

# Continuous remote monitoring of insulation resistance on equipment to prevent unplanned downtime



# Preventing unexpected equipment stoppage and electric shock accidents due to "insulation degradation"

Understanding the trend of insulation resistance degradation in equipment is ideal to prevent facilities stoppages and electrical shock accidents. However in reality, it is difficult to secure experienced maintenance personnel and make the time to visit the site and measure it manually.

Conventional insulation resistance measurements requires an equipment shutdown, disconnection of power, and a skilled maintenance worker. OMRON is introducing a more efficient way to monitor the insulation of your equipment.

## On-site issue #1

Experience required to measure insulation resistance with a Megohmmeter



## On-site issue #2

Required machine shutdown and select optimum measure voltage for insulation resistance measurement



## On-site issue #3

Lack of maintenance staff and time to perform manual on-site measurements



## What is insulation degradation?

Insulation degradation is the degradation of the insulating material meant to prevent the leakage of electricity from the electric circuit to the chassis, making it unable to fulfill its purpose. If the degradation of the insulation progresses, you risk unexpected equipment stoppage, electric shock and/or fire accident.

## Risks due to insulation degradation



Electric shock



Fire



Failure

# K7GE, by making use of experienced maintenance personnel skills, "safely and efficiently" resolves your issues regarding monitoring of insulation degradation

The insulation resistance monitoring device K7GE is capable of measuring insulation resistance each time under the same conditions with high reproducibility.

Delivers safe and secure measurement by monitoring the operating status of the measurement target.

In addition, increasing its frequency of automatic measurement allows for understanding the degradation trend, which was so far difficult. K7GE proposes a new way of monitoring insulation.

## Solution 1

Highly reproducible measurement with experienced maintenance know-how incorporated

