MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow eco Changes

Control and Monitoring System for Social Infrastructure
MELViz iQ PlantSuite

iQ MELViz PlantSuite

Plant management faces various serious challenges. To reduce costs and improve productivity, management supervisors must optimize cost performance and take responsibility to ensure a global competitiveness.
Mitsubishi Electric's iQ PlantSuite provides outstanding cost performance solutions with our popular FA devices, power distribution control devices, network devices that connect these devices, and SCADA that monitors the entire system.
Mitsubishi Electric is the plant management partner supporting the global developments.

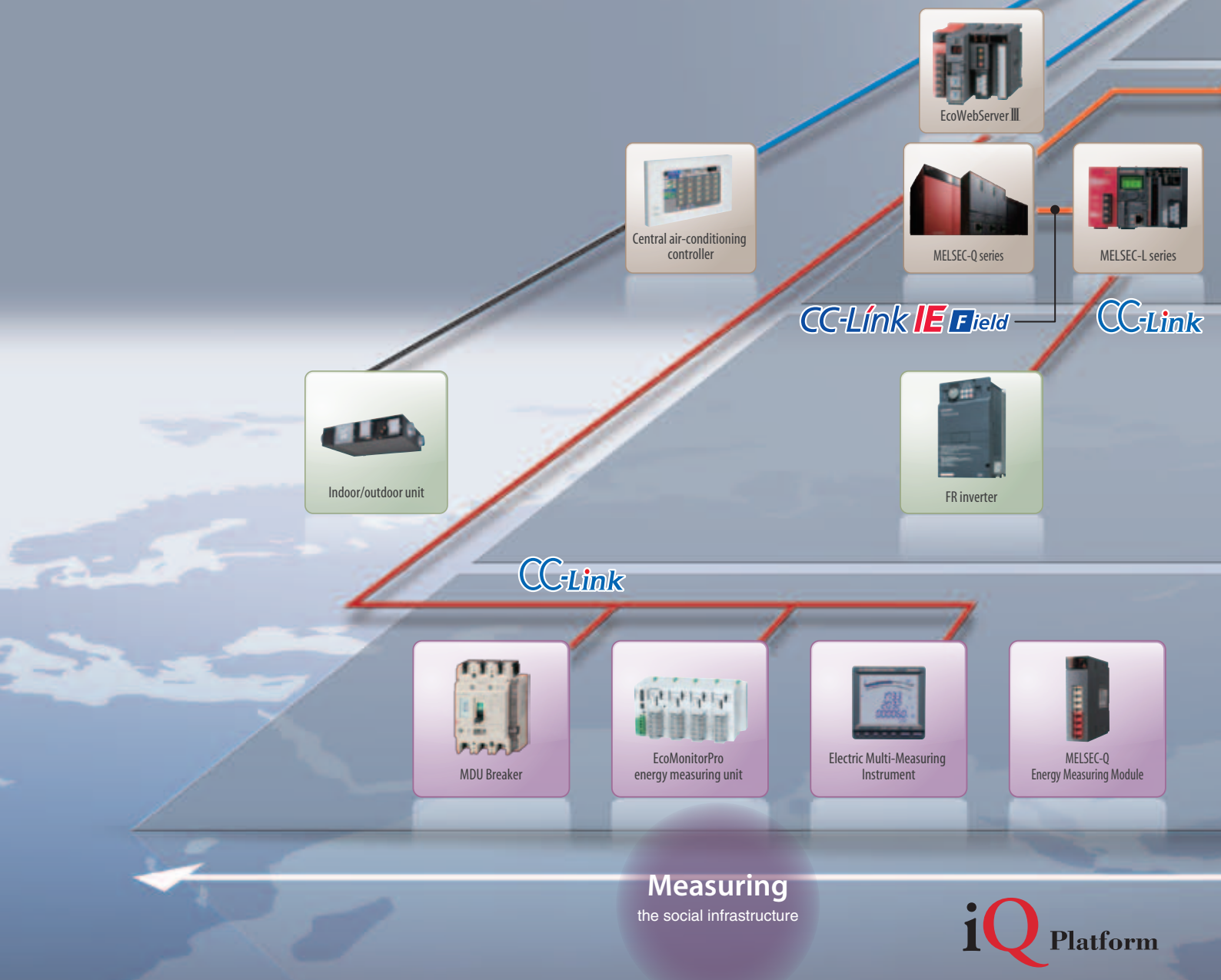
Supporting safety and security with flexible plant solutions for various infrastructure markets

■ **INDEX**

iQ MELViz PlantSuite

iQ PlantSuite Total Solution for Social Infrastructure

Mitsubishi Electric proposes total systems from host monitoring systems to slave field devices for use in social infrastructure field (water treatment, building, transportation, facilities, etc.).



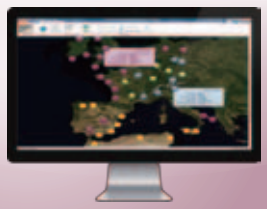
Managing
the social infrastructure

ERP
MES

Information link

Ethernet

HMI (GOT1000)



MC Works64

MES InterfaceIT Module

MES Interface Module

High-speed Data Logger Module

Visualizing
the social infrastructure

CC-Link IE Control

C Controller

MELSEC-Q Process CPU / Redundant CPU

MELSEC safety PLC

Motion controller

Controlling
the social infrastructure

CC-Link CC-Link/LT CC-Link Safety

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK

MELSEC-F PLC

Safety remote I/O

AC servo MR-J4

Driving
the social infrastructure

AnyWire DB A20 compatible product

CC-Link IE, CC-Link
CC-Link/LT, CC-Link Safety
SSCNET
Partner products

CC-Link協会

CC-Link
CC-Link partners

Compatible with various other networks

Modbus
FL-net
PROFIBUS-DP
DeviceNet

Anywire

Connecting
the social infrastructure

iQ MELViz PlantSuite

Plant management is an increasingly challenging task.
As demands increase for suppressed costs and maximized efficiency,
the maximization of operational performance is key to ensure the plant's competitiveness on the international playing field.
In order to achieve this goal, it is necessary to employ the use of analytical tools and to ensure the reliability of systems' operations.
Mitsubishi Electric's solution "iQ PlantSuite" is an integrated solution for monitoring and control.
iQ PlantSuite integrates advanced SCADA with world-class performance FA equipment to provide users with excellent performance.
It is the fruit of many years of accumulated experience in working with different processes.

Total Solutions

■ Customers' request

We want to easily build a plant system by integrating the FA devices, power distribution control devices, the network devices to connect these, and using SCADA to monitor the entire system.

■ Solution

iQ PlantSuite, a total solution for social infrastructures, provides all necessary components including the FA products and SCADA. A system built with Mitsubishi Electric's worldwide popular FA devices enables detailed monitoring and control, and helps to increase your equipment efficiency.

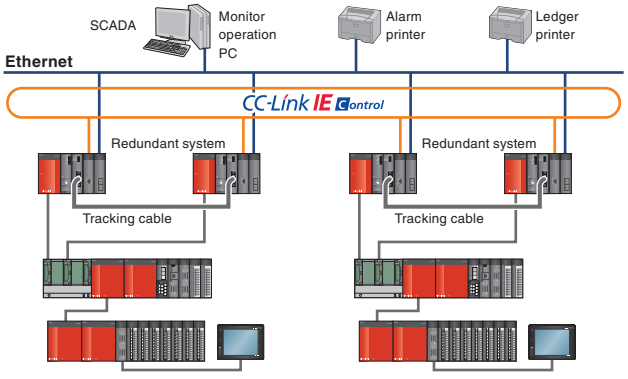
Redundant and High Reliability Solutions

■ Customers' request

We want to build a highly reliable system, for a water treatment plant, etc., that can continue plant operation even in the event of trouble.

■ Solution

iQ PlantSuite uses its Redundant CPU, CC-Link IE controller network, and SCADA redundant configuration to prevent your plant system from crash failure.
The highly reliably redundant configuration added to the system's key components provides stable system operations.



Monitoring Solutions

■ Customers' request

We want to perform monitoring and control operations with an easy to read user-friendly screen.

■ Solution

iQ PlantSuite's very expressive 3D SCADA allows images, such as a device's depth, to be displayed on the screen unlike previous 2D images. The 3D monitor screens provide real-time angles from various angles, so you can quickly and accurately grasp the equipment's state and carry out intuitive monitoring and control operations.

Energy Saving Solutions

■ Customers' request

In addition to increasing our factory's production line efficiency, we want to conserve energy throughout the plant. We want to extend our energy saving efforts to utilities such as air conditioning and lighting. What is a solution that can comprehensively enable this energy saving?

■ Solution

iQ PlantSuite provides an energy-saving solution that links the Mitsubishi Electric electricity metering devices with the AX Energy software capable of advanced energy visualization and analysis. Energy is visualized, and the customer's energy is conserved. A full lineup of energy saving devices, such as the Mitsubishi Electric inverter that increases motor drive efficiency, is available to help you realize energy saving with your factory equipment.

Preventive Maintenance Solutions

■ Customers' request

We want to use our vast amounts of data, collected to monitor the factory equipment, etc., for preventive maintenance, etc.

■ Solution

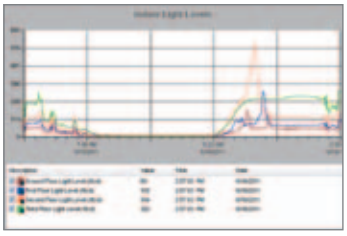
iQ PlantSuite provides a facility management solution that links the advanced fault detection and device diagnosis software AX Facility to the MES Interface that collects and manages information such as production information. Automatically collect the device operation status data from this vast data, and use it for operation rate control, preventive maintenance and device fault prediction, etc.

Data Collection and Analysis Solutions

■ Customers' request

We want to easily collect data from our various factories and facilities. We want to verify the collected data with graphs, etc.

■ Solution



Using the OPC server, connect iQ PlantSuite to various devices including programmable controllers, I/O devices and HMI's to easily collect data from several factories. Real-time and historical data can be visualized with charts.
Combine this with the high-speed data logger module, capable of high-speed data collection synchronized with the sequence program scan, to collect highly precise historical data and increase the range of your data application.

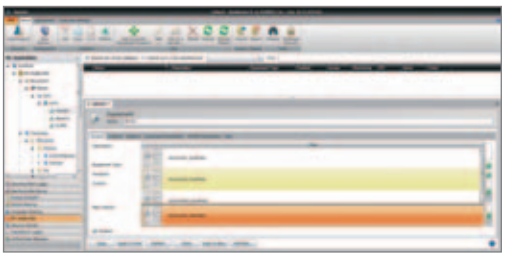
Design Support Solutions

■ Customers' request

We want to efficiently use the design information prepared at the upstream process when building our plant control program and monitor screens.

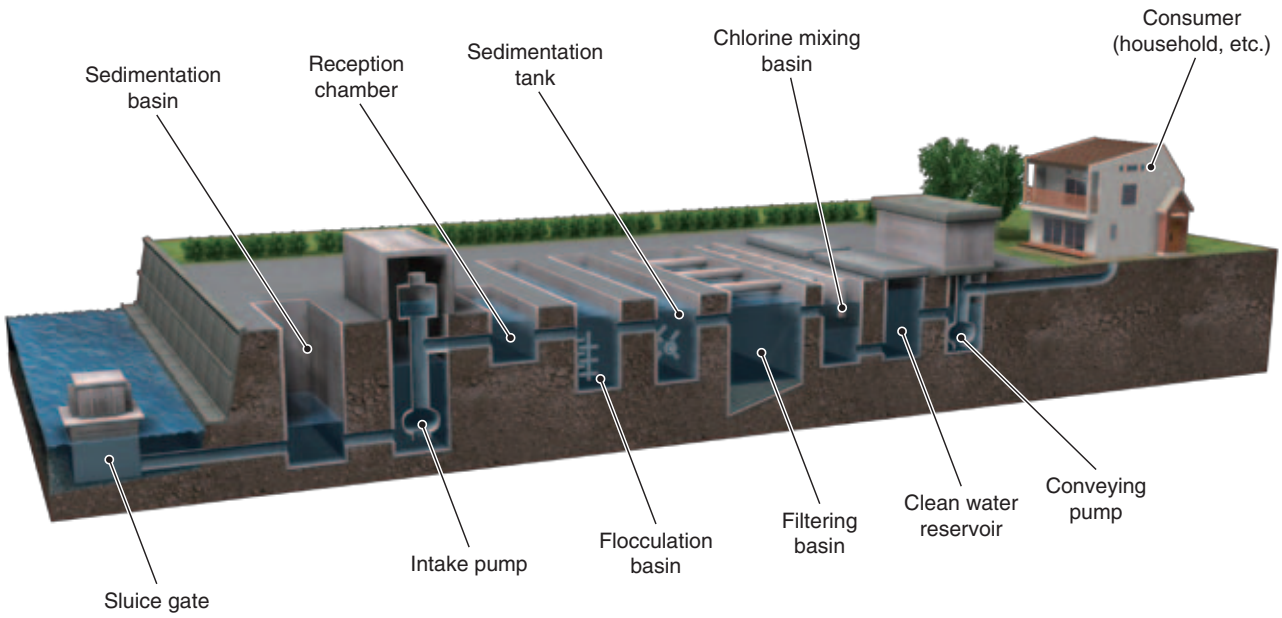
■ Solution

iQ PlantSuite has equipped MC Works64 with a system design support function that efficiently uses the upstream process design data and automatically generates the monitor screen, sequence program and OPC tag settings. This design support function eliminates setting mistakes in the tag settings and helps increase the quality. Debugged templates are also provided as a standard. These standard templates can be used to easily build a system.




for Water treatment
iQ
MELVIZ
PlantSuite

Water treatment

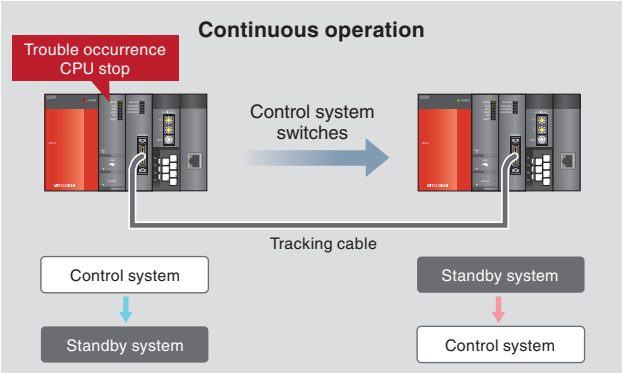


Stable operation monitoring for water treatment plants

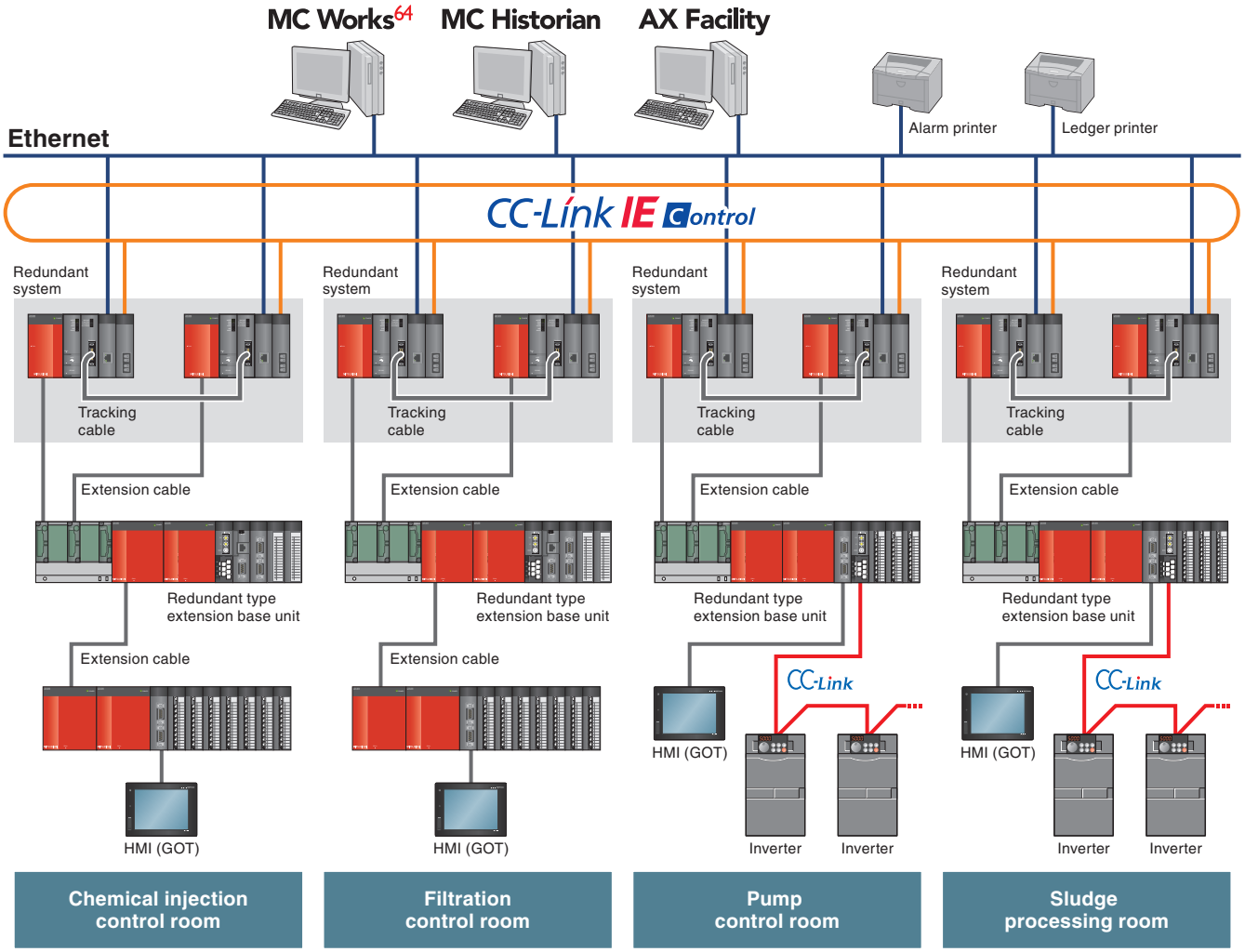
The water purification plant is a water facility that takes raw water retrieved from rivers or groundwater, etc., purifies and sterilizes the water, and then supplies the purified water as city water.
A three-stage water purification process of sedimentation, filtration and sterilization is carried out to supply city water satisfying legally set water quality standards.
A highly reliable monitoring and control system is required for this public facility, to ensure that city water is constantly supplied in a stable state.
iQ PlantSuite incorporates a highly reliable Redundant system and MC Works64 to realize safe and stable water treatment plant operations.

Highly reliable system provided by Mitsubishi FA devices

Conventionally, a DCS was incorporated to monitoring and control water treatment plants that require a high-reliability. Implementing and maintaining this exclusive system was very expensive.
iQ PlantSuite ensures a high reliability with universal and high-cost performance Mitsubishi Electric FA devices including the Redundant CPU, channel isolated analog module and CC-Link IE controller network module, etc. The redundant configuration provided by the Redundant CPU allows the plant to continue operation even in the event of trouble.
Operators can use the GOT unit provided at the site to check the operation status and events, and to carry out manual operation while confirming the state when trouble occurs.

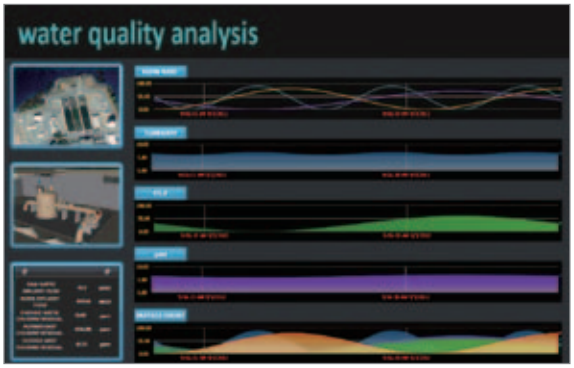


Water treatment

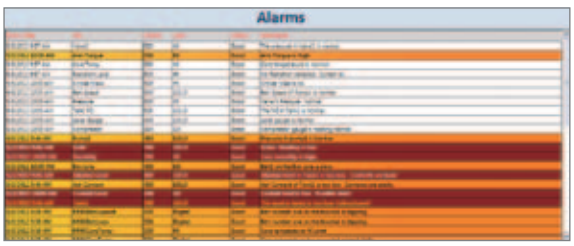


Integrated operation monitoring of multi-branch water treatment facility

MC Works64 is used to monitor operations throughout the plant. In recent years, demands for low cost, highly efficient operations have become a focus even for public facilities such as water treatment plants. To enhance plant efficiency, it was necessary to implement the standard SCADA as well as business analysis tools, etc. iQ PlantSuite uses advanced monitoring with 3D graphics, and MC Works 64 equipped with functions such as trends and alarms to make it easy to grasp the plant's operation state. This system can be easily linked with MC Historian (data collection) and AX Facility (data diagnosis) to support efficient plant operations.



