



PPO

Elektroniikka

Insulation Monitoring System for Medical Facilities



MVA - Electrotecnia, Lda

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PPO MEV-8 INSULATION MONITORING SYSTEM

3

year warranty

MEV-8 SAVES LIVES IN OPERATING ROOMS



ELECTRICAL SAFETY WITHOUT EARTH LEAKAGES

Earth leakage is an invisible killer without any visible signs in medical G2 premises.

The MEV insulation monitoring system has been saving lives and protecting valuable equipment since 1981. PPO-Elektroniikka is a pioneer in electrical safety.

The MEV-8 system monitors the safety of electrical equipment in operating rooms and other G2 medical premises, where defective electrical devices can cause serious incidents.

International (IEC 60364-7-710) and national standards regulate electrical installations and the operation of devices in medical facilities. MEV-type insulation monitoring equipment is required in the operating rooms of all countries in the European Union due to EU regulation.

THE MEV-STORY

PPO-Elektroniikka was founded in 1981 as a manufacturer of professional electronics. Our aim was to develop a system to improve electrical safety in operating rooms. We started with our first-generation insulation monitoring equipment in the same year.

The MEV system revealed a big problem: there were many more medical devices with electrical current leakages than had been expected. Up to 20 devices with problems were detected in average hospitals. Electrical and power failures were clearly a risk to staff, patients and operating room equipment.

At the request of hospital engineers, we launched our intelligent digital MEV-3 system in January 1983.

In the end of 1983, insulation monitoring became mandatory in Finnish medical G2 premises.

Fifth-generation MEV-8 was completed in early 2019. All generations have been developed together with the users, who have faced the daily problems.



INSULATION LEVEL AND TRANSFORMER MONITORING SYSTEM

MEV-8 monitors the insulation of a floating IT network following an isolating transformer, transformer overload and temperature as well as the continuity of protective earth 24/7.

The MEV-8 system consists of seven different devices, each with its own important function. Some of the devices work in the transformer room, and some are placed in the operating room or other G2 medical premises.



THE MEV SYSTEM MONITORS 24/7

- The electric power network of the operating room is separated from the electrical grid by a medical insulation transformer.
- The insulation-level monitoring system monitors all the electrical devices connected behind this transformer. Units control the insulation level of the IT system, the transformer load, and temperature as well as the continuity of protective earth 24/7.
- The equipment indicates the faults and problems before dangerous situations arise.



A transformation room in the new Children's Hospital in Helsinki

A recovery room with our MEV equipment (on the right behind the doors).

WHY INSULATION MONITORING IS SO IMPORTANT: THE MEV SYSTEM PROTECTS PATIENTS, PERSONNEL AND EQUIPMENT

Detecting electrical problems at an early stage are extremely important issues in critical environments. Hazardous situations occur frequently in an operating room environment. What starts as a minor equipment failure may lead to an electrical fire and electric shock. The breakdown of a medical device may pose an immediate risk of death to the patient or personnel. The leakage of electrical current can cause a fatal electric shock without any visible signs. Because of this, the protective systems in all G2-classified facilities must be more comprehensive than normal.

The patient is often entirely dependent on equipment that ascertains vital functions. A patient undergoing an operation is weaker than usual, so more susceptible to complications. Because of anaesthesia or strong medication, the patient is unable to react to dangerous situations caused by electric current. The patient may have damp skin, wounds and subcutaneous device sensors for example, which enhance electrical conductivity. An electrical shock may result from direct contact with a live component or wire, or a part of a device may become live and is then connected to the patient. Electrosurgical instruments pose a particular risk because their functionality is based on electric voltage.



SAFETY, EFFICIENCY AND COST SAVINGS



It is a matter of patient and personnel safety, and a matter of cost savings in hospitals. Regardless of all the precautionary measures, the possibility of device failure, power failure or human error cannot be discounted.

MEV Insulation Monitoring System protects the patients and personnel from electric shocks as well as prevents electrical fires and burns.

MEV Insulation Monitoring System

- Protects the patients and personnel from electric shocks
- Prevents electrical fires and burns
- Ensures that unnecessary downtime can be avoided
- Ensures that the life of surgical equipment is extended.

