MITSUBISHI ELECTRIC

Insulation Monitoring Module

Mitsubishi Programmable Controller MELSEC-Q

Model QE82LG

User's Manual (Hardware)

・Before using this module, please read both this manual and Details carefully and pay full attention to safety to handle this module correctly.
・Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

ABOUT MANUALS

The following manuals are also related to this module.
Order each manual as needed, referring to the following list.

Manual name	Manual number (model code)
Insulation Monitoring Module User's Manual (Details) QE82LG	IB63564 (19H871)

COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES

(1) For programmable controller system
To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.
(2) For this module
For the compliance of this module with the EMC and Low Voltage Directives, refer to Section 6.1 Wiring.

1. Features

●This enables to measure leak current for safety actions.
By monitoring leak current (Io), risk for electric shock can be detected.
●This enables constant monitoring of insulation for equipment.
By monitoring leak current for resistance (Ior), deterioration of equipment insulation can be tracked.
●This enables 2-level alarm monitoring during monitoring for each measuring element.
For each leak current (Io) and leak current for resistance (Ior), 2-level alarm monitoring can be performed without a sequence.
●This enables to measure two circuits, using one device.
At the power source with the same-phase wire method, a single device can measure two circuits.
●This enables to measure sensitive.
By changing setting to high sensitivity mode, this enables to measure from 0.01mA.

2. Checking packaged contents

The following items are included in the package. Check that no items are missing.
・ Insulation Monitoring Module x 1
・ User's Manual (Hardware) x 1

3. Safety Precautions

3.1 Precautions for Operating Environment and Conditions

Do not use this product in the places listed below. Failure to follow the instruction may cause malfunctions and a life decrease of product.
・Places the Ambient temperature exceeds the range 0 – 55ºC.
・Places the Relative humidity exceeds the range 5 – 95% or places with dewfall.
・Altitude exceeds 2000 m.
・Places exposed to rain or water drop.
・Dust, corrosive gas, saline and oil smoke exist.
・Vibration and impact exceed the specifications.
・Installed excluding the control panel.

3.2 Matters concerning the preparation before use

・Use the module in the specified usage environment and conditions.
・The setting of this module (phase system, primary voltage, primary current) is necessary before using it.
※Please refer to "User's Manual (Details)" about each setting method.

3.3 Installation and Wiring Precautions

⚠ Danger

・For installation and wiring works, make sure that the power source is shut off for all outside phases. If all phases are not turned off, it may cause an electric shock or product damages.

⚠ Caution

・Any person who is involved in the installation and the wiring of this Sequencer should be fully competent to do the work.
・Use the programmable controller in an environment that meets the general specifications in the User's Manual for the CPU module used. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
・To mount the module, while pressing the module-mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.
Incorrect mounting may cause malfunction, failure or drop of the module.
When using the Sequencer in an environment of frequent vibrations, fix the module with a screw.
・Tighten the screw within the specified torque range. Under tightening can cause drop of the screw, short circuit or malfunction. Over tightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
・Shut off the external power supply for the system in all phases before mounting or removing the module.
Failure to do so may result in damage to the product.
・Do not directly touch any conductive part of the module. Doing so can cause malfunction or failure of the module.
・FG terminal must be grounded according to the D-type ground (Type 3) dedicated for sequencer. Failure to do so may result in an electric shock or a malfunction.
・When using this product, make sure to use it in combination with zero phase transformer (CZ series and ZT series). Please not to exceed the ratings of this product for input of zero phase transformer. For further details, please refer to zero phase transformer manual to maintain the functionality and the accuracy of this product.
・This module and the zero-phase current transformer are used for less than 600V circuit only. They are not used with exceeding 600V circuit.
・ZCT CZ series and ZT series do not have a secondary output polarity.
・Take care not entering any foreign objects such as ships and wire pieces into the module. It may cause a fire, a failure or a malfunction.
・In order to prevent the module from incoming foreign objects such as wire pieces during wiring work, a foreign-object preventive label is placed on the module. While a wiring work is performed, keep the label on the module. Before operating the system, peel off the label for heat release. If the foreign-object preventive label is not peeled and the system is in use, residual heat inside the module may reduce the product life.
・The wires to be connected to the module shall be placed in a duct or fixed together by clamping. If the electric wires are not placed in the duct or clamped together, loosen wires or their movement or careless stretch may cause a breakage of the module or wire or a malfunction due to poor contact of electric wires.
・Use appropriate size of electric wires. If inappropriate size of electric wire is used, it may cause a fire due to generated heat.
・In case using stranded wire, take measures so that the filament should not vary by using a bar terminal or by processing the point twisted. Use the bar terminal appropriated for the size of electric wires. If inappropriate bar terminal is used, a wire breakage or a contact failure may occur, which may cause a device malfunction, a failure, a burnout, or a fire.
・After inserting the electric wire or a bar terminal, make sure that no missing insertion is existing. Missing insertion may cause a device malfunction, a fire, or an electric shock.
・If the wires connected to the module are strongly pulled off, it may cause a malfunction or a breakage to the module or the wire.
・Ensure the wiring to the module properly, checking the rated voltage and current of the product and the terminal pin assignment. If the input voltage exceed the rated voltage or the wiring is improper, it may cause a fire or a breakage. (Tensile load: 22N or less)
・Do not exceed the specified voltage when doing an insulation resistance test and a commercial frequency withstand voltage test.

