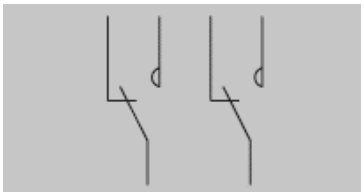
Klippon® Relay

D-SERIES dimensioning recommendation

Selection table for switching small resistive and inductive loads

The table below helps you to select suitable relay loads.
A service life of around 100,000 switching operations is assumed.

		DRR 2 CO 
Example Part No. Single relay 24 V DC input		2765020000
Example Part No. KIT 24 V DC input		-
Insulation between input and output		Basic insulation
Contact material		AgSnO
Width plugged on socket		38 mm
Socket connection technologies		PUSH IN and Screw
Max. Operating temperature		55°C
Resistive AC load	AC1 loads: Heaters 250 V AC	< 10 A
Inductive AC load	AC15 loads: Valves, contactors 250 VAC	< 3.5 A
Inductive AC load	AC3 loads: 1-phase motors 250 VAC	< 1.5 A
Resistive DC load	DC1 loads: Heaters 24 V DC	< 10 A
Induktive DC Last	DC13 loads: Valves, contactors 24 V DC	< 2.5 A
Inrush current optimized		-
Recommended field of application		Power relay (octal relay) for switching several industrial loads < 3.5 A.

The indicated currents only apply to the normally open contact. The data of the normally closed contact are to be set at approx. one third of the specified values. The real service life can be both above and below the specified value because each load stresses the switching contact differently and other environmental factors influence the service life of the switching contact, e.g. ambient temperature, mounting position, switching frequency, and many more. Therefore, these values are without guarantee and serve as orientation for better dimensioning. They may not be used as B10 or B10d values for the calculation of failure data such as MTTF or MTTFd either. The assessment of the maximum load capacity was carried out on the basis of many years of practical experience as well as life cycle tests under laboratory conditions.

Additional information on the selection tables

Simple formulas for calculating individual values

Calculating the service life of the relay contacts for different switching currents

In the previous tables we gave you the maximum recommended currents at various loads for a service life of approx. 100,000 switching cycles. If you switch lower currents, the service life of the relay contacts will be extended. With the following formulas you can approximately calculate how the service life of the relay contacts will change.

Example: A 24 V DC solenoid valve with 200 mA current consumption should be switched with a 6.4 mm wide TERMSERIES RSS 1 CO relay. A solenoid valve corresponds to a DC13 load. According to the table, a switching current of max. 1 A is specified for the relay at this load. To calculate the expected service life, proceed as follows:

$$x = \frac{I_{Table}}{I_{App}} = \frac{1\ A}{200\ mA} = 5$$

$$n_{new} = 100{,}000 \cdot x = 100{,}000 \cdot 5 = 500{,}000 \text{ switching cycles}$$

The expected service life when switching a 200 mA solenoid valve should be approx. 500,000 switching cycles.

I_{App}	= Switching current in the application
I_{DC}	= DC Switching current at the DC switching voltage in the application
$I_{Load\ curve}$	= DC Switching current from the load limit curve of the data sheet
I_{Nom}	= Continuous current from relay data sheet
I_{Table}	= Switching current from the selection table for the respective load
n_{new}	= Service life at switching current in the application
x	= Reduction factor of the switching current

Calculating the switching currents for voltages that deviate from the values in the table

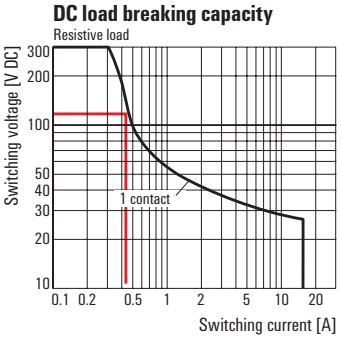
AC switching voltage:
With AC loads, the switching current has the greatest influence on the service life. Therefore, the switching currents from the table can also be used for switching voltages up to 100 V AC. For values below 100 V AC, the service life increases at the same switching current:

- at 24 V AC four times the service life
- at 60 V AC twice the service life

Example: If the table shows a switching current of 2 A for a 250 V AC AC15 load, then these 2 A are also applicable for 120 V AC. At 24 V AC switching voltage, the expected service life increases four times to 400,000 switching cycles.

DC switching voltage:
When switching DC loads, the switched voltage has a large influence on the maximum switching current of the relay contact. This can also be seen from the DC load breaking curve given in the data sheet. The following formulas can be used to roughly determine the maximal switching current for other DC switching voltages:

Example: A TERMSERIES RCL 1 CO relay with a DC13 load and a switching voltage of 110 V DC. According to the table a maximum of 2 A at 24 V DC applies to a DC13 load for a service life of 100,000 switching cycles.



The curve shows a maximum switching current of approx. 0.45 A with resistive load. This must now be set in relation to the rated current of the relay (16 A) from the data sheet and the value for a DC13 load from the table.

$$x = \frac{I_{Table}}{I_{Nom}} = \frac{2\ A}{16\ A} = 0.125$$

$$I_{DC} = I_{Load\ curve} \cdot x = 0.45\ A \cdot 0.125 = 0.056\ A = 56\ mA$$

To achieve 100,000 switching cycles, a DC13 load of 56 mA can be switched with a switching voltage of 110 V DC.

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