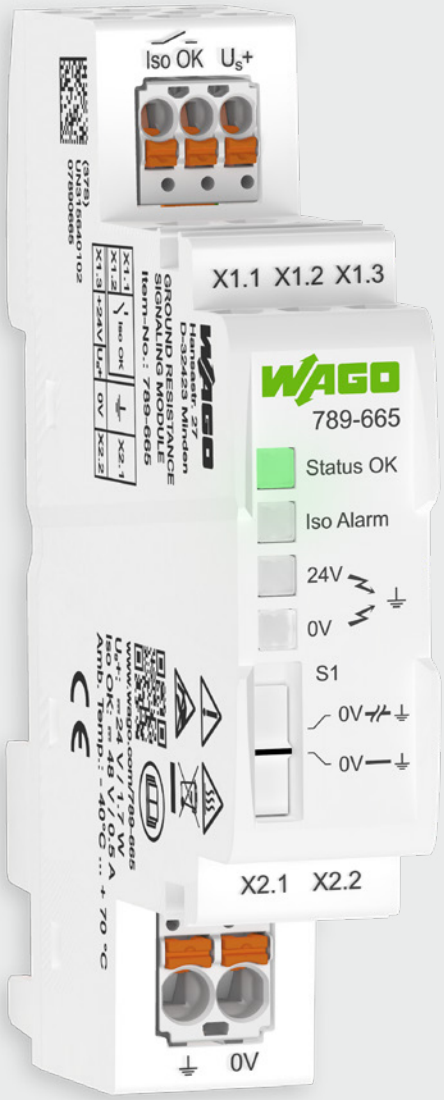
WAGO Ground Resistance Signaling Module

Preventive Maintenance in Control Circuits

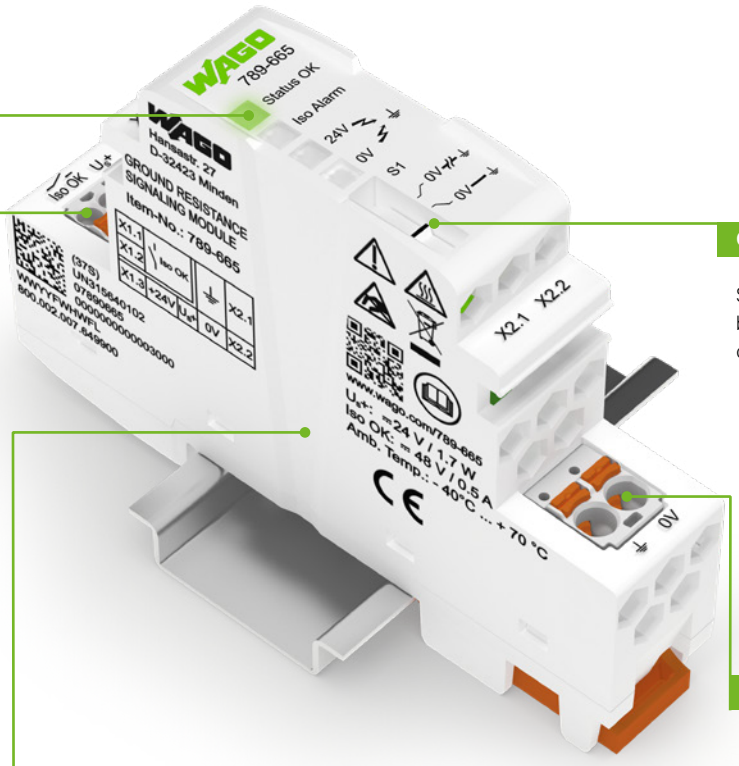


WAGO Ground Resistance Signaling Module (789-665)

Properties

Clear Signaling

Signaling occurs via LED displays and a potential-free contact when the value falls below a specified limit.



Operating Mode Selection

Slide switch S1 enables switching between grounded and ungrounded operation.

Convenient Connection Technology

Easy connection via Push-in CAGE CLAMP® and a push-button for all conductor types

Automated Evaluation

Checks the insulation resistance between the +24 V/0 V terminals and ground in grounded (every 10 seconds) and ungrounded control circuits (every second).

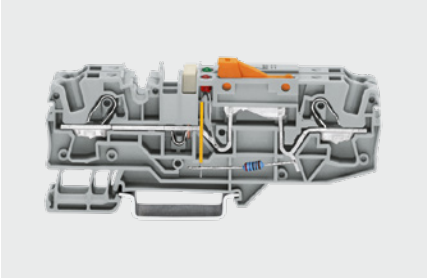
The IEC 60204-1 standard states:

Measures must be taken to reduce the probability of malfunctions due to insulation faults/ground faults in a control circuit. This includes initiating potentially dangerous movements unintentionally or preventing the machine from stopping intentionally.