Although the European standard requires an IT system and insulation monitoring system, not all countries yet follow the legislation. In addition to that, law enforcement is currently inadequate.

Acquiring the MEV system is a long-term investment; the price is low in relation to the value. It is a matter of human life that cannot be measured in money. It is seriously worth considering.



REFERENCES / MEV-8

- Durable, reliable and made in Finland on the principles of sustainable development.
- Meets all the international regulatory acts and technical standards.
- **All operating rooms in Finland use the MEV system.** Over 30,000 MEV-insulation monitoring systems since 1981 in every hospital district (public healthcare) and private hospital in Finland.
- We have developed our fifth-generation MEV-8 in cooperation with hospital engineers and we have also good dialogue with our international partners.
- One of the newest MEV-installations: The new Children's Hospital, which provides medical care for patients from all over Finland. It is a part of Helsinki University Hospital (pictured below).
- PPO-Elektroniikka is a member of the Association of Finnish Hospital Engineering, which is in turn a member of the International Federation of Hospital Engineering.
- Our MEV team has 38 years' experience in electrical safety and insulation monitoring.
- PPO-Elektroniikka has received the highest possible Dun & Bradstreet Credit Worthiness Classification and the highest credit rating by Bisnode Finland.



MEV-8 IS MADE FOR ALL CRITICAL ENVIRONMENTS

The monitoring of the critical conditions is a very important but invisible part of everyday life in settings where defective electrical equipment can cause seriously dangerous situations.

Examples of such places and processes:

- In hospitals: operating rooms, operation preparation and post-operation facilities; anaesthesia rooms; intensive care rooms; heart catheterisation facilities; arteriography/angiographic rooms; premature baby care rooms
- Chemical laboratories
- Production and service areas
- Operation of cranes and other hoisting equipment
- Explosive-sensitive (ATEX) premises and warehouses, ammunition factories, etc.



MEV-8 FOR MONITORING THE INSULATION STATE OF A FLOATING IT NETWORK FOLLOWING AN ISOLATING TRANSFORMER

The **MEV-8** insulation level monitoring device monitors the insulation state of a floating IT network (leakage current), transformer load (current A) and temperature (°C).