Monitor the equipment operation status on the graphic screen, and the water quality on the trend screen



Alarms such as major or minor faults are listed in chronological order

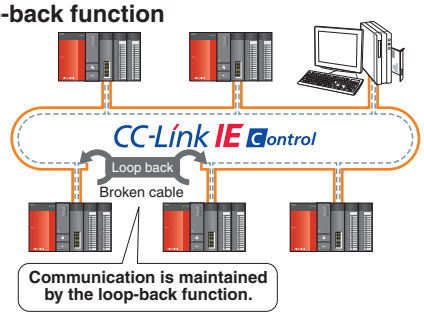
Fast, highly reliable CC-Link IE controller network

As the scale of a network to be monitored and managed increases, bothersome settings and tuning to maintain the performance are required. Not only does start up take longer, it also takes longer to pinpoint the cause when a problem occurs. The CC-Link IE controller network is a high-speed highly reliable network that incorporates a reliability guaranteed 1 Gpbs high-speed communication to eliminate tuning, incorporates a network diagnosis function to realize swiftly troubleshooting in the event of trouble.

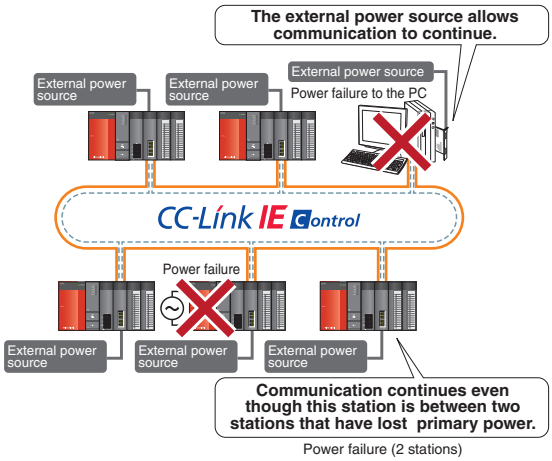
Even at large-scale water purification plants, large volumes of data can be shared between the controllers at a high speed, so large-scale controller dispersed control is possible.

The optical dual loop transmission method maintains communication with the loop back function even if the cable is broken or the power fails. By using the module with external power supply function, communication can be maintained without the loop back function even if the CPU power fails. This system ensures stable operation of your plant.

■ Loop-back function



■ External power supply



Power failure (2 stations)

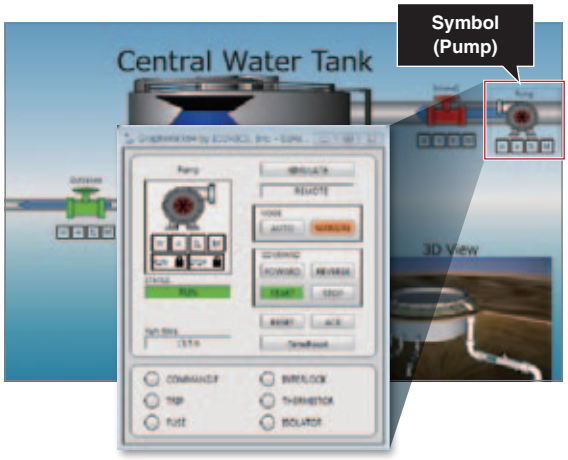
Quality improvement with templates

Engineering of a conventional monitoring and control system required an operator to create a control program while viewing the plant design drawings (P&ID and I/O lists), while also creating a monitor screen with SCADA. This process required many hours to program the system and to verify its operation.

MC Works64 has a variety of reliable debugged templates corresponding to the basic devices, such as valves and pumps, used at a water treatment plant.

Using MC AppBuilder, the control programs and the monitor screen graphics parts, etc. using templates are automatically generated from the design drawings.

These reduce the engineering hours and improve quality.



Easily call out face plates by clicking the symbol.

Components

MELSEC-Q series
Redundant CPU

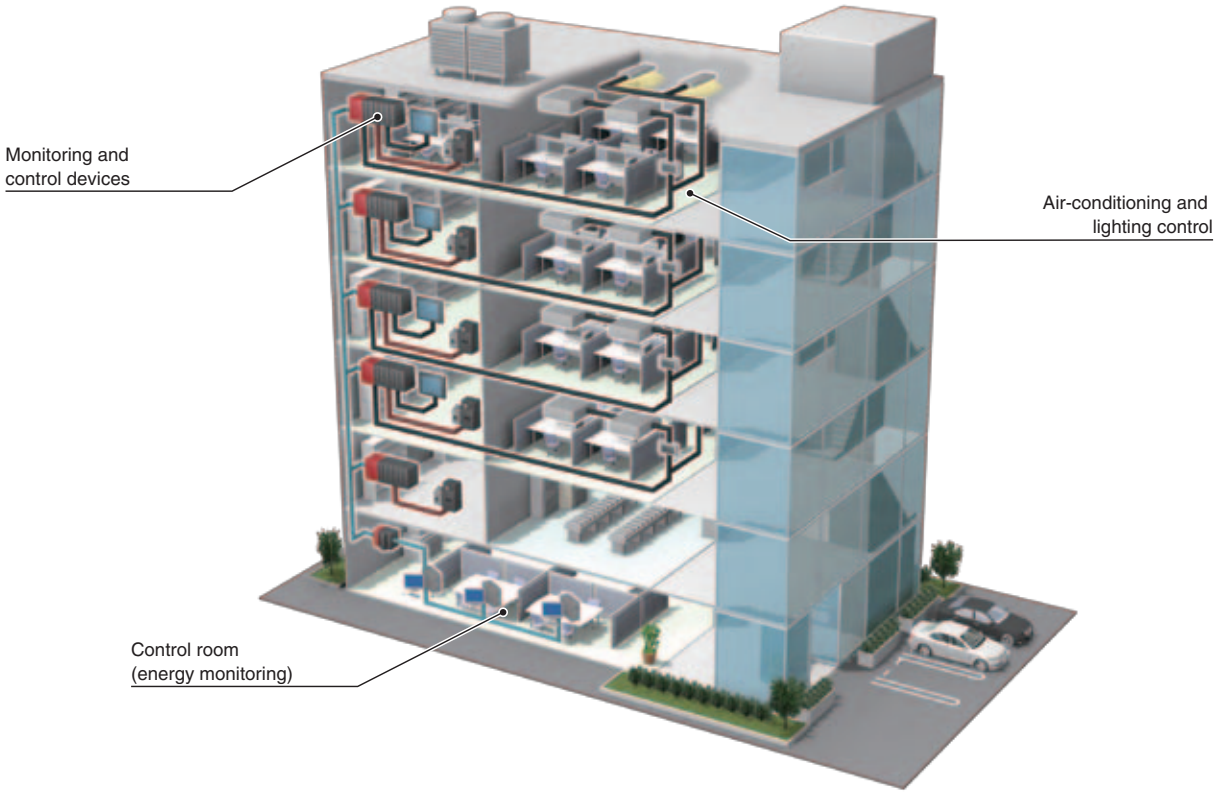
HMI
(GOT1000 series)

MC Works64
MC Historian
AX Facility

for Building Automation

iQ MELViz PlantSuite

Building Automation



iQ PlantSuite has a system to save energy and reduce CO_2 emissions as a measure against global warming while at the same time providing comfort to building residents. Money saved with energy conservation can be applied to managing the building equipment.
Integrated management and control of the building's equipment and system operations helps to enhance the building's value.

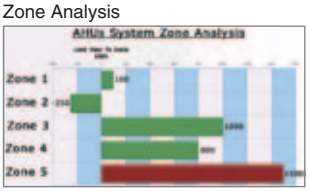
Managing the entire building's energy

By using the iQ PlantSuite products, the energy consumed through air-conditioning, lighting, gas and water as well as the consumption of energy in public spaces such as the lobby, hallways, rest rooms and parking lot can be "visualized".
For example, the energy consumption amounts can be easily measured using EcoWebServer Ⅲ included in the iQ PlantSuite and power measurement devices. The energy amount can be "visualized" by using these measured amounts with the advanced visualization and diagnostics software AX Energy. This "visualized" energy consumption rate can be used to analyze points of waste and adopt further energy saving measures.

Building Performance

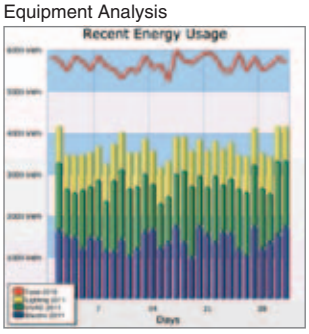
Energy Consumption

Zone Analysis



Easily Find Energy Offenders

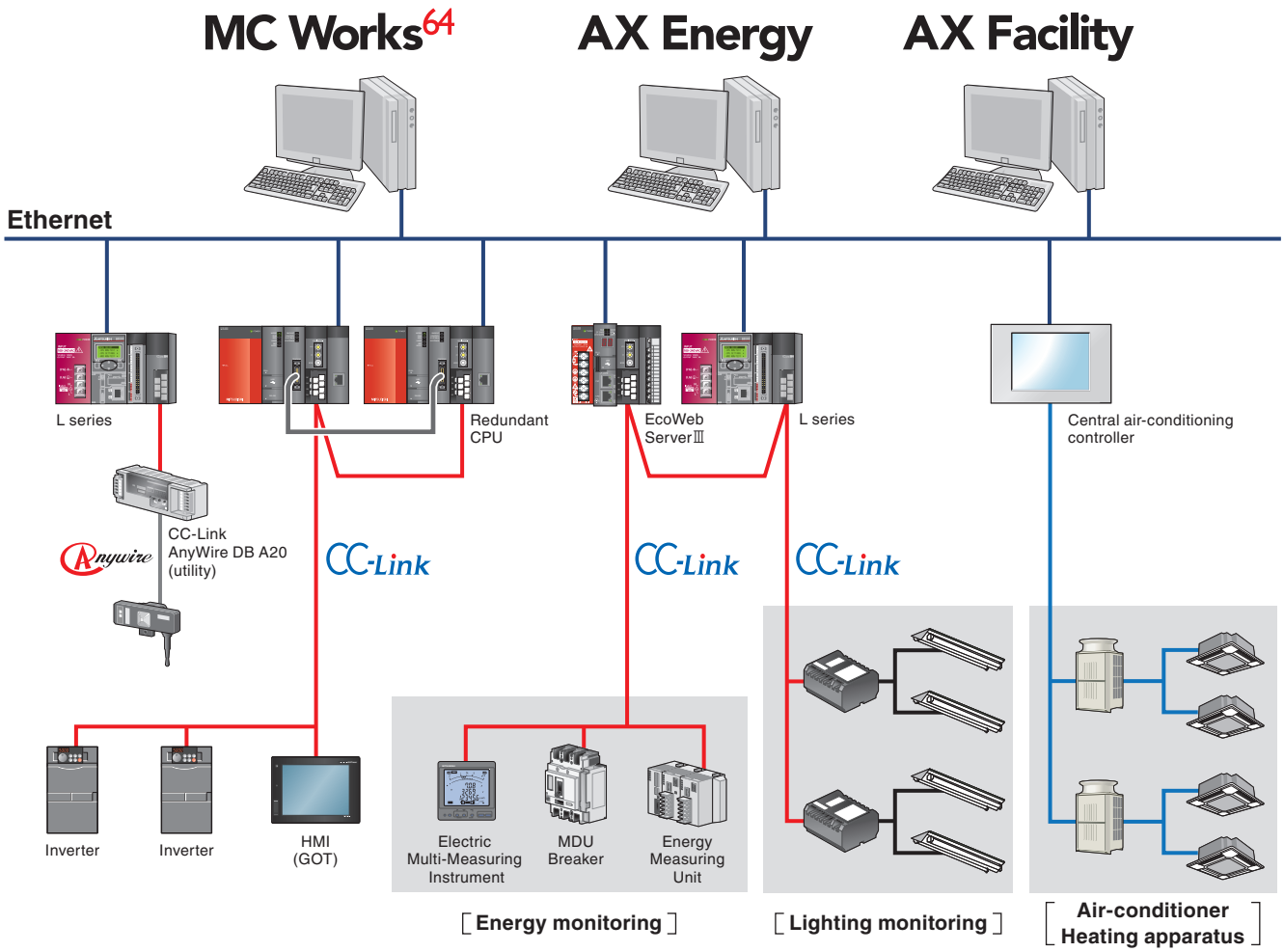
Equipment Analysis



Equipment Efficiency Usage

Natural navigation to identify energy opportunities

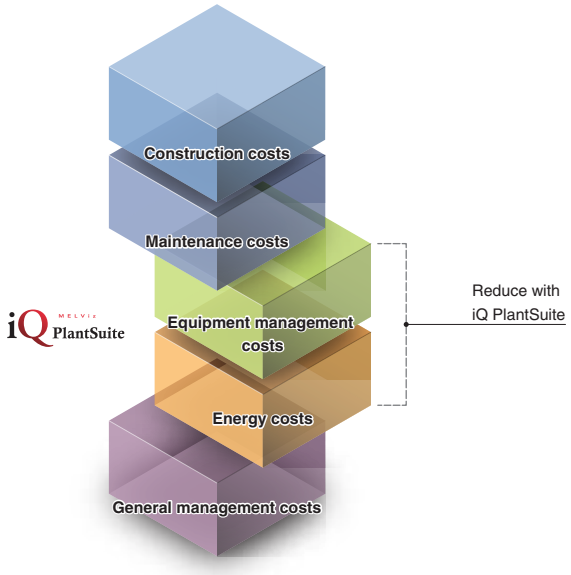
Building Automation



Providing comfort and energy saving with air-conditioning control and lighting control

To maintain a comfortable space regardless of seasonal changes in the outdoor temperature, indoor temperature or humidity, the air-conditioning control switches between cooling and heating, and controls the temperature and air volume settings. Energy consumed by air-conditioning is high, and often is more than 50% of the total power consumption rate. Comfort is often sacrificed when energy saving is pursued.
iQ PlantSuite maintains comfort while realizing energy saving without hampering the air-conditioning's original functions. By using the iQ PlantSuite products, groups of air-conditioning installed on each floor can be centrally managed and controlled. In addition to ON/OFF control, detailed control such as the set temperature and switching of operation modes is possible.
The lighting can also be controlled, such as turning the lights ON/OFF at a schedule or when persons are detected.

■ **Life cycle cost of building**



Monitor each system's operation status and alarms

Buildings have a variety of systems that require 24-hour monitoring. These include, electric power equipment such as lights and sockets; air-conditioning systems such as air-conditioners, heating apparatuses and ventilation; water supply/discharge systems such as reservoirs, pumps, drain systems; and machinery such as elevators, automatic doors and escalators. The operation states and alarms of each system can be monitored with iQ PlantSuite. For example, MC Works64 provides graphic displays allowing the system state to be grasped at a glance. Chronological changes in the measured values, cumulative values and device operation time are displayed on trend graphs and bar graphs, allowing changes in the alarms and system state to be monitored at real time. The advanced fault prediction and device diagnostics software AX Facility enables system management by collecting data on the device operation state, controlling the operation rate, providing preventive maintenance and predicting device failure.

Components

MELSEC-L series

EcoWebServer Ⅲ

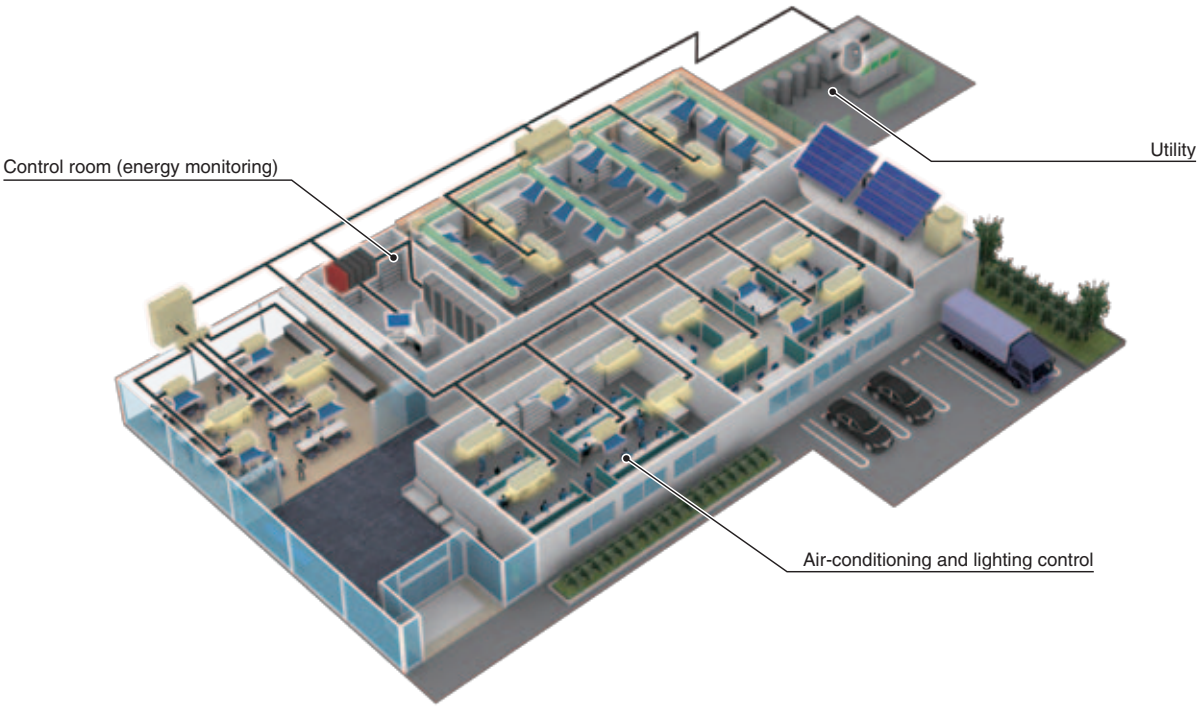
MELSEC-Q series
Redundant CPU

HMI
(GOT1000 series)

MC Works64
AX Energy
AX Facility


for Facility
iQ MELViz PlantSuite

Facility



To totally monitor factory equipment, it is essential to increase the entire factory's efficiency by downsizing the system through unified monitoring functions and to realize significant collaboration between the monitoring systems. iQ PlantSuite can centrally control various monitoring aspects of the factory equipment and increase the entire factory's efficiency.

[Air-conditioning monitoring]
Perform the air-conditioning equipment's operation control, mode control and temperature control in detail.
Save energy with the central air-conditioning controller's schedule function and energy saving function.

[Lighting monitoring]
Turn the lights ON and OFF with a schedule.

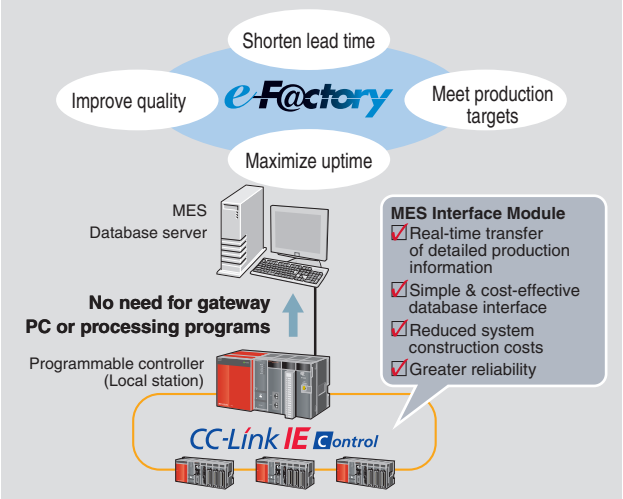
[Utility monitoring]
The operation state of the production equipment (process values for pressure and flow rate, operation time, etc) is monitored, and the energy consumption rate for each equipment is monitored.
High-speed, high-precision, large volume data processing is realized with the MELSEC-Q programmable controller.

[Energy monitoring]
Monitor the power distribution and power equipment states in real time.
Easily monitor the energy consumed by power equipment using EcoWebServer Ⅲ that combines functions indispensable for energy saving control and power measurement devices that enable detailed measurement of energy for each device and equipment.