3.4 Precautions for Start-up and Maintenance

⚠ Caution

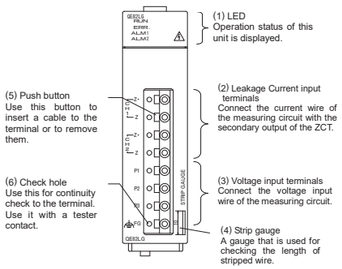
・Use the product within the ratings specified in this manual. If it is used outside the ratings, it may cause not only malfunction or failure but also fire or burnout.
・Before operating the product, check that active bare wire, etc. does not exist around the product. If any bare wire is found, stop the operation immediately, and take an appropriate action such as isolation protection.
・Do not disassemble or modify the module. It may cause failure, malfunction, injury or fire.
・Attaching and detaching the module must be performed after the power source is shut off for all outside phases. If all phases are not shut off, it may cause electric shock, failure or malfunction of the module.
・Do not touch powered wires. It may cause malfunction.
・Tighten mounting screws and cleaning module must be performed after the power source is shut off for all outside phases. If all phases are not shut off, it may cause electric shock, failure or malfunction of the module.
・Use a soft dry cloth to clean off dirt of the module surface.
・Do not let a chemical cloth remain on the surface for an extended period of time nor wipe the surface with thinner or benzene.
・Check for the following items to use this module properly for long time.
<Daily maintenance>
(1) No damage on this module (2) No abnormality with LED indicators (3) No abnormal noise, smell or heat.
<Periodical maintenance> (Once every 6 months to 1 year)
(4) No looseness with installation, wire connection to terminal blocks, and connector connection. (Check these items under the electric outage condition.)

3.5 Disposal Precautions

・When disposing of this module, treat it as industrial waste.

4. Name and function of each part

4.1 Names and functions of parts of QE82LG are provided below.



Names of signals of terminal block

Name of terminal	Description
CH1 Z+, Z	Leakage current input terminal (CH1)
CH2 Z+, Z	Leakage current input terminal (CH2)
P1 P2 P3	1-phase voltage input terminal 2-phase voltage input terminal 3-phase voltage input terminal
FG	Frame GND terminal

✓**Supplementary**

Check the stripping length using the strip gauge of this module.

4.2 Names and functions of LEDs

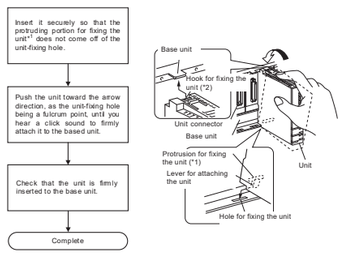
The following describes names and functions of LEDs.

Name	Color	Role	Indicator condition
RUN LED	Green	Displays the operation status of this module.	ON: Normal operation OFF: 5V power discontinuity, watch dog timer error
ERR. LED	Red	Displays errors and conditions of this module.	ON: Hardware error*1 Flashing: Out-of-range error*1 OFF: Normal operation
ALM1 LED	Red	Displays alarm occurrence status of CH1.	Changes according to the alarm status of CH1 Alarm.*2
ALM2 LED	Red	Displays alarm occurrence status of CH2.	Changes according to the alarm status of CH2 Alarm.*2

*1 : For details, check with the list of error codes. (Refer to section 9.1)
*2 : Refer to User's Manual (details) : Capter4, 4.2.3.

