

# GFM Status and Baseline Procedure During the Integration

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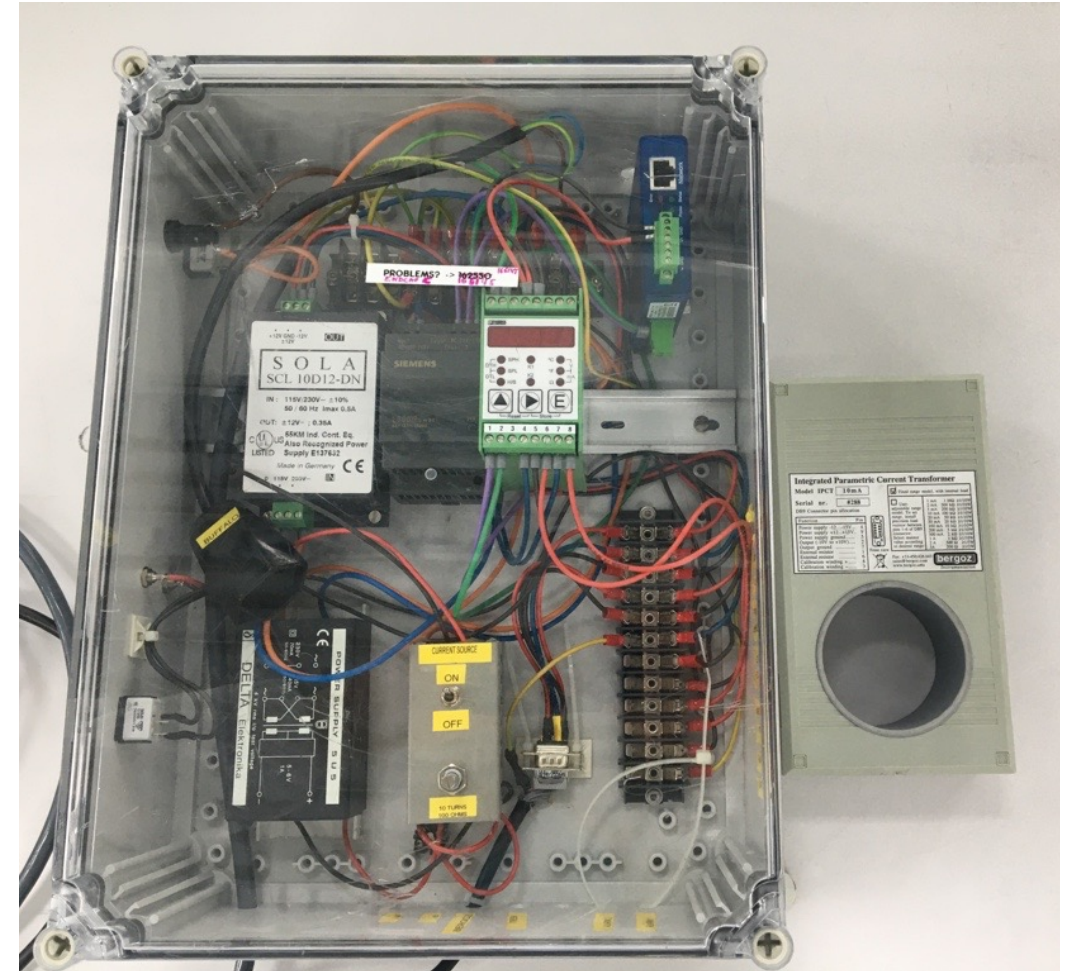




