MITSUBISHI ELECTRIC
Changes for the Better

for a greener tomorrow eco Changes

iQ Platform-compatible PAC
Energy Measuring Module

MELSEC iQ-R series

Brief

MELSEC iQ-R Series Broadcast

Realizing faster data measurement refresh cycle

The MELSEC iQ-R Series lineup includes the energy measuring module. Capable of processing measured data at a refresh cycle of 10 ms, the energy measuring module is ideal for energy saving, facility monitoring, and quality control at the manufacturing site. Improved productivity of both equipment and the production line can be achieved by synchronizing the monitoring of consumed energy and specific energy consumption management with the control program.

Improvements

- Faster measured data refresh cycle (10 ms)
- Energy measurement functions can be added to the MELSEC iQ-R base unit, reducing space and wiring
- Conformance to the United States (UL), European (CE Marking) and Korean (KC Marking) standards ensures installation in equipment for overseas markets

Modular design realizing compact size with minimal wiring

The module can be installed directly on the MELSEC iQ-R base unit unlike a conventional energy measuring device that requires extra space for the device and communication cables, realizing reduced space and less wiring. In addition, communication programming is not required, further reducing engineering. By using GX Works3, configuration can be done using the parameters, while setting and measured values can be confirmed easily supporting a quick implementation of the measuring system.

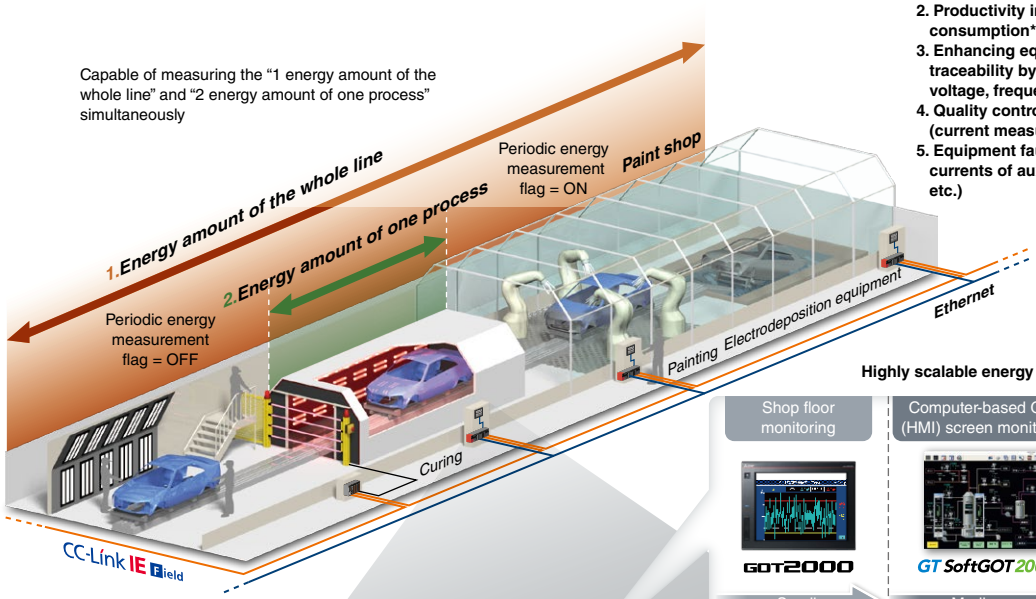
Energy measuring module

Improved energy saving and productivity on the production line through energy measurement synchronized with control program

Managing both energy amount and production data (production volume, non-defective volume, etc.) of the facility realizes specific energy consumption management according to model and process. By visualizing the points where specific energy consumption are deteriorating, problems at production site can be detected in real time, allowing operation improvement.
The energy consumption during production and non-production can be collected by turning on the measurement flag during production using the periodic electric energy measurement function. Monitoring wasteful standby energy during non-production helps to realize energy saving.