5. Attaching and removing the module

5.1 How to attach to the base unit



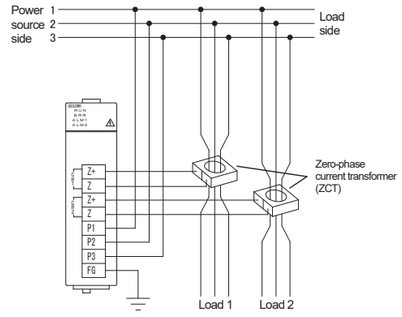
・Attach to the base unit of MELSEC-Q series.
・When attaching the module, make sure to insert the protruding portions for fixing the module into the holes on the base unit. In doing so, insert it securely so that the protruding portion of the module does not come off of the holes. Do not force to attach the module; otherwise the module may break.
・When installing the module at a vibrating area with strong impact, tighten the module to the base unit using screws.
Fixing-Module screw (arranged by user): M3 x 12mm
Tightening torque of the fixing-module screws: 0.36 – 0.48 N•m

6. How to wire

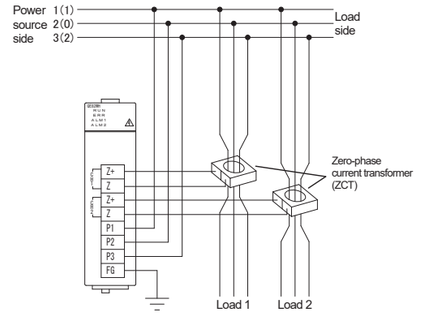
6.1 Wiring

For external connection to QE82LG, follow the phase method and the connection diagram.
When using this product, make sure to use it in combination with zero phase transformer (CZ series and ZT series). See the User's Manual (Details) of this module, and the installation method and the detailed specifications of ZCT.

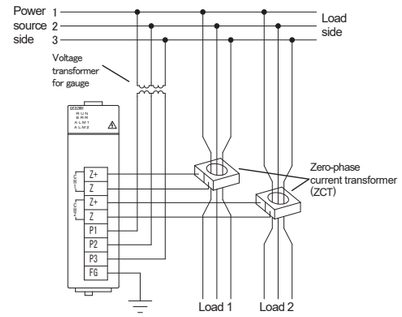
three-phase 3-wire



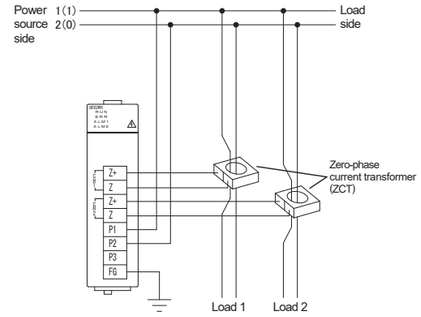
single-phase 3-wire



three-phase 3-wire (with the voltage transformer)



single-phase 2-wire



⚠ Caution

●Input signal wire shall not be bound together with or placed close to the main circuit and power line. Keep 300 mm or longer distance between them. The noise causes malfunctions.
●For wiring voltage circuit and ZCT secondary, use separate cables from other external signals in order to prevent from AC surge and induction.
●In case of measuring leakage current for resistance, it is possible on single-phase 2-wire, single-phase 3-wire, three-phase 3-wire delta circuit.
●The measurement of two circuits is possible at one module in the same system in the same trans.
●ZCT CZ series and ZT series do not have a secondary output polarity.
●Length of wire between ZCT and this module is max. 50 m.
●ZCT output wire from Z+ and Z terminal has to be stranded at 40 times/m.
●Wiring it is necessary to wire voltage input.
●When 220 V or higher is loaded to the voltage circuit, use a voltage transformer. For connection to P1 - P3 terminals on QE82LG, connect the secondary of transformer.
●Make sure that terminal symbols are correct. If phase wires are connected incorrectly, accurate measurement cannot be performed.
●For the actual usage, connect the FG terminal to ground. (D-type ground: Type 3) Connect it directly to the ground terminal.
●Do not connect to FG terminal during the insulation resistance test and pressure test.

