Electrical safety

Electrical safety of smart meters

Electricity meters may be exposed to tough electrical conditions. Normally being installed in a metering cabinet the meters are directly connected to the electrical grid. As a result, they are exposed to surges and impulse voltages. On the other hand, they should be able to withstand high short-circuit currents and immune to dust, water and other phenomena. Therefore, it is very important that the design is robust. Even in case of a single fault condition, it is crucial that the meter remains safe and that end users are being protected for electrical shocks and hazards.

IEC TC13 has developed a new specific product safety standard for electricity meters and equipment for load control, the IEC 62052-31. It applies to newly manufactured metering equipment. Although the existing 62052 / 62053 standards already contained some safety related requirements, the new standard presents a comprehensive and complete set of requirements for meters, including possible add-on modules. Therefore recently specific Amendments to the existing 62052 / 62053 standards are published, where the specific safety clauses are replaced, referencing the new safety standard instead. As a result, the IEC 62052-31 has become mandatory, being part of the group of 62052 / 62053 standards, while applying a specific transitional period.

SAFETY STANDARD IEC 62052-31

TThe document contains specific requirements on the design of the metering equipment, related to its application. It includes the protection against mechanical hazards, but also insulation requirements are covered, as well as clearance and creepage distances. Impulse voltage tests, AC or DC voltage tests, but also resistance to heat or protection against spread of fire are included. Depending on the design of the meter, the standard contains also specific tests for supply control switches or load control switches. This includes exposure to short-circuit currents, testing with a number of operating cycles, dielectric strength tests and others.

The document also contains requirements for maximum surface temperatures, in case the device is exposed to the specified maximum overload current. Also, the temperature of terminals and internal parts are included in the investigation, which are dependent on the type of material.

The safety of the meter is also examined under single fault conditions. This may happen in case a certain protection component is damaged, which can be simulated by short-circuiting or disconnection of that part.

TESTING ELECTRICAL SAFETY AT NMi

At NMi, smart meters and load control equipment can be examined in accordance with the IEC 62052-31 safety standard. For other equipment, also the IEC 61010-1 can be applied, which is for instance referenced in standards for power quality meters or PMD's. During the examination, a check of the design of the meter is performed, including a documentation check. Furthermore, the meters are exposed to all the tests as described in the standard. This includes testing on possible add-on modules. The results of the examination are presented in a report listing the outcome for each individual test.

INTERESTED?

If you're interested in the examination of electrical safety we are happy to answer all your questions. Please feel free to contact us at nmi@nmi.nl. On our website, you can find more information about our services.