## Solution 2

Automatic measurement depends on equipment condition

## Solution 3

Remoto condition monitoring for automatic insulation resistance measurement

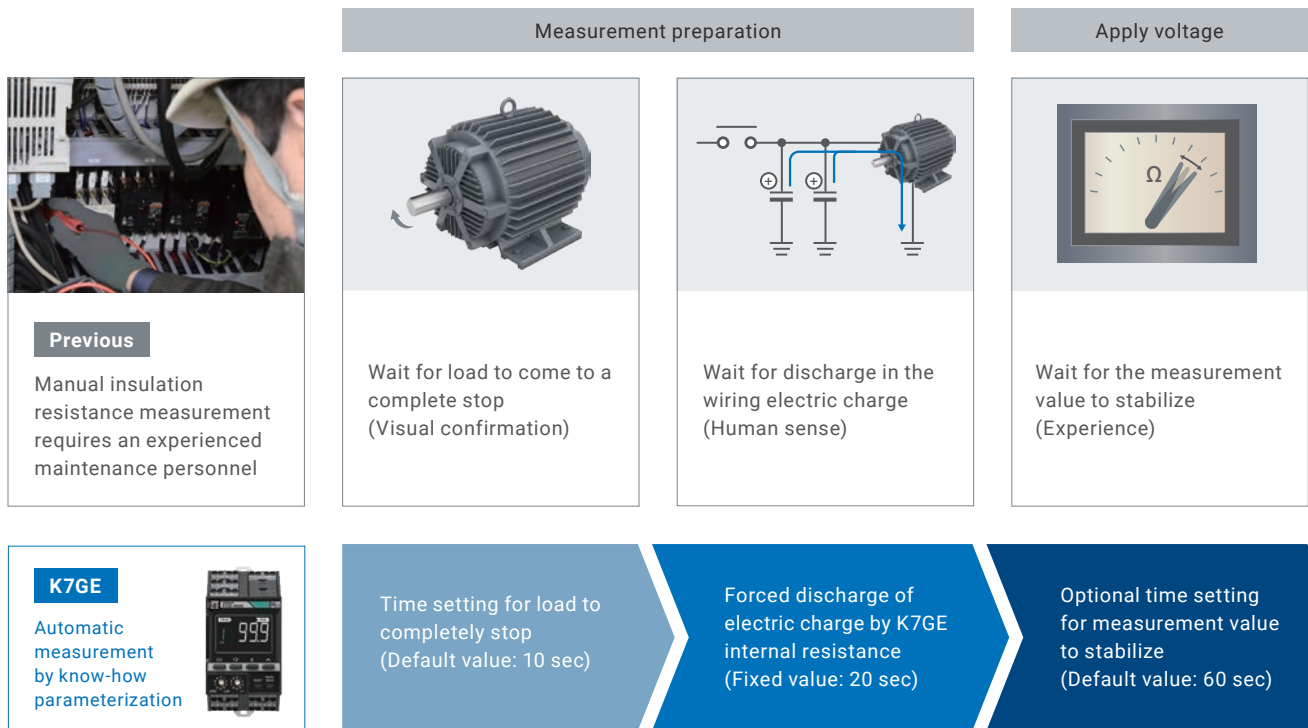


# Highly reproducible measurement with experienced maintenance know-how incorporated

The complexity of manual measurement makes the frequency of measurement necessary for trend monitoring difficult to attain, which may lead to excessive preventive maintenance and/or sudden stoppages due to delay in corrective maintenance. With K7GE, you will be able to increase the measurement frequency to conduct condition-based maintenance by trend monitoring.

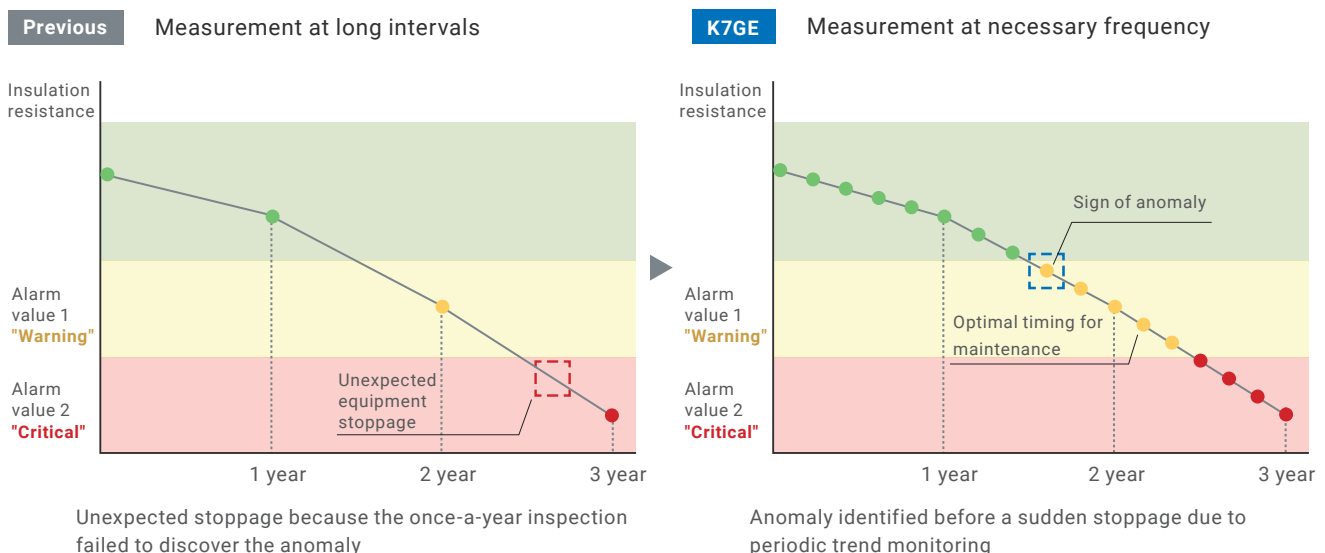
## Parameterization of testing levels to reproduce the measurement typically done by experienced personnel

Trend monitoring is not possible if measurement fluctuates due to measurer's lack of insulation resistance measurement know-how. However, K7GE can contribute to trend monitoring because tasks that cause measurement fluctuation may be set up by parameters, allowing for highly reproducible measurement.



## High frequency of measurements to accurately identify equipment abnormalities

Since measuring insulation resistance requires stopping the equipment power to remove the wiring, there are many hurdles to increasing measurement frequency, such as production adjustment, securing of resources or person-hours to conduct on-site measurement, etc. K7GE allows for automatic measurement during a short equipment downtime, enabling measurement at the necessary frequency to help avoid sudden stoppages due to insulation degradation which conventional inspections conducted at long intervals may miss.

