Energy-saving Data Collecting Server
EcoWebServerⅢ

Simple - Convenient - Compact
Realizing Energy Visualization and Demand Management
Global Player

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

**Energy and Electric Systems**
A wide range of power and electrical products from generators to large-scale displays.

**Electronic Devices**
A wide portfolio of cutting-edge semiconductor devices for systems and products.

**Home Appliance**
Dependable consumer products like air conditioners and home entertainment systems.

**Information and Communication Systems**
Commercial and consumer-centric equipment, products and systems.

**Industrial Automation Systems**
Maximizing productivity and efficiency with cutting-edge automation technology.

Through Mitsubishi Electric’s vision, “Changes for the Better” are possible for a brighter future.
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Energy Management System

Energy-saving Data Collection Server EcoWebServer III

Support factory, building and school energy-saving activities. Build visualized environments and manage energy effectively. Support to energy conditions at all times and quickly resolve energy loss problems. Finally reduce energy loss, increase productivity and cut production costs.

Energy-saving method

- **Plan**
  - Comparatively high specific consumption (waste of energy, negative influence on productivity)
  - Ex) kWh of electricity per day can be saved with improvement.
- **Do**
  - Facilities start-up too fast
  - After investigation and deciding appropriate start-up time, implement countermeasure
- **Check**
  - Compare data before and after implementing countermeasure
  - (kWh reduced per day)
- **Action**
  - Implement similar countermeasures for other facilities

Support energy-saving activities using “Visible Management”

- 1. Monitor/Manage energy by department
- 2. Specific consumption-based management of energy-saving activities
- 3. Monthly/Annual target-based management
- 4. Monitor equipment operating status
- 5. Manage/Record energy data

System Configuration Example

- **EcoWebServer III**
  - (with demand control function)
  - Modbus TCP
  - Data collection inside inner register
  - Measurement data written to inner register
  - Transfers files in CSV format
  - Comparison zoom (1 or 5 min), daily, monthly, annual, facility (daily), specific consumption, demand (daily, monthly, annual), demand alarm, control, operation history, system log file
  - E-mail notification
  - Abnormal upper/lower limits, operating status, target value over specific consumption, over planned energy value, error information
  - Smtp server
  - Snmp server
  - Ftp server
  - Acquire time information
  - Adjust EcoWebServer clock

- **EcoWebServer**
  - (with demand control function)

- **MELSEC programmable controller**
  - Q Series, QnA Series, A Series, L Series, F Series
  - *F Series requires serial converter

- **Energy Measuring Unit**
  - (EcoMonitorPlus)
  - (EcoMonitorLight)

- **Electronic multi-measuring instrument** (ME96SS Ver.A)

- **LAN**
  - (Ethernet)

- **Pulse**
  - Signal

- **Target-based management**
  - Specific consumption management
  - Demand measurement
  - Pulse signal

- **Collects energy data**
  - Up to 32 units
  - Up to 31 units
  - Up to 42 units (refer to P22)

- **Collects production data**

- **Support energy-saving activities using “Visible Management”**

- **1. Monitor/Manage energy by department**
- **2. Specific consumption-based management of energy-saving activities**
- **3. Monthly/Annual target-based management**
- **4. Monitor equipment operating status**
- **5. Manage/Record energy data**

- **Support factory, building and school energy-saving activities.**
- **Build visualized environments and manage energy effectively.**
- **Support to energy conditions at all times and quickly resolve energy loss problems.**
- **Finally reduce energy loss, increase productivity and cut production costs.**
System Configuration Example

Transfers files in CSV format
- zoom (1 or 5 min), daily, monthly, annual, facility (daily), specific consumption, demand (daily, monthly, annual), demand alarm, control, operation history, system log file

E-mail notification
- abnormal upper/lower limits, operating status, target value over specific consumption, over planned energy value, emit information

Acquire time information
- Adjust EcoWebServer II clock

Mitsubishi Electric AE-200E Web-compatible integrated air-conditioning controller

Air conditioning

Data collection inside inner register

Measurement data written to inner register

Electronic multi-measuring instrument (ME96SS Ver.A)

Ethernet (MELSEC communication protocol)

Collects production data

Up to 32 units

Specific consumption management

Collects energy data

Up to 42 units (refer to P22)

Target-based management

CC-Link

MDU breaker

Electronic multi-measuring instrument (ME96SS Ver.A)

MELSEC-Q Series Energy measuring module / Insulation monitoring module

GOT MITSUBISHI

Check demand information and alarm records onsite

Network monitoring lamp

Up to 31 units

RS-485 (MODBUS® RTU)

Protocol converter

Up to 31 units

Measure of current, leakage current, input of analog, pulse...etc.

Electronic multi-measuring instrument (ME96SS Ver.A)

Energy Measuring Unit (EcoMonitorLight)

Energy Measuring Unit (EcoMonitorPlus)

Production line

For monitor equipment status

For managing objectives

For improvement activities

* It needs an optional unit to communicate with server.
Importance of visualizing energy

Essentials Issues for Saving Energy

Target Value Management
Managing objectives is a very important issue when practicing energy savings. “Target value management” is the process of transforming actual conditions into ideal conditions, and thereby requires understanding the actual situation and how much “unseen” waste there is. For this reason, target value management involves performing detailed management of operations, moving from months to days and lines to equipment, and evolving from “seeing” waste to “understanding” it. Additionally, when using target value management, it is necessary to construct and put into practice an organization that values “people who set objectives (manage),” “people who find things” and “people capable of thinking of improvements and implementing them.”

Specific consumption management
In lines where there is a large difference in production volume, it is difficult to save energy and improve productivity using energy management alone. By understanding specific consumption —energy consumed per product— waste in energy and production processes can be clarified, and it becomes easier to implement countermeasures. Rather than simply not using energy, it’s important to use energy efficiently when, where and how much needed.

EM (Energy loss Minimum) activities

Actual
• No-load power is consumed when there is no production.
• Lights are on in areas where there are no people.
• There are no inverters, so an unnecessary amount of energy is being used.

This is specific consumption management

Improvements
Energy required for production:
• Necessary time (year, month, day, hour, minute, second...)
• Necessary place (all, building, department, production line, equipment)
• Necessary amount (technical standards, use/operation standards)

Discover waste

Improve productivity (→ Save energy)

The ideal condition is efficient use of the necessary amount of energy, at the necessary place and necessary time.


**Importance of Demand Monitoring**

**Energy Saving by visualizing demand**

**What is “Demand”…?**

Demand is average electric power at a specified period. This period for demand differs for each country and the way of management method.

Electric fee is basically determined based on the highest demand in one year (contract demand).

The higher the contract demand is, the more expensive the electric basic charge is.

There are two types of basic demand management method as below.

(2) **Fixed block demand management method**

The demand period consists of only an interval.

**Fixed block demand management**

Ex) Interval: 30min

(2) **Rolling block demand management method**

The demand period consists of interval and sub interval. Interval is the period for calculation of average electric. Sub interval is the period for update the calculation.

**Rolling block demand management method**

Ex) Interval: 15min, Sub interval 5min

**EcoWebServer III with demand monitoring function** complying with the Fixed block demand management method. Interval can be selected from 15min or 30min or 1hour.

**Subtotal Volume**

- Demand (power demand) is computed and calculated by taking pulses from the multi-measuring meter (transaction meter) for power demand.

**Estimation**

- The value at the end of the 30-minute time limit is estimated from the measured demand (power demand).

**Warning**

- Based on the results of the estimation, an alarm is output and a notification sent when the objective demand has been exceeded.
- The alarm notification can be a buzzer, display lamp, etc., which is sent through the contact output.

**Load interruption**

- Load interruption may be necessary depending on power use.
- A control output signal can be used to automatically interrupt the load.

**Realize visualization of energy and demand management with one EcoWebServer III.**
1. Measured Data in Graphs on a Web Browser

- With built-in applications focused on energy saving (including graph functions), it is possible to contribute to energy-saving measures in plants.
- By HTTP server functions, the collected data is transmitted via Ethernet across the Intranet so that anyone in the network can check and grasp the energy usage in real-time.

- Get on-site information from smartphones and tablets instantaneously
- Improve the awareness of energy saving on the site by making the monitor seen
- Possible to see graphs from PCs in the same network

2. Smartphone and Tablet Supported

- It is possible to display graphs directly on a Web browser, so you can see the graphs from mobile terminals including smartphones and tablets as well as PCs.