# Introduction

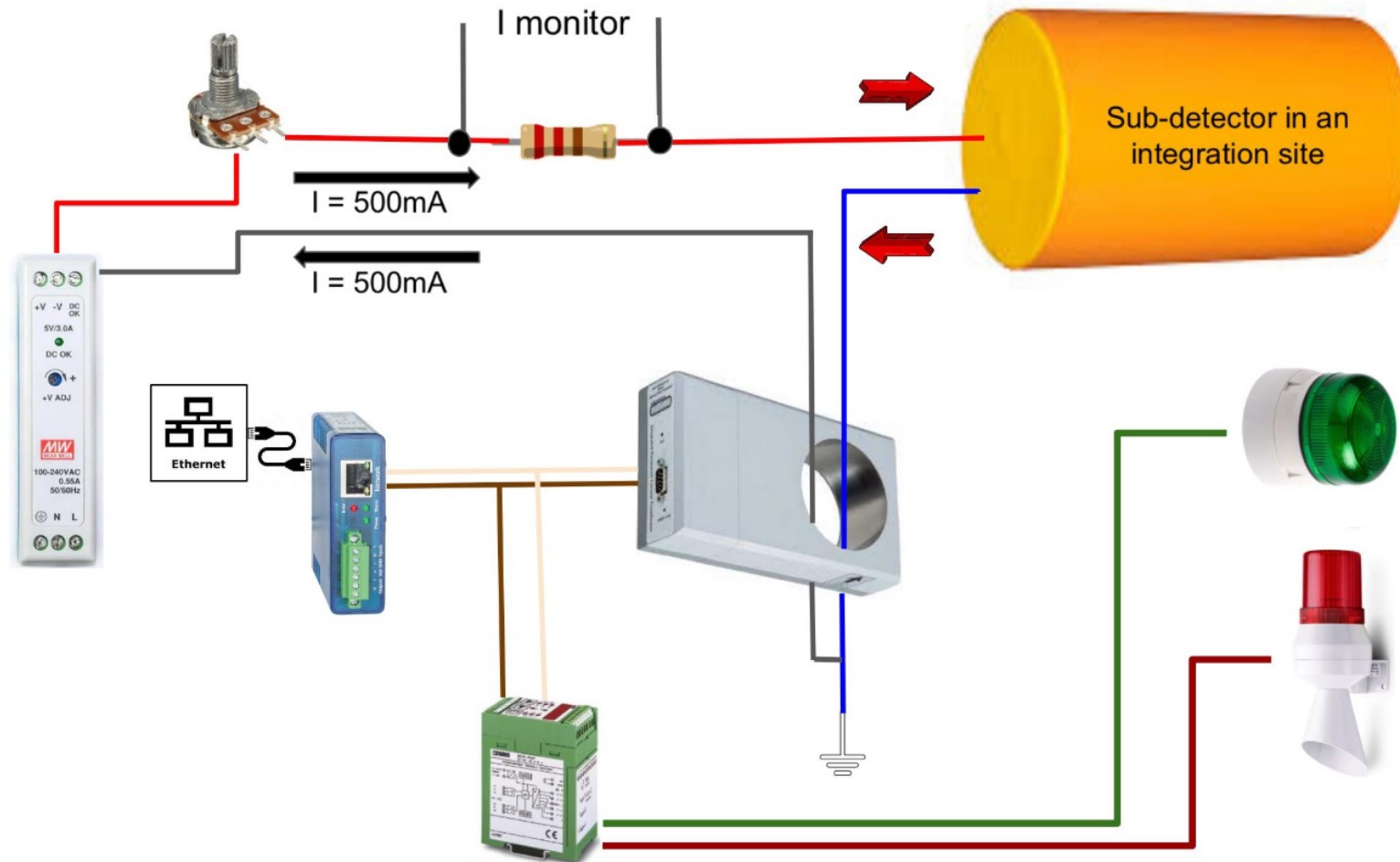
## Ground Fault Monitor: what it is, why we need it and how it works?

- What?
  - The GFM provides real time information of the ground status of an element.
- Why?
  - We need to monitor the grounding status of the sub-detector during integration and, once the integrations evolves, during the commissioning.
- How?
  - The GFM applies a current to the sub-detector reference that comes back from the earth point to the GFM.
  - A current sensor (Bergoz toroidal) is continuously measuring the balance of the current and the return.