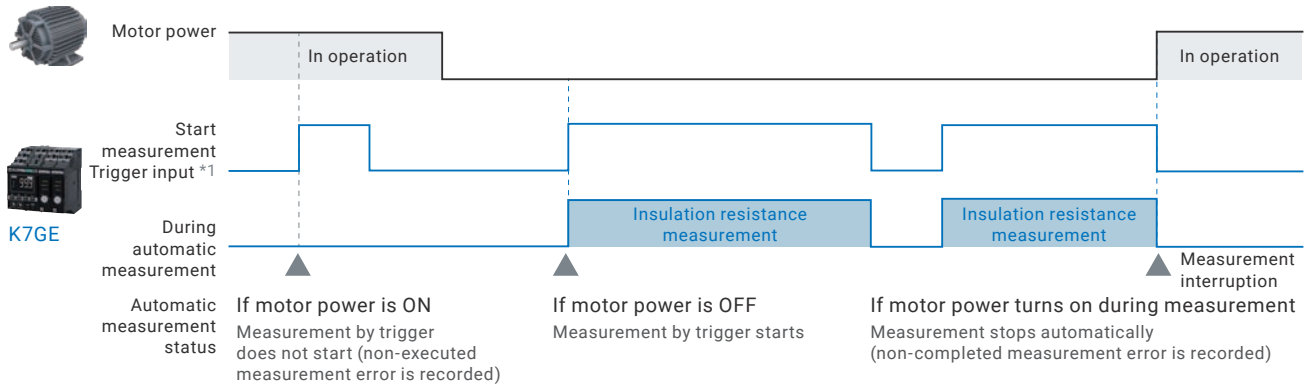


# Automatic measurement depends on equipment condition

Allows safe insulation resistance measurement for both people and equipment, reducing the risk of work accidents.

## Reduced equipment failure risk by automatic measurement depends on continuous equipment power monitoring

The automatic measurement eliminates any risk of equipment failure by stopping measurement if the equipment power is restored after its start.



\*1. Refer to "Automatic measurement by arbitrary trigger input" on page 6 for details on trigger input.

## Automatic measurement reduce electric shock accident for worker

Allows for reducing the risk of work accidents such as electric shocks since measurement is automatic and does not require manual tasks.

**Previous** Risk of electric shock due to manual measurement



**K7GE** Safe since measurement is automatic



## Reduced risk of equipment failure due to measurement with fixed DC 50 V

Conventional measurement with a typical Megohmmeter requires selecting a voltage range in accordance with the measurement target, with the risk of breaking down the equipment target of measurement if a wrong range is selected. With K7GE, there is no way to measure with the wrong voltage range since the voltage to be applied to the measurement target is fixed at DC 50 V. In addition, even when measuring with DC50V, -You can obtain the same result as the measured value measured by applying DC500V / DC1000V with a megohmmeter.

**Previous** DC 1,000 V applied by mistake



Voltage range must be selected in accordance with the rated value of the measurement target

**K7GE** No worries since voltage is fixed at DC 50 V



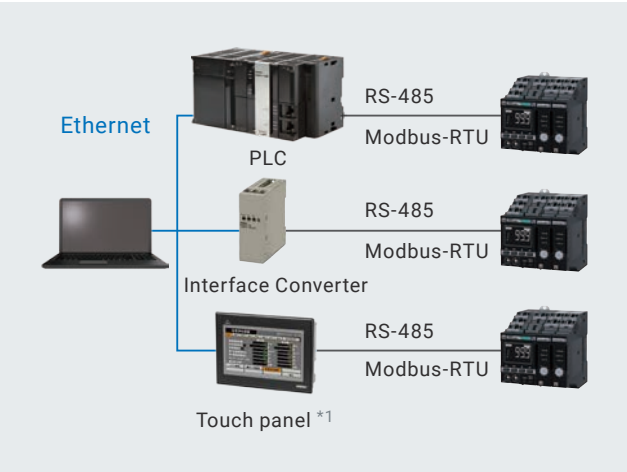
No way to apply the wrong voltage since it is fixed at DC 50 V

# Remote condition monitoring for automatic insulation resistance measurement

K7GE allows for easy measurement data processing and analysis since they can be collected remotely by using a dedicated tool.

## Remote data assessment via network connection

K7GE allows for remote monitoring from the office via network connection using a touch panel, PLC, and communications converter. It also allows for on-site measurement results confirmations and parameter setting changes via the Main Unit indicator.



\*1. Sample program available

## Easy measurement data collection and trend monitoring by using a dedicated tool

K7GE data collection tool runs on Excel, allowing for direct analysis and processing.