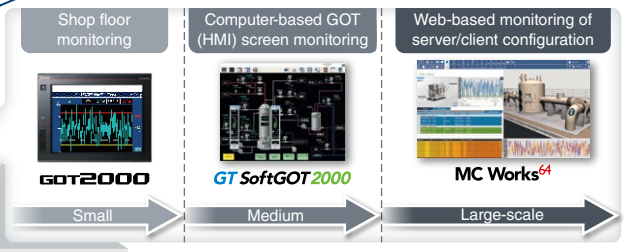
■ **Automotive manufacturing line**

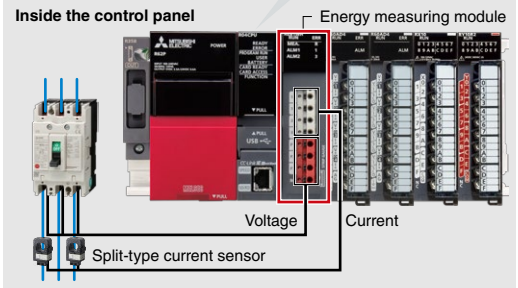
Capable of measuring the "1 energy amount of the whole line" and "2 energy amount of one process" simultaneously



1. Collecting the energy consumption and standby energy of each process such as electrodeposition, painting and curing
2. Productivity improvement through specific energy consumption*1 management of each process
3. Enhancing equipment fault monitoring and traceability by monitoring fluctuation of current, voltage, frequency, etc. of paint robots
4. Quality control by detecting heater disconnection (current measurement, etc.) during curing process
5. Equipment fault monitoring by monitoring the currents of auxiliary equipment (exhaust fan, pump, etc.)

Highly scalable energy data visualization

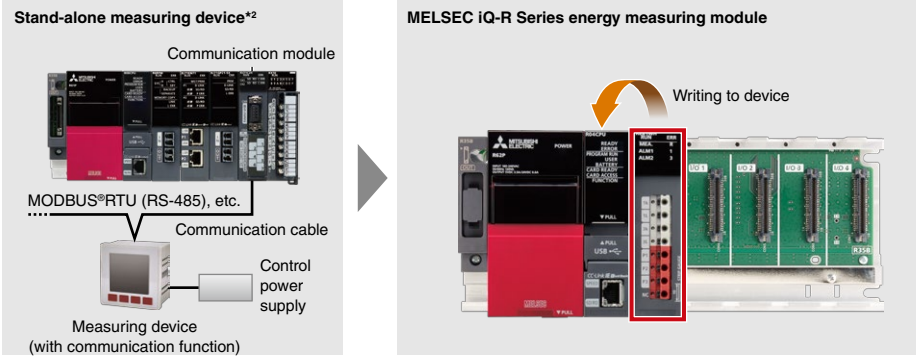




*1. The specific energy consumption is a numerical value displayed by "dividing energy consumption by production volume," which is one type of index that measures energy productivity.

Modular design realizing compact size with minimal wiring

Energy measuring modules can be introduced easily as they require minimal space and wiring, unlike conventional energy measurement devices that require space for the device and communication cables. The module can be installed directly on a vacant slot of the MELSEC iQ-R base unit, enabling measurement functions to be added without changing the layout in the control panel. Split-type current sensors can be easily attached to the pre-installed cables. Engineering time can also be reduced as there is no need to create a separate communication program between the energy measuring module and programmable controller.



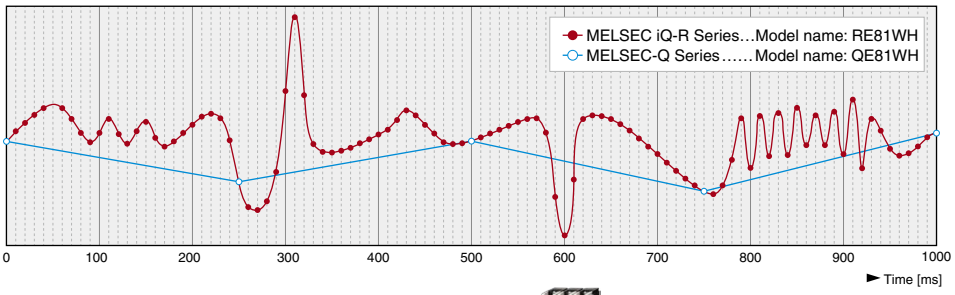
*2. A configuration where measurement data is collected using a programmable controller