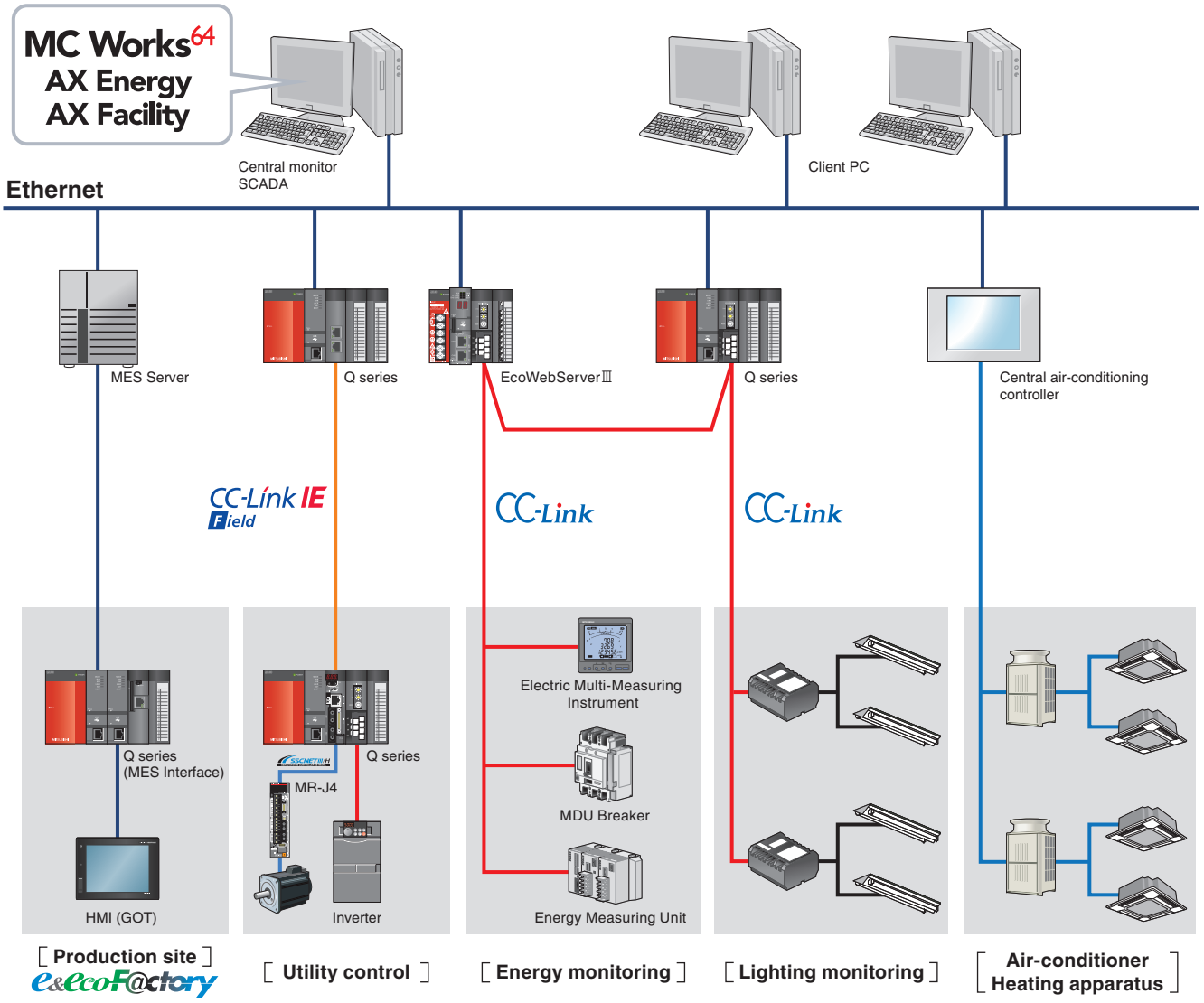
Supporting production equipment's operation rate

The production line data can be uploaded to the MES database server using the MELSEC-Q programmable controller MES Interface. The PLC and MES database server can be connected with easy program-less settings. Analyze the collected production data to improve your production equipment's operation rate.

■ System using MES Interface Module

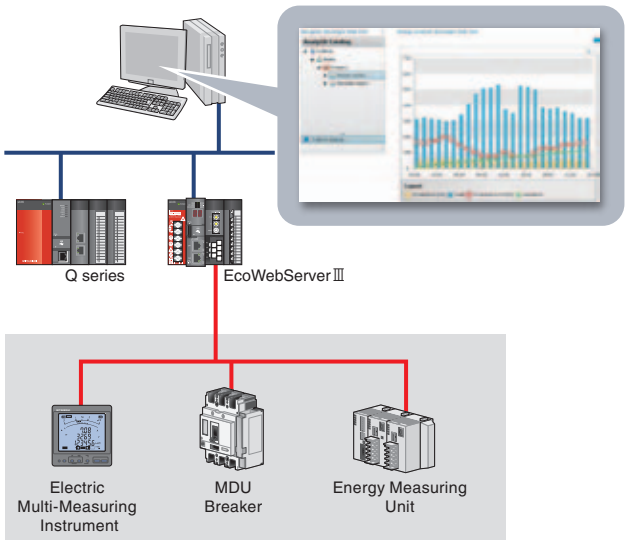


Facility



Analyzing energy to improve productivity and energy saving

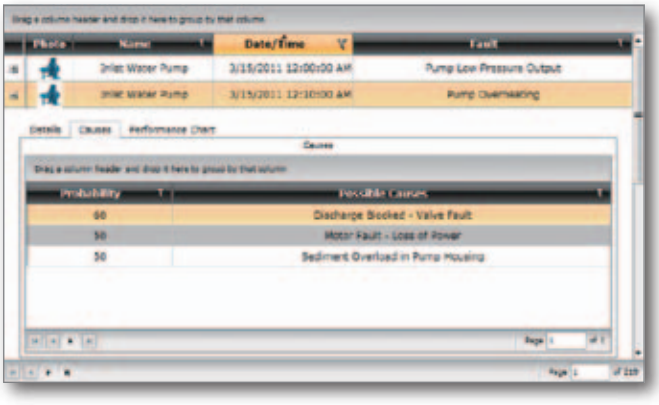
Demands for energy saving and power monitoring have increased at factories, etc., in recent years. Conventionally to achieve this, the universal SCADA as well as energy monitoring software compliant with energy saving devices were required.
iQ PlantSuite directly retrieves the measured energy rate, current and voltage, etc., from EcoWebServerⅢ to MC Works64, and clearly displays the energy consumption rate. Link this to the advanced energy visualization and analysis software AX Energy to improve your productivity and save energy.



Preliminary prediction of factory equipment faults

To improve operation rates, it is essential to keep the equipment stop time as short as possible. Predicting equipment faults beforehand is important for reducing this stop time, but with conventional operation methods, it was not easy to use the programmable controller information for preventive maintenance.
iQ PlantSuite directly connects the MELSEC-Q programmable controller with the MES, and links MES Interface, capable of collecting and managing the production information, etc., to the advanced fault prediction and equipment diagnosis software AX Facility. This allows the device operation status data to be automatically collected, and for equipment to be managed with operation rate control, preventive maintenance and device fault prediction, etc. Use this system to prevent the effect of faults onto production and reduce maintenance costs.

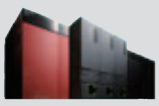
Generated faults are listed



Pinpoint cause from state of alarm at fault

Graphical display of number of fault occurrences

Components



MELSEC-Q series

EcoWebServer Ⅲ

MES Interface Module

HMI
(GOT1000 series)

MC Works64
AX Energy
AX Facility

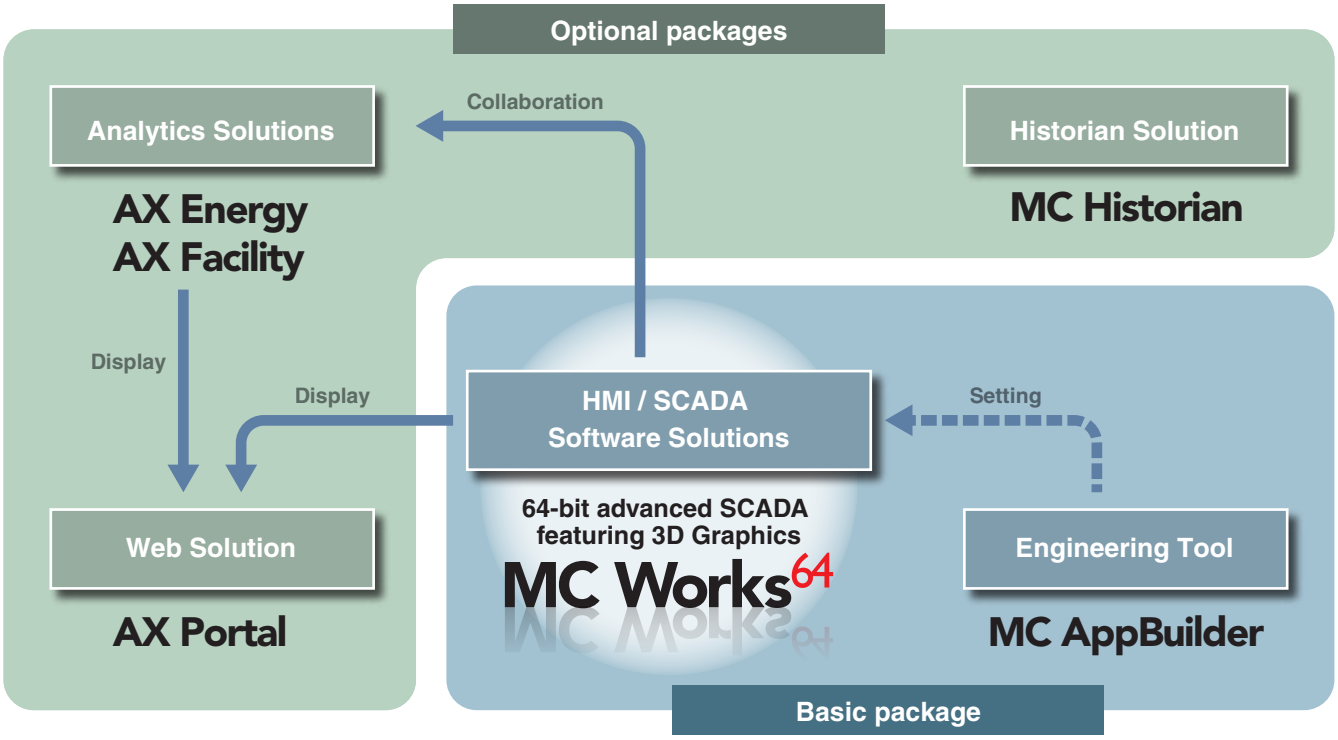
Reduce plant costs and improve productivity

64-bit advanced SCADA featuring 3D Graphics

MC Works64

MC Works64 is an integral software providing a variety of functions and refined user interfaces suitable for social infrastructure fields. Apply this software to comprehend the plant operation state and monitor plant-wide operation to support efficient plant operations.

iQ MELViz PlantSuite



Various packages for each market

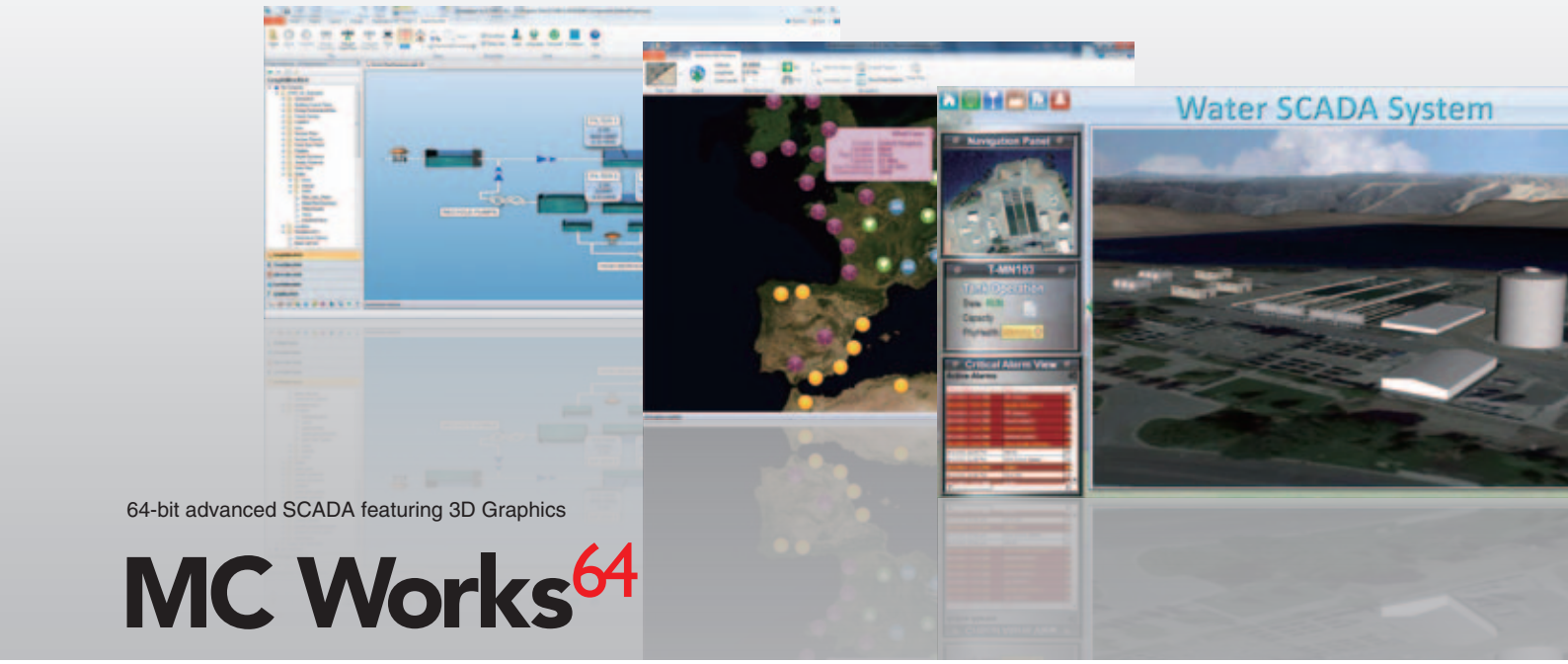
MC Works64, the core of iQ PlantSuite, is an advanced 64-bit OS compatible SCADA equipped with 3D graphics screen. MC Works64 features the MC AppBuilder engineering tool to realize easy collaboration between the SCADA and programmable controller.
Implement MC Works64 for monitoring and control including functions such as HMI screens, trends and alarms, and for engineering to support aspects from monitoring to control.
Functions for various markets can be realized by adding the optional package to the basic package MC Works64.
For example, add AX Energy to control energy such as power, water and gas in the factory or plant.

■ Basic package

MC Works64	Software including monitor control with HMI screens, trend and alarm functions, supporting operations from monitoring to control
MC AppBuilder	Software to support MC Works64 / MC Graph / MC Alarm/ settings

■ Optional packages

AX Energy	Software to monitor energy including factory and plant energy, water and gas
AX Facility	Software for factory or plant equipment control and preventive maintenance
MC Historian	Software for high-speed data collection, redundancy and automatic archiving of data
AX Portal	Software to display and analyze MC Works64 / AX Energy / AX Facility screens on web browser
MC Graph	Software specialized for the MC Works64 HMI screen creation and display application
MC Alarm	Software specialized for MC Works64 alarm collection, saving and display application



64-bit advanced SCADA featuring 3D Graphics

MC Works64

64-bit high-resolution SCADA featuring 3D Graphics

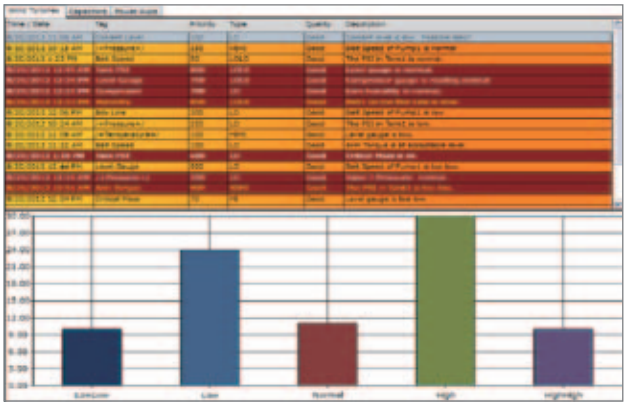
Create convincing 3D graphics screens with a visibility improving platform that fully utilizes WPF (Windows® Presentation Foundation). With 3D graphics screens, images can be viewed in real time from various angles allowing the operator to accurately grasp the equipment state.

Solid and highly reliable redundant functions

High level redundancy is provided to ensure the maximum communication reliability for critical business projects in which applications must run 24 hours without failing.
The essential business data, alarms and history information can be viewed and logged on-demand when necessary, such as when a fault is automatically detected. If the server should fail in any case, an alarm to notify the server failure accurate notifies the operation status when the alarm is detected. The alarm history save and transmission function enable accurate data access and maintenance with alarm and history information if the server fails.

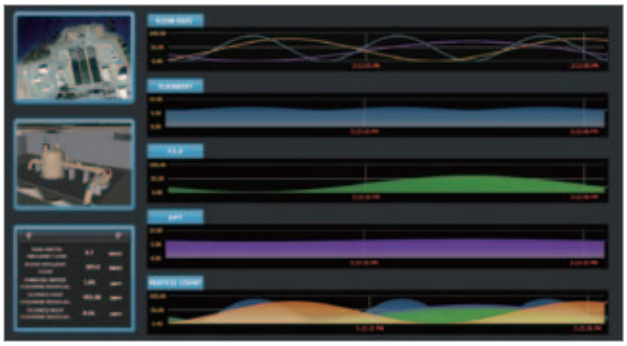
Oject based Destributed Alarm Management

The dispersed type and enterprise-wide multi-function alarm and event management system is perfect for large scale applications with strict specifications requirements.



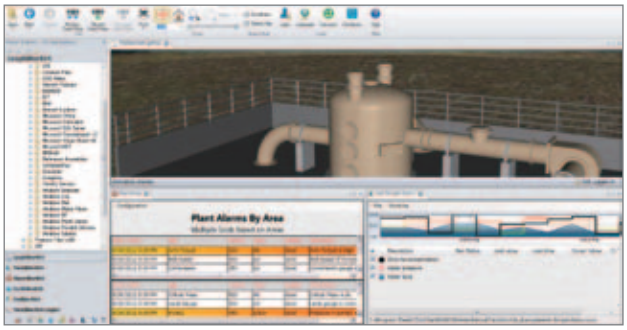
Real time and historical 3D chart display and analysis

Data collection, logging, charting, reporting and analysis of the entire system are performed. The system is designed to log the data into an OLEDB database (Microsoft® SQL Server® 2008, Oracle® MySQL™, etc.) and tools are provided to display the real time data and history data as trends or graphs. Pens can be added randomly, and several trends can be viewed simultaneously.



Combinations of Viewer Elements

Workbench comprehensively configure all MC Works64 software. Functional and study workbench, used for processes such as editing in software, line time operations and saving and managing projects, function as advanced real time operator interfaces with outstanding visibility.
Use together with Microsoft® Silverlight® to create screens which support other browsers and different platforms.



Quickly access base data with cutting edge map data integration function

Visualize bases such as water treatment plants, building facilities and factories, scattered over a wide range in real time.

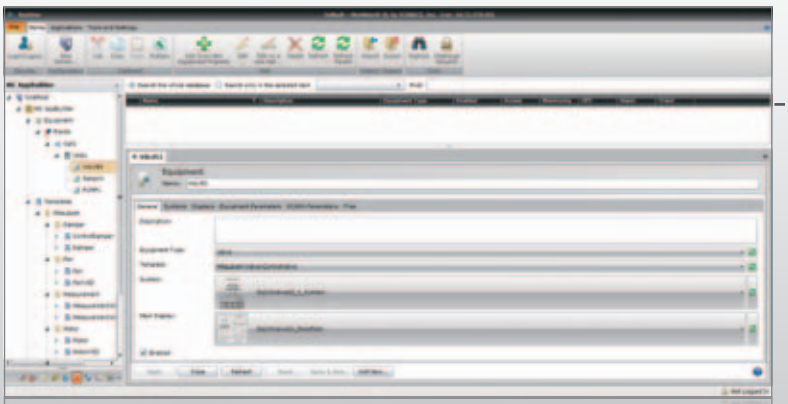
Universal connectivity

Open connectivity is provided for OPC UA and OPC Classic (DA, HDA, A/E) data sources.
Connection to BACnet, SNMP, and various databases (SQL, SAP, ODBC, OLEDB, etc.) is also supported.