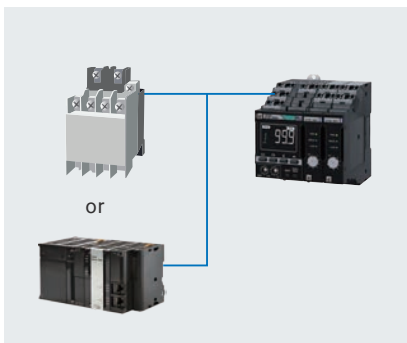
Download available at [https://www.ia.omron.co.jp/k7ge\\_tool](https://www.ia.omron.co.jp/k7ge_tool)

Date	Measurement time	C10		C11		C12		C13		C14		C15		C16		C17		C18		C19		C20		C21		C22		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
2020/12/18 09:00	09:00	99.9	0	0	21.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/18 09:00	09:00	99.9	0	0	21.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/18 09:00	09:00	99.9	0	0	20.7	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/18 09:00	09:00	99.9	0	0	20.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/17 09:00	09:00	99.9	0	0	19.5	1	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/16 09:00	09:00	99.9	0	0	19.2	1	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0
2020/12/16 18:00	18:00	99.9	0	0	19.8	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0	99.9	0	0

## Automatic measurement with several trigger inputs

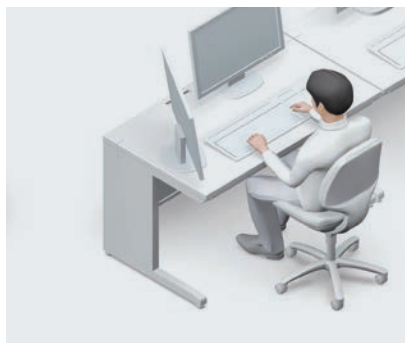
Automatic measurement can be started in the most convenient way in accordance with the equipment conditions, such as via external contact input, communications, or front switch.

External contact input



“Motor power OFF signal” input from contactor auxiliary contact or PLC to K7GE trigger input terminal

Communications



External measurement start signal by serial communications

Front switch



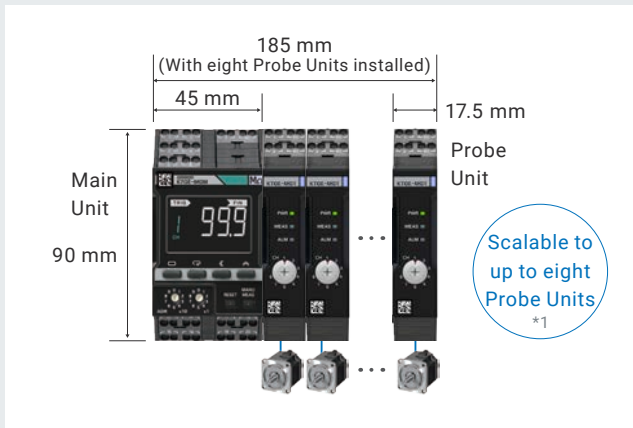
“MANU MEAS” switch on the lower right of the front panel

# User-friendly features that support the trend monitoring

K7GE is equipped with various features to support "safely and efficiently" trend monitoring of insulation resistance by making use of experienced maintenance personnel's skills.

## Scalable Probe Units

K7GE supports up to eight Probe Units for measurement targets on the same system. It provides for a space-efficient installation as the number of Probe Units can be scaled in accordance with the number of measurement targets.

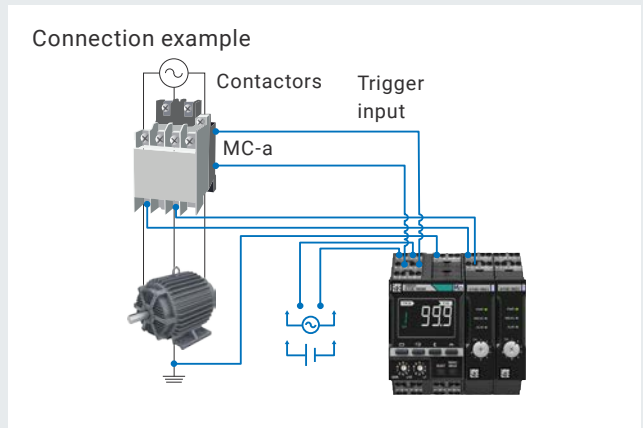


\*1. The Main Unit and Probe Units are sold separately; purchase in the required combination for use.

Note: When there are two or more Probe Units installed, the insulation resistance measurement is conducted sequentially since simultaneous use of multiple channels is not supported.

