result in abnormal heating and damage to the relay or other parts.

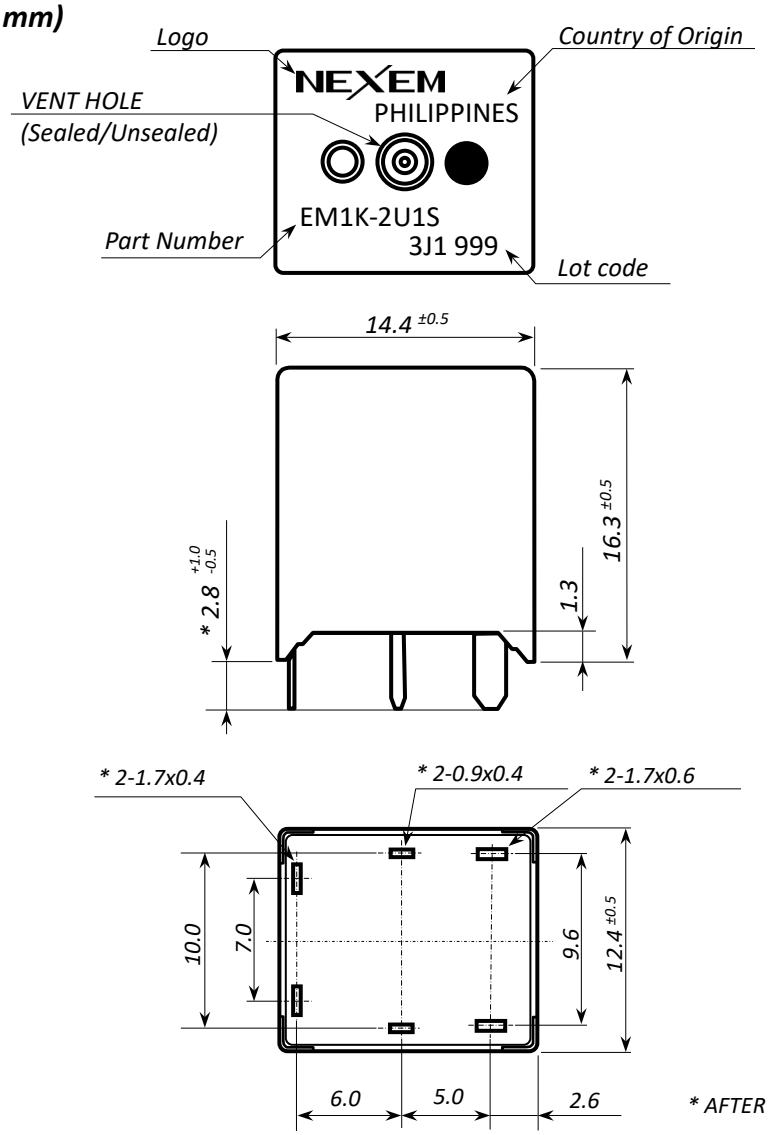
READ CAUTIONS IN THE SELECTION GUIDE

Read the cautions described in EM Devices' “Miniature Power Relay Automotive Function and Notes on Correct Use” and “Notes on Correct Use” in Miniature Relays selection guide” before does designing your relay applications.

SCHEMATICS (BOTTOM VIEW)

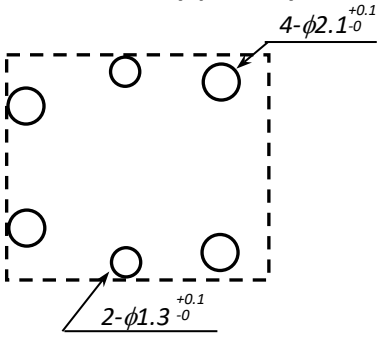


DIMENSIONS (in mm)



* AFTER SOLDER DIP

RECOMMENDED PCB PAD LAYOUT (BOTTOM VIEW) (in mm)



SPECIFICATIONS

(Ambient temperature: 20°C)