- In addition, the size and position of graphs are automatically adjusted to the window width of a Web browser and the screen size of a terminal, so now, you can see the screen adjusted to the terminal to use.
3. Easy Setting (programming less, ladder less)

- The minimum registration setting required for measurement is only:

1. Registering measuring terminals → 2. Registering measuring points → 3. Writing a project

**Setting Process**

1. **Measuring Terminal Registration**
   - Select a terminal equipment to register to the lower rank in a pull-down system.

2. **Measuring Point Registration**
   - Select measuring items (such as electric current, voltage and energy) in a pull-down system.

3. **Project Writing**
   - Write the registered terminal and measuring point information to EcoWebServerⅢ.

* The example screens and settings belong to MES3-25SC-DM-EN.
4. Installed a variety of graphs for Energy-Saving Management

A variety of graph types and functions are built-in, so you can display graphs without drawing details.

**Date Comparison Graph**

- It is possible to select measuring items and comparison dates to display a graph instantly. You can identify abnormal values, which leads to improvement activities.

  Also possible to display daily and monthly graphs
  It is possible to display daily and monthly graphs, best suited to finding out a problem.

**Visible difference from the date in comparison**

The difference from the date in comparison is visible, so you can find out the cause immediately.

**Possible to display tool tips**

Put the mouse pointer on the graph, and you will be able to check the detailed values.

**Measuring Point Comparison Graph**

- It is possible to select measuring point groups and a date, and display a measuring point comparison graph instantly. You can identify the department with a greater effect provided by energy-saving measures, which leads to efficient activities.

**Possible to display up to 12 items**

Up to 12 items can be displayed in a graph. It is possible to hide unnecessary items by a click, so you can select only necessary parts to display and make a comparison.

**Possible to hide a legend by a click**

By clicking a legend, you can hide unnecessary items.

**Possible to display more than one bar chart**

It is possible to display parallel as well as stacked bar charts. You can use them for the comparison of energy usage in a same facility, and others.
Specific Consumption Graph

- Configure the settings for a specific consumption graph, and a date comparison graph for specific consumption can be displayed instantly. Based on the graph, you can improve the management on the site, which leads to a productivity improvement (see p.18 and 19 for details).

Visible productivity

It is possible to display specific consumption in a line graph and in a bar chart, so you can check the part where the productivity is lower at a glance.

Easy to compare dates for facility energy usage

At the same time with a specific consumption graph, a date comparison graph for the energy usage is displayed.

Demand Monitor (MES3-255C-DM-EN only)

- You can check the current condition and shift of demand at a glance.

Current demand condition monitor

The demand value at the end of a 30-minute time limit is forecasted and displayed in a pie chart*. The color is changed according to the current demand condition, so you can check the condition at a glance.

When the demand is normal

When the demand is above

* Interval can be selected from 15min or 30min or 1hour.

Demand load curve

The load curve of the demand condition is displayed. You can check the demand condition relative to the target in a glance.
5. It can be connected at MODBUS* RTU/TCP communication

- Using the LAN interface (CH2) of EcoWebServerIII, **realize MODBUS* TCP communication.** (As with the case of MC protocol communication)
- Using the LAN CH2 of EcoWebServerIII, via MODBUS* TCP ↔ MODBUS* RTU converter, realize **MODBUS* RTU communication**.*

*1 MODBUS* TCP ↔ RTU converter is required for MODBUS* RTU communication. That has been functionally verified is SI-485 MB, SI-485 MB2 by LINEEYE CO., LTD.
*2 Only EMU4-FD1-AB can be connected and it needs an optional unit (Model name: EMU4-CM-MT)
*3 It needs an optional unit (Model name: ME-000MT-SS96)

6. Detect Target Excess and Facility Abnormality Instantaneously by Alarm Output and E-Mail Notification

- It is possible to send an e-mail notification and an alarm output in case of the occurrence of target excess or facility abnormality, so you can catch a condition change at once. It is possible to accelerate the PDCA cycle from problem finding to measure taking and improve the productivity.
- Smartphones and tablets are supported, so you can check the alarm contents and e-mail notifications on the site.

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**Alarm Output/E-Mail Notification**

**Check from a PC**

**Check from a smartphone or a tablet**

**Network monitoring indicator lamp**

* Ask the network administrator (or administration department) in your company for details.
7. Specific Consumption Management in Coordination with a Mitsubishi PLC

- Based on production information in a Mitsubishi PLC and energy information in EcoWebServerⅢ, specific consumption is managed.
- The setting software dedicated to EcoWebServerⅢ enables to read the data in a Mitsubishi PLC easily.
- You can conduct detailed improvement activities for each facility, based on specific consumption data.

8. Connection with Mitsubishi Electric GOT display device.

- Information collected on the EcoWebServerⅢ can be displayed on the GOT.
- By displaying the alarm state/measuring value for energy information/demand, real-time monitoring at the site and urgent countermeasures are possible.

9. Possible to Create Ledgers

- Use the software for creating daily and monthly reports and analyzing specific consumption, “EcoMeasureⅢ”, (sold separately), and you will be able to create a ledger for daily, monthly and annual reports from the CSV files saved automatically by EcoWebServerⅢ (see p.33 for details).
- Use the master ledger function, and you will be able to customize the ledger form.

[Example of Daily report output]

You can create stamp boxes and use them for providing materials for related departments.
10. Simultaneously visualize demand trends and energy consumption per building/load
Compatible model: MES3-255C-DM-EN only

- As the breakdown of power demand (load balance) can be easily understood from the power demand trends and stacked bar graphs for each regional substation and operating equipment can be reviewed, and operations can be planned and proposed based on the analysis results, which enable peak shift/peak cut.

Load installed in a location separated from the EcoWebServer™ can also be controlled by CC-Link transmission. (CC-Link: total cable length up to 1.2km)

Graph screen example

- Demand monitor screen

Current demand display area

Demand load curve

Target Value

Fixed Value

Current day demand trend graph

Alarm status display area

Demand information display area

Control status display area
11. Energy-saving air conditioning operation realized with integrated air-conditioning controller

- Demand control possible by interconnecting with Mitsubishi Electric Web-compatible integrated controller—AE-200E G-150AD, etc.
- Additionally, automatic control of load possible through contact point output via main unit of EcoWebServer™ and CC-Link.

![Diagram of energy-saving air conditioning operation]

Capacity-saving control combined with energy-saving monitor level (60/70/80/90%)

12. Virtual Measuring Point Function

- A virtual measuring point refers to a measuring point for which the computation result between measuring points is used as virtual measurement data. A maximum of 128 measuring points (excluding the 255 measuring points) can be registered.

![Diagram of virtual measuring point function]

- It is possible to convert into CO₂ or electricity charges.
- All you have to do for setting is to input the computing equation of measurement data and input the unit by hand or select it from the list.

**Example** Convert the energy into CO₂ and display a graph

![Example calculation for CO₂ conversion]
Energy Saving Management for the Whole Factory

Use Demand Monitor Measuring Point Comparison Graphs and Reduce Electricity Charges.

Best suited to such customers as:
- Have a high ratio of electricity charges in the plant and want to reduce electricity charges.
- Can’t monitor the demand condition constantly.
- Can’t grasp the conditions or rate of energy usage in each department.

Tips for Electricity Charge Reduction (In the case fixed block demand management)

- The reduction of contract demand leads to the reduction of electricity charges.

1. Electricity charge system
   - Basic charge
   - Energy charge

2. Basic charge system
   - Basic charge = Contract demand × Unit price

Calculate based on the maximum demand (power) in the previous year
- Select the maximum in the previous year (July in the example below)

Example: a new maximum demand (power) was established in July and the demand was lowered from the next month.

By lowering the maximum demand in a year, you will be able to reduce the contract demand!

Demand Reduction by EcoWebServer III

1. Set the Target Demand
   Use the dedicated software for setting and set the target demand value based on the past conditions of energy usage.

2. Select the Load to Cut Off
   Identify the load to control when the target value is exceeded. It is general to select the load of air conditioning or lighting on which a sudden control or cut-off has a smaller influence.

3. Consider the Control Method (Manual or Automatic Control)
   EcoWebServer III enables to create a system to control loads automatically when the target value is exceeded (up to 12 loads).

4. Settings for External Equipment Coordination (Automatic Control)
   Set the load (capacity) to control automatically by using the dedicated software for setting.

You can configure the settings easily by the dedicated software for setting!
5. Check Daily Demand Monitoring and Control Information in Graphs

You can check demand graphs from PCs, smartphones and tablets.

