Possible Problems when using CMMs as Load Switch

Version: 1.1 | Author: madi1 | Last Update: 13.12.2024 | Revison History

Revision History

| Revision	Date	Author	Change Log
1.0	07.11.2023	madi1	Initial Release
1.1	13.12.2024	madi1	Add info about load switches from IRS

The CMMs are NOT designed to be used as load switches.

The CMMs are designed as sensitive measurement devices which can measure currents as low as 1µA. Therefore they offer little protection against voltage spikes and have no integrated freewheeling diode or other protective circuitry, because this circuitry would add unwanted measurement errors.

If you need to switch DUTs on and off, you should use a suitable load switch like a relay. A recommendation for two DUTs which are powered from the same power supply is illustrated in the image below. IRS can help you to find a suitable solution for your application and offers a load switch which can be directly connected to the CMM-3CH.
Please contact IRS for further information.
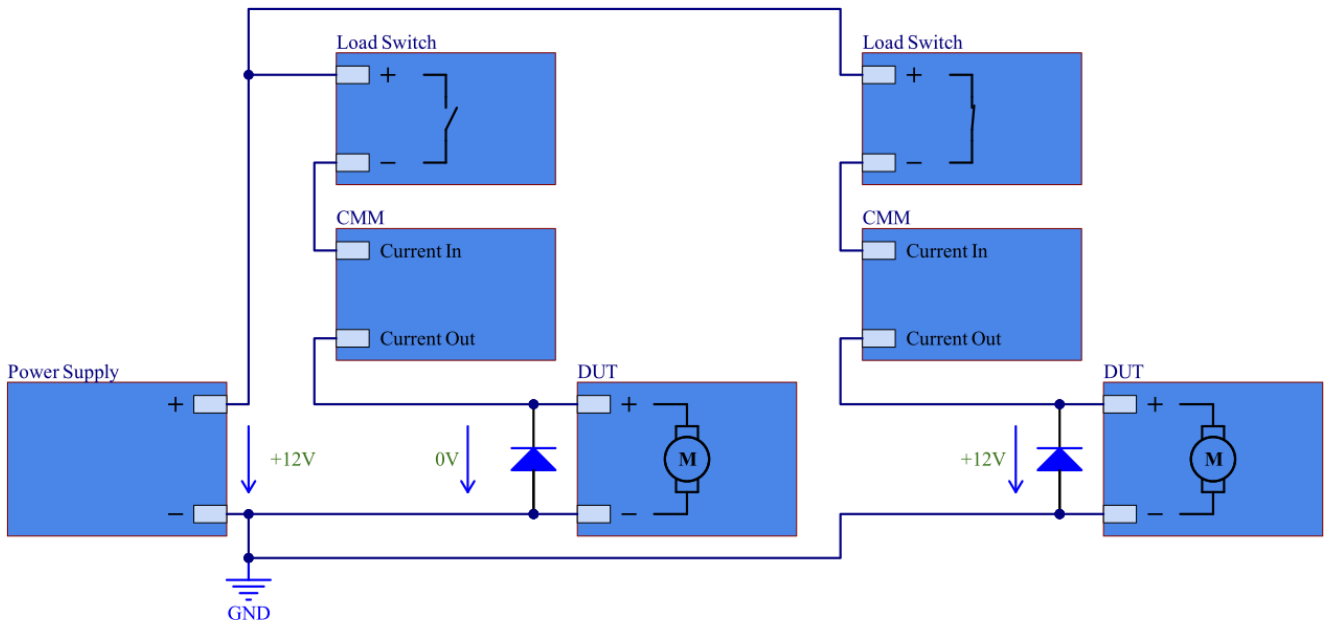
If you really need to use the CMM as a switch there are at least two possible problems which should be considered:

Max Voltage Rating could be exceeded when inductive Loads are switched off

If an inductive load is switched off, the energy stored in the load is released. This energy can cause a voltage spike which can exceed the maximum voltage rating of the CMM. The following image illustrates the problem:
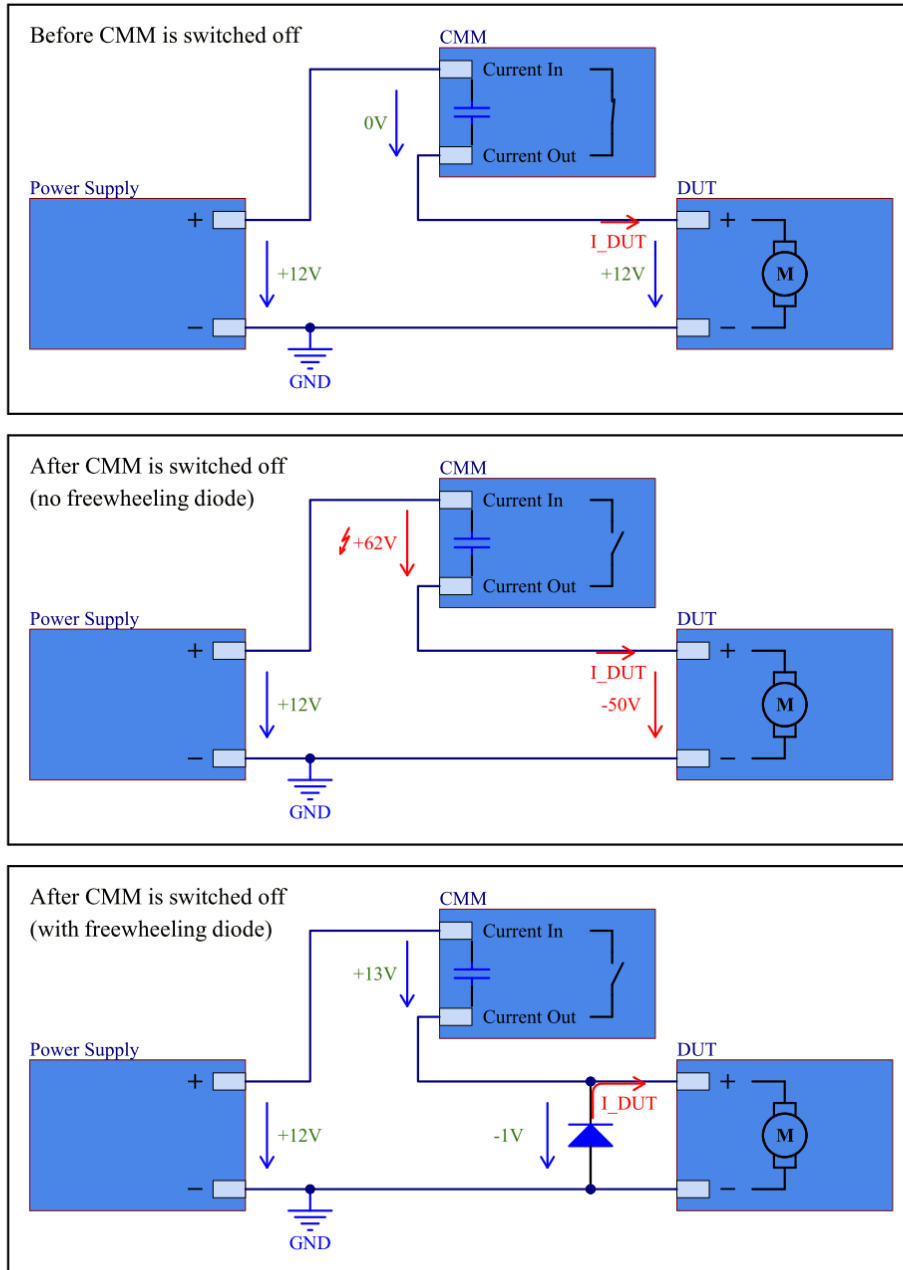

If you need to switch the CMM while an inductive load is connected, you must always connect a freewheeling diode to the load to protect the CMM. Our recommendation is NOT to use the CMM as a load switch. Use a suitable load switch instead.

Negative Spike when Power Supply is switched off while CMM is "open"

The CMMs have a built-in capacitor to smoothen current measurements. If a CMM is open, either because it is not powered or because it is switched to the "open" state, the capacitor is charged to the supply voltage. If the supply voltage is then switched off, while the CMM is still open, the capacitor remains charged and a negative voltage is seen by the DUT.