OUR ANSWER:
WAGO's Innovative Ground Resistance Signaling Module with Iso OK Contact

There are two variants for grounding the 0 V to meet the requirements of IEC 60204-1:

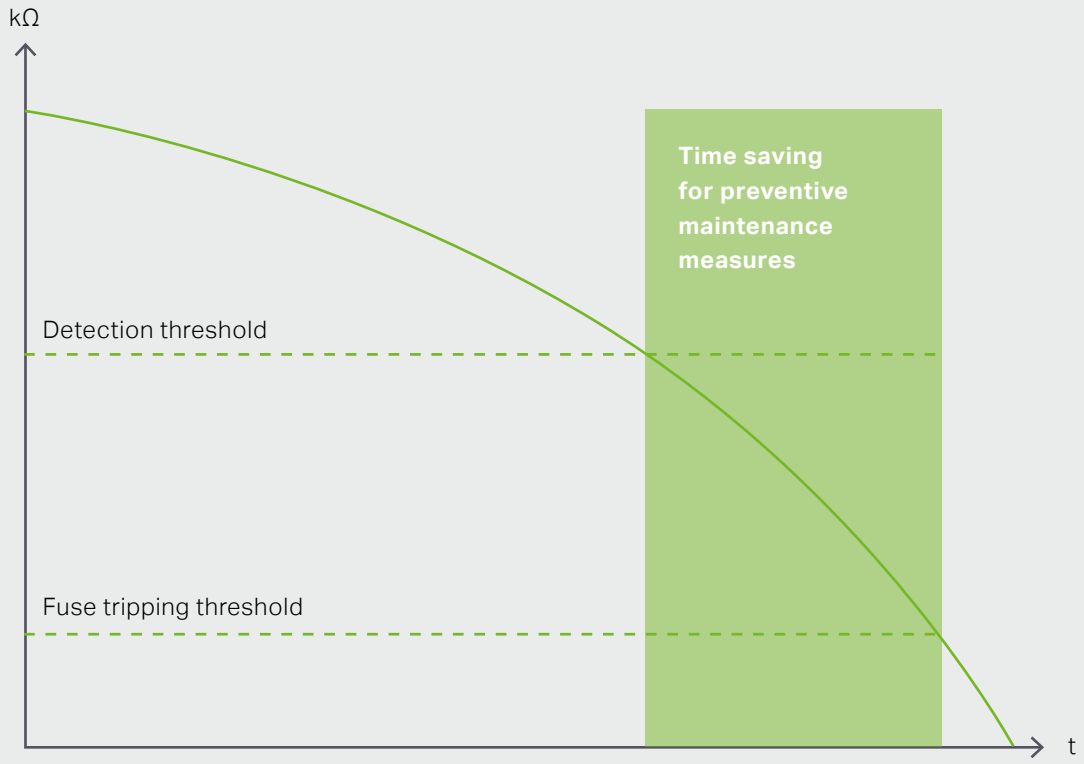
Single wire
- Fuse is blown immediately and system standstill is instant if a much too low insulation resistance (ground fault) is detected – without warning



Mechanical ground conductor disconnect terminal block
- Builds on the single wire's basic function by adding the ability to detect a developing ground fault through regular use of the knife disconnect and evaluation via LEDs
- After checking, immediately close the knife disconnect or else there will be no fuse protection
- Typical maintenance interval of up to 3 months

WAGO's newest model:

Ground Resistance Signaling Module
- Same as the mechanical ground conductor disconnect terminal block, but also features fully automatic measurement of the insulation resistance and early signaling of incipient ground faults via LEDs and potential-free contact
- Maintenance interval shortened to a max. of 10 seconds
- No risk due to incorrect usage



Requirements and Solutions

Why does the standard require taking measures against ground faults?

Ground faults in control circuits can cause the following problems:

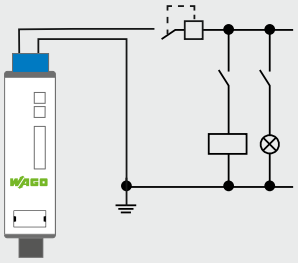
- Unintentionally starting dangerous movements or preventing the emergency shutdown of machinery (safety risk)
- Distortion of analog signals (no correct process flow)

Why is the early detection of approaching ground faults useful?