- **Check the demand forecast monitor**
  Check the demand condition constantly and take a measure when the forecast demand is above. If you control manually, you can cut off the peak energy by controlling the load of air conditioning or others on which the influence is smaller.

- **Check control conditions**
  You can check the control condition of the loads registered in setting.

- **Check daily demand trend**
  It is possible to check the peak period at a glance, so you can find out the time period where a lasting measure is necessary.

6. Impose on Departments a Duty to Conduct and Report Energy-Saving Improvement Activities

For reducing the contract demand, each department has to conduct improvement activities to lower the demand. Then, it is important to use a measuring point comparison graph to find out the points where an improvement can be expected to have an effect.

- **Measuring point comparison graph (daily)**

- **Identify the bottleneck part, based on a stacked bar chart**
  It is possible to clarify the energy consumption rate in each department in the whole. The department with more energy consumption is visible, so you can conduct efficient energy-saving activities.

7. Coordinate with Departments to Improve the Management and Introduce Energy-Saving Equipment

See p.19 for details.

8. Check the Effect before and after an Improvement

It is possible to use a date comparison graph to compare the data before and after an improvement. You can check the effect of an energy-saving measure at a glance.
**Energy-Saving Management in Each Department**

Use Date Comparison Graphs and Improve the Management in Each Department.

- Don’t have a person in charge of energy saving in each department and can’t conduct energy-saving activities in each department.
- Want to introduce energy-saving equipment (such as LEDs and efficient transformers), but don’t know from where to start the introduction.
- Haven’t set the target value of energy usage and don’t have the limit of energy usage in each department.

**Tips for Operational Management**

- Assign a person in charge in each department using energy and create the awareness of energy saving.
- **Substation for each building**
  Conduct measurement at each substation and select a person in charge if a substation is disposed for each production site and office building.
- **Panelboard for each department and floor**
  Select a person in charge on each floor and conduct operational management of air conditioning, lighting, OA circuits and others.
- Create a system for managing energy-saving targets from the top down.

(Example)

- Person in charge of plant energy
- Instructions to manage the target, based on quantitative graph data

**Energy-Saving Activities by Improving Management with EcoWebServer III**

1. **Set the Target Value in Each Department**
   Set the target (plan) value from the “Target Value” button on the Web screen.

2. **Conduct Management Not to Exceed the Target, Based on a Monthly Graph**
   Check regularly not to exceed the target value at the end of a month.

   - Visible plan/target value
     You can set the target value every month on a Web graph and reflect it on the graph. Conduct monthly target management based on the information.
3. Find Improvable Points, Based on a Date Comparison Graph

Find out improvement points, based on a date comparison graph.

- Identify improvement points, based on comparison values
  Clarify the point of change from the comparison date and take a measure if energy usage is obviously different in a date comparison.

- Consider energy consumption measures during a recess and after the fixed time
  Take measures including the automatic control of lighting and air conditioning if the energy usage is high during a recess or after the fixed time.

4. Improve the Management and Introduce Energy-Saving Equipment at the Level of a Person in Charge

Improve the management and introduce energy-saving equipment once the part to take an energy-saving measure in is decided.

**Examples of Management Improvement**

(Buildings and offices)

- Limiting the time for lighting
- Limiting the time for operating air conditioning (only during the fixed time)
- Turning off the light in a lunch break and turning off the light simultaneously after the fixed time
- Setting the date for going home simultaneously on time and limiting late-night work

- Reconsidering the time for starting up a facility
- Controlling the operation of ancillary facilities (including a cooling tower incidental to a compressor)

**Introduction of Energy-Saving Equipment**

- Efficient transformer
- Air conditioning
- Efficient motor
- LED lighting

5. Check Return on Investment before and after an Improvement

Check the effect of the improvement activities and equipment introduction conducted and use the result for the next improvement plan.

- Check the effect before and after an improvement
  Check the effect and make it a step for introducing equipment in the future when a specified period passes after taking a measure.
**Productivity Improvement on the Site**

Use Specific Consumption Graphs and Achieve the Productivity Improvement.

- Can’t show energy usage on the production site quantitatively and haven’t achieved an improvement on the site.
- Want to make the information of specific energy consumption visible.
- Can’t grasp the specific energy consumption in each facility.

**Tips for improving the productivity by specific consumption management**

- Select energy-saving model lines
  
  ![Image of energy-saving model lines](image)

  Set the lines with higher energy usage or frequent program changes as energy-saving model lines and conduct specific consumption management.

  Roll out to other lines if an effect is provided

- Various data measurement methods

  ![Image of various data measurement methods](image)

**Process for Specific Consumption Management by EcoWebServer III**

1. **Configure the Settings for a Specific Consumption Graph**

   You can configure the settings easily only by using the dedicated software for setting and selecting energy and production amounts.

2. **Set a Target Value for Specific Consumption**

   You can easily set from a Web browser.
3. Monitor Specific Consumption graph after Completing the Settings

You can check specific consumption graphs from PCs, smartphones and tablets.

- Identify improvement points, based on specific consumption
  Find out the parts where specific consumption is worsened and take a measure after identifying the cause.

- Monitor facility energy usage
  Take a measure after identifying the cause if you find abnormal values because a date comparison graph for facility energy usage is displayed, too.

4. Coordinate with the Site to Conduct Improvement Activities and Introduce Efficient Equipment

Submit an improvement request to the site and improve the management based on quantitative graph data.

**Improvement Example**  Optimize the time for starting up a facility

- Check abnormal values for specific consumption
  When a facility wasn’t in operation, the standby time after starting up was long and the specific consumption got worsened. Turning on the facility 30 minutes before the start of operation has led to the reduction of the standby time.

5. Check and Report the Effect before and after a Measure

Check the effect before and after a management improvement in a date comparison graph. Roll out the same measure equipment if an improvement is achieved, and select another equipment if little effect is provided.

**Actions for Preventive Maintenance (Extra Actions)**

1. Measure the load/leakage current of a motor.
2. Set a target value and output an alarm when the target is exceeded.
3. Detect an abnormality before a trouble and conduct early replacement.

Prevent the production loss caused by a motor trouble and improve the productivity!
## Energy-saving Data Collection Server EcoWebServer III

### Network Specifications (CC-Link)

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission speed</td>
<td>156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps</td>
</tr>
<tr>
<td>Maximum total cable length (maximum transmission distance)</td>
<td>1200m</td>
</tr>
<tr>
<td>Maximum number of connected units</td>
<td>64 units however, conditions on the right must be met</td>
</tr>
<tr>
<td>Communication method</td>
<td>Broadcast polling method</td>
</tr>
<tr>
<td>Synchronization method</td>
<td>Frame synchronization method</td>
</tr>
<tr>
<td>Encoding method</td>
<td>NRZI method</td>
</tr>
<tr>
<td>Transmission route format</td>
<td>Bus (RS-485)</td>
</tr>
<tr>
<td>Transmission format</td>
<td>HDLC compatible</td>
</tr>
<tr>
<td>Error control method</td>
<td>CRC (x^8 + x^4 + x^3)^n</td>
</tr>
<tr>
<td>Connecting cable</td>
<td>CC-Link Ver1.10-compatible dedicated cable</td>
</tr>
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</table>

### MODBUS* TCP

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>1 port (10BASE-T/100BASE-TX)</td>
</tr>
<tr>
<td>Transmission method</td>
<td>Base band</td>
</tr>
<tr>
<td>Number of cascade connection stages</td>
<td>Max. 4 stages (10BASE-T)</td>
</tr>
<tr>
<td>Maximum node-to-node distance</td>
<td>200m</td>
</tr>
<tr>
<td>Maximum segment length</td>
<td>100m</td>
</tr>
<tr>
<td>Connector applicable for external wiring</td>
<td>K435</td>
</tr>
<tr>
<td>Cable</td>
<td>10BASE-T Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 or more)</td>
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<tr>
<td>Protocol</td>
<td>MODBUS* TCP (Port Number 502)</td>
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### MODBUS* RTU

<table>
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<tr>
<th>Item</th>
<th>Specifications</th>
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</thead>
<tbody>
<tr>
<td>Physical interface</td>
<td>RS-485 2-wires half duplex</td>
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<tr>
<td>Transmission wiring type</td>
<td>Multi-point bus (either directly on the trunk cable, forming a daisy-chain)</td>
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<tr>
<td>Slave address</td>
<td>1~247 (FF)</td>
</tr>
<tr>
<td>Response time</td>
<td>15 or less</td>
</tr>
<tr>
<td>Distance</td>
<td>1200m</td>
</tr>
<tr>
<td>Max. number</td>
<td>31</td>
</tr>
<tr>
<td>Terminate</td>
<td>120Ω 1/2W</td>
</tr>
<tr>
<td>Recommended cable</td>
<td>Shielded twisted pair, AWG24 to T4 gauge</td>
</tr>
</tbody>
</table>

* MODBUS* TCP => RTU converter is required for MODBUS* RTU communication. That has been functionally verified is SL-485 MB, SL-485 MB2 by UNEEYE CO., LTD.