The following images illustrate the problem:
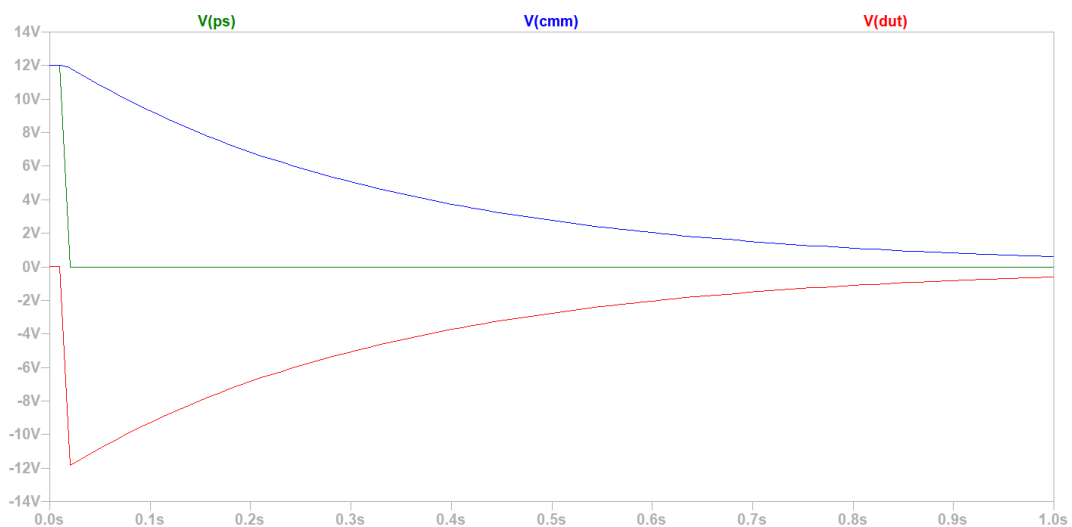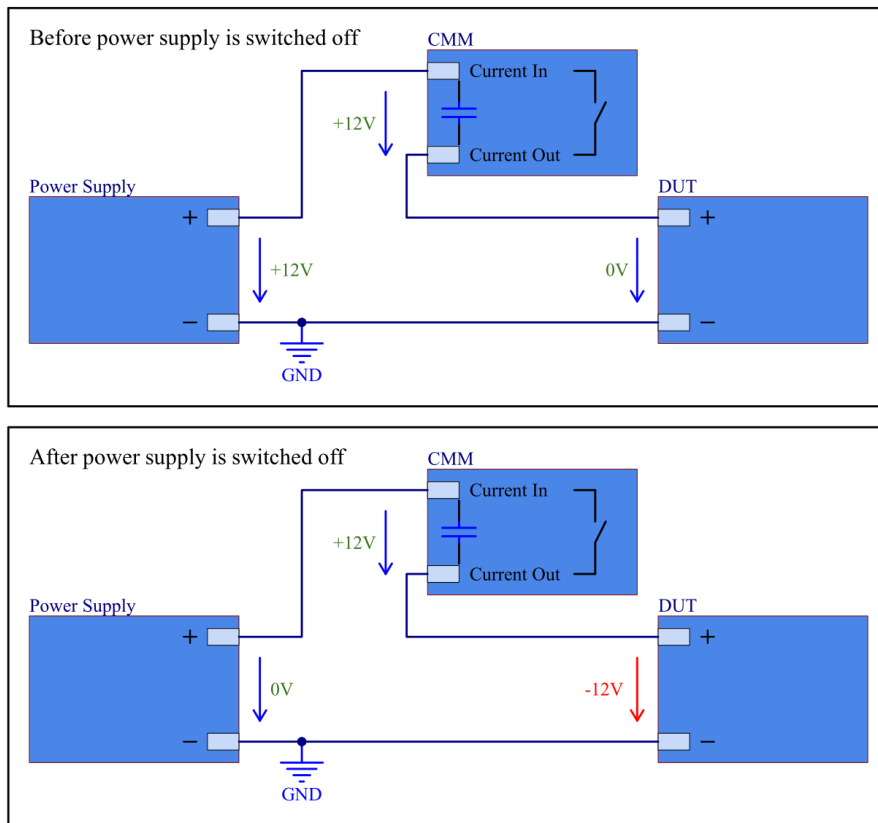
This problem mainly occurs with DUTs which have a high input impedance (for example a DUT in sleep mode) and therefore cannot discharge the capacitor quickly. The negative voltage could either damage the DUT or a connected measurement device like the MesSy-II.