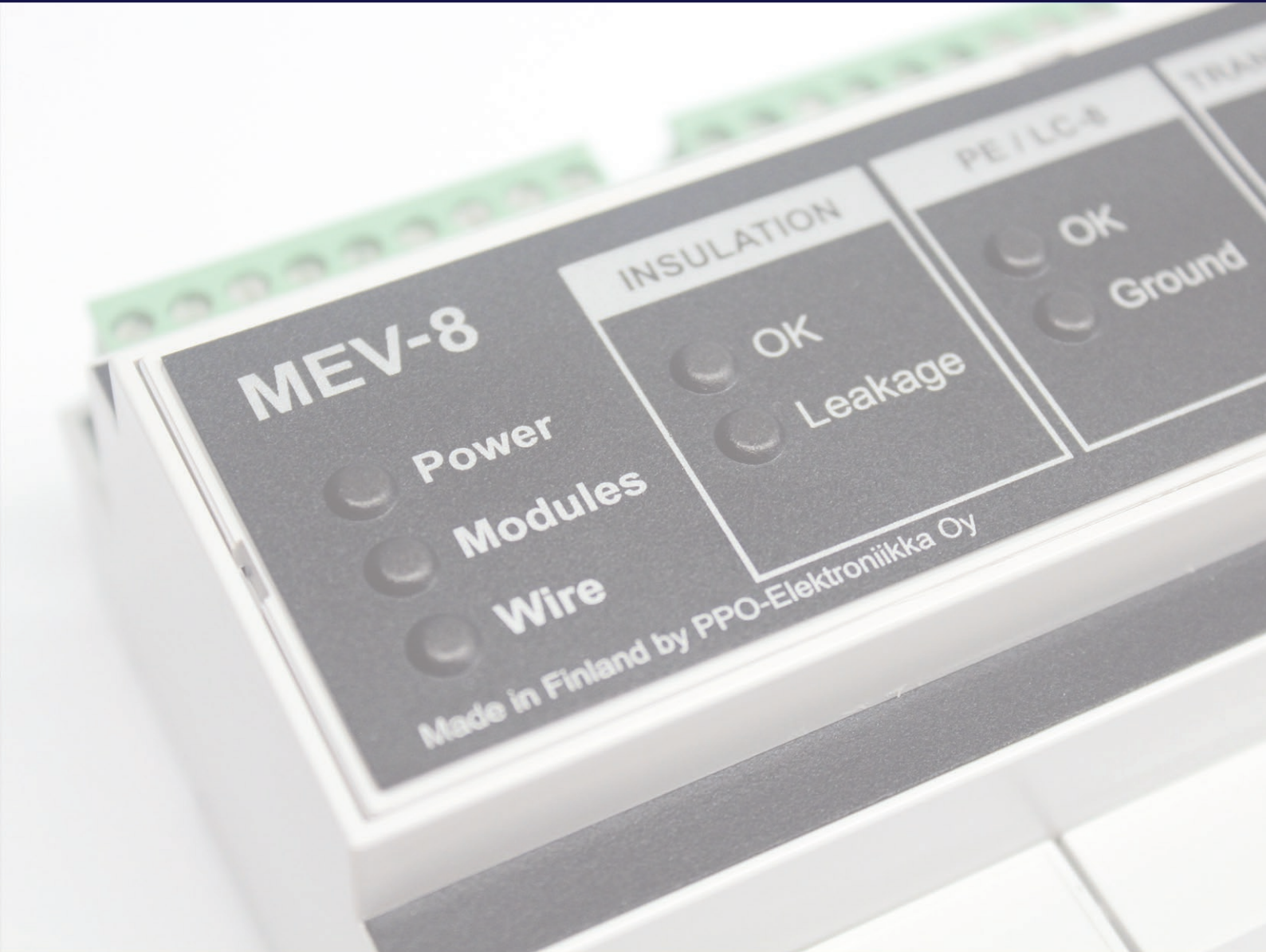
If an insulation fault occurs, the fault can also be located using an **FI-8** fault locator unit.

The continuity of protective earth is monitored with an **LC-8** line controller.

The system monitoring panel **SP-8** indicates any insulation level alarms, line controller alarms and test lead faults as well as transformer overloading and temperature alarms.

The Alarm gateway **AG-8** unit transmits alarms to touch-screen panels and the control room's PC programmes via the rs-485 bus.





PPO-Elektroniikka Oy

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EU Declaration of Conformity

We



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declare under our sole responsibility that the following product

Equipment: Device for floating network monitoring.
Monitor insulation state, protective earth continuity and transformer overload.
Brand name: Insulation level monitoring system
Model/type: MEV-8, LC-8, M-8, EV-8, SP-8, FI-8, CU-8 and AG-8

is in conformity with the

RoHS The Restriction of Hazardous Substances Directive 2011/65/EU
LVD, low voltage directive 2006/95/EY
EMC, electromagnetic compatibility 2004/108/EY

and the following harmonised standards and technical specifications have been applied:

EMC: EN 61000-4-2 - ESD
EN 61000-4-3 - RF Radiated - Immunity
EN 61000-4-4 - Fast transients
EN 61000-4-5 - Surge
EN 61000-4-6 - RF conducted - immunity
EN 55022-B - Rated emissions

Other: SFS 6000-7-710 - Requirements for special installations or locations - Medical locations
IEC 60364-7-710 - Requirements for special installations or locations - Medical locations

IEC 61557-8 - Electrical safety in low voltage distribution systems up to 1 000 v a.c. And 1 500 v d.c. - Equipment for testing, measuring or monitoring of protective measures –
Part 8: Insulation monitoring devices for IT systems

IEC 61557-9 - Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures –
Part 9: Equipment for insulation fault location in IT systems

Helsinki 4.12.2018

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A handwritten signature in blue ink, appearing to read 'Timo Ohtonen', written over a horizontal line.

Timo Ohtonen, General manager