---

MODBUS* TCP

**Item**

**Specifications**

- **Interface**: 1 port (10BASE-T/100BASE-TX)
- **Transmission method**: Base band
- **Number of cascade connection stages**: Max. 4 stages (10BASE-T)
- **Maximum node-to-node distance**: 200m
- **Maximum segment length**: 100m
- **Connector applicable for external wiring**: K435
- **Cable**
  - 10BASE-T: Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 or more)
  - 100BASE-TX: Cable compliant with the IEEE802.3 10BASE-TX Standard (shielded twisted pair cable (STP cable), Category 5 or more)
- **Protocol**: MODBUS* TCP (Port Number 502)

---

MODBUS* RTU

**Item**

**Specifications**

- **Physical interface**: RS-485 2-wires half duplex
- **Transmission wiring type**: Multi-point bus (either directly on the trunk cable, forming a daisy-chain)
- **Slave address**: 1~247 (FF)
- **Response time**: 15 or less
- **Distance**: 1200m
- **Max. number**: 31
- **Terminate**: 120Ω 1/2W
- **Recommended cable**: Shielded twisted pair, AWG24 to T4 gauge

Note: Baud rate, stop bit and parity are necessary to set in the setting mode of each terminal.
### Support terminal

#### MES3-255C-EN, MES3-255C-DM-EN (CC-Link)

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Icon/type name</th>
<th>Station type</th>
<th>Number of occupying stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>EnergyMeasuringUnit (1P2W, 1P3W, 3P3W)</td>
<td>EMU4-BD1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (1P2W, 1P3W, 3P3W, 3P4W)</td>
<td>EMU4-HD1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (1P2W, 1P3W, 3P3W, 3P4W)</td>
<td>EMU4-FD1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Energy measuring standard model *1</td>
<td>EMU4-BM1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Energy measuring high performance model *1</td>
<td>EMU4-HM1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Insulation Monitoring model *1</td>
<td>EMU4-LG1-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Energy measuring extension model for same voltage system *2</td>
<td>EMU4-A2</td>
<td>Remote device station</td>
<td>3 stations occupied</td>
</tr>
<tr>
<td>Energy measuring extension model for different voltage system *2</td>
<td>EMU4-VA2</td>
<td>Remote device station</td>
<td>3 stations occupied</td>
</tr>
<tr>
<td>Energy measuring extension model for analog input *2</td>
<td>EMU4-AX4</td>
<td>Remote device station</td>
<td>3 stations occupied</td>
</tr>
<tr>
<td>Energy measuring extension model for pulse/digital input *2</td>
<td>EMU4-PA4</td>
<td>Remote device station</td>
<td>3 stations occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (Power reception and distribution monitoring (standard product 5 circuits))</td>
<td>EMU2-RD3-C</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (Power reception and distribution monitoring (standard product 7 circuits))</td>
<td>EMU2-RDS-C</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (Power reception and distribution monitoring (3P4W 2 circuits))</td>
<td>EMU2-RD2-C</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit (Power reception and distribution monitoring (3P4W 4 circuits))</td>
<td>EMU2-RD4-C</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>EnergyMeasuringUnit</td>
<td>EMRJ-DP1-C</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>MDU breaker (WS-V)</td>
<td>NF250-SEV/HEV with MDU</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>MDU breaker (WS)</td>
<td>NF250-SEV/HEV with MDU</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Low-voltage air circuit breaker (AE-5W with CC-Link interface unit)</td>
<td>A6-5W(BP-CC)</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Electronic multi-measuring instrument</td>
<td>ME965SHA-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Electronic multi-measuring instrument</td>
<td>ME965SHA-MB</td>
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<td>1 station occupied</td>
</tr>
<tr>
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</tr>
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</tr>
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<td>ME965SHA-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Electronic multi-measuring instrument</td>
<td>ME965SHA-MB</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Electronic multi-measuring instrument with transmission function</td>
<td>ME110SBR-0H</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Electronic multi-measuring instrument with transmission function</td>
<td>ME110SBR-0H</td>
<td>Remote device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Thermostcouple temperature input unit</td>
<td>A6SST-68TD</td>
<td>Remote device station</td>
<td>4 station occupied</td>
</tr>
<tr>
<td>Platinum resistance temperature sensor Pt 100 temperature input unit</td>
<td>A6SST-64RD3</td>
<td>Remote device station</td>
<td>4 station occupied</td>
</tr>
<tr>
<td>Analog-digital conversion unit</td>
<td>A6SST-64AD</td>
<td>Remote device station</td>
<td>2 station occupied</td>
</tr>
<tr>
<td>Terminal block type 24 VDC input unit (8 points)</td>
<td>A6SSBTB1-8D</td>
<td>Remote I/O station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Terminal block type 24 VDC input unit (16 points)</td>
<td>A6SSBTB1-16D</td>
<td>Remote I/O station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Terminal block type 24 VDC input unit (32 points)</td>
<td>A6SSBTB1-32D</td>
<td>Remote I/O station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Terminal block type DC input transistor output combined unit (Input 8 points, Output 8 points)</td>
<td>A6SSTBT1-16D</td>
<td>Remote I/O station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>Terminal block type DC input transistor output combined unit (Input 16 points, Output 16 points)</td>
<td>A6SSTBT1-32D</td>
<td>Remote I/O station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>CC-Link master/local unit (Local station)</td>
<td>QJ61BT11N</td>
<td>Intelligent device station</td>
<td>1 station occupied</td>
</tr>
<tr>
<td>CC-Link master/local unit (Local station)</td>
<td>QJ61BT11</td>
<td>Intelligent device station</td>
<td>1 station occupied</td>
</tr>
</tbody>
</table>

*1 EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB are main units of EcoMonitorPlus.
*2 EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PA4 are extension units of EcoMonitorPlus.
*3 Combination of main unit and extension unit occupied 1 station.

---

#### MES3-255C-EN, MES3-255C-DM-EN (MODBUS*)

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Icon/type name</th>
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<tr>
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<td>EMU4-AX4</td>
</tr>
<tr>
<td>Energy measuring extension model for pulse/digital input *2</td>
<td>EMU4-PA4</td>
</tr>
</tbody>
</table>

*1 EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB are main units of EcoMonitorPlus.
*2 EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PA4 are extension units of EcoMonitorPlus.
1. Date comparison graph screen

Electric consumption/current display

Voltage/power factor display

2. Measuring point comparison graph screen

Analysis by application

Correlation analysis (graph overlapping)

3. Specific consumption graph screen

Daily

Monthly

Yearly
4. Demand monitor screen

5. Demand trend graph screen

Daily

Monthly

Yearly

6. Current value/contact point output monitor screen

Current value

Contact point output
Application Examples

### Factories
Support Energy-saving Activities using "Visible Management".

- Monitor/Manage energy by department
- Specific consumption-based management of energy-saving activities
- Monthly/Annual target-based management
- Monitoring of equipment operating status
- Manage/Record energy data

#### At production site...

- **Factory No. 1**
  - CC-Link
  - Measurement data
  - Production
    - Department
    - Power/Power consumption
    - Power factor
    - Consumption of water/steam/air/gas/other
    - Specific consumption data
    - Production quantity, other
  - Administration Department
    - Air conditioning
    - Lighting
    - Office automation equipment
    - Electrical outlets
    - Water/Gas usage

- **Factory No. 2**
  - CC-Link
  - Operating status (contact signal)
  - Production quantity (pulse signal)
  - Production equipment

#### In the office...

- PLC PLC Ethernet communications (MELSEC communications protocol)

#### For target management...

- Did we achieve the target this month?

#### To monitor equipment status...

- Alarm activated

#### Employees

- Plant manager
- Employees

#### For improvement activities...

- We can reduce waste even further here.

---

LAN(Ethernet)
Buildings

Significantly reduce installation cost by using the existing LAN.