Faster data measurement refresh cycle (10 ms)

Energy measuring modules are capable of detailed energy measurement for individual production equipment. Using only one module, highly detailed information such as electric energy (consumption and regeneration), reactive energy, current*1, voltage*1, electric power, power factor, frequency, harmonic current, and harmonic voltage can be measured. With constant current monitoring of motors and other devices, it is possible to avoid line stoppages and downtime; thereby reducing delivery time issues due to production stoppages as well as maintenance related labor and costs. Moreover, by detecting abnormal voltage or current in manufacturing equipment and removing products manufactured during the time of abnormality, shipping defective products can be prevented.

*1. Waveform data for current and voltage can also be obtained. For further details, please refer to the product user's manual (detailed edition).

High-speed data processing



Alarm status confirmation/ alarm occurrence record Trend analysis

GOT (HMI)

- Recording of maximum and minimum values
- 2 types of upper/lower-limit alarm monitoring
- Alarm status is stored in buffer memory, eliminating complex ladder programming

Circuit breaker

Split-type current sensor

Inverter

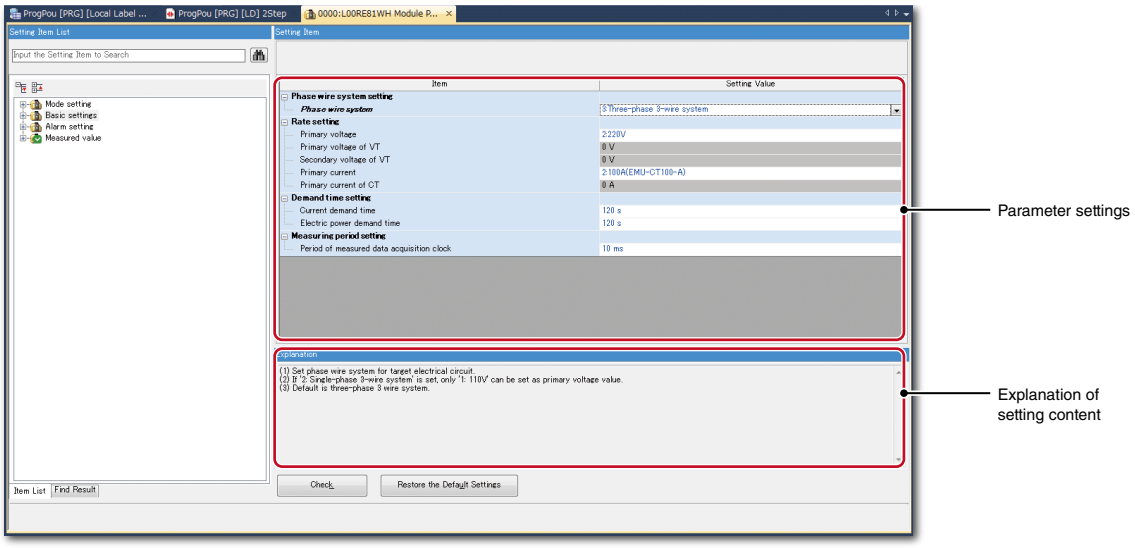
Preventive repair/service/overhaul

Motor

Factors behind motor failure

Easier implementation of measuring systems by utilizing GX Works3

Registering parameters can be done using GX Works3. Ladder programming is no longer necessary and setting is done by displaying the setting item name and guidance at the bottom of the screen. Setting values and measured values can be easily confirmed on the intelligent function module monitor screen without having to check buffer memory assignment with a manual. In addition, auto refresh function transfers data in the buffer memory to specified devices, eliminating reading/writing data from the ladder program.



