Opto-coupler modules

General information

Opto-couplers are used as an interface between different signal levels or to isolate one signal from another. Similar to function to a relay, the following points should be noted:

Opto-couplers have the following qualities:

- long life
- no mechanical wear and tear (solid state operation)
- silent operation
- no contact bounce
- shorter switching time

The modules are often used to enable the low voltage outputs of PLC's to control higher voltage and current loads. For example, a load voltage of 250 V AC, will be completely isolated from the PLC.

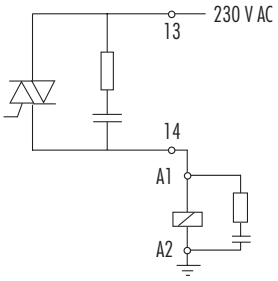
Control of DC loads

To control DC voltages, an opto-coupler with a transistor output is used. An opto-coupler can be used, for example, to convert an NPN output into a PNP output, or vice versa.

Modules are available to cover the input range 5 to 230 volts. Switched output current can be up to 40 A.
When switching inductive loads, it is advisable to prevent voltage transients by suppressing the load.

Control of AC loads

To control AC voltages, an opto-coupler with a triac output is used. Murrelektronik opto-couplers for AC switching incorporate a control circuit which ensures that the triac is switched on only when the AC voltage is at zero and is switched off only when the load current is zero. This eliminates the electro-magnetic interference which would otherwise be caused.

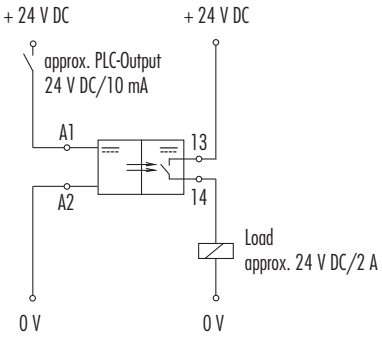


An RC snubber network is fitted internally across the triac switch. This is necessary to limit the rate of rise of the voltage. However, it does result to a small leakage current which will flow through the load when the switch is off.

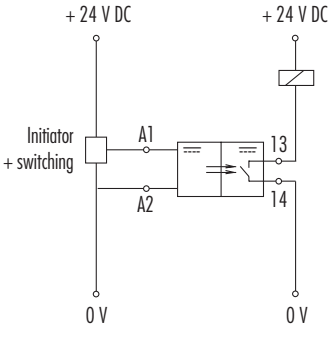
This must be taken into account when driving low power loads, where the leakage would be significant. By fitting a resistor or a resistor-capacitor network (e.g. Murrelektronik Art.-No. 20011) across the load, some of the leakage can be diverted away from the load.

Applications

Application with electrical isolation



Conversion from PNP to NPN



Conversion from NPN to PNP