Items		Specifications
Contact form		1u
Contact rating	Max. switching voltage (1)	16Vdc
	Max. switching current (1)	100A ON / 60A OFF at 14Vdc
	Min. switching current	1A at 5Vdc
	Max. carrying current (2)	81A at 14Vdc for 1hour at 20°C
	Contact resistance	2.5mΩ typical, 25mΩ max. (6Vdc–7A voltage drop method, initial)
	Rated load	40A-14Vdc, Resistive load
Contact material		Silver oxide complex alloy
Operate time (3)		10ms max.
Release time (3)		10ms max.
Insulation resistance		100MΩ min. at 500Vdc
Breakdown voltage	Between open contacts	500Vac min. for 1minute
	Between coil and contact	500Vac min. for 1minute
Shock resistance	Misoperation	98m/s^2
	Destructive failure	980m/s^2
Vibration resistance	Misoperation	10 to 300Hz, 43m/s^2
	Destructive failure	10 to 500Hz, 43m/s^2 for 200hours
Ambient temperature		-40 to +125°C (no freezing)
Life expectancy	Mechanical	1,000,000 cycles
	Electrical	100,000 cycles (Rated load)
Weight		8g typical

(1) Resistive, 10cycles
(2) Copper thickness: 105µm, width: 15mm.
(3) Excluding contact bounce, nominal voltage applied, without flywheel coil diode
(4) EM Devices recommends that the usage of the coating agent close to the relay is to be avoided.

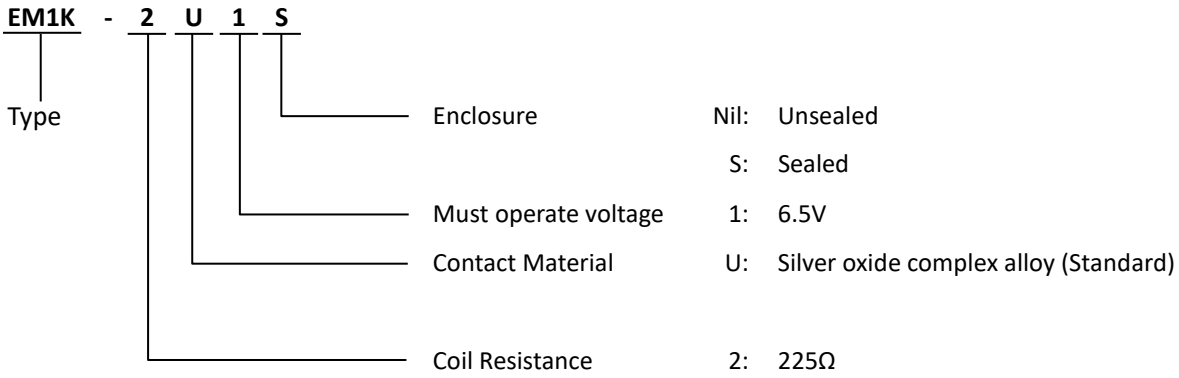
COIL RATING

(Ambient temperature: 20°C)

Nominal Voltage (VDC)	Coil Resistance (Ω)±10%	Must Operate Voltage (4) (VDC)	Must Release Voltage (5) (VDC)	Nominal Operating Power (W)
12	225	6.5	0.9	0.64

(5) Test by pulse voltage

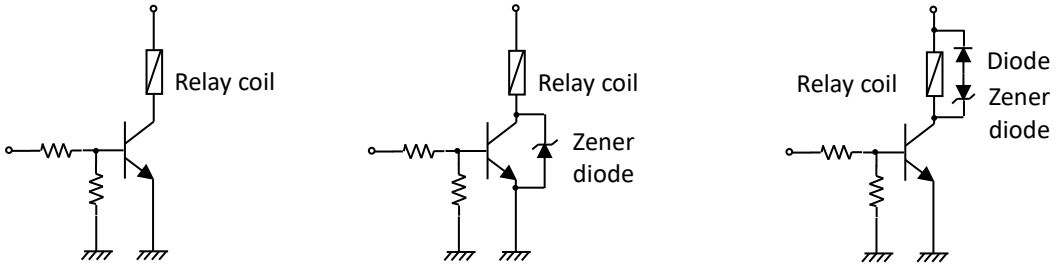
PART NUMBER SYSTEM



Contact form	Coil Nominal voltage	Coil Resistance	Sealed type	Unsealed type
1u	12VDC	225Ω	EM1K-2U1S	EM1K-2U1

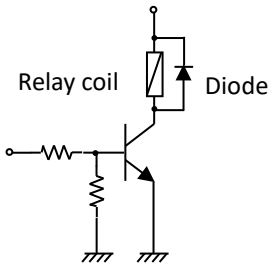
COIL DRIVE CIRCUIT

Recommended Circuit



(a) **(b)** **(c)**

Non-recommended Circuit



(d)

(Note)

EM Devices recommends coil drive circuit (b) and (c) for coil fly back suppression, but does not recommend the circuit (d) because the performance of the EM1K relay does not appear enough.