iQ Platform-compatible PAC
Energy Measuring Module

Specifications

Item	RE81WH
Number of measurable circuits	1
Phase-wire systems	Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire
Instrument ratings	
Current circuit	5, 50, 100, 250, 400, 600 A AC (Using dedicated split-type current sensor. Each value indicates current sensor's primary current value.) 5 A AC (Using dedicated 5 A current sensor. 5 A current sensor is used with two-stage configuration in combination with current transformer (CT). Primary current value can be set up to 6,000 A.)
Frequency (Hz)	50/60 (frequency automatically judged)
Voltage circuit	
Single-phase 2-wire, three-phase 3-wire	110, 220 V AC common
Single-phase 3-wire	110 (1-2 lines, 2-3 lines), 220 V AC (1-3 lines)
Measurement specifications	
Data refreshing cycle (ms)	10…10000 (able to set in increments of 10 ms)
Measurement items/main unit tolerance (current sensors not included in tolerance)	Current,*1 current demand : ±1.0% (against 100% of the rating) Voltage*1 : ±1.0% (against 100% of the rating) Electric power, electric power demand : ±1.0% (against 100% of the rating) Reactive power : ±1.0% (against 100% of the rating) Apparent power : ±1.0% (against 100% of the rating) Harmonic current : ±2.5% (against 100% of the rating) Harmonic voltage : ±2.5% (against 100% of the rating) Frequency : ±1.0% (45…65 Hz range) Power factor : ±3.0% (against an electrical angle of 90°) Electric energy : ±2.0% (5…100% of the rating range, power factor = 1) Reactive energy : ±2.5% (10…100% of the rating range, power factor = 0)
Transient overvoltage	Measurement circuit: CAT Ⅲ
Commercial frequency withstand voltage	2210 V AC for 5 s (between voltage/current input terminals - programmable controller power supply and GND terminals)
Applicable standards*2	EMC : EN61131-2: 2007, EN61326-1: 2013 Safety standards : EN61131-2: 2007, EN61010-1: 2010 UL61010-1 : 3rd Edition
Power failure backup	Non-volatile memory backup (Recorded items: setting values, maximum/minimum values and date/time of occurrence, electric energy (regeneration, consumption), reactive energy, periodic electric energy)
Number of occupied I/O points	32
Applicable software packages	GX Works3 Version 1 SW1DND-GXW3-E 1.040S or later
Operating environment	
Operating ambient temperature (°C)	0…55 (daily average temperature of 35°C or lower)
Operating ambient humidity	5…95% RH (no condensation)
Storage ambient temperature (°C)	–25…75
Operating altitude (m)	2000 or less

*1. Waveform data for current and voltage available. For details, refer to the user's manual (details).
*2. For details on safety certification conformance conditions, refer to the user's manual (details).

Split-type current sensor

Model name	Rated primary current	UL/CE compatible
Split core current sensor		
EMU-CT5-A*3	5 A	-
EMU-CT50-A	50 A	-
EMU-CT100-A	100 A	-
EMU-CT250-A	250 A	-
EMU-CT400-A	400 A	●
EMU-CT600-A	600 A	●
EMU-CT50	50 A	●
EMU-CT100	100 A	●
EMU-CT250	250 A	●
5 A split-type current sensor		
EMU2-CT5*3	5 A	●

5 A split-type current sensor cables

Model name	Cable length	UL/CE compatible
5 A split-type current sensor cable*4		
EMU2-CB-Q5A	0.5 m	●
Extension cable (standard type)*5		
EMU2-CB-T1M	1 m	●
EMU2-CB-T5M	5 m	●
EMU2-CB-T10M	10 m	●
Extension cable (separate type)*5		
EMU2-CB-T1MS	1 m	●
EMU2-CB-T5MS	5 m	●
EMU2-CB-T10MS	10 m	●

3. If measuring high-voltage circuits or using an existing CT, connect a 5 A split-type current sensor to the primary side of the CT (/5 A).
*4. Be sure to use when using the EMU2-CT5.
*5. Used if EMU2-CT5 is extended.

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