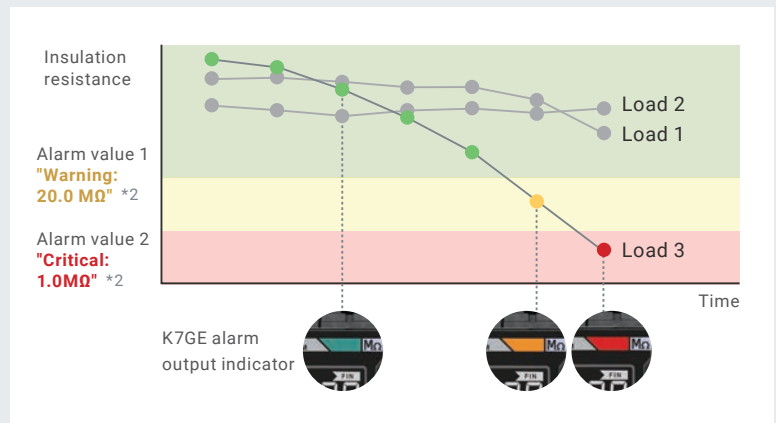
## Easy to install and retrofit

Easy to retrofit since it can be used just by wiring to the power cable of the target equipment.



## Maintenance timing notification by two-level alarm: warning and critical

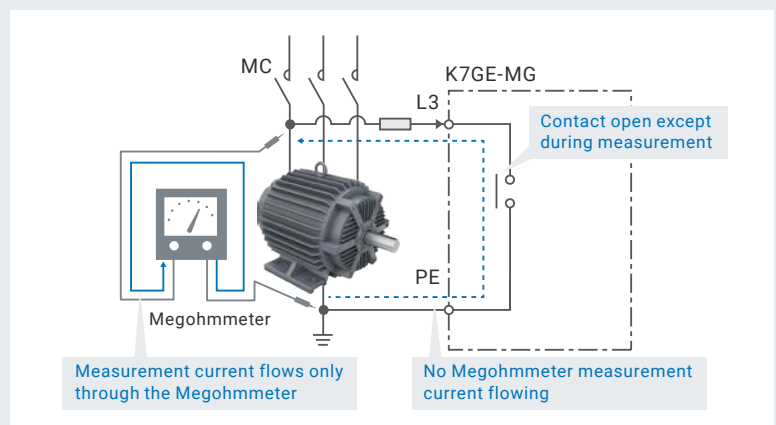
The threshold for indicating the degree of degradation can be set in two levels and anomalies can also be confirmed through communications data, making it possible to identify the optimal timing for maintenance without the need for frequently visiting the site. Furthermore, a load such as an anomaly detection indicators can be directly connected to the units transistor alarm outputs.



\*2. Factory default settings

## Periodic inspection by Megohmmeter with K7GE installed

K7GE does not have any impact on measurement results by the Megohmmeter since its internal dry contact isolates it from the equipment target of measurement, except during measuring. When needed, it can easily support measurement by calibrated measuring equipment as well.



# Introducing Predictive Maintenance Solutions

## Three Values of Omron's Condition Monitoring



Replicate maintenance engineer's analysis



Retrofit



Simple remote monitoring

### Resolve issues through condition monitoring

Our predictive maintenance solution is based on replicating skilled maintenance engineer's analysis, retrofitting existing equipment and remote monitoring. The technology simplifies the analysis of equipment by translating measurement data into simple alarms so a maintenance engineer can respond faster to issues.

**Note: Do not use this document to operate the Unit.**

**OMRON Corporation Industrial Automation Company**  
Kyoto, JAPAN

Contact: [www.ia.omron.com](http://www.ia.omron.com)

**Regional Headquarters**

**OMRON EUROPE B.V.**

Wegalaan 67-69, 2132 JD Hoofddorp  
The Netherlands  
Tel: (31)2356-81-300/Fax: (31)2356-81-388

**OMRON ELECTRONICS LLC**

2895 Greenspoint Parkway, Suite 200  
Hoffman Estates, IL 60169 U.S.A.  
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

**OMRON ASIA PACIFIC PTE. LTD.**

No. 438A Alexandra Road # 05-05/08 (Lobby 2),  
Alexandra Technopark,  
Singapore 119967  
Tel: (65) 6835-3011/Fax: (65) 6835-2711

**OMRON (CHINA) CO., LTD.**

Room 2211, Bank of China Tower,  
200 Yin Cheng Zhong Road,  
PuDong New Area, Shanghai, 200120, China  
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

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