1. Manage/Monitor energy by floor/application
2. Manage data remotely
3. Easy for tenants and other personnel to read meters
4. Monitor operating status of building facilities (e.g., elevators, escalators, air conditioners)
5. Record/Manage energy data

Stores

1. Remote management of energy data for small, spread-out stores
2. Compare data of each store
3. Record/Monitor equipment operating status (e.g., manage freezer/refrigerator temperatures)
4. Easy for tenants and personnel to read meters

Schools

1. Understand power consumption by facility (e.g., gymnasium) and equipment (e.g., transformer)
2. Monitor operating status of equipment distributed across a wide area
3. Save time and staff needed for meter-reading work
4. Record/Manage energy data

* When using a public line, a dial-up router is required.
* For use via the Internet, a separate contract with an Internet service provider is required.
Main Unit Specifications

**MES3-255C-EN** front

- **7-segment LED display**
  Displays an error code when an error is detected. In addition, in IP address display mode, the preset IP address is displayed at start-up.

- **USB interface**
  Not used.

- **LAN interface CH1**
  Use connected to a computer network.

- **LAN interface CH2**
  Use when connected to a programmable controller network, MITSUBISHI GOT, MODBUS® communication.

- **Power-supply terminal block**
  Connect power supply. (Note 1)

- **CC-Link terminal block**
  Connect CC-Link communication cable.

**MES3-255C-DM-EN** front

- **7-segment LED display**
  Displays an error code when an error is detected. In addition, in IP address display mode, the preset IP address is displayed at start-up.

- **USB interface**
  Not used.

- **LAN interface CH1**
  Use connected to a computer network.

- **LAN interface CH2**
  Use when connected to a programmable controller network, MITSUBISHI GOT, MODBUS® communication.

- **Power-supply panel**
  When you open the panel, you will see the power-supply connection section. (Note 1)

- **LED display**
  Display each status.

**Front surface (cover of Server section opened)/bottom surface (CC-Link transmission device)**

- **CompactFlash™ memory card EJECT button**
  Push the button and remove the CompactFlash™ memory card.

- **MODE/STOP/RUN switch**
  Normally, used in RUN state.

- **RESET/SELECT switch**
  Used when resetting the main unit.

- **CompactFlash™ memory card**
  Stores programs for collecting and displaying data. Data collected is also saved to it. (Note 3)

**Bottom surface**

- **RS-232 interface**
  Not used.

- **Battery storage compartment**
  Store the battery. Remove the cover and connect the connector. (Note 4)

---

**Note 1**
- Connect to AC100–240V±10%,-15%~5%/60Hz/50Hz/60Hz. Do not connect to a power supply other than that specified as this may cause an accident.

**Note 2**
- A separate power supply is required for the demand monitor section when using. When using the main device, AC100–240V±10%,-15%~5%/60Hz power is required for the demand monitor connector terminals V1, V2. It is possible to connect power from the power-supply module.

**Note 3**
- When removing the card from the memory card slot, be sure to place the RESET/SELECT switch in the SELECT position and remove it only after turning off the power supply and the CF CARD LED has turned off.
- Do not use the CompactFlash™ memory card with any other product. This could corrupt the internal data.
- Do not insert a CompactFlash™ memory card other than the one included in the package in this device. If a different card is inserted, the system will not operate correctly.

**Note 4**
- Be sure to exchange the battery within three minutes after turning off the power. If more than three minutes passes after the battery is removed, the final one hour of data may be lost or the clock may initialize. (Data or configuration settings from more than one hour before will not be initialized). If the clock initializes, please set again after backing up the data. Refer to the operating manual (hardware edition) for the battery replacement procedure.
Model: MES3-255C-EN, MES3-255C-DM-EN

Power-supply section

Server communications section (LAN interface)

Connecting point output section

When displaying graphs

When setting (CH1)

When connecting the PLC (CH2)

CC-Link communication section

Demand monitor section

(1) Where the transaction meter of the multi-measuring power demand meter is 10,000 pulse/kWh
## Function Comparison/System Environment

### Functions

<table>
<thead>
<tr>
<th>Demand function</th>
<th>MES3-255C-EN</th>
<th>MES3-255C-DM-EN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connection device</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC-Link terminal device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of remote I/O stations</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Number of device stations</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Number of local stations</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>MODBUS® terminal device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of MODBUS® TCP terminals</td>
<td>255</td>
<td>255</td>
</tr>
<tr>
<td>Number of MODBUS® RTU terminals</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Number of total MODBUS® terminals</td>
<td>286</td>
<td>286</td>
</tr>
<tr>
<td>MITSUBISHI PLC, GCT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MC protocol connection (LAN CH2 1 for each gateway)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* device read/write</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of measuring points</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring points</td>
<td>255 points</td>
<td>255 points</td>
</tr>
<tr>
<td>Number of operation measuring points</td>
<td>32 points (includes 255 measuring points)</td>
<td>32 points (includes 255 measuring points)</td>
</tr>
<tr>
<td>Virtual measuring points</td>
<td>128 points</td>
<td>128 points</td>
</tr>
<tr>
<td>Specific consumption measuring points</td>
<td>64 points</td>
<td>64 points</td>
</tr>
<tr>
<td>Connection point output</td>
<td>32 points</td>
<td>32 points</td>
</tr>
<tr>
<td>Demand monitoring</td>
<td>Receiving demand</td>
<td>Receiving demand</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>2 points (fixed) whole day, timeframe 1-10</td>
</tr>
<tr>
<td></td>
<td>Receiving electric energy</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>2 points (fixed) whole day, timeframe 1-10</td>
</tr>
<tr>
<td><strong>Data saving function * CSV format</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoom (every 1min) data</td>
<td>62-day amount</td>
<td>62-day amount</td>
</tr>
<tr>
<td>Zoom (every 5min) data</td>
<td>14-day amount</td>
<td>14-day amount</td>
</tr>
<tr>
<td>Daily data (on the hour or every 30min)</td>
<td>186-day amount</td>
<td>186-day amount</td>
</tr>
<tr>
<td>Monthly data (specified time) once a day</td>
<td>60-month amount</td>
<td>60-month amount</td>
</tr>
<tr>
<td>Yearly data (specified time) once a day</td>
<td>5-year amount</td>
<td>5-year amount</td>
</tr>
<tr>
<td>Virtual measuring point data (daily)</td>
<td>186-day amount</td>
<td>186-day amount</td>
</tr>
<tr>
<td>Virtual measuring point data (monthly)</td>
<td>60-month amount</td>
<td>60-month amount</td>
</tr>
<tr>
<td>Virtual measuring point data (yearly)</td>
<td>5-year amount</td>
<td>5-year amount</td>
</tr>
<tr>
<td>Specific consumption measuring point data (daily)</td>
<td>186-day amount</td>
<td>186-day amount</td>
</tr>
<tr>
<td>Specific consumption measuring point data (monthly)</td>
<td>60-month amount</td>
<td>60-month amount</td>
</tr>
<tr>
<td>Specific consumption measuring point data (yearly)</td>
<td>5-year amount</td>
<td>5-year amount</td>
</tr>
<tr>
<td>Equipment data (daily)</td>
<td>186-day amount</td>
<td>186-day amount</td>
</tr>
<tr>
<td>Operating history data</td>
<td>64KB x 4 files</td>
<td>64KB x 4 files</td>
</tr>
<tr>
<td>System log</td>
<td>256KB x 8 files</td>
<td>256KB x 8 files</td>
</tr>
<tr>
<td>Demand data (daily)</td>
<td>—</td>
<td>186-day amount</td>
</tr>
<tr>
<td>Demand data (monthly/daily maximum)</td>
<td>—</td>
<td>60-month amount</td>
</tr>
<tr>
<td>Demand data (yearly/monthly maximum)</td>
<td>—</td>
<td>5-year amount</td>
</tr>
<tr>
<td>Demand alarm/Control log</td>
<td>—</td>
<td>128KB x 122 files</td>
</tr>
<tr>
<td><strong>Real-time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand monitor</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Current value monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displays connecting point output status</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection point output monitor</td>
<td>Displays connecting point output status</td>
<td>Displays connecting point output status</td>
</tr>
<tr>
<td>Graph display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand trend graph</td>
<td>Displays demand trend graph</td>
<td>Displays demand trend graph</td>
</tr>
<tr>
<td>Measuring point comparison graph</td>
<td>Displays comparison of multiple measuring point data for specified display intervals/time displayed</td>
<td>Displays comparison of multiple measuring point data for specified display intervals/time displayed</td>
</tr>
<tr>
<td>Daily comparison graph</td>
<td>Displays comparison of specified measuring points for desired data</td>
<td>Displays comparison of specified measuring points for desired data</td>
</tr>
<tr>
<td>Specific consumption graph</td>
<td>Displays graph after dividing energy volume by number produced</td>
<td>Displays graph after dividing energy volume by number produced</td>
</tr>
<tr>
<td>Equipment graph</td>
<td>Displays graph of equipment efficiency, number of defects and equipment energy volume</td>
<td>Displays graph of equipment efficiency, number of defects and equipment energy volume</td>
</tr>
<tr>
<td><strong>Data file</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Download measuring point data, virtual measuring point data, specific consumption data, equipment data, operating history data, system log, demand data, alarm/Control log * (only for products with demand monitoring functions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment values list</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displays measuring points, connection point output and content of email notifications set for EcoServer®</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring functions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email notification function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmits main unit error notifications, periodic notifications, upper/lower limit notifications, operating status notifications, specific consumption objective value notifications, energy plan value notifications and demand notifications * to the specified SMTP Server * (only for products with demand monitoring functions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection point output</td>
<td>Outputs connection points for EcoWebServer® connection point output module or combined CC-Link input/output module</td>
<td>Outputs connection points for EcoWebServer® connection point output module or combined CC-Link input/output module</td>
</tr>
</tbody>
</table>
## Function Comparison/System Environment

