Switching high currents and voltages using a relay.

Electronic equipment use and produce low currents and low voltages. To connect or control high current and voltage electric devices a relay can be used. The relay uses an electromagnet to switch a mechanical contact or switch on and off.

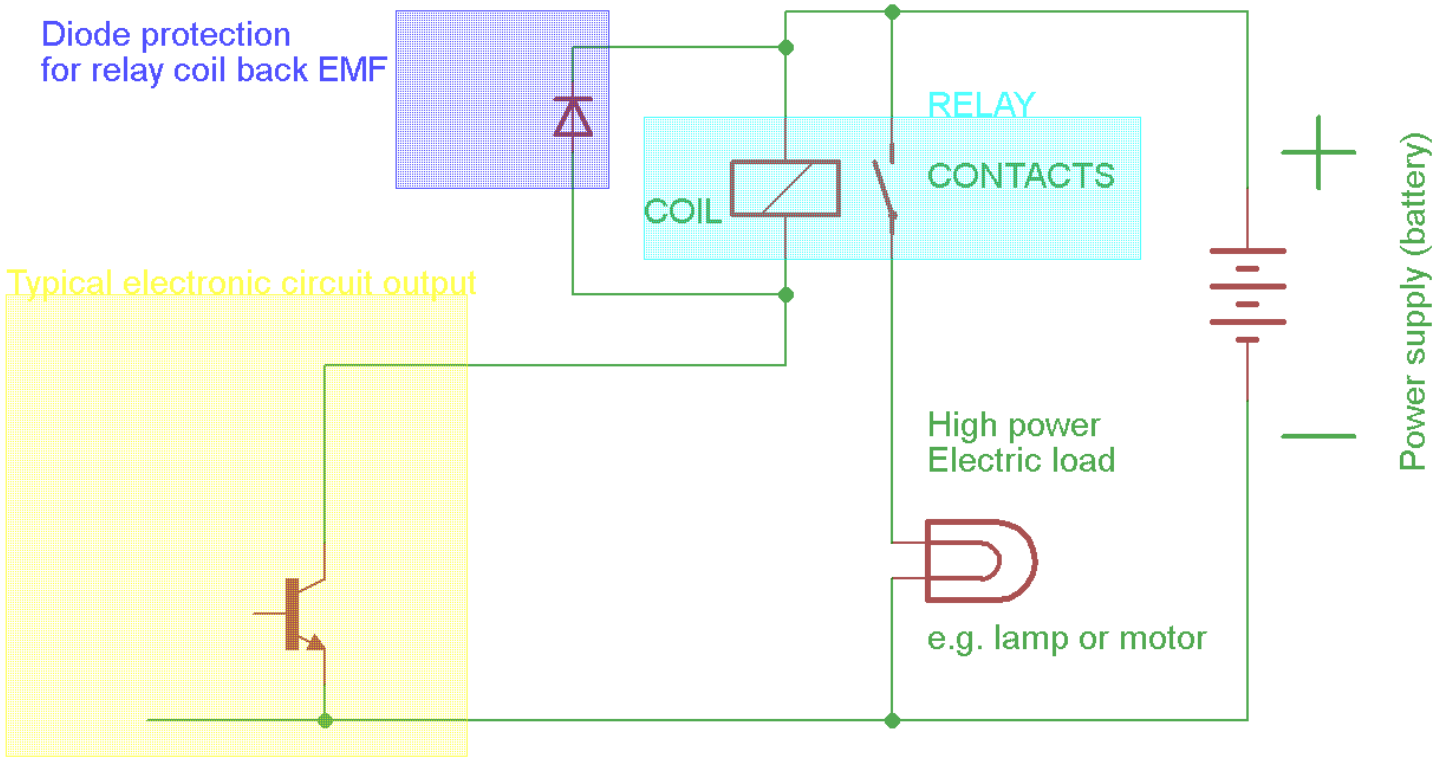
The input voltage to control the relay is applied to the coil of the relay. The relay specification show the voltage range that is necessary to activate and close the contacts of the relay. Also specified is the resistance of the coil. To calculate the current needed to activate the relay the following formula can be used:

$$I = \frac{V}{R}$$

For example a 12 volt relay have a 48 ohm coil then the relay will draw a current of:

$$I = \frac{12}{48}$$
$$= 0.25\ Amp$$
$$= 250\ mA$$

The output of the electronic circuit can be connected to the relay as follow:



An interesting characteristic of a relay coil is that the coil will “store energy” in the inductance of the coil when the coil is switched on (energised). When the relay is switched off, this energy is released as an Electromotive force (EMF) that generate a voltage pulse in the opposite direction as the original applied voltage. The diode will “short circuit” the current and stop the generation of a high voltage pulse that can damage the electronic device.