Mitsubishi Electric's FA Integrated Solutions: Nitto Denko Corporation, a Customer Case Study

Retrofitted modules reduce fire risk through leakage monitoring of existing installed electrical devices and wiring; safety is improved and long term maintenance cost's reduced.

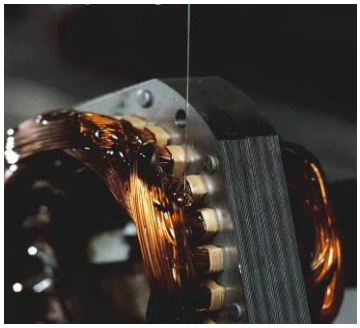
At Nitto Denko Corporation's Kameyama Plant 2, Mitsubishi Electric's MELSEC-Q Series PLC insulation monitoring module "QE82LG" monitors electrical devices and wiring for insulation deterioration. Using PLC based modules helps to improve leakage countermeasures without reworking major equipment.

Key Points

1. Rapid identification of leakage points has led to an efficient renovation process
2. Making use of existing facilities yet still enabling the rapid execution of electrical fire countermeasures
3. Continued safety improvement in parallel with cost reductions

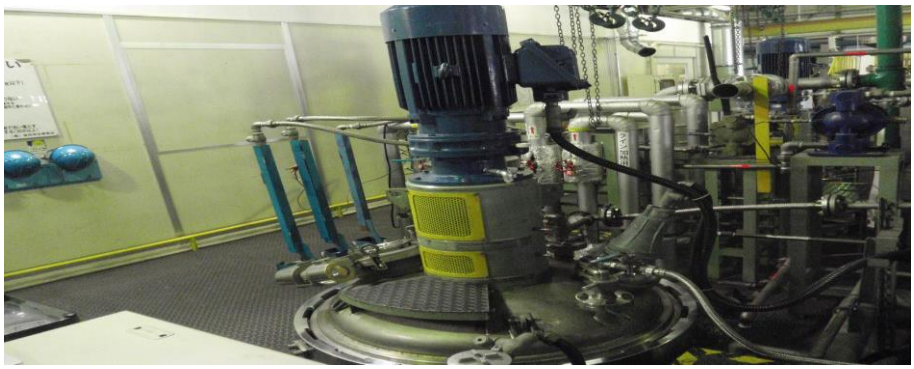
As a specialist in adhesives and coatings technologies, Nitto provides unique products to diverse business areas like; electronics, automobiles, and residential building materials. The Kameyama Plant is responsible for producing "CISFLEX ®", a thin-film metal based board used for precision circuits in hard disk drives, as well as, transparent resin for LED sealing and polarizing film for liquid crystal displays.

The Kameyama Plant 2 has been in operation since 1969. Their main concerns are leakage from old wiring and electrical machines which could lead to fire.



Plant 2, the oldest at the Kameyama Plant, started operation in 1969; the coil varnish it produces

“Plant 2 has no shortage of devices and wiring that have been in use for over 40 years, since it began operation. But it’s not realistic to replace them for new. We had to handle the problem by raising the everyday monitoring level,” said Mr. Shinya Ueki, Senior Technician at the Production Technology Section of Nitto ICT Sector Manufacturing Supervision Department. Nitto checks for loosened connection or contact areas of circuits with yearly maintenance checks using thermography, but they faced a challenge with electrical leakage.



Production equipment at Plant 2. Fire is strictly prohibited because of the presence of flammable liquids.

In order to resolve the issue, Nitto turned to Mitsubishi Electric’s insulation monitoring module “QE82LG” to monitor leaks individually, close to the load, and inform the supervisor immediately when leaks are detected.

Many devices at Plant 2 have been used since the start of operations over 40 years ago.

Rapid identification of leakage of unknown origin is now a real possibility

The QE82LG module can measure leakage current for individual circuits, and accurately monitor insulation deterioration through measuring the amount of resistance leakage current due to wiring or device deterioration.

The ZCT (left) mounted on the cables at the base of the panel board sends leakage current information to the insulation monitoring module "QE82LG" (right) within the panel board for processing.

Nitto placed 30 QE82LGs in the transformer room and 22 in the cubicles of its Plant 2. The Zero-phase Current Transformer (ZCT) sends leakage current information to the QE82LG for processing, and the Graphic Operation Terminal (GOT) displays the measurement results. Nitto set an electric-shock level of 30mA and a potentially fire causing leakage-level of 200mA. If any of the monitoring devices exceed these levels, the GOT displays the leakage point in yellow or red and emits a warning. As a result, it is now clear to determine the causes of leakage.

Main display screen (left) and individual monitoring results display screen (right) on the GOT. Values exceeding the set threshold values light up in yellow or red.

Furthermore, it easily identifies moisture-caused leakage at panel board level, and the ability to see leakage current by circuit numerically allows the maintenance staff to grasp status trends and respond more quickly. Besides, Nitto was able to create the GOT display screens and monitor the programs themselves.

Senior Technician Mr. Ken'ichiro Nishiwaki (left) and Mr. Yoshiaki Sugimoto (right) of the Nitto ICT Sector Manufacturing Supervision Department, Production Technology Division, Production Technology Section, were also involved in the introduction process. "It's easier now to identify leakage points."

"Better organization of maintenance activities"

A key advantage of the QE82LG is the reduction of future maintenance cost. Like any plant operating with more than 7000V, Nitto's Kameyama Plant is bound to observe the regulations strictly; name a chief electrical engineer and to present maintenance and safety regulations. But as the targeted facilities age, their risk of failure also increases as it requires additional maintenance procedures on top of the frequent conventional maintenance, which leads to escalating maintenance costs. As in the case of Plant 2, when devices and wiring on site are used beyond the

manufacturer's recommended replacement values, things can go wrong at any time. A fixed cycle of maintenance may not be enough to prevent accidents completely. It is essential to have regular system monitoring which detects trouble more quickly, and Nitto judged that insulation monitoring using the QE82LG would be effective.

Nitto ICT Sector, Manufacturing Supervision Department, Production Technology Division, Production Technology Section, Senior Technician Mr. Shinya Ueki says "I think we're going to be able to reduce maintenance costs at the same time as improving safety."

Nitto now plans to introduce their insulation monitoring systems to other factories. They are also envisioning future systems which would inform maintenance staff of alarms wirelessly from the PLC when a leakage occurs. The effects of the introduction of QE82LG's insulation monitoring for safety and security seem to be even greater than they had imagined.

Nitto Denko Corporation

Founded: October 25, 1918

Business content: Electronics, automobile-related areas, residential building materials, general industry, environment, health care

URL: http://www.nitto.co.jp/

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For more information visit http://www.MitsubishiElectric.com.

***At an exchange rate of 120 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2015*

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