# Principle of operation

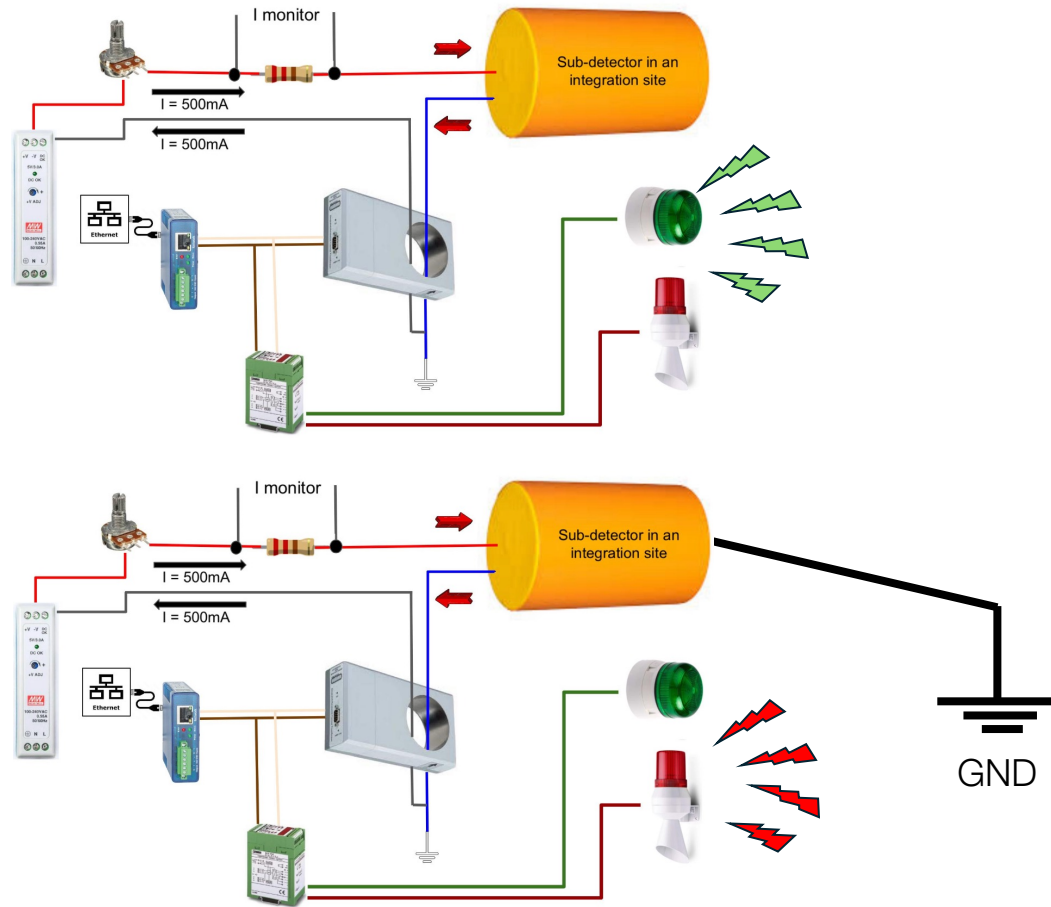
The GMF operating scheme



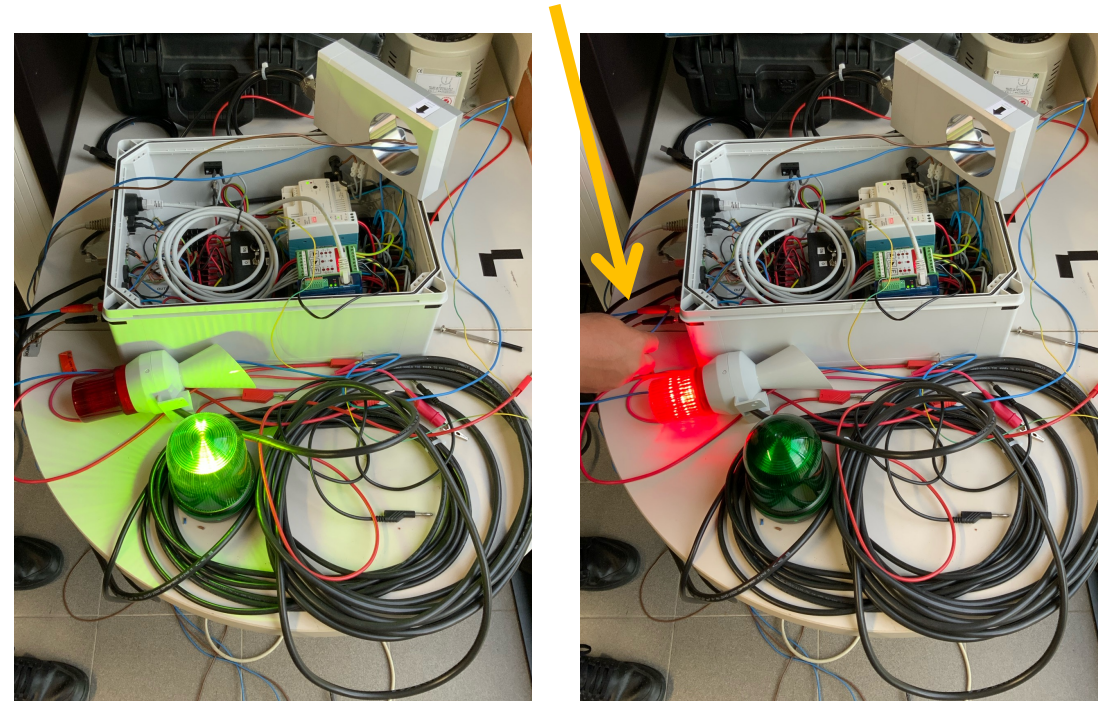
- The current generator pushes a constant current to the sub-detector
- Any undesired connection between the sub-detector and an earthed object below a few  $\text{k}\Omega$  will create an additional path to earth and an imbalance of the current through the sensor.
- The Bergoz toroidal sensor, connected to a switch, will trigger a green light if no unbalanced current is detected, a red light (with an audible alarm) otherwise

# GFM status in LNF

## The functionality test



We simulated a leak of current from the detector, connecting it to another load with a wire that does not pass through Bergoz



We tested the GFM functionality simulating the connection of the subdetector to a load. **It works!**



# Baseline proposal

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During the installation of pipes, cables, and Half-Rings

- Our proposal is not to operate with the GFM during the installation of the local supports.
- While it's easier to individually ground pipes, it's more intricate for HRs:
  - The ground for loaded HRs is shared across HV, LV, and DCS, so we could attach to the ground connector with a cable, but how?
  - However, disconnecting everything once the HR is adequately installed might be inconvenient.
- Nonetheless, subsequent verification post-installation could be conducted to ensure the absence of spurious contacts, either using a multimeter or by grounding the installed components and utilizing the GFM.
- After integration, during tests and commissioning the GFM will be connected to the Half-Shell (HS) for continuous monitoring of the system.
- However, we welcome any advice or recommendations regarding the procedure 😊