### Hardware specification

<table>
<thead>
<tr>
<th>Power supply section</th>
<th>MES3-255C-EN</th>
<th>MES3-255C-DM-EN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary power input</td>
<td>100 to 240 V AC (+10%,-15%), 50/60 Hz (±5%)</td>
<td></td>
</tr>
<tr>
<td>Consumption VA</td>
<td>19 VA (at 110 V AC)</td>
<td>34 VA (at 110 V AC)</td>
</tr>
<tr>
<td></td>
<td>25 VA (at 220 V AC)</td>
<td>46 VA (at 220 V AC)</td>
</tr>
<tr>
<td>Insuff. current</td>
<td>20 A, 8 ms or less</td>
<td></td>
</tr>
<tr>
<td>Allowable momentary power interruption time</td>
<td>20 ms or less (100 V AC or higher)</td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>Between all input/0 terminals and all output terminals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,830V rms AC/3 cycles (altitude: 2,000 m)</td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>10 MΩ or more by 500 V DC insulation tester at the same locations as for withstand voltage</td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature/humidity</td>
<td>0 to 55 °C, 5 to 95% RH, Daily average temperature exceeds 35°C</td>
<td></td>
</tr>
<tr>
<td>Storage ambient temperature/humidity</td>
<td>-25 to +75 °C, 5 to 95% RH</td>
<td></td>
</tr>
<tr>
<td>Installation area</td>
<td>Inside a control panel</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.9 kg (Without demand)</td>
<td>1.25 kg (With demand)</td>
</tr>
</tbody>
</table>

### Ethernet

<table>
<thead>
<tr>
<th>Clock accuracy</th>
<th>0 to 55 °C</th>
<th>Additional difference of ±0.5 seconds can be produced during power outages.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Per day: 10.89 to +8.64 sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Per day: +4.32 to +5.25 sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Backup data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measured data for the last 1 hour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measured data except for the last 1 hour</td>
<td></td>
</tr>
</tbody>
</table>

### Server section

<table>
<thead>
<tr>
<th>Number of output points</th>
<th>16 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact output</td>
<td>A switch type</td>
</tr>
<tr>
<td>Insulation method</td>
<td>Relay insulation</td>
</tr>
<tr>
<td>Rated switching voltage/current</td>
<td>24 V DC, 2 A (resistance load)</td>
</tr>
<tr>
<td>Min. switching load</td>
<td>5 V DC, 1 mA</td>
</tr>
<tr>
<td>Max. switching load</td>
<td>264 V DC, 2 A, 125 V DC, 2 A</td>
</tr>
<tr>
<td>Life</td>
<td>Mechanical: 20,000,000 times or more, electrical: 100,000 times or more at rated switching voltage/current</td>
</tr>
</tbody>
</table>

### Contact output section

<table>
<thead>
<tr>
<th>Pulse input/Time limit synchronization, signal input</th>
<th>Dedicated detection CT</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pulse detector</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Number of pulses: 50000 pulses/1kHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distance: 100 m or below (dedicated cable)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Signal type: No-voltage normally-open contact/Open collector</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of pulses: 50000, 125000, 10000, 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pulse conditions: Pulse width, Pulse interval</td>
<td></td>
</tr>
<tr>
<td>Power frequency input</td>
<td>—</td>
<td>100-110 V AC, ±15% ±10%, 50/60 Hz</td>
</tr>
<tr>
<td>Contact output (1 point)</td>
<td>—</td>
<td>No-voltage normally-closed contact, 250 V AC 3 A, 30 V DC 3 A</td>
</tr>
</tbody>
</table>

### Standard specification

<table>
<thead>
<tr>
<th>Standard specification</th>
<th>CE/L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>*KC, Chinese RoHS is for profit.</td>
<td></td>
</tr>
</tbody>
</table>

### Recommended system environment

#### (PC)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS (basic software)</strong></td>
<td>Microsoft® Windows® 7 Professional (32-bit or 64-bit) (English version) SP1</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Windows® 8.1 Pro (32-bit or 64-bit) (English version)</td>
</tr>
<tr>
<td></td>
<td>Microsoft® Windows® 10 Pro (32-bit, 64-bit) (English version)</td>
</tr>
<tr>
<td><strong>CPU</strong></td>
<td>1 GHz or higher Pentium® processor, or compatible microprocessor (x86/64 compatible)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>1GB or more</td>
</tr>
<tr>
<td><strong>Hard disk</strong></td>
<td>Save data collected by EcoWebServerII to PC, enough disk space for the data is required</td>
</tr>
<tr>
<td><strong>CD drive</strong></td>
<td>One or more drives (required to install the setting software)</td>
</tr>
<tr>
<td><strong>Display resolution</strong></td>
<td>1,280 × 1,024 pixels or more</td>
</tr>
<tr>
<td><strong>Display color</strong></td>
<td>65,536 colors or more</td>
</tr>
<tr>
<td><strong>Input device</strong></td>
<td>A mouse and a keyboard</td>
</tr>
<tr>
<td><strong>English input system</strong></td>
<td>The system included in OS (English version only)</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td>10BASE-T / 100BASE-TX</td>
</tr>
<tr>
<td></td>
<td>Memory card reader (when writing / reading / confirming a project via drive by setting software)</td>
</tr>
<tr>
<td><strong>Web browser</strong></td>
<td>Microsoft Internet Explorer® 9 (32-bit), 10 (32-bit), or 11 (32-bit)</td>
</tr>
<tr>
<td></td>
<td>Microsoft Edge</td>
</tr>
<tr>
<td></td>
<td>Google Chrome</td>
</tr>
</tbody>
</table>

*1 Note that the required memory and free space of hard disk vary depending on the system environment. *2 Operation check for Microsoft Edge is done in version 38, Operation check for Google Chrome is done in version 54. **Tablet**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS</strong></td>
<td>Android 6.0</td>
</tr>
<tr>
<td><strong>Web browser</strong></td>
<td>Google Chrome, Safari</td>
</tr>
</tbody>
</table>

*3 Tablet is only for browsing the web screen. Setting software cannot be used on the tablet. *4 Operation check for Google Chrome is done in version 54, Operation check for Safari is done in version 10.
External Diagram/Bundled Products List

External dimensions

<table>
<thead>
<tr>
<th>MES3-255C-EN</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side surface</td>
<td>122.3</td>
</tr>
<tr>
<td>Front surface</td>
<td>189</td>
</tr>
<tr>
<td>Bottom surface</td>
<td>111.5</td>
</tr>
</tbody>
</table>

Peripheral installation conditions

**MES3-255C-EN**
- Shows frame roof or wiring duct, part position
- 30mm or more *1
- 5mm or more
- 80mm or more

**MES3-255C-DM-EN**
- Shows frame roof or wiring duct, part position
- 30mm or more *1
- 10mm or more
- 30mm or more
- 80mm or more

*1 These are the conditions when considering radiation. At the same time, please secure enough space to replace the battery in the lower layer of the main unit.
*2 When height of the wiring duct is 50mm or less. Others are 40mm or more.

Bundled Products List

<table>
<thead>
<tr>
<th>Product Name</th>
<th>CC-Link communication product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy-saving Data Collection Server (main unit)</td>
<td>MES3-255C-EN: 1</td>
</tr>
<tr>
<td>CompactFlash™ memory card (software)</td>
<td>1</td>
</tr>
<tr>
<td>Setup software (CD-R)/operating manual collection</td>
<td>1</td>
</tr>
<tr>
<td>Battery (installed in lower surface of main unit battery section) **</td>
<td>1</td>
</tr>
<tr>
<td>Frame attachment screw</td>
<td>4 (M4×12)</td>
</tr>
<tr>
<td>CC-Link terminal resistance (black: 110Ω/2W) (white: 130Ω/2W)</td>
<td>Black: 2</td>
</tr>
<tr>
<td>IEC rail attachment adapter</td>
<td>Small 2</td>
</tr>
<tr>
<td>IEC rail attachment screw (W5 x 10)</td>
<td>2</td>
</tr>
<tr>
<td>IEC rail attachment corner washer</td>
<td>2</td>
</tr>
<tr>
<td>IEC rail attachment stop metal clamp</td>
<td>2</td>
</tr>
<tr>
<td>Operating manual hardware edition</td>
<td>1</td>
</tr>
<tr>
<td>LAN port cap</td>
<td>2</td>
</tr>
</tbody>
</table>

*1 To purchase a replacement battery (model name: Q6BAT), inquire at the dealership where you purchased the main product.
EcoMeasure III Daily Monthly Report Software

This software supports the specific consumption analysis graph and ledger preparation of daily reports, monthly reports and annual reports from CSV files collected and output by the Mitsubishi Electric EcoWebServer III Energy-saving Data Collection Server.

* The supporting product version, EcoWebServer III with demand monitoring function, for EcoMeasure III, will be released soon.

Features

1. Easily create daily, monthly and annual reports.
   - Ledger prepared ledger is saved as an Excel file in user-designated place.

2. Easily perform specific consumption management as the index of energy-saving activities.
   - Possible to manually input production volume and perform specific consumption management of energy information from EcoWebServer III.

3. Easily collect data.
   - CSV files stored in EcoWebServer III can be downloaded with simple operations.

Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model name</td>
<td>ME5-SWI-DR-FR</td>
</tr>
<tr>
<td>Language</td>
<td>English, Chinese</td>
</tr>
<tr>
<td>Connection devices</td>
<td>Number of units 8 units maximum (combination of following target devices)</td>
</tr>
<tr>
<td>Target devices</td>
<td>EcoWebServer</td>
</tr>
<tr>
<td>Number of virtual measurement points</td>
<td>Maximum 96 points (Total of 96 points including virtual measurement points for calculating management points and virtual measurement points for input)</td>
</tr>
<tr>
<td>Number of virtual measurement point groups</td>
<td>Maximum 50 groups, Addition/Subtraction calculations for up to 32 virtual measurement points can be registered in the virtual measurement point groups,</td>
</tr>
<tr>
<td>Ledger creation function</td>
<td>Date report creation, monthly report creation, annual report creation</td>
</tr>
<tr>
<td>Maximum number of items</td>
<td>Monthly, yearly, and annual reports can have up to 2,250 output items.</td>
</tr>
<tr>
<td>Calculation items</td>
<td>Maximum, minimum, average</td>
</tr>
<tr>
<td>False</td>
<td>Total, maximum, minimum, average</td>
</tr>
<tr>
<td>Demand</td>
<td>Maximum</td>
</tr>
<tr>
<td>Number of specific consumption</td>
<td>Maximum 100 points (1 license per 1 client)</td>
</tr>
<tr>
<td>(number of computers installed in)</td>
<td>Hardware key attached (USB: 1 unit)</td>
</tr>
</tbody>
</table>

*1: It needs to start in the Chinese version of Microsoft operating system (OS).

Operating environment

The system environment necessary for this software to operate correctly is as shown below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS (basic software)</td>
<td>English version of Microsoft Windows Vista 32 bits/64 bits Business, English version of Microsoft Windows 7 32 bits/64 bits Professional, English version of Microsoft Windows 8.1 Pro (32bits/64bits), English version of Microsoft Windows 10 Pro (32bits/64bits)</td>
</tr>
<tr>
<td>Required software</td>
<td>English version of Microsoft Excel 2007 SP1, 2007 SP2, 2013 SP1 (32bits); 2013 SP2 (32bits); 2016 (32bits)</td>
</tr>
<tr>
<td>CPU</td>
<td>For Windows Vista or Windows 7 and Windows 8.1 or Windows 10; As recommended for the operating system</td>
</tr>
<tr>
<td>Memory</td>
<td>As recommended for the operating system</td>
</tr>
<tr>
<td>Hard disk</td>
<td>Software Approx. 100 MB or more, Data: 8 GB or more</td>
</tr>
<tr>
<td>CD-ROM drive</td>
<td>1 drive (for installing the software)</td>
</tr>
<tr>
<td>LAN</td>
<td>10/100/1000BASE-T 1 x 1</td>
</tr>
<tr>
<td>USB connector (Type A)</td>
<td>1 connector for connecting the hardware key</td>
</tr>
<tr>
<td>Display resolution</td>
<td>800x600 pixels or more</td>
</tr>
<tr>
<td>Display color</td>
<td>256 colors or more</td>
</tr>
</tbody>
</table>

*1: Note that the required memory and available hard disk space may vary depending on the system environment.

*2: Shows the capacity required when the product is used with 8 subsystems connected at the maximum.

[Daily Report]

[Monthly Report]

[Annual Report]
1. Safety Precautions to be Followed at All Times

**Operating Environment/Conditions**

Using this product in any of the following environments may cause a malfunction or shorten service life. Do not use in environments where:

- Ambient temperature outside the range of 0 - 55°C
- Daily average temperature exceeds 35°C
- Relative humidity outside the range of 5 - 95% or where condensation occurs
- Altitude is higher than 2000m above sea level
- Presence of excessive dust, corrosive gas, salt-saturated air or oily smoke
- Unit is subject to excessive vibration or physical shock
- Unit is exposed to rain or drops of water
- Unit is exposed to direct sunlight
- Pieces of metal or inductive substances nearby
- Presence of strong electromagnetic field or excessive external electrical noise interference

**Installation/Mounting**

Be sure to read the user’s manual before installing/mounting the product.

![](https://via.placeholder.com/150)

**CAUTION**

- For safety unit installation and all wiring connections should be performed by a qualified electrician.
- When tightening screws or connecting wiring, be sure that small particles or cut pieces of electrical wiring do not get inside the unit.
- Check the wiring diagram carefully before making all connections. Incorrect connections may cause a malfunction, fire or electrical shock.
- Do not perform wiring work using live circuits. Doing so may cause a malfunction, fire or electrical shock.
- Use electrical wires of appropriate size. Not doing so may cause a fire due to the possible generation of heat.
- Use a solderless terminal that matches the size of the electrical wire. Not doing so may result in disconnected wires or improper electrical contact, thereby causing a malfunction, failure, burnout or fire.

<table>
<thead>
<tr>
<th>Location</th>
<th>Wire size</th>
<th>Compatible solderless terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power-supply terminal block</td>
<td>0.75 - 2 mm²</td>
<td>RAV1, 25-3</td>
</tr>
<tr>
<td>CC-Link communication terminal block</td>
<td>RAV1, 25-3</td>
<td></td>
</tr>
<tr>
<td>Contact output terminal block</td>
<td>RAV1, 25-3</td>
<td></td>
</tr>
<tr>
<td>Demand monitor block</td>
<td>0.5 - 1.5 mm²</td>
<td>TGV TC-1, 25-117 equivalent (NeChiFu Co., Ltd.)</td>
</tr>
</tbody>
</table>

- Be sure to check that all screws have been tightened. Not doing so may cause a malfunction, failure, burnout or fire.
- Tighten screws to the specified torque. Excessive tightening may cause damage to the terminal and/or screws. Failure to tighten properly may cause a malfunction, fire or electrical shock.
- When using lines from demand monitor terminal block, twist the heads of the fine lines together so they do not spread before attachment.

<table>
<thead>
<tr>
<th>Location</th>
<th>Tightening torque</th>
<th>Location</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal screws for power-supply terminal block (M3 screw)</td>
<td>0.6 - 1.0 Nm</td>
<td>Terminal screws for contact output terminal block (M3 screw)</td>
<td>0.42 - 0.58 Nm</td>
</tr>
<tr>
<td>Terminal screws for CC-Link communication terminal block (M3 screw)</td>
<td>0.42 - 0.58 Nm</td>
<td>Mounting screws for contact output terminal block (M3,5 screw)</td>
<td>0.66 - 0.89 Nm</td>
</tr>
<tr>
<td>Mounting screws for CC-Link communication terminal block (M3,5 screw)</td>
<td>0.66 - 0.89 Nm</td>
<td>Unit attachment screws (M3×12 screw)</td>
<td>0.36 - 0.48 Nm</td>
</tr>
</tbody>
</table>

- Be sure to check that the terminal cover has been attached. Not doing so may result in electrical shock.
- To prevent induction noise, control wires and communication cables should be installed as far as possible from power lines (wiring should be separated by a distance of at least 100mm).
- Avoid installation inside a panel where high-voltage equipment is used. Use a surge protector for equipment that tends to generate electrical noise.
- Use Class C grounding (dedicated grounding) for “FG”.
- Do not connect the FG terminal to a box (ground) when conducting the withstand voltage test or insulation resistance test.

**Preparations Before Use**

- Be sure that the installation location complies with the operating environment and conditions.
- This product requires setting before use. If setting is not done properly, a malfunction may occur.
- Confirm the power-supply rating of the product.
- Confirm the type of dust-resistant seal after completing installation and wiring construction.
- Not doing so may cause a malfunction due to the possible generation of heat.
- This product is equipped with a lithium battery. As the battery is not connected at the time of shipping, please connect it before use.

**Regarding Use**

- Use only within rating range specified in the product’s instruction manual. Not doing so may cause a malfunction, failure, fire or burnout.
- An IP address and other addresses are required to connect this product to a network (Ethernet). Before use, use the accompanying setup software to perform network-related settings such as setting the IP address.
- The factory default settings are:

  IP address = 192.168.10.1, subnet mask = 255.255.255.0, gateway = none

No setting changes are required for direct connection to a computer.

- This product is equipped with a built-in clock. Before use, use the accompanying setup software to set the current date and time.
- Before use, be sure to check that there are no live circuits or bare wires in the vicinity of the product.
- If a live circuit or bare wire is found during use, stop operation immediately and take appropriate measures, such as providing protective insulation.
- Please consult with a Mitsubishi Electric sales representative when considering using this product with machinery or systems designed for specialized use such as nuclear power, electric power, aerospace/outer space, medical, or passenger transportation vehicles. (To contact a sales representative, please refer to the end of this document.)

- If the power supply is turned on immediately after turning it off (within 5s), incoming current may exceed the stipulated value (less than 2ms). Please wait more than 5sec before turning the power supply on after turning it off.

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Safety Precautions

Maintenance/Inspection

- Do not disassemble or modify product. Doing so may cause a failure, electrical shock or fire.
- A seal sheet has been placed on the side of this product. If the seal sheet has been removed from the product, the product is out-of-service, such as down for maintenance or malfunction analysis.

Storage

- When storing this product, turn off the power supply, disconnect the wiring and place it in a plastic bag.
- When turning the power supply off for long periods of time, disconnect the connector for the battery. (The cumulative power outage compensation time of the battery is up to 13,700hr (1.57yr). Using the battery outside of the warranty period may result in losing measurement data.)
- Storing the product in one of the environments described below may cause a malfunction or shorter service life. Do not store the product for long periods of time in environments where:
  - Ambient temperature is outside the range of -25 to +75°C
  - Average daily temperature exceeds 35°C
  - Relative humidity is outside the range of 5% to 95% where condensation occurs
  - Altitude exceeds 2,000m
  - Presence of excessive dust, corrosive gas, salt-saturated air or oily smoke

Disposal

- Dispose of this product following relevant laws and/or guidelines regarding disposal and clearing (Waste Management Law).
- This product is equipped with a lithium battery. Please dispose of it according to relevant local laws and/or guidelines.

QR Code displayed on product

- As the QR Code displayed on this product is used for production management, it is not for the customer to use.
- There is no guarantee that the QR Code can be read by a commercial code reader, etc.

Warranty

- Regarding technical inquiries or questions regarding the product, please contact nearest Mitsubishi Electric dealership or distributor.
- Please consult with a Mitsubishi Electric sales representative when considering using this product with machinery or systems designed for specialized use such as nuclear power, electric power, aerospace/outside space, medical, or passenger transportation vehicles.
- This manual and equipment are shipped under strict quality control and product inspection. In the unlikely case of any defect resulting from production processes, Mitsubishi Electric will replace the product. Please contact the dealership where the product was purchased. Please note, however, Mitsubishi Electric’s warranty doesn’t include replacement in the cases of failure and/or damage caused due to natural disasters or improper use.
- Please understand that Mitsubishi Electric will not bear the liability for any system problems caused by a customer or third party, legal issues, failure caused by improper use of or during use of the product, or damage caused by other defects.
- Mitsubishi Electric shall not bear the liability for any damage caused by reasons that are not the fault of the Company, loss of opportunity or loss of income suffered by a customer due to the occurrence of this product’s failure, damage or secondary damage resulting from special reasons, regardless of whether or not it was foreseeable, accident compensation or other compensation for any damage caused to products other than those of Mitsubishi Electric, and other services.
- The free warranty period of this product shall be the shorter period, either one (1) year after purchase and delivery to the designated location, or 18 months after shipping from the Company factory (beginning from month and year manufactured).
- However, even during the warranty period, if repair is required due to one of the following causes, a fee shall be charged:
  - Improper use or 2) Improper operation.
  - Fee-based repairs are available after the end of the free warranty period.
- The free warranty period for repairs shall not be renewed.

Reairs at the time of failure/abnormality

- Any abnormality occurs in one of the products listed in this catalog, please read the section, “Trouble Shooting,” in the instruction manual (operation version) to check for possible reasons of the problem. If there is no description matching the problem found, please contact nearest Mitsubishi Electric dealership.

2. Precautions for Use

Precautions Regarding Software Use

- Mitsubishi Electric does not guarantee or provide support for FTP server or SMTP server operations.
- Additionally, Mitsubishi Electric does not provide technical support for individual servers.
- Please consult with the manufacturer or administrator.
- When it is necessary to secure system safety against unauthorized access attempt from outside, please take measures by the users.
- We shall not be held responsible against various problems generated by unauthorized access. It is recommended to use by being cautious of the following.
  1) Use LAN to avoid unauthorized access from outside.
  2) When connecting to the Internet, take measures such as firewalls, VPL, etc.
  3) Change the account information (login ID and password) from the default one. To avoid the login information from leaking, please setup them by noting the following.
    - Avoid to figure out phrases such as your name and date of birth, and simple sequence of numbers.
    - Set hard to figure out login ID and password consisting of 8 characters or more containing uppercase and lowercase alphabets, and numbers.
  4) After using the system software to modify display settings (e.g., a measuring point name) and restart the web browser.
- Not doing so may cause the changes not to take effect due to the web browser’s caching function.

3. Trademarks

- Java and all Java related trademarks and logos are registered trademarks of the Oracle Corporation and its subsidiaries and affiliates in the United States and other countries.
- CompactFlash™ and CF are trademarks of SanDisk Corporation.
- Ethernet is a trademark of Xerox Corporation in the U.S.A.
- QR Code is a registered trademark of Denso Wave Incorporated in Japan.
- EcoServer is a registered trademark of Mitsubishi Electric Corporation.
- Other company names and product names are registered trademarks or trademarks of their respective companies.
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Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories. As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.
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* Not all products are available in all countries.
Precautions Before Use

- Please consult with a Mitsubishi Electric representative when considering the application of products presented in this catalogue with machinery or systems designed for specialized use such as nuclear power, electrical power, aerospace/outer space, medical, or passenger transportation vehicles.
- Mitsubishi Electric Corporation shall not be liable, to the customer or equipment user, for:
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  2) The loss of opportunity or profits for the customer or user caused by any fault in a Mitsubishi Electric product.
  3) Damage, secondary damage or accident compensation resulting from special factors regardless of whether or not such factors could be predicted by Mitsubishi Electric.
  4) Damage to products of other companies and/or guarantees relating to other services.

For Safety: Please read the instruction manual carefully before using the products in this catalog. Wiring and connection must be done by the person who has specialized knowledge of electric construction and wirings.

Trademarks
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Eco Changes is the Mitsubishi Electric Group’s environmental statement, and expresses the Group’s stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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