- Avoiding immediate plant shutdown (loss of production)
- Preventive maintenance, in the form of early detection, allows for maximum repair time

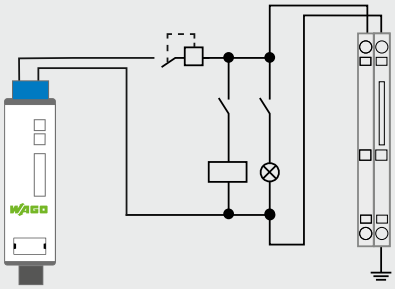
Advantages of the ground resistance signaling module over the mechanical ground conductor disconnect terminal block:

- Replacement of the manual test for incipient ground faults
- Reduction of the inspection interval from approx. 3 months to 10 seconds
- Potential-free contact allows immediate signaling to a PLC



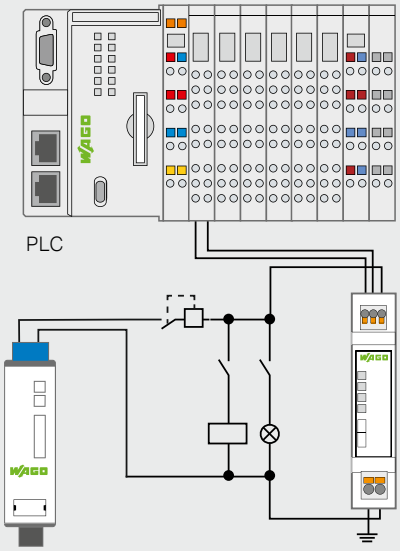
Single wire

- Immediate triggering of the fuse in case of a ground fault
- Immediate system shutdown
- No pre-warning



Ground conductor disconnect terminal block – manual insulation resistance test

- Immediate triggering of the fuse in case of a ground fault
- Immediate system shutdown
- Detection of potential ground faults through regular manual maintenance intervals



Ground resistance signaling module – automatic insulation resistance test

The ground resistance signaling module offers the industry's best cost-benefit ratio and is easy to use. The existing ground conductor disconnect terminal block can easily be replaced. Only two additional wires have to be connected to the PLC to make the potential-free contact ready for evaluation.

Iso OK

Ground fault +24 V

Ground fault 0 V

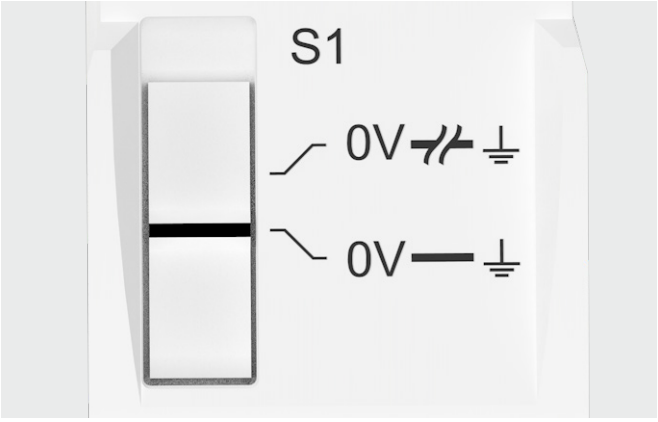
IMD versus Ground Resistance Signaling Module

In Ungrounded Control Circuits

Isolation monitoring devices (IMD) comply with IEC 61557-8 and are required in some areas to permanently monitor the insulation in ungrounded systems. The ground resistance signaling module does not meet all DIN EN 61557-8 requirements. While it cannot replace IMDs for insulation monitoring in ungrounded systems, it can be used to support IMDs in locating ground faults.

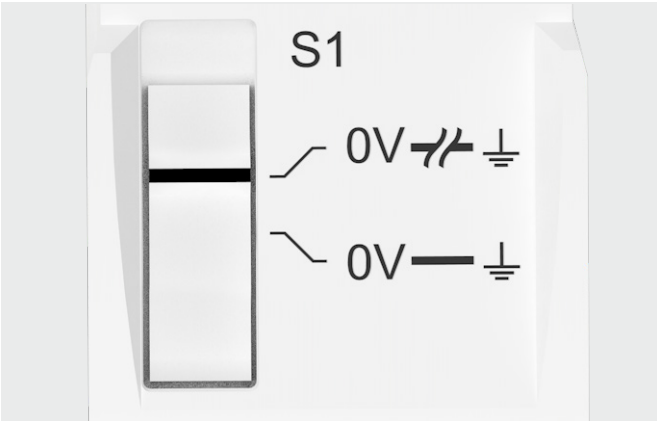
Note the boundary conditions for using our ground resistance signaling module:

- Ground fault must be asymmetrical
- Control circuit supply must be switched on
- Ground fault resistance must be less than 5 kΩ at 24 V nominal voltage
- Iso OK contact must not be used to trigger safety devices



Switch position S1
for grounded control circuits:

Measurement between 24 V or 0 V and by disconnecting the connection between 0 V and ground potential – every 10 s for 0.5 s



Switch position S1
for ungrounded control circuits:

Measurement between 24 V or 0 V and ground potential – every second for 0.5 s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