6.2 How to connect wires

●Use appropriate electric wires as described below.
●Stripping length of the used wire in use has to be 10 to 11mm. Check the stripping length using the strip gauge of QE82LG module.
●When stranded wire is used, a bar terminal must be used.
●When attaching and detaching cables to/from the terminal, use the push button. Check that the wire is securely inserted.
●Insert a wire to the terminal all the way until it touches the end.

<Applicable wire (Usable electric wire)>

Single wire: φ0.5 – 1.2mm (AWG24～AWG17)
Stranded wire: 0.5 – 1.3 mm² (AWG20～AWG16)
・UL/c-UL listed corresponds, use the wires according to the following conditions.
Single wire : AWG24～AWG18
Stranded wire : AWG20～AWG18
●60/75℃ copper conductor only.

<Câble applicable (Fil électrique utilisable)>

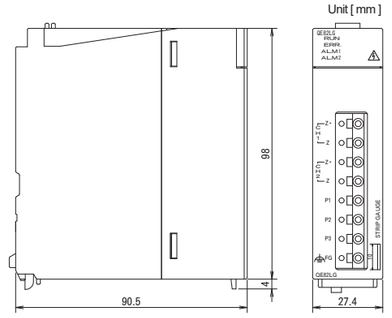
Câble simple: φ0.5-1.2mm² (AWG24～AWG 17)
Câble brin: 0.5-1.3mm² (AWG20～AWG16)
・Pour être conforme à UL/c-UL standard, utilisez le fil électrique selon les conditions suivantes.
Câble simple : AWG24～AWG18
Câble brin : AWG20～AWG18
●Seulement le conduit en cuivre 60 ºC /75 ºC

<Recommended bar terminal>

TGV TC-1.25-11T (NICHIFU TERMINAL INDUSTRIES CO.,LTD)

7. Dimensions

Unit [mm]



8. Specifications

Item			Specifications
Model			QE82LG
Phase-wire system			single-phase 2-wire / single-phase 3-wire / three-phase 3-wire
Rating	Voltage circuit	single-phase 2-wire, three-phase 3-wire	110 V, 220 V AC
		single-phase 3-wire	110 V AC (b/w 1- and 2-phase, 2- and 3-phase) 220 V (b/w 1- and 3-phase)
	Leak current circuit		1 AAC (Zero-phase current transformer (ZCT) is used. It indicates the primary current value of ZCT.)
	Frequency		50-60 Hz
Measuring range			Low sensitivity mode : 0 – 1000mA High sensitivity mode : 0.00 – 100.00mA
Resolution			Low sensitivity mode : 1mA High sensitivity mode : 0.01mA
Allowable tolerance of module (excluding ZCT)			Leak current : ±2.5% (10 – 100% range of Rating) : ±2.5mA (0 – 10% range of Rating) Leak current for resistance : ±2.5% (10 – 100% range of Rating) : ±2.5mA (0 – 10% range of Rating)
Measurable circuit count			2 circuits
Operating temperature			0 – +55°C (Average daily temperature 35°C or below)
Operating humidity			5 – 95% RH (No condensation)
Storage temperature			-25 – +75°C
Operating altitude			2000 m or below
Commercial frequency withstand voltage			Between voltage/leakage current input terminals - FG terminal 2210 V AC5 sec Between voltage/leakage current input terminals - sequencer power source and GND terminals 2210 V AC5 sec
Standard			EMC :EN61131-2:2007, EN61326-1:2006 LVD :EN61131-2:2007, EN61010-1:2001
Installation area			Inside a control panel

9. Warranty

・The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

・Our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss and lost earning of the customer due to failure of the product, and loss, secondary loss, accident compensation, damage to other products besides our products and other operations caused by a special reason regardless of our company's predictability in both within and beyond the charge-free warranty period.

⚠ Caution

If an abnormal sound, bad-smelling smoke, fever break out from this module, I switch it off promptly, and don't use it.

10. Customer Service

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, Japan

Please refer to "catalog" or "user's manual (Details)" for more detail.