

Coil Voltage Rating of Relay

Asked 1 year, 9 months ago Active 1 year, 9 months ago Viewed 2k times



0



I have seen many relays with same current and voltage rating (like 10A 230VAC or 5A 30V) but the coil rating (I am not sure, I am using the right word) are different. Some are 5V some are 12V and so on.. . What I want to know is, why there's difference is in this value? Do it have something to do with the force with which switching contact are touched and released?

voltage power current relay switching

[Share](#) [Cite](#) [Improve this question](#) [Follow](#)

asked Aug 15 '19 at 8:53



Bhuvnesh

532 1 12

- 3 You will often find the same relay style available with different coil voltages, such as 3V, 5V, 12V, 24V. You pick the one that matches the voltage you have available in your circuit. eg if you have 5V available, use a 5V relay. – Steve G Aug 15 '19 at 9:16
- 1 Different wire thickness -> different length of wire -> different resistance -> different voltage ratings – Harry Svensson Aug 15 '19 at 14:52

2 Answers

Active	Oldest	Votes
--------	--------	-------



1



The relays are designed and manufactured to be operated with the stated nominal voltage across the coil when energized.

If you want to make a relay to be operated from a 5V power source, you will use fewer turns of thicker wire than if it is to operate from 12V or 24V, all other things being equal.



For the relay to work mechanically, the ampere-turns of the different coils has to be about the same for different rated coil voltages. So the DC resistance of a 5V coil will be less than for a 12V coils. Relays are basically current-operated devices that are specified in terms of voltage. The distinction becomes important if the relay coil gets very hot, which results in less current and the relay may then fail to pull in, even with the (nominal) rated voltage applied. When cold, it might pull in with 70% of the rated voltage applied. For example, look at [this](#) relay datasheet:

Eg.

■ COIL RATING

Standard type (360 mW)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release-Voltage (VDC) *	Rated Power (mW)
5	5	69	3.5	0.25	360
6	6	100	4.2	0.3	
9	9	225	6.3	0.45	
12	12	400	8.4	0.6	
18	18	900	12.6	0.9	
24	24	1,600	16.8	1.2	
48	48	6,400	33.6	2.4	

As it turns out, the net result is that the coil **power** is about constant for a given relay design. So if a model of relay consumes, say, 360mW when energized, then the 5V version will draw 72mA and the 12V version will draw 30mA.

Share Cite Improve this answer Follow

answered Aug 15 '19 at 14:28



Spehro Pefhany

291k 12 240 607



1



Some are 5V some are 12V and so on.. . What I want to know is, why there's difference in this value?

Relays are made with different coil voltages to match the voltage used in the circuit that is controlling the relay.

Do it have something to do with the force with which switching contact are touched and released?

Indirectly. The coil has to exert enough force to move the contacts against the spring that returns them to the un-energized position. If the voltage is too low then the magnetic field and therefore the force is too weak. If the voltage is too high then power is wasted in the coil and it might overheat.

Different coils are made with different sizes of wire and numbers of turns around the core, such that the right strength of magnetic field is created when the specified voltage is applied. For more information about this, look up the design of solenoid coils — 'solenoid' here refers to the simple cylindrical shape of the coil rather than the electromechanical plunger device.

Share