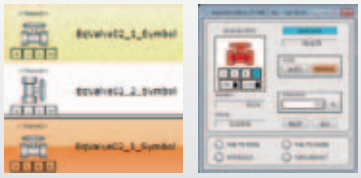
Windows® 7 multitouch function*1 supported

Using the Windows® 7 multitouch function, an operator can use one or two fingers to intuitively operate a graphic such as zoom in/out or rotate the graphic.

*1: Dedicated multitouch screen is required.

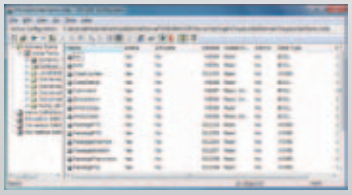


— Monitor screen —



Symbols Face plate

— OPC tag setting —



— PLC projects —

Function blocks and labels

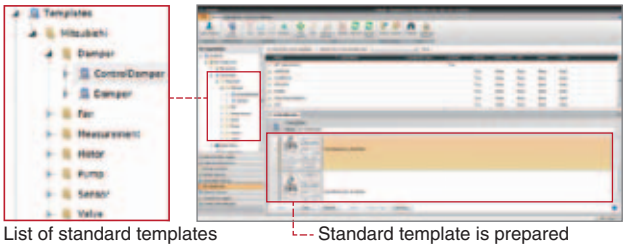
Design support software for automatic generation of monitor screens, tag settings and PLC projects

MC AppBuilder

The MC AppBuilder tool supports designs for the PLC and SCADA. Templates consisting of the function blocks and screen parts realize efficient engineering.

Automatically generate monitor screens, tag settings and PLC projects

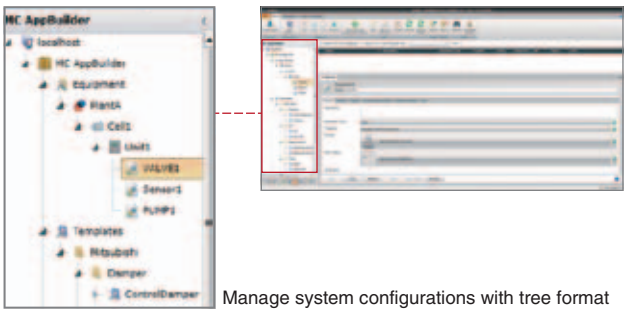
Automatically create the monitor screen definition information (including symbol parts and face plate parts), OPC tag setting information (including alarms and trend settings), and GX Works2 projects (including sequence programs and label definitions). The easy design helps avoid faults caused by inconsistent tag setting information, etc.



List of standard templates — Standard template is prepared

Manage system configuration with tree format

A system tree that shows the plant system configuration can be built and revised by importing a system list (CSV format) prepared with CAD or Microsoft® Visio®, etc., into MC AppBuilder. Manage the plant's system configuration with an intuitive and easy-to-understand tree format.



Manage system configurations with tree format

Reduce design hours by using templates*1

Designs that can be shared among device types have been gathered as templates that are managed as a library. Assign a template corresponding to the device in the system tree to reduce design steps.

*1: Templates include graphic part information such as symbols and face plates, control program information such as function blocks, and various interface information (including default alarms and trend settings).

Easy system updating

Devices can be added to or removed from a completed system. Reduce the design man-hours when updating your system.

Design information export function

Design data is portable now as relevant file groups can be exported in a group. Use this function when you need to take projects prepared at the office to the site, or when moving hardware in the engineering environment, etc.

■ Template Libraries

Graphic parts such as the control function blocks and face plates are provided as a template library.

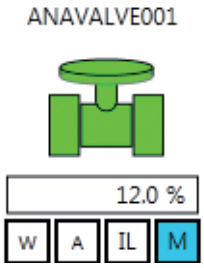
Name	Explanation
Sensor	Indicates the input status of the connected sensor. Status, Warning or Alarm is set as the input status notification method.
Fan	Executes the fan's ON / OFF control. *1
Motor	Executes the motor's ON / OFF control. *1
Pump	Executes the pump's ON / OFF control. *1
Valve	Executes the valve's Open / Close control. *2
Damper	Executes the damper Open / Close control. *2
FanVSD	Executes ON/OFF control with designated fan speed.
MotorVSD	Executes ON/OFF control with designated motor speed.
PumpVSD	Executes ON/OFF control with designated pump speed.
FanVSDWithCCLink	Executes ON/OFF control with designated fan speed via CC-Link.
MotorVSDWithCCLink	Executes ON/OFF control with designated motor speed via CC-Link.
PumpVSDWithCCLink	Executes ON/OFF control with designated pump speed via CC-Link.
ControlValve	Executes OPEN/CLOSE control of a valve for which the opening degree can be set between 0 and 100%.
ControlDamper	Executes OPEN/CLOSE control of a damper for which the opening degree can be set between 0 and 100%.
MeasurementWith4threshold	Indicates the measured value status corresponding to the preset HH/H/L/LL range. If HH or more or LL or less, an alarm is notified. If H or more or L or less, a warning is notified.
MeasurementWith8threshold	Indicates the measured value status corresponding to the preset HH/H/H2/H1/L1/L2/L/LL range. If HH or more or LL or less, an alarm is notified. If H or more or L or less, a warning is notified. If H1 or more or L1 or less, a status is notified.
PID	Executes PID control.*3
ConverterToEngineeringValue	Convert the input value of the analog module to the engineering value.
ConverterFromEngineeringValue	Convert the engineering value to the output value for the analog module.
HARTMonitor	Monitor the HART device.
EnergyMeasurementWithCCLink	Display various energy measurement values via CC-Link.

*1: The speed is not controlled.
*2: There is no function to designate the open/close status.
*3: Process CPU is not compatible with PID control.

Example. Control Valve

① Face plate

② Symbol



③ Control function block

Use standard templates or add customized templates.

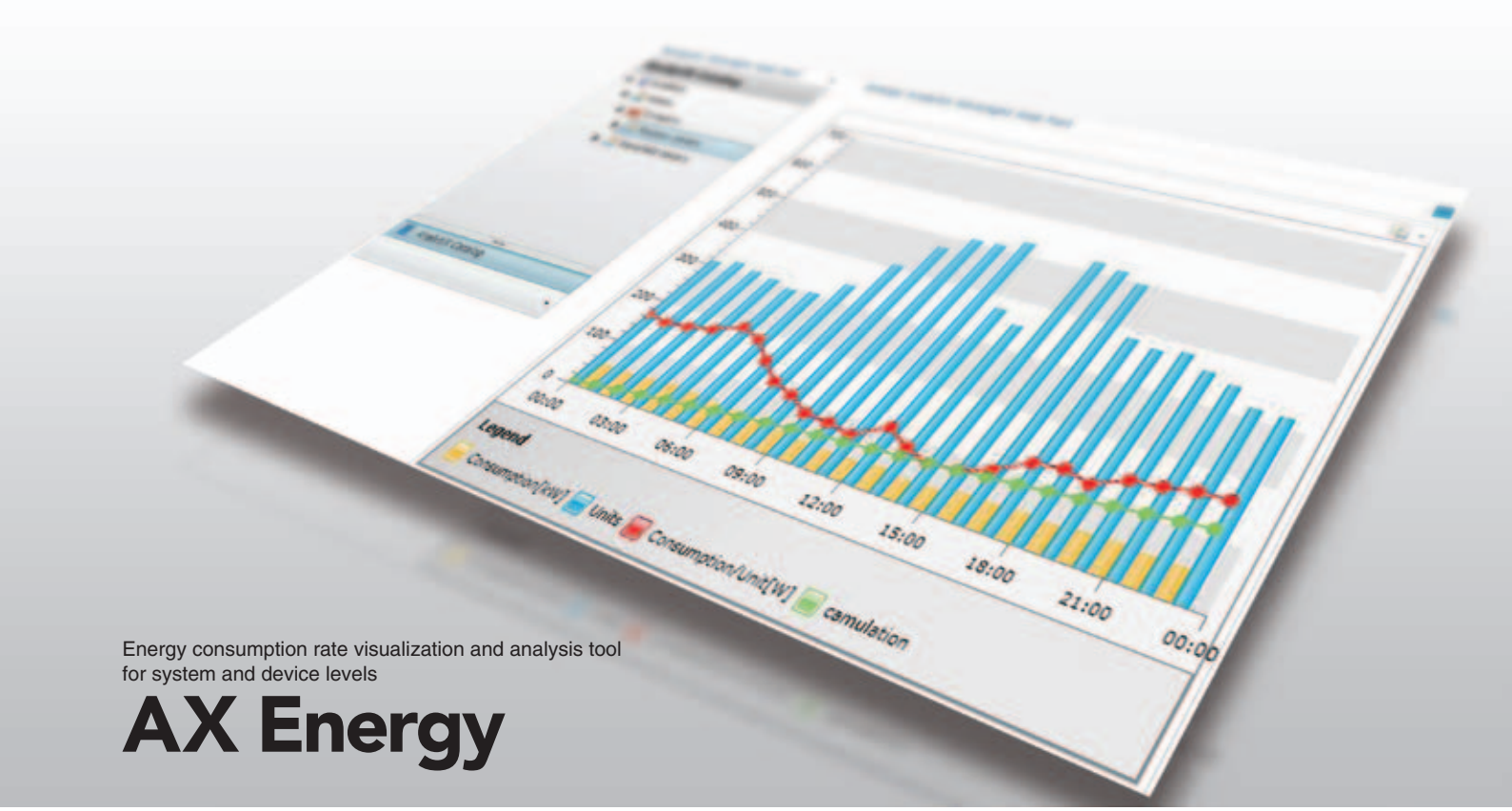
■ List of equipment supported by MC AppBuilder

Item	Model
Basic model QCPU	Q00CPU
	Q01CPU
High Performance model QCPU	Q02CPU
	Q02HCPU
	Q06HCPU
	Q12HCPU
	Q25HCPU

Item	Model
Universal model QCPU	Q00UJCPU
	Q00UCPU
	Q01UCPU
	Q02UCPU
	Q03UDCPU
	Q03UDECPU
	Q04UDHCPU
	Q04UDEHCPU
	Q06UDHCPU
	Q06UDEHCPU

Item	Model
Universal model QCPU	Q10UDHCPU
	Q10UDEHCPU
	Q13UDHCPU
	Q13UDEHCPU
	Q20UDHCPU
	Q20UDEHCPU
	Q26UDHCPU
	Q26UDEHCPU
	Q50UDEHCPU
	Q100UDEHCPU

Item	Model
Process CPU	Q02PHCPU
	Q06PHCPU
	Q12PHCPU
	Q25PHCPU
Redundant CPU	Q12RPHCPU
	Q25PRHCPU
LCPU	L02SCPU
	L02CPU
	L02CPU-P
	L06CPU
	L26CPU
	L26CPU-BT
	L26CPU-PBT



Energy consumption rate visualization and analysis tool for system and device levels

AX Energy

Real time energy management system

AX Energy is an energy monitoring, energy analysis and energy management system (EMS) that delivers a rich platform and browser-independent real-time visualization. This system helps improve energy usage patterns, monitor energy reliability and even forecast energy consumption.

Flexible and open connectivity

AX Energy provides an open connectivity with OPC Classic, OPC Unified Architecture, BACnet, SNMP, Modbus and Web service. Easily connect AX Energy to existing networks with this open connectivity.

■ **Examples of AX Energy application**

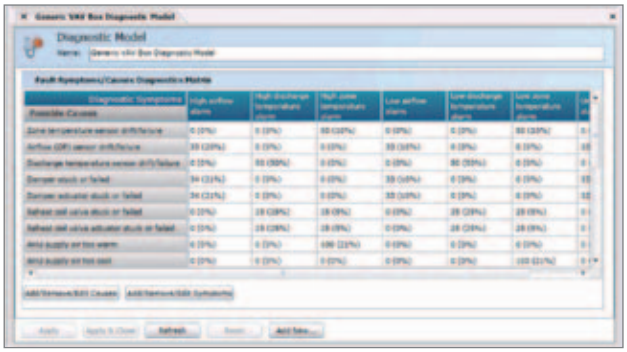
» Optimize energy management
» Pinpoint assets that consume large amounts of energy
» Identify peak consumption periods to disperse asset loads and utilize idle intervals
» Visualize energy consumption rate for site areas
» Analyze CO_2 emissions per worker and area
» Monitor trends and details of device energy consumption rates
» Issue alarm to operators if meter fails or energy consumption rate exceeds upper limit
» Mail energy consumption rates and cost information to administrators
» Present alternate energy sources for higher efficiency and cost reduction

Device fault detection and analysis tool

AX Facility

Device fault prediction and diagnosis solutions

AX Facility is a predictive equipment diagnosis solution that uses an advanced Fault Detection and Diagnostics (FDD) Engine to analyze all available information to detect and predict faults in equipment. It incorporates algorithms that weigh the probability of faults and advise management, operators and maintenance personnel of actions to prevent equipment failure from excessive use of energy. Should an equipment fail, the advanced software technology provides automatic guidance to a list of causes sorted by probability, resulting in reduced downtime and lower costs for diagnosis and repairs.

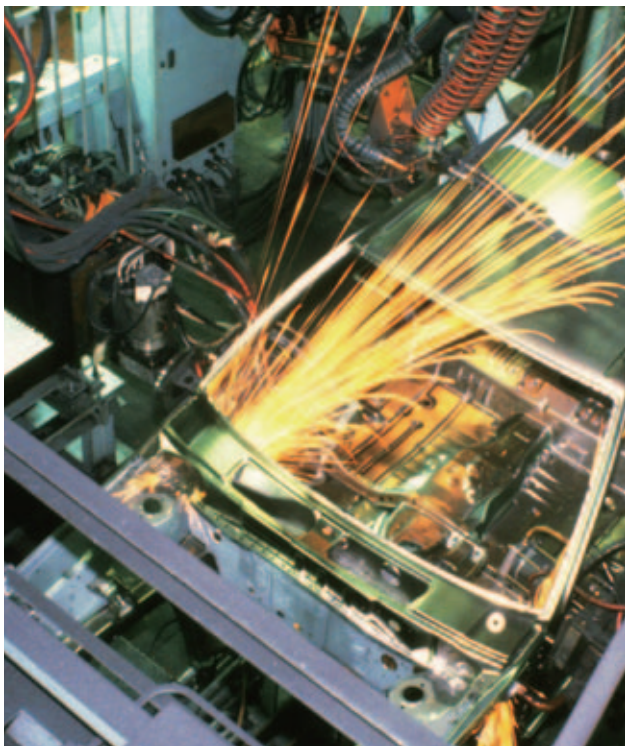


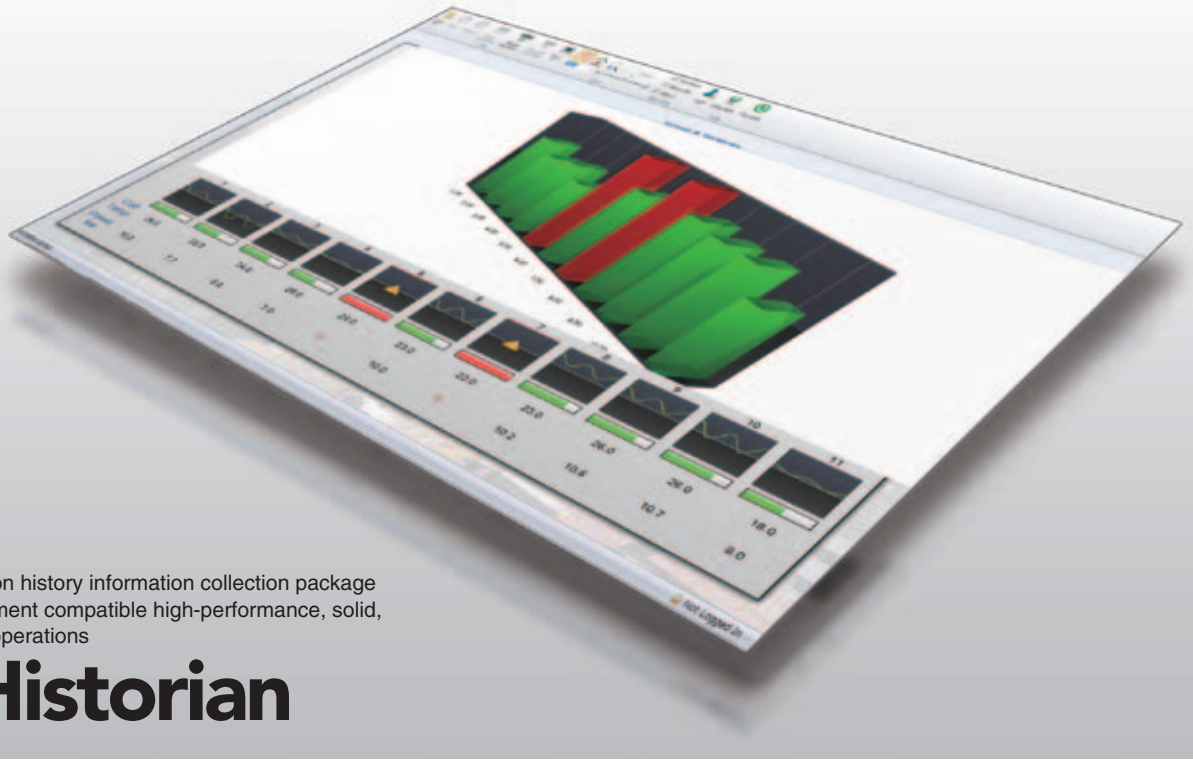
Flexible and open connectivity

AX Facility provides an open connectivity with OPC Classic, OPC Unified Architecture, BACnet, SNMP, Modbus and Web service. Easily connect AX Facility to existing BAS, SCADA or control networks with this open connectivity.

■ **Examples of AX Facility application**

» Predict, reduce and eliminate equipment downtime
» Automate equipment fault detection, and send real-time notifications
» Reduce maintenance and pinpoint estimated causes
» Improve reliability and control
» Improve general environment quality
» Notify on a “random platform from anywhere at anytime”





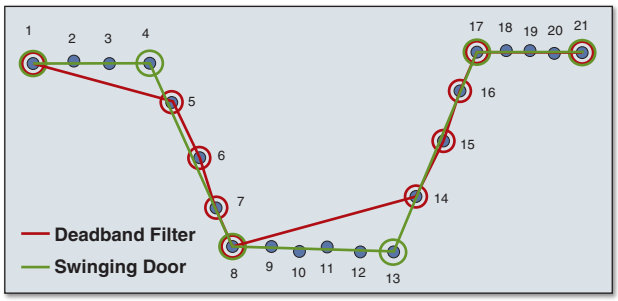
Real-time production history information collection package with 64-bit environment compatible high-performance, solid, scalable and safe operations

MC Historian

Prominent performance

The cutting edge data compression algorithm, Swinging Door, allows data to be collected at a high speed of 50,000 points per minute.

Swinging Door Algorithm



Deadband Filter
- Stores unneeded samples(6,7,15,16)
- Misses inflection samples(4,13)

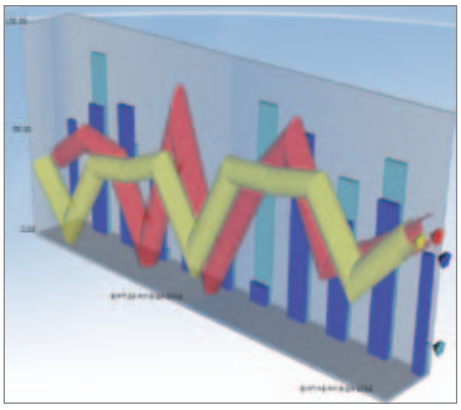
Swinging Door
- Higher Compression
- Better accuracy

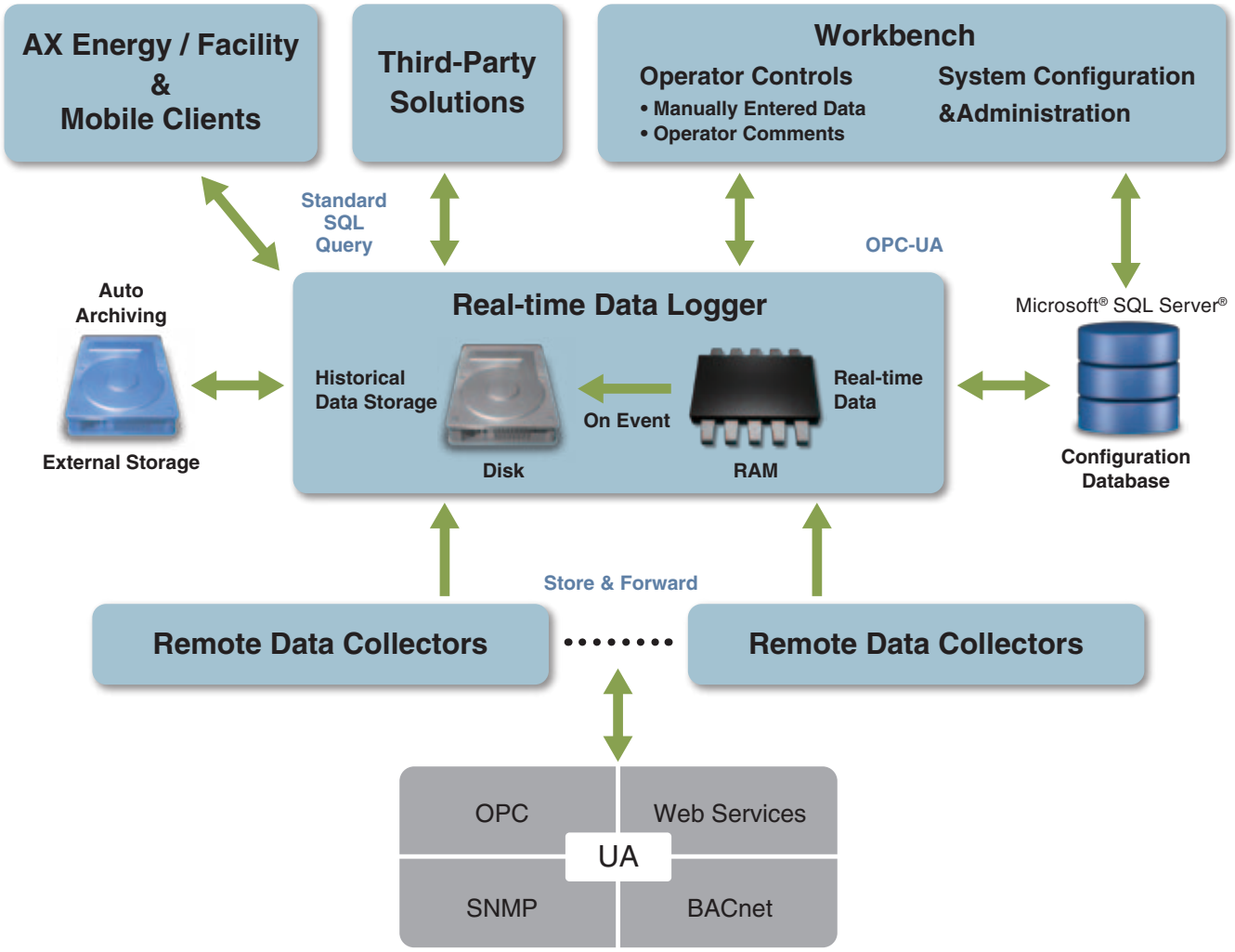
Integrated redundancy functions

Solid software redundancy functions are assembled to support essential business applications requiring continuous access and data collection.

Real time and history 3D chart

Data can be charted in 3D using XY coordinate graph, logarithm graphs, bar graphs, strip charts and pie graphs.
By overlapping the real-time data and history data for the same trend plots, this week's data can be easily compared with last week's data.





Ensuring safety with automatic save and automatic transmission functions

Maintain data integrity even if your system fails or a communication error occurs. This data can be used to swiftly recover your system.

SQL integration

The industry standard SQL query interface is incorporated allowing solid connections with Microsoft® SQL Server® 2005, SQL Server® 2008, Oracle® MySQL® and many other SQL compatible databases.

Industry standard data connectivity

The advanced data integration function realizes projected connectivity to any device via OPC-DA, OPC-UA, OPC-HDA, OPC XML, SNMP, BACnet or values in the database.

Automatic archiving function

Easily create backup files to free disk space, ensure long time storage of data, and to restore data.

Web analysis screen programming support tool

AX Portal

Real-time collaboration and visual dashboard

AX Portal provides a real-time collaboration portal built on the powerful Microsoft® SharePoint® 2010 Platform. Utilizing AX Portal and the SharePoint® Platform, users can easily define portals and dashboards for corporate and customer collaboration.
With "web parts" delivered through AX Portal, and optional web parts available from Microsoft® and many third-party vendors, users can deliver the required information to any user or position in their organization or supply chain.
AX Portal is an innovative frame-based runtime environment that provides an organized screen layout, often called a portal or dashboard. AX Portal makes it easier and faster to configure complex dashboards and layouts for functions such as alarm monitoring and operation control.
AX Portal supports both Microsoft® Silverlight®, and can be deployed easily on any system with very little setup.

Flexible and open connectivity

AX Portal provides an open connectivity with OPC Classic, OPC UA, OPC.NET, BACnet, SNMP and Web service.

■ **Main features of AX Portal**

» Existing HMI screens, trends, manufacturing information reports and charts, etc., can be used with point & click settings.
» The right amount of information is provided to realize cost savings through informed decisions.
» The user's organization is given authority to positively and quickly resolve problems.
» Intuitive navigation is realized with drill down analysis that matches the situation.
» TCO (Total Cost of Ownership) is reduced and early ROI (Return On Investment) recover is realized by utilizing the existing IT foundation.

MC Works64
AX Energy
AX Facility

AX Portal

AX Facility screen
AX Energy screen
MC Works screen

Using AX Portal, MC Works64/AX Energy/AX Facility screens can be displayed together on the web browser.

FA engineering software

MELSOFT iQ Works

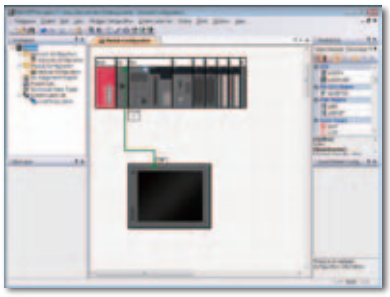
Next Generation Seamless Engineering Environment

iQ Works is the combination of Mitsubishi engineering software (GX Works2, MT Works2, GT Works 3, RT ToolBox2) that allows for the sharing of design information to improve programming efficiency and reduce TCO.

System Management Software

MELSOFT Navigator

In combination with GX Works2, MT Works2, GT Works3, and RT ToolBox2, this software performs upstream system design and inter-software operation. It provides such convenient functions as system configuration design, batch setting of parameters, system labeling, and batch reading.



Programmable Controller Engineering Software

MELSOFT GX Works2

This all-in-one package provides all functions required for system designing and programming, debugging and maintenance, to PLC engineering.
Use this tool effectively in scenes where languages are freely mixed according to applications SFC, ST and ladders for IEC61131-3 Standards productization during modularization and structured programming for IEC61131-3 Standards.

Motion Controller Engineering Software

MELSOFT MT Works2

This software comprehensively supports motion controller design and maintenance. Reductions to the motion system's TCO are assisted by intuitive settings on a graphical screen, programming functions and convenient functions such as the digital oscillation simulator.

GOT1000 Screen Design Software

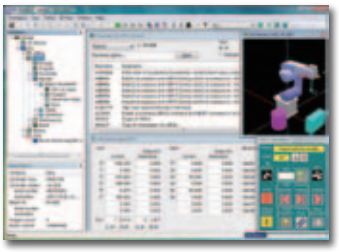
MELSOFT GT Works3

This software comprehensively supports creation of screens for Graphic Operation Terminal. User-oriented functions have been created with three concepts in mind, simplicity, aesthetics, and ease of use, to help the creation of high-grade screens with simple settings.

Robot Programing Software

RT ToolBox2

This software comprehensively supports robot program programming and editing, implementation, startup and maintenance after the start of operation.
Use is not limited to robot engineering, but also extends to effective teaching, research and training.



Realizing high-speed large-volume data processing for complicated production systems and manufacturing systems.

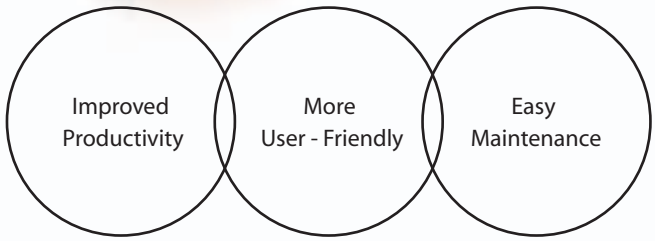
iQ Platform Programmable Controllers MELSEC-Q series

Current production requirements are calling for an increase in productivity and carrying out production processes even faster due to an increase in production information such as production results and traceability.
The MELSEC-Q series new generation programmable controller "Universal Model QnU" is a leader for these market needs. High-speed basic instruction processing on a micro scale dramatically increases your system and machine performance.
Inheriting the high robust and ease of use design of the Q series.
MELSEC QnU … This new-generation programmable controller will open up new possibilities for your automation solution.

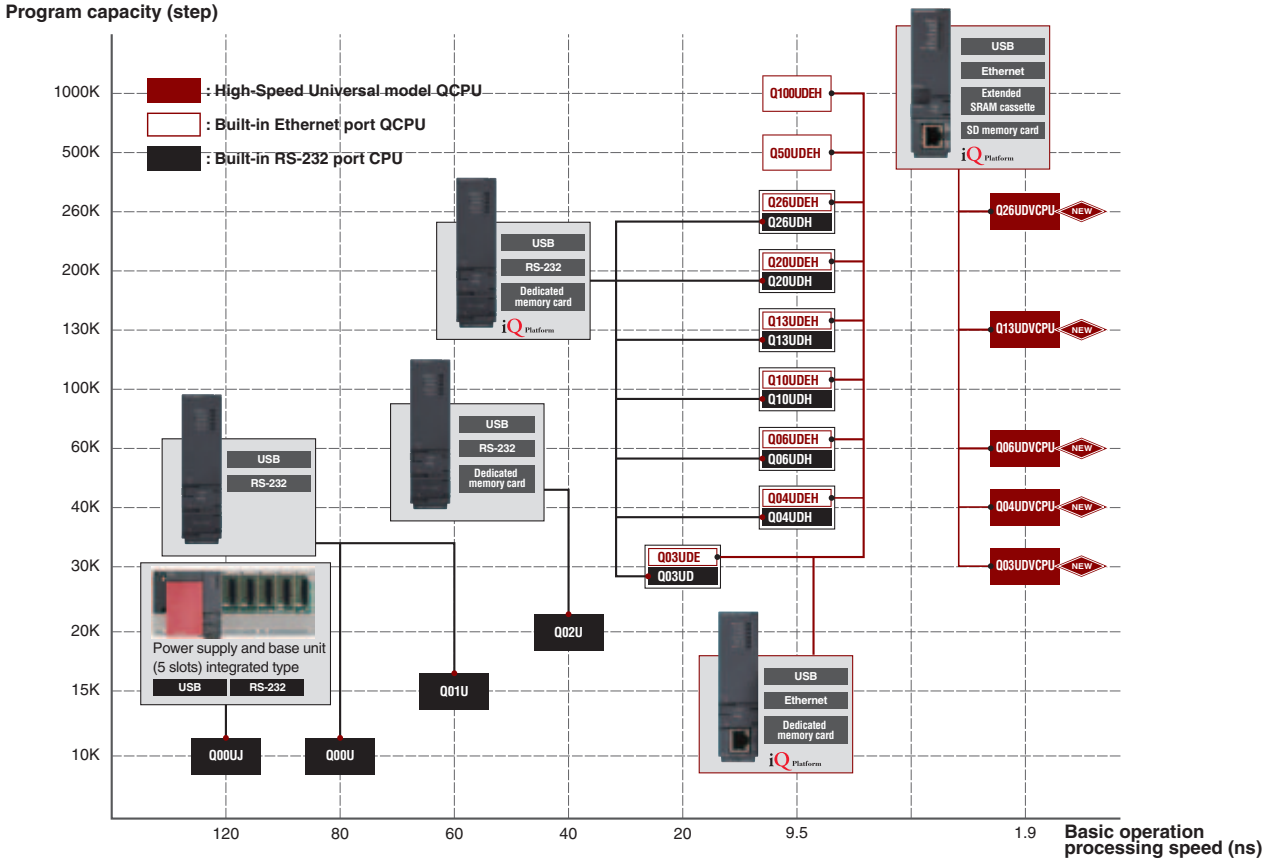
High-speed 1.9ns | Large capacity 1000K steps | Built-in Ethernet | Built-in USB | SD memory card slot | Security | Data logging function

Customer experiences created this new-generation Programmable Controller

- Support for shorter operation cycle times
- Support for higher quality control requirements
- Complex and large-scale equipment and systems
- Expanding control and production control data
- Shorter product cycles
- Support for higher equipment operation rates



MELSEC-Q series Universal Model Lineup



“Little on size, Large on performance”
The new L series has a small footprint and is loaded with features.

Programmable Controllers MELSEC-L series

Convenience that fits in the palm of your hand.
The L series is the latest in a long line of MELSEC products renowned for exceptional performance and rock solid reliability.
Get the performance, functions, and capabilities required for today's most demanding applications in an incredibly small package.
MELSEC-L series greatly expands the range of functionality traditionally associated with compact PLCs and through user-centric design, pushes the limits of ease of use.

MELSEC L series

Functionality

The CPU module contains a diverse range of control functions.
A large variety of I/O types and features are built-in for convenience.
Due to an abundance of advanced functionality, L series CPUs are flexible enough to meet a wide variety of needs.

Performance

High speed, large memory capacity CPU.
The CPU has a basic operation processing speed of 9.5ns and 260k steps of program capacity are available for complex programs and equipment control.

Capabilities

Advanced capabilities focused on improving efficiency
The user-friendly display unit enables routine operations to be made without a computer. An SD memory card slot is included as standard for data logging and program storage. Write programs and manage L series controllers using GX Works2 and iQ Works, the most advanced and effective software for Mitsubishi controllers yet.

MELSEC-F series - Industry leading high-speed processing, reliable and proven micro programmable controller.

Programmable Controllers MELSEC-F series

Selling more than 10 million units worldwide in 30 years

It has been more than thirty years since the FX programmable controller F series was introduced in 1981. More than 10 million units have been sold worldwide during this time. The FX programmable controller has been incorporated throughout the world including Japan, Europe, America, Asia and Oceania in a variety of fields including FA industries, foodstuff and distribution. Its applications are bound to increase in various fields.

MELSEC-F

Diverse built-in functions

The FX programmable controller’s compact body is equipped with outstanding functions such as positioning functions and high-speed counters. Simple programs can be controlled at high speeds using the high-speed controller, and using the built-in positioning function, highly precise positioning control of up to three axes is possible without increasing costs.

Extendability

The FX series has a wide lineup of extension devices supporting data collection, analog control and field networks, etc. Mitsubishi Electric proposes configurations suitable for user’s applications with inexpensive function extension boards and adaptors and high-function special modules.

Affinity

The FX programmable controller’s affinity with Mitsubishi Electric FA goods has been improved. The Mitsubishi Electric inverter can be monitored and set using dedicated inverter instructions, and the parameters can be referred to and changed. Up to eight units can be individually controlled, thus contributing to your system’s added value.

Detailed instrument control according to process state from simple loop control to complicated loop control.

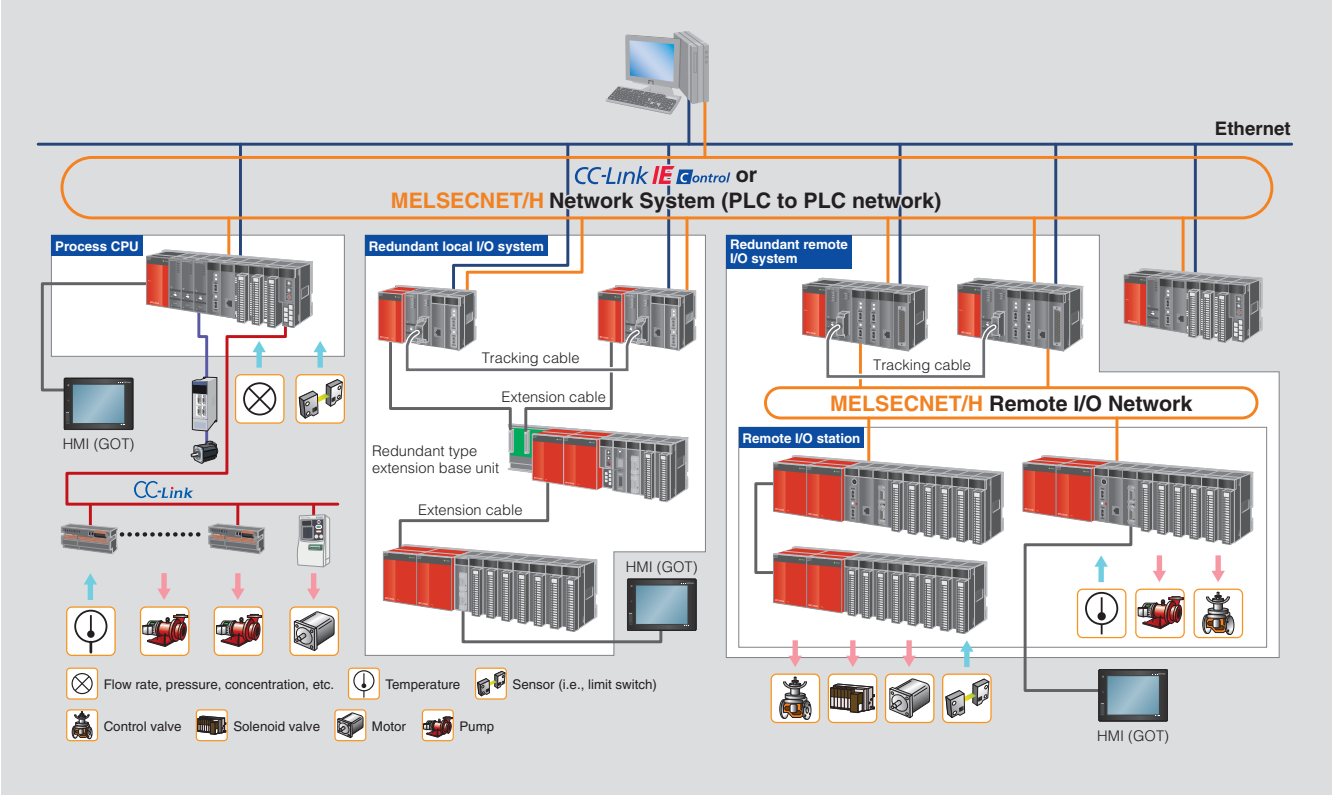
Redundant basic system including CPU module, power supply module, main base unit and network module realizes highly reliable system.

Process CPU

Q Series process controllers offer features that rival those of costly DCS systems at a fraction of the cost. A single CPU can control a large number of PID loops while simultaneously performing standard sequence control. The process CPUs are complemented by a range of channel isolated high resolution analog I/O modules with online change (hot-swap) capability, and the function block programming and engineering software environment, PX Developer.

Redundant CPU

The redundant systems are designed to provide the users with systems that have the properties of Q Series and are not affected by sudden failures. The basic system including CPU module, power supply module, main base unit and network module is redundant to prevent system down. Programming can be performed without consciousness of redundancy.

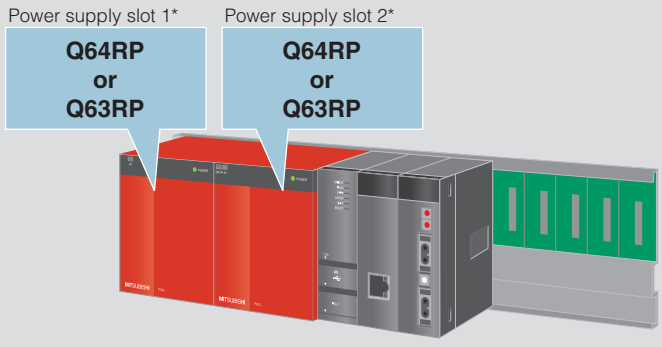


The redundant power supply system can be configured to back up the system in the event of a power failure.

Redundant power supply system

Redundant power supplies supporting all CPUs

1. Even if one power supply module fails, the other one supplies the power to the system.
2. A failed power supply module can be confirmed by a "power failure detection function" or "LED indicators", allowing for quick replacement. This ensures system backup.
3. The power supply module can be replaced while online.
4. Q64RP (AC input) and Q63RP (DC input) can be used together. Creating two power supply systems (AC and DC) further enhances system reliability.



* Either Q64RP or Q63RP can be mounted on the power supply slot 1 and 2.
Also, in the event of a power failure, the power supply module can be replaced while online.

Built-in system platform runs C Controller with MELSEC.

Real Time Operating System C Controller

The C Controller (pre-installed with RTOS VxWorks®) is an embedded controller that can run C-language type programs. Based on the MELSEC system architecture, it utilizes industrial performance characteristics such as long term parts supply, high availability, and high functionality.

The Q24DHCCPU-V is a high-end information processing controller system with advantageous features such as high speed information processing and control system I/O, all within a very small foot-print. In addition, the Q12DCCPU-V is a standard model C Controller capable of high-speed I/O control in small spaces. Having the two C Controller types together with the full range of MELSEC-Q series platform modules, a diverse range of applications requiring information processing and control can be realized based on the C programming language.

Stronger, simpler, with higher performance, creating the "Standard" for embedded system Platforms. The MELSEC C Controller will continue to evolve as the core element for IA (Industrial Automation).

Partner utilization

Utilise 3rd party products to build a diverse system!!

- **Utilize 3rd party products**
  The C Controller can be used as a dedicated module by installing 3rd party applications.

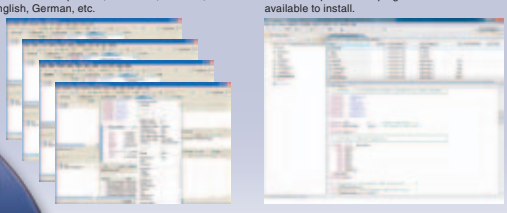
Intuitive application development!!

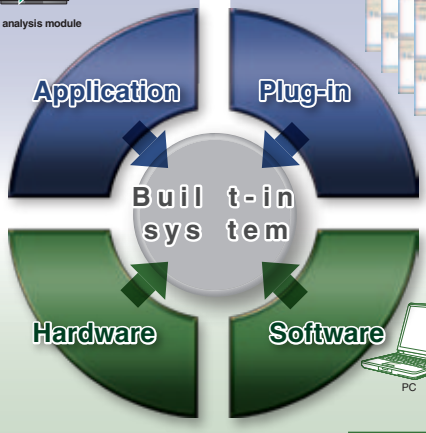
- **Utilize C-Language program attributes**
  C language based programs can be easily incorporated into the MELSEC system platform.
- **Create user applications utilizing the (API) library**
  Easily develop user applications by utilizing the VxWorks® and MELSEC diverse range of available APIs.

Utilization of open source

Extend functions with plug-in tools!!

- **Utilize plug-ins for open source Eclipse**
  Can switch between different language windows, such as from Japanese, to Korean, Chinese, English, German, etc.
  A vast repository of development tools and other open source plug-in software are available to install.



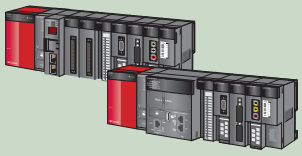


Construct a robust system platform!!

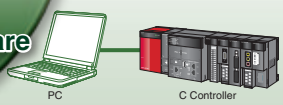
- **Robust environmental characteristics**
  The same robust environmental characteristic standards as the MELSEC-Q series are realized.
  - Operating ambient temperature 0 to 55°C
  - Operating ambient humidity 5 to 95%RH
- **Diskless**
  - Flash ROM drive
  - Standard RAM drive
  - Standard ROM drive
  - SD card drive
  - Compact Flash drive
- **Real-time OS**
  High integrity system can be created with VxWorks®.

Utilize the MELSEC platform features!!

- **Diverse modules**
  More than 120 different types of I/O modules, intelligent function modules and network modules are available.
- **Sharing processes with multiple CPU configuration**
  programmable controller CPU, motion CPU, C CPU



Embedded application development software!!



No need to develop OS setup driver | Work on application development right after installation | Development architecture supported

CW Workbench | Wind River Workbench

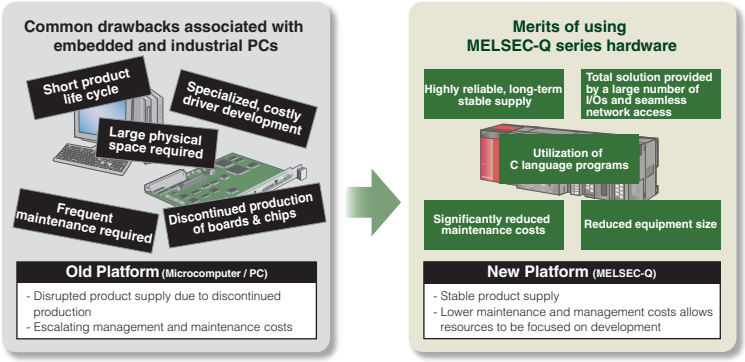
C Controller setting and monitor tool

CW-Sim / CW-Sim Standalone

Mitsubishi Electric products

The C Controller overcomes the overheads associated with maintaining embedded PCs (micro boards., etc) and industrial PCs realizing a cost effective solution.

The C Controller platform is a solution that realizes PC level functionality without the burden of high maintenance costs usually associated with PCs. In addition, it includes a robust design that is ideal for industrial environments by being based on the high quality MELSEC control system.



The concept of safety is shifting from "zero accidents" to "zero risk."

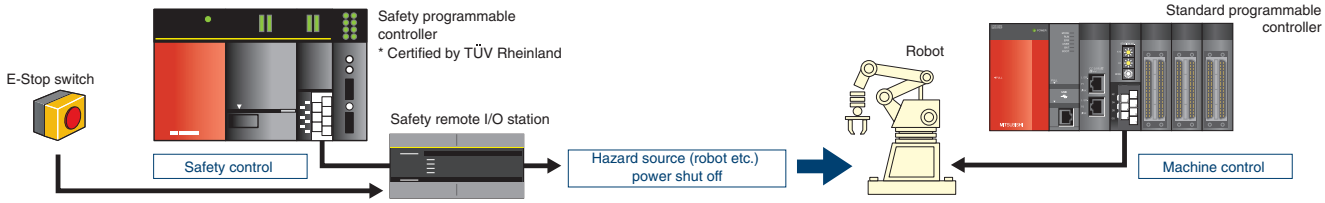
Safety PLC MELSEC-QS Series

MELSEC Safety realizes visualization of safety information, realizing optimal safety control, and boosting productivity.
The safety components such as Safety PLC, Safety Controller, and Safety Relay Module provide a total safety solution.

MELSEC Safety
MITSUBISHI SAFETY FA SOLUTION

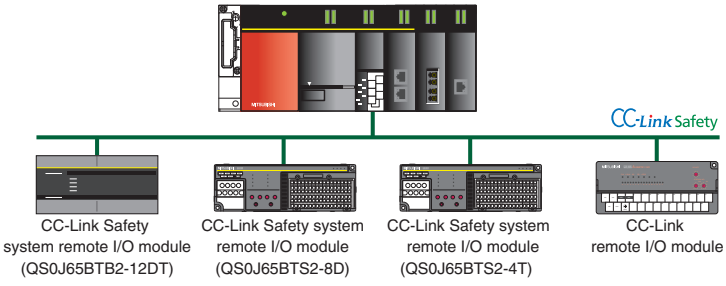
MELSEC-QS Safety programmable controller

The safety programmable controller is an International Safety Standard certified PLC for safety control. When connected with a safety device, such as an emergency stop switch or light curtain, this programmable controller executes safety control by turning the safety output OFF with a user-created sequence program to stop movement toward a source of hazard, such as a robot.
Machine control of the robot and conveyor, etc., is executed with a general-purpose programmable controller in the conventional manner. The difference between the safety programmable controller and general-purpose programmable controller lies in that if the safety programmable controller itself fails, it performs a self-diagnosis to detect the failure and turn the safety output OFF forcibly. This prevents the safety functions from being disabled because of a fault. Create a distributed safety control system using the CC-Link Safety network or the CC-Link IE Field Network with Safety Communication Functions for large scale systems requiring many safety I/O points.



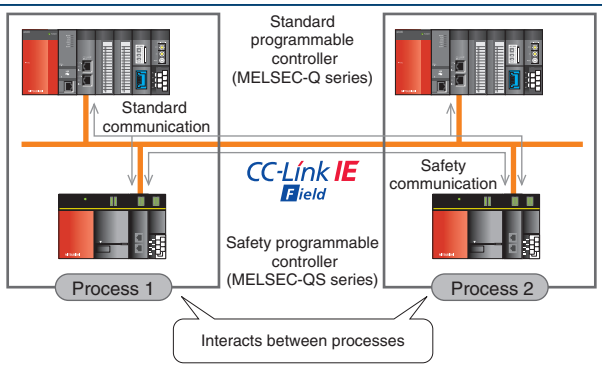
CC-Link Safety open field network

The CC-Link Safety network detects the communication errors defined by safety standards, and serves as a safety system to turn outputs OFF when those errors are detected. CC-Link Safety is compatible with the established CC-Link open device level network, and features an additional error detection function protocol required for safety control, thereby permitting it to be used as a safety field network. Communication is stopped when an error is detected, and the Safety CPU and Safety Remote I/O modules turn the outputs OFF.
CC-Link Safety is an international standard for the safety field network, and has been enacted as the safety communication standard IEC61784-3-8.



CC-Link IE Field Network

This industrial Ethernet field network "CC-Link IE Field Network" enables intelligent manufacturing systems to perform high speed I/O control and distributed control simultaneously. Wiring is done easily thanks to standard Ethernet cables and flexible cabling.
Safety information can be shared between two or more safety programmable controllers using "Safety Communication Functions".
Communications between standard programmable controllers may be performed concurrently with communications between safety programmable controllers.
CC-Link IE Field Network with Safety Communication Functions meets international safety standards IEC61508 SIL3 and IEC61784-3(2010).



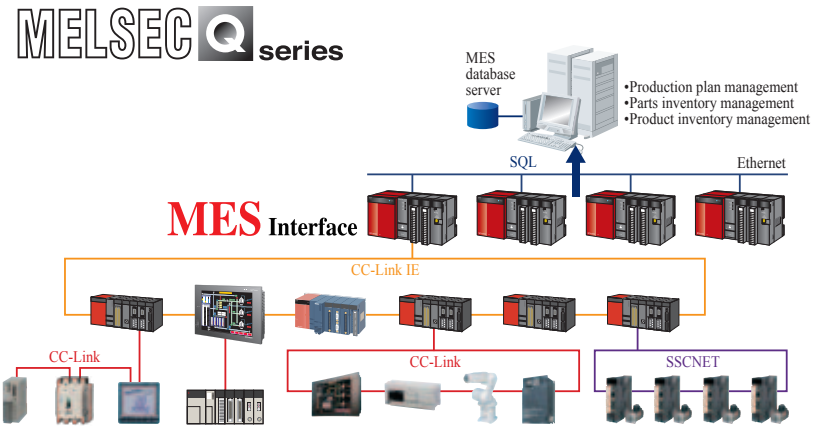
PLCs are directly linked to the MES for efficient collection and management of energy information.

MES Interface Module for MELSEC-Q Series PLCs

The MES Interface Module for MELSEC-Q Series PLCs automatically generates data to be sent to the MES (Manufacturing Execution System) in SQL. Configuration is easy, as PLCs can be connected directly to the MES without gateway PCs or processing programs that were conventionally required. The seamless network allows collection and management of all types of information inside a factory, including energy information and information regarding production processes, equipment operations, and quality. The MES Interface Module creates an information link between production equipment and MES easily, and at low cost.

Collect and manage all types of information inside the factory, such as on production processes, equipment operations, quality, and energy through a seamless network.

Information from even the most peripheral equipment can be collected via a field network.

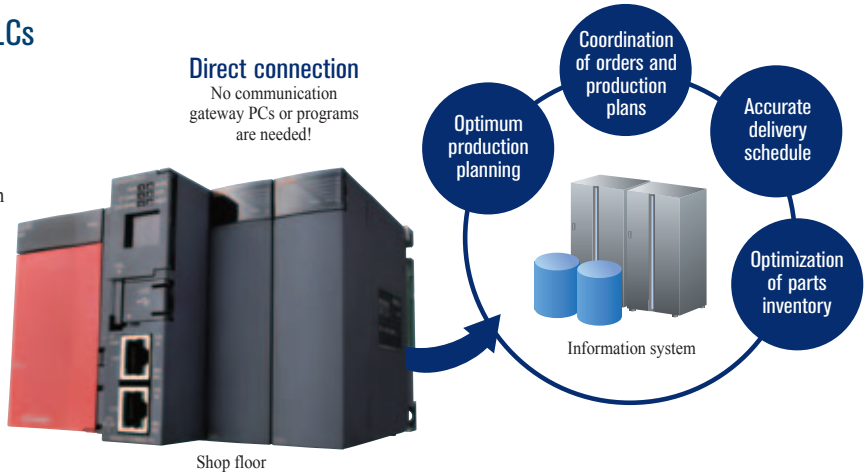


Greater compatibility with diverse platforms and databases ensures direct connections between the shop floor and information systems.

MES Interface IT for MELSEC-Q PLCs

MES Interface IT was developed to integrate shop floor operations into management strategies.
By connecting the shop floor to information systems directly without the use of any programs,
MES Interface IT allows effective management of information from production lines and facilitates business management.

- Eliminates the need for communication gateway PCs or programs and provides an efficient information collection system at low cost.
- Supports a wide range of communication protocols to ensure efficient connections with information systems and to deliver compatibility even with large-scale IT platforms.
- Allows easy set-up using simple tools and easy mapping of data collected by PLCs and information systems.



Main differences between MES Interface and MES Interface IT

Item	MES Interface	MES Interface IT
Compatible databases	Microsoft® SQL Server®, Microsoft® Access®, Oracle®, Wonderware® Historian	IBM® DB2®, Microsoft® SQL Server®, Oracle®
Message communication and other communication programs	—	Message communication:WMQ, JMS, MSMQ Other communication programs:TCP, e-Mail
IT platforms	Windows®	UNIX®, LINUX®, Windows® (compatible with all types of IT platforms)

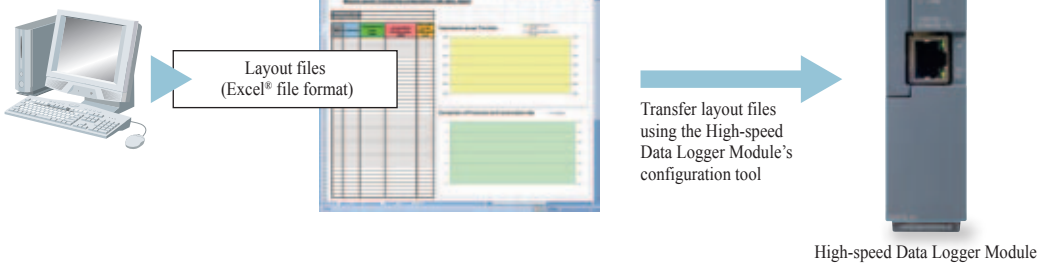
Electric power and currents are logged to monitor energy and keep daily records of specific energy consumption.

High-speed Data Logger Module

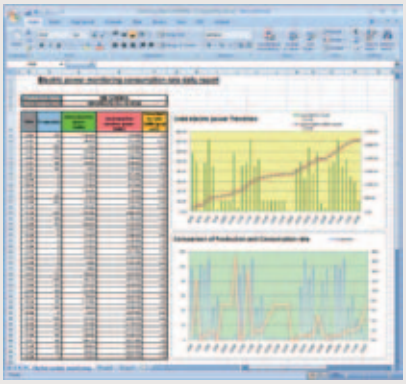
Mitsubishi's high-speed, simple, and low-cost High-speed Data Logger Module provides accurate data logging that transcends the conventional data logging framework.
For example, it can be used to monitor electric power and currents obtained from a MELSEC-Q Series power measuring unit or to create daily reports on specific energy consumption. By accumulating various data from production processes, the High-speed Data Logger Module not only contributes to reducing energy cost, but also to optimizing systems that are necessary for improving production quality and building an efficient production site.

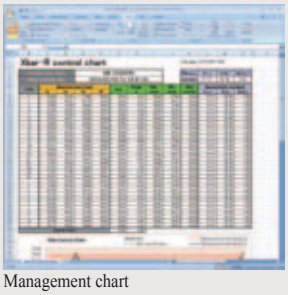
Automatic creation of Excel® files from logging data

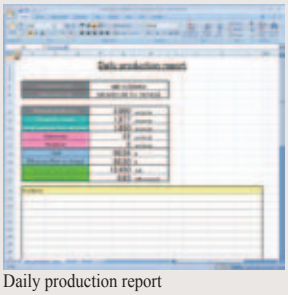
Charts and reports are automatically generated from logging data, simply by transferring Excel® layout files to the High-speed Data Logger Module. This function can be used, for example, to monitor electric power and currents obtained from a MELSEC-Q Series power measuring unit or to create daily reports on specific energy consumption.



Daily records, charts, reports, and a variety of other documents that include visual aids can be created automatically.




Management chart


Daily production report

Synchronization with a program scan sequence

Energy measurements and other such data can be logged at high speed and with precision in synchronization with a program scan sequence, the smallest unit of time that can be controlled. Using this function, collected data can be analyzed for detailed operational analysis, as even the slightest change in control data is detected and logged.

Prompt analysis of problems in the event of trouble

The High-speed Data Logger Module allows the user to narrow down and extract only specific data, such as on specific energy consumption, that is saved around the time of a pre-defined trigger occurrence. This function is helpful in promptly identifying the cause of an error and implementing solutions for quick restoration of operations. Additionally, potential causes of errors can be established as triggers, so that the High-speed Data Logger Module only saves the data logged immediately before and after the occurrence of those triggers.

Slots directly into the PLC for simple measurement of diverse energy information!

MELSEC-Q Series Energy Measuring Module

Meets Energy-Saving measurement needs
I want to monitor the power used by each piece of equipment, for detailed energy-saving monitoring.

Meets Short-Term measurement needs
I want a fast measurement cycle to measure short-term loads.

Meets Quality control needs
I want to detect power supply irregularities in manufacturing equipment to control product quality.

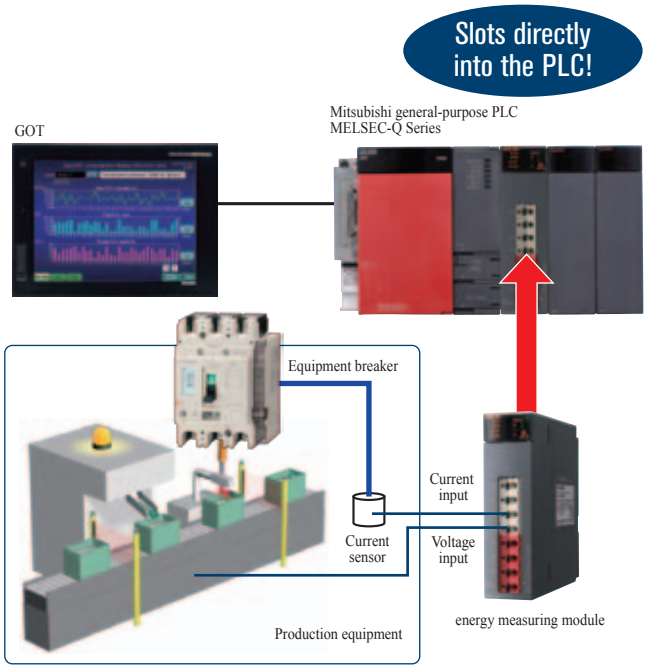
Meets Preventive maintenance needs
I want to detect power and current used by manufacturing equipment and prevent sudden failures.

Meets Simple installation needs
I want simple and smooth installation, with no program for power measurement.

MELSEC Q series

These are key e&eco-F@ctory products, achieving fusion between production and quality information, and energy information.

MELSEC-Q, a constant innovator in the production workplace, launches a new energy measuring module. This unit makes it easy to measure current, voltage, power, power factor, effective power consumption and other information, integrating production and quality information with energy information, and leading to improved productivity, energy saving, and preventive maintenance. And, it slots directly into the PLC, saving space, wiring, and cost. It enables energy measurement for each piece of production equipment, preventive equipment maintenance based on realtime measurement, and the use of quality control indices linked to manufacturing information.



Slots directly into the PLC!

The energy measuring module is directly attached to the PLC, so there is no need to install any other instruments or connect wiring. There is no need for any major system construction either, so it also saves space.

Measure energy consumption simply

Read the signal from the current sensor on the device breaker, to measure energy consumed by the device. It's easy to grasp power consumption for each PLC unit and manage the specific energy consumption for each individual device.

Easy comparison of power consumption

Power can be measured only when a specific output signal is on. Power over a period can be measured at two points, to find the standby power consumed while idling or compare power consumed over a certain period.

Grasp the energy consumption status of a device

Record the maximum and minimum values of demand current, voltage, demand power and power factor for each device. Equalization of energy consumption is supported, to identify devices and times of high energy consumption.

Quickly catch abnormal device status

Set two measurement factors and monitor their upper and lower limit values. That makes it possible to quickly catch abnormal device status, and to find devices which are using large amounts of energy.

Energy information is also measured to promote the "visualization" of the shop floor.

GOT1000 : HMI

The GOT1000 human-machine interface (HMI) for production lines incorporates MES Interface functions. It collects and displays electric power, water, air, gas, and fuel measurement data from a MELSEC-Q Series measuring module via CC-Link. It not only monitors energy consumption in real time, but it also facilitates energy management, quality management, and monitoring of equipment operations in accordance with shop floor information.

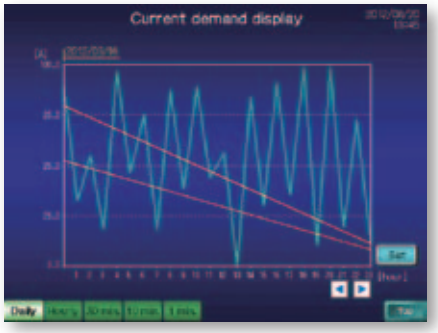
Monitors energy consumption in real time

GRAPHIC OPERATION TERMINAL GOT1000

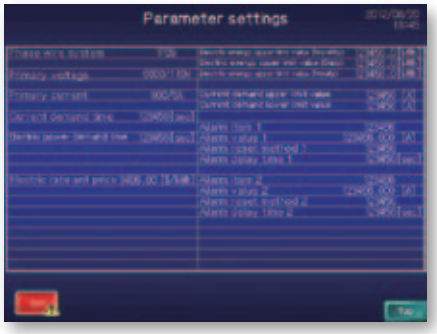
For energy management, quality management, and equipment monitoring

- Monitors energy consumption in real time.
- Facilitates energy management, quality management, and monitoring of equipment operations in accordance with shop floor information.
- Computerizes information from existing equipment and equipment other than MELSEC PLCs.
- Supports workers by providing a connection to a barcode reader and displaying documents.
- Offers extensive information management functions that can only be offered by an HMI.

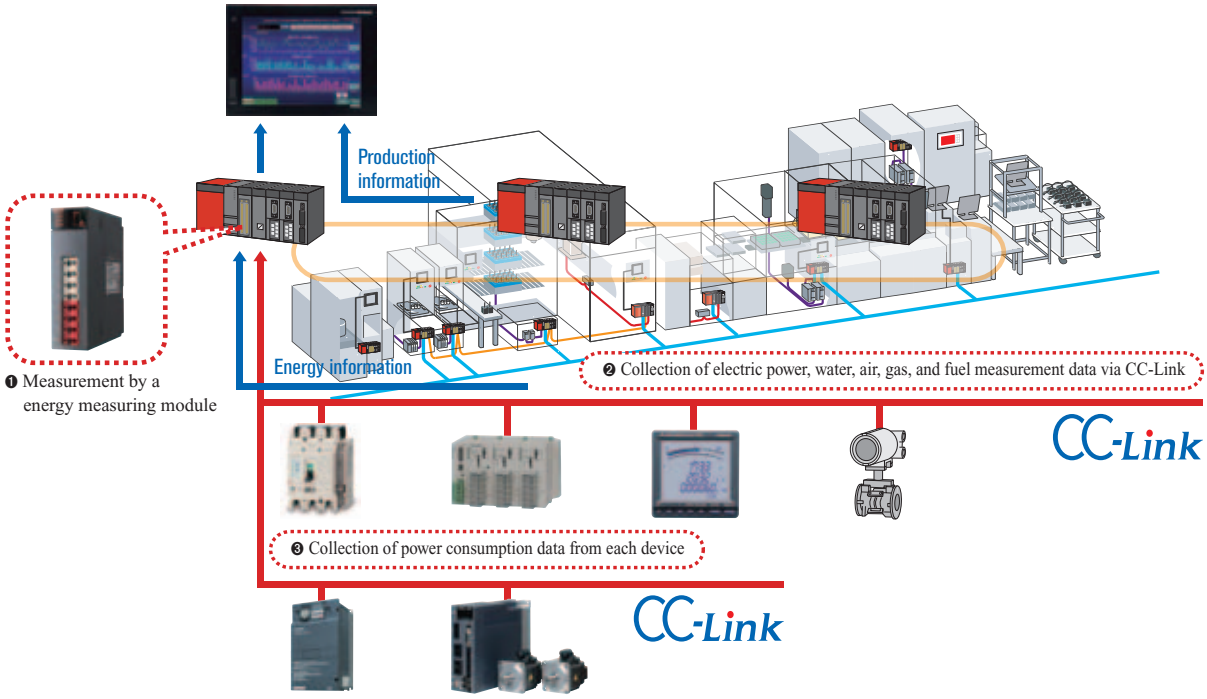
■Screen showing specific energy consumption (electricity rates)



■Screen showing demand electric current



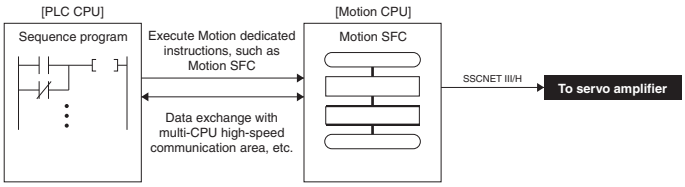
■Screen showing parameter settings for a Q Series power measuring unit



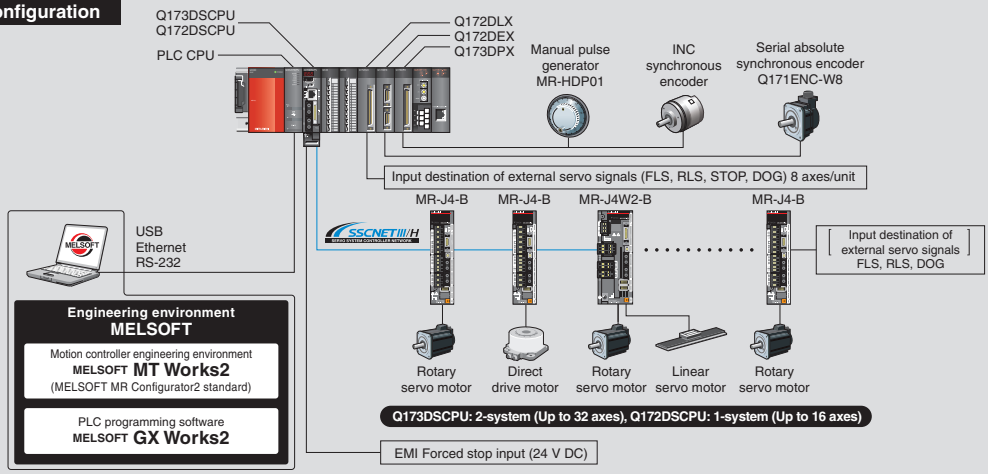
Most-advanced Motion controller.

SSCNET III/H compatible Motion controller
Q173DSCPU, Q172DSCPU

The Motion controller is a CPU module used with the PLC CPU for Motion control. The Motion controller using Motion SFC program separately controls I/O modules, etc., from PLC CPUs; therefore high speed control is achieved.



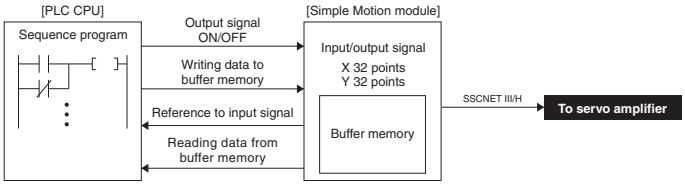
Example of system configuration



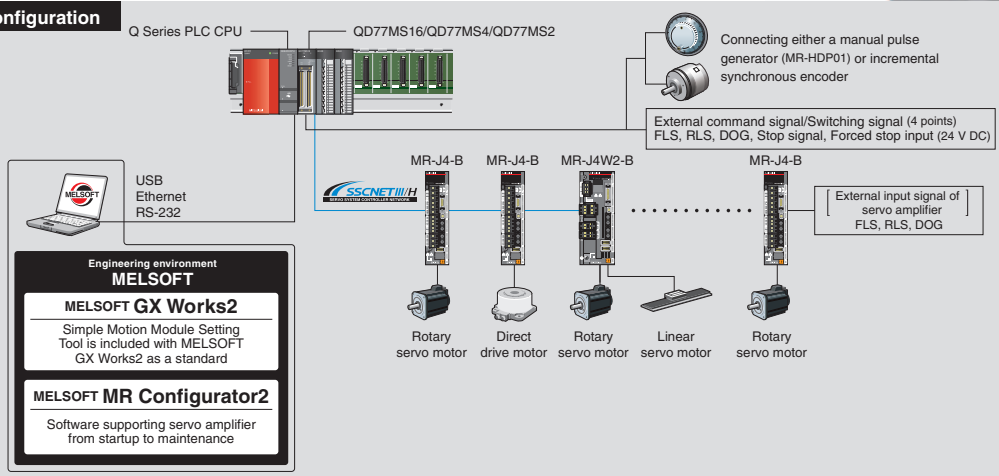
Advanced control but simple use as the positioning module.

SSCNET III/H compatible Simple Motion module
QD77MS16, QD77MS4, QD77MS2

The Simple Motion module is an intelligent function module performing positioning control following the PLC CPU's command. Synchronous control that was unavailable with the previous positioning module is now available with this new Simple Motion module, which is used easily just like the positioning module.



Example of system configuration



Mitsubishi Electric Servo Systems offering high performance drive solutions.

MELSERVO-J4 series

Backed by Mitsubishi Electric's global track record of proven reliability, the new MELSERVO-J4 series takes machine performance to the highest level. With the safety, ease of use, and energy-efficient design of the new MR-J4, man, machine and environment can at last work together in perfect harmony. Compatible with the high-speed optical networking "SSCNET III/H", this servo offers diverse product lines for various applications and operates rotary servo motors, linear servo motors, and direct drive motors.

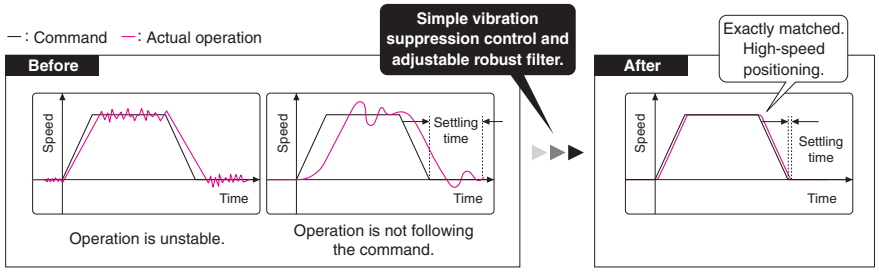
MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-J4

High functionality

The leading edge in drive control

Servo gains including machine resonance suppression filter, advanced vibration suppression control II, and robust filter are adjusted just by turning on the one-touch tuning function. Machine performance is utilized to the fullest using the advanced vibration suppression control function.

Precise vibration suppression control with one-touch ease

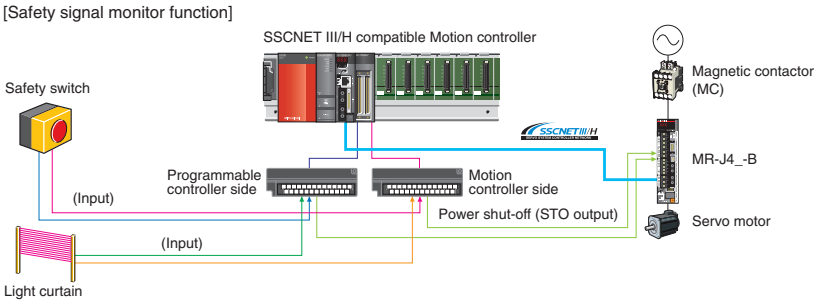


Safety standards

Safety and convenience

When combined with SSCNET III/H compatible Motion controller, MR-J4 is compatible with the following functions defined as "Power drive system electric safety function" in IEC/EN 61800-5-2 as standard.

Advanced features for world-class safety

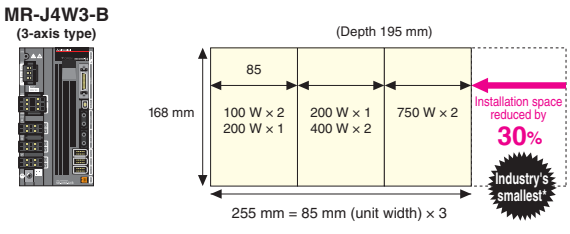


Space saving

Eco-friendly design that's winning acclaim worldwide

3-axis servo amplifier MR-J4W3-B requires 30% less installation space than three units of MR-J4-B.
The three axes use the same connections for main and control circuit power, peripheral equipment, control signal wire, etc. Thus, the number of wirings and devices is greatly reduced.

Designed to cut waste and save on space, wiring, and energy use



* This is when two units of 100 W, 200 W, 400 W, and 750 W each are used.
* Based on Mitsubishi Electric research as of September 2012.

Evolution of the inverter for fan and pump applications, energy savings for buildings and factories as a whole.

FR-F700 series : Energy saving inverter

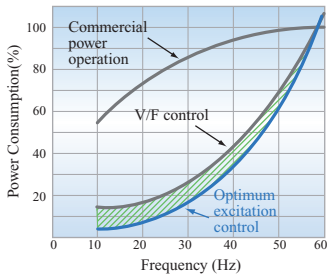
As the need grows to conserve energy, inverters capable of delivering significant energy savings have become indispensable, especially for air conditioning equipment, fans and pumps that have to run continuously.
The FR-F700 Series advances energy conservation technology, using optimum excitation control to reduce energy consumption by up to about 12%. It offers a full lineup, from small capacity (0.75 kW) to large (560 kW) inverters with excellent drive control, ease of maintenance, environmental durability and operability.

More Energy Savings

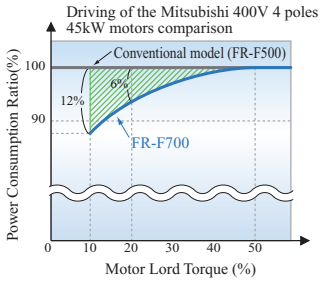
Upgrade of the renown Optimum Excitation Control

•Achieved a higher level of energy savings during acc./dec. to say nothing of during constant speed.

Ex. of Blower Operation Characteristics



Ratio of Motor Power Consumption during Acc./Dec.



The effect of energy savings is obvious

•The effect of energy savings can be confirmed using the operation panel, output terminal (FM, AM terminal) and via networks with the newly developed energy saving monitor.

Ex. of Power Savings Monitor Display

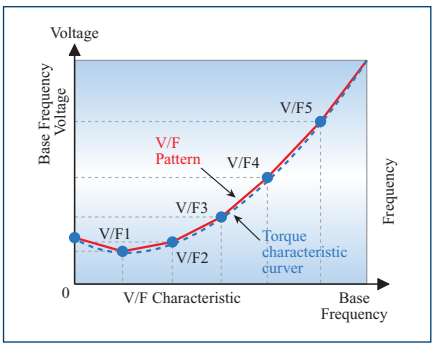
Energy Saving Monitor List

Power saving monitor (kW)
Power saving rate (%)
Power saving amount (kWh)
Power saving amount charge ($)
Power saving average value (kW)
Power saving rate average value (%)
Power saving charge average value ($)
Annual power saving amount (kWh)
Annual power saving amount charge ($)

Ideal for Fans and Pumps

Adjustable 5 points V/F

•Possible to set the torque pattern that is optimum for the machine's characteristic
•Possible to expect even more energy savings with optimum excitation control and optimum V/F pattern working together



Enhanced PID function

•Energy savings in low speed region ... PID shutoff (sleep control) function
•Shorter PID startup time ... PID automatic switchover function
•Monitor of set point/measured value/deviation possible ... PID monitor
•Convenient for HVAC usage ... forward/reverse operation switchover is simple with an external signal
•Corresponds to a wide range of detectors ...set point and measured value for PID input can either be voltage (0 to 5V/0 to 10 V) or current (4 to 20mA)

All-in-One Inverter with Built-in Power Regeneration.

FR-A701 : General-Purpose Inverter

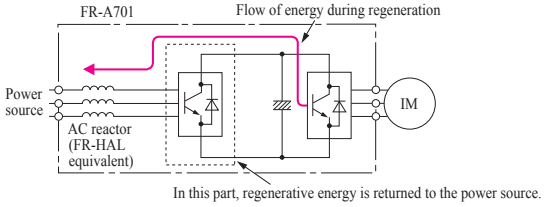
The FR-A701 Series adds power regeneration to Mitsubishi's established FR-A700 Series of high-function general-purpose inverters to achieve great braking capacity. Because the power regeneration function is built into the inverter, it dispenses with the complicated and cumbersome wiring that was previously necessary and also saves space. The energy conservation effect is apparent, since the amount of energy regenerated can be checked by the regeneration monitor. This helps save energy in machinery and facilities that produce regenerative torque, such as lifts, cranes, centrifuges and winders.

Energy conservation with power regeneration function

You can reduce your total costs compared to a combination of conventional systems (inverter + power regeneration converter + AC reactor). And because regenerative energy is returned to the power source, you reap the energy savings. The actual amount of energy regenerated can be confirmed by checking a new function, the power regeneration monitor.

What is power regeneration?

Power regeneration is an action that yields great braking force by returning regenerative energy from the motor to the power source.

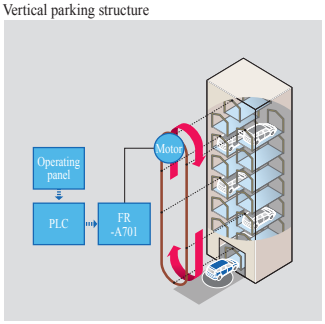


Requires less wiring and space

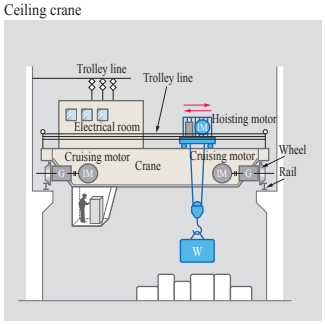
Compared to a conventional setup with a common converter that is placed separately, this can reduce wiring in the main circuit by about 60% and the equipment footprint by about 40%. And there's no need to go to the trouble of picking a particular brake unit, because the brake circuit is built in. (In the case of 200 V, 7.5 k.)

Application example

Vertical parking structure



Ceiling crane



“Collection” “Saving” “Visualization (web, analysis)” “Monitoring” Smart energy saving management in a compact body.

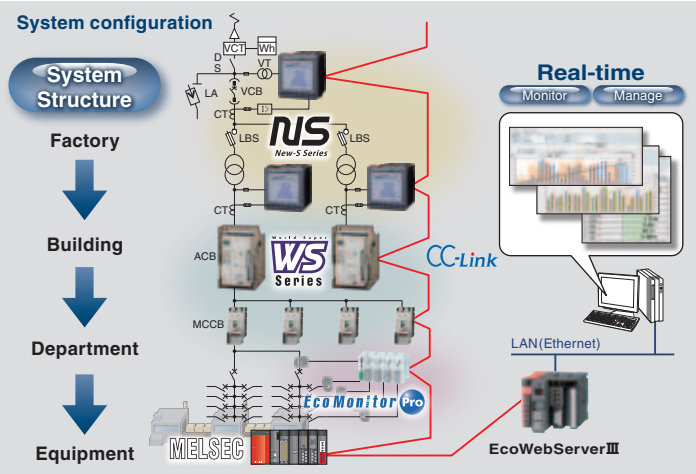
Energy saving data collection server EcoWebServerIII

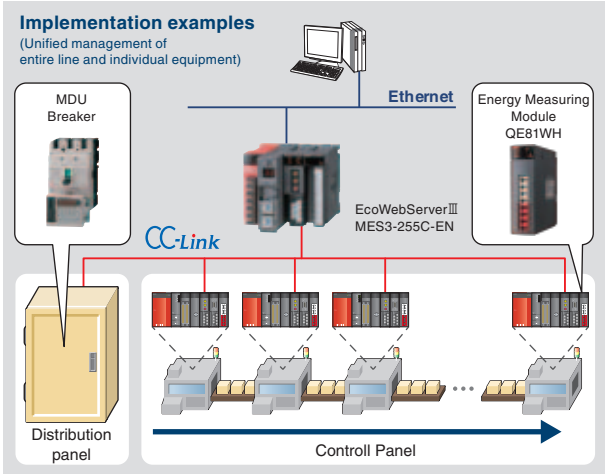
EcoWebServerIII generously supports optimized measurement terminals installed throughout the factory and equipment to collect, save, visualize and manage the energy data.
The shortest data logging cycle is one minute, allowing detailed real-time data control for each equipment.
In addition to logging data for the entire factory’s power consumption, the energy information as well as the production information can be retrieved from the production site for efficient unit control and improved productivity.

EcoWebServerⅢ

Features

- Shortest logging cycle: one minute
  Storage period: 62 days (daily data; 186 d)
- Measurement data is displayed as graphs on Web browser
- Upper/lower limits monitored with alarm contact output
- Program ladder-less, additional software not required
- Simple settings (3 steps for shortest setting)



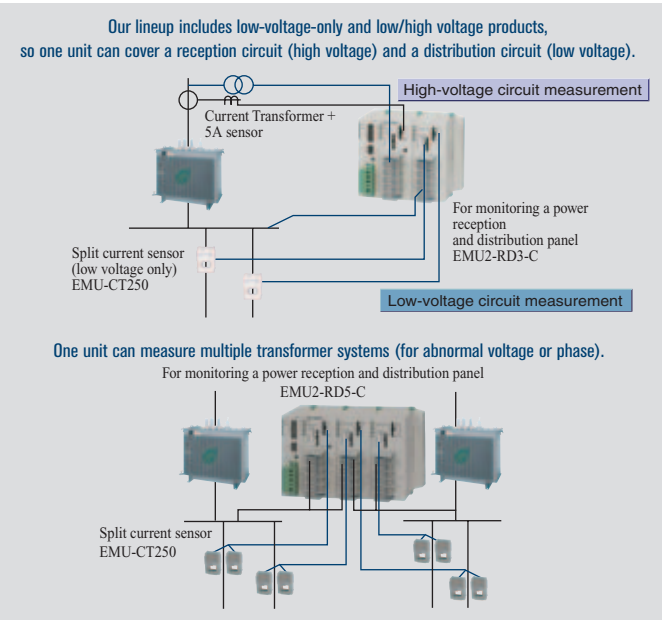


This measuring unit is easy to attach to the equipment or circuit to be measured.

Energy Measuring Unit : EcoMonitorPro

The package and flexible concept and the combination with split current sensors makes this energy measuring unit easy to attach to the equipment or circuit to be measured.

EcoMonitor Pro



Flexible setting of measurement parameters

One unit can measure multiple transformer systems (for abnormal voltage or phase), and the necessary measurement parameters can be set for each circuit. The use of a relay system means that sensor cables can be adjusted to the right length when attached, for economical and waste-free wiring. Modules for CC-Link communications, can be retrofitted in cassette form to configure future systems.

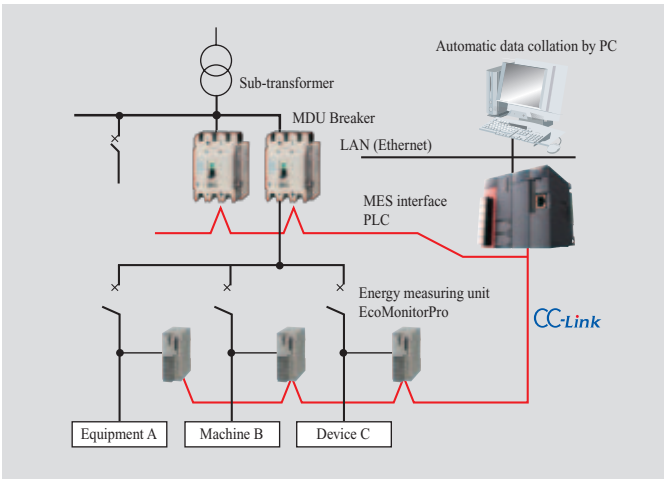
Wide lineup of packages

Products for 3, 5 or 7 circuits are packaged in our lineup (products for 3 phase 4 wire are for two or four circuits). You can devise waste-free system configurations.

Diverse functions in a small body assist detailed energy-saving management.

MDU Breaker

The Measuring Display Unit Breaker (MDU Breaker) has measuring functions and display unit. That measures circuit information and displays it digitally. The MDU Breaker supports detailed energy management and our customer's energy-saving activities.



MDU BREAKER

From energy saving to preventive maintenance

If the breaker trips, the cause of the incident and the current involved are stored on flash memory. That makes it quick to identify the cause and restore the system. If the breaker also has networking functions (CC-Link communication), the times of peak values can be logged, which helps to identify times of peak power usage.

Saves wiring, construction and space

The breaker is a single unit together with the measurement VT/CT and the measuring display unit, which helps to save wiring, construction and space.

Easier to use

Our 250A frame products are even easier to use than before, with adjustable rated current, so it is simple to change the setting when loads increase, just by turning a dial.

Extensive functions and ease of use support energy-saving measurement monitoring.

Electric Multi-Measuring Instrument : ME96 Series

Further expanded functions for measurement monitoring,
display, output, communications and operation.
This meter has functions beyond those of a regular meter, and is still easy to use.
Advanced functions and ease of use support all kinds of measurement monitoring systems and energy-saving measurement monitoring systems.

High accuracy monitoring functions by dedichted ASIC

- Upper / lower limit monitoring up to 4 items
- Harmonics monitoring
- Measures import / export active energy

Easy to read display functions

- 4 Items displayable
- Backlight automatic off function

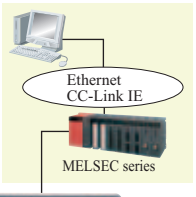
Wide range of output functions

- Output functions for 7 items
- Pulse width settable
- Analog output range settable

Communication

- Modbus communication
- CC-Link communication

Space saving



■ SCADA Products List

Basic set parts

Product name	Model	Tag	Product outline (Please see Function list below for details.)
MC Works64 DV	SW1DND-MCWDV-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	HMI/alarm/trend (Development Version)
MC Works64 RT	SW1DND-MCWRT-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	HMI/alarm/trend (Runtime Version)
MC Works64 LT	SW1DND-MCWLT-ET	75, 150, 500, 1500	HMI/alarm/trend (Runtime Simple Version)
MC Graph64 DV	SW1DND-MCGDV-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	HMI (Development Version)
MC Graph64 RT	SW1DND-MCGRT-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	HMI (Runtime Version)
MC Alarm64 DV	SW1DND-MCADV-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	Alarm (Development Version)
MC Alarm64 RT	SW1DND-MCART-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	Alarm (Runtime Version)
MC Historian SD	SW1DND-MCHSD-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k, 500k, 1M	High-speed data collection (Standard Version)
MC Historian ET	SW1DND-MCHET-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k, 500k, 1M	High-speed data collection (Extended Version)

* Version without MX OPC Server enclosed is also available. Contact your sales representative for details.
* A commercially-available OPC server can be used for the OPC server. Refer to the P51 Partner Parts for details on the commercially-available OPC servers.

Function list

Product name	Component [Function]									
	MC AppBuilder [Design support tool]	GraphWorX64 View Client [HMI screen (Runtime)]	AlarmWorX64 View Client [Alarm viewer]	TrendWorX64 View Client [Trend viewer]	GraphWorX64 Development Option [HMI screen creation]	AlarmWorX64 Development Option [Alarm collection/ logger setting]	TrendWorX64 Development Option [Trend viewer/ logger setting]	BACnet [Connection to BACnet]	SNMP [Connection to SNMP]	GridWorX [Grid display of data]
MC Works64 DV	●	●	●	●	●	●	●	●	●	●
MC Works64 RT	●	●	●	●	—	—	—	●	●	●
MC Works64 LT	●	●	●	●	—	—	—	—	—	—
MC Graph64 DV	●	●	—	—	●	—	—	—	—	●
MC Graph64 RT	●	●	—	—	—	—	—	—	—	●
MC Alarm64 DV	●	—	●	—	—	●	—	—	—	—
MC Alarm64 RT	●	—	●	—	—	—	—	—	—	—
MC Historian SD	—	—	—	●	—	—	●	●	●	—
MC Historian ET	—	—	—	●	—	—	●	●	●	—

Product name	Component [Function]									
	ScheduleWorX64 [Scheduling]	ScriptWorX64 [Scrip creation/ RUNTIME]	UDM Tag Restricted [Tag restriction]	MC HistorianServer [High-speed historian]	EZSocketDuo [Middleware function]	MX OPC Server [OPC server]	EarthWorX64 [Wide area monitoring screen]	Workbench64 [Workbench]	Modbus OPC Server [Modbus OPC server]	WebHMI64 Server [Web publishing function]
MC Works64 DV	●	●	—	—	●	●	●	●	●	●
MC Works64 RT	●	●	—	—	●	●	●	●	●	●
MC Works64 LT	—	●	●	—	●	●	—	●	●	●
MC Graph64 DV	—	●	—	—	●	●	●	●	●	●
MC Graph64 RT	—	●	—	—	●	●	●	●	●	●
MC Alarm64 DV	—	●	—	—	●	●	—	●	●	●
MC Alarm64 RT	—	●	—	—	●	●	—	●	●	●
MC Historian SD	●	●	—	● (Standard)	●	●	—	●	●	●
MC Historian ET	●	●	—	● (Enterprise)	●	●	—	●	●	●

Product name	Component [Function]					
	WEBHMI64 CAL [CAL for WebHMI64 (according to client type)]	FrameWorX [Application platform]	Unified Data Manager [Data source manager]	OPC-UA Data Bridging [OPC-UA data bridge]	Global Aliasing [Global alias function]	Distribute Collector [Dispersed type collection server for MC Historian]
MC Works64 DV	1Client (MC Works64 CL DV)	●	●	●	●	—
MC Works64 RT	1Client (MC Works64 CL RT)	●	●	●	●	—
MC Works64 LT	1Client (MC Works64 CL RT)	●	●	●	●	—
MC Graph64 DV	1Client (MC Works64 CL DV)	●	●	●	●	—
MC Graph64 RT	1Client (MC Works64 CL RT)	●	●	●	●	—
MC Alarm64 DV	1Client (MC Works64 CL DV)	●	●	●	●	—
MC Alarm64 RT	1Client (MC Works64 CL RT)	●	●	●	●	—
MC Historian SD	1Client (MC Works64 CL DV)	●	●	●	●	—
MC Historian ET	1Client (MC Works64 CL DV)	●	●	●	●	2 licence

AnalytiX® set parts

Product name	Model	Asset*1	Product outline
AX Energy SV	SW1DND-AXESV-ET	5	Energy consumption rate analysis 1 AX Client + 1 report (MC Works64 license required)
AX Energy	SW1DND-AXE-ET	5	Energy consumption rate analysis + MC Works64 (75tag) + 1 AX Portal CL + 1 report *2
AX Facility SV	SW1DND-AXFSV-ET	5	Error detection/analysis 1 AX Client + 5 report (MC Works64 license required)
AX Facility	SW1DND-AXF-ET	5	Error detection/analysis + MC Works64 (75tag) + 1 AX Portal CL + 1 report *2
AX Portal SV	SW1DND-AXPSV-E	—	Web analysis screen preparation support server HMI application for SharePoint + 1 AX Client (Option for MC Works64)
AX Portal ET	SW1DND-AXPET-E	—	Web analysis screen preparation support server + MC Works (15k tag) + AX Portal + 25 AX Portal CL *2

*1: AX Energy / Facility is licensed in number of analysis (asset) units instead of number of tags.
*2: Version without MX OPC Server enclosed is also available. Contact your sales representative for details.

Function list

Product name	Function								
	Energy consumption rate analysis	Error detection and analysis	Modbus OPC server	Connection to BACnet	Connection to SNMP	Web analysis screen creation support (according to client type)	Ledger	MC Works64 package	Remarks
AX Energy SV	●	—	●	●	●	Server +1 Client (AX Client)	● (1 report)	—	Additional package for MC Works64
AX Energy	●	—	●	●	●	Server +1 Client (AX Portal CL)	● (1 report)	MC Works64 DV	Set part with MC Works64 (75 tags)
AX Facility SV	—	●	●	●	●	Server +1 Client (AX Client)	● (5 report)	—	Additional package for MC Works64
AX Facility	—	●	●	●	●	Server +1 Client (AX Portal CL)	● (1 report)	MC Works64 DV	Set part with MC Works64 (75 tags)
AX Portal SV	—	—	—	—	—	Server +1 Client (AX Client)	—	—	Additional package for MC Works64
AX Portal ET	—	—	●	●	●	Server +25 Client (AX Portal CL)	—	MC Works64 DV	Set part with MC Works64 (15k tags)

Other products

Product name	Model	Tag	Product outline
MC Works64 CL RT	SW1DND-MCWCLRT-E	—	1 client license
	SW1DND-MCWCLRT-EK	—	5, 25 client license
MC Works64 CL DV	SW1DND-MCWCLDV-E	—	1 development client license
	SW1DND-MCWCLDV-EK	—	5, 25 development client license
MC Works64 CL R	SW1DND-MCWCLR-E	—	1 client license for redundant configuration
	SW1DND-MCWCLR-EK	—	5, 25 client license for redundant configuration
MC Historian R	SW1DND-MCHR-ET	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k, 500k, 1M	MC Historian redundant version (Two MC Historian ET added to redundant configuration MC Works64 / MC Graph64 / MC Alarm64)
MC Historian C	SW1DND-MCHC-E	—	MC Historian remote collector license (Dispersed type collection server added to MC Historian ET) (Remote collector is usable only with enterprise version)
MC Historian CR	SW1DND-MCHCR-E	—	Remote collector license for MC Historian R (Dispersed type collection sever added to MC Historian ET redundant configuration)
AX Client	SW1DND-AXC-E	—	1 AX Energy, AX Facility client license (MC Works64 license required)
	SW1DND-AXC-EK		5, 25 AX Energy, AX Facility client license (MC Works64 license required)
AX Portal CL	SW1DND-AXPCL-E	—	1 AX Portal client license
	SW1DND-AXPCL-EK		5, 25 AX Portal client license
AX Energy AS	SW1DND-AXEAS-E	—	MC Works64 (10tag) + 1 asset added to AX Energy *1 (MC Works64 license required)
AX Facility AS	SW1DND-AXFAS-E	—	MC Works64 (10tag) + 1 asset added to AX Facility *1
MC Works USB Key	NZ2HK-IPS	—	USB license key

*1: AX Energy / Facility is licensed in number of analysis (asset) units instead of number of tags.

■ Specifications

System requirements

Item	MC Works64 MC Graph64 MC Alarm64	MC Historian	AX Energy AX Facility AX Portal
Series	PC/AT-compatible personal computer		
CPU	Dual/Multi Core 64 bit processor 2GHz or higher is recommended		
Memory	4GB (8GB or more recommended)		
Hard disk drive (During installation)	4GB or more open space	4GB or more open space	20GB or more open space (50GB or more recommended)
Virtual memory (during operation)	512MB or more		
Disk drive	DVD-ROM drive		
OS*1	64bit Windows® OS (English version)		
Display	Resolution 1024 x 768 pixels or higher		
Database*1	Microsoft® SQL Server®		
.NET Framework	4.0		
Web server*2	Microsoft® Internet Information Services (IIS) 7.0 or higher		
Web browser*1*2	Silverlight® compatible browser (Internet Explorer®, etc.)		
Other requirements	—	—	Microsoft® SharePoint® 2010*4 Microsoft® Office Excel® (2003 or later)*3
iQ Works	1.91V or later		—

*1: Refer to the following table for details on each software's version compatibility.
*2: Required to view a screen on the browser.
*3: Required to use ledger function.
*4: Only AX Portal is compatible.

Compatible OS

OS	MC Works64 MC Graph64 MC Alarm64	MC Historian	AX Energy AX Facility AX Portal
Windows® 8	●	●	●
Windows® 7*1	● (SP1)	● (SP1)	● (SP1)
Windows Server® 2008 R2	—	● (SP2)	● (SP2)
Windows Server® 2008	—	●	●
Windows Vista®*2	—	● (SP2)	—
Windows Server® 2003	—	●	—

*1: Only Professional, Enterprise and Ultimate versions compatible.
*2: Only Business, Ultimate and Enterprise versions compatible. Compatible database (For storing application setting data)

Compatible database (For storing application setting data)

Database	MC Works64 MC Graph64 MC Alarm64	MC Historian	AX Energy	AX Facility AX Portal
SQL Server® 2012*1	●	●	●	●
SQL Server® 2008 R2*2	●	●	●*1	●

*1: AX Energy is compatible only with the SQL Server® 2008 R2 Standard, Enterprise and Developer versions (Express version is not supported).
*2: The free version of Express can be used.

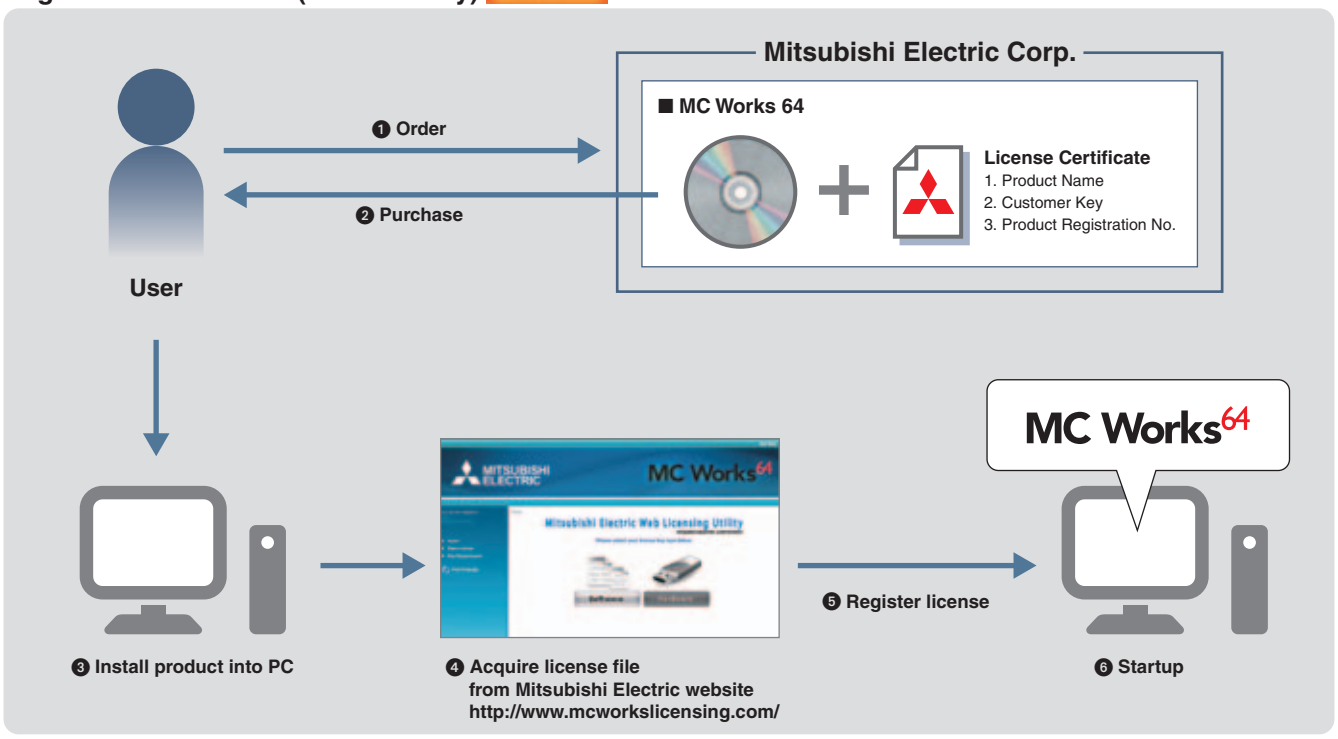
Compatible web browser (for screen display)

Web browser	MC Works64 MC Graph64 MC Alarm64	MC Historian	AX Energy AX Facility AX Portal
Internet Explorer® 10	●	●	●
Internet Explorer® 9	●	●	●
Internet Explorer® 8	●	●	●
Internet Explorer® 7	—	—	●
Firefox 3 and higher	*1	*1	●
Other browser (Silverlight® compatible)	*1	*1	●

*1: Only the Silverlight® version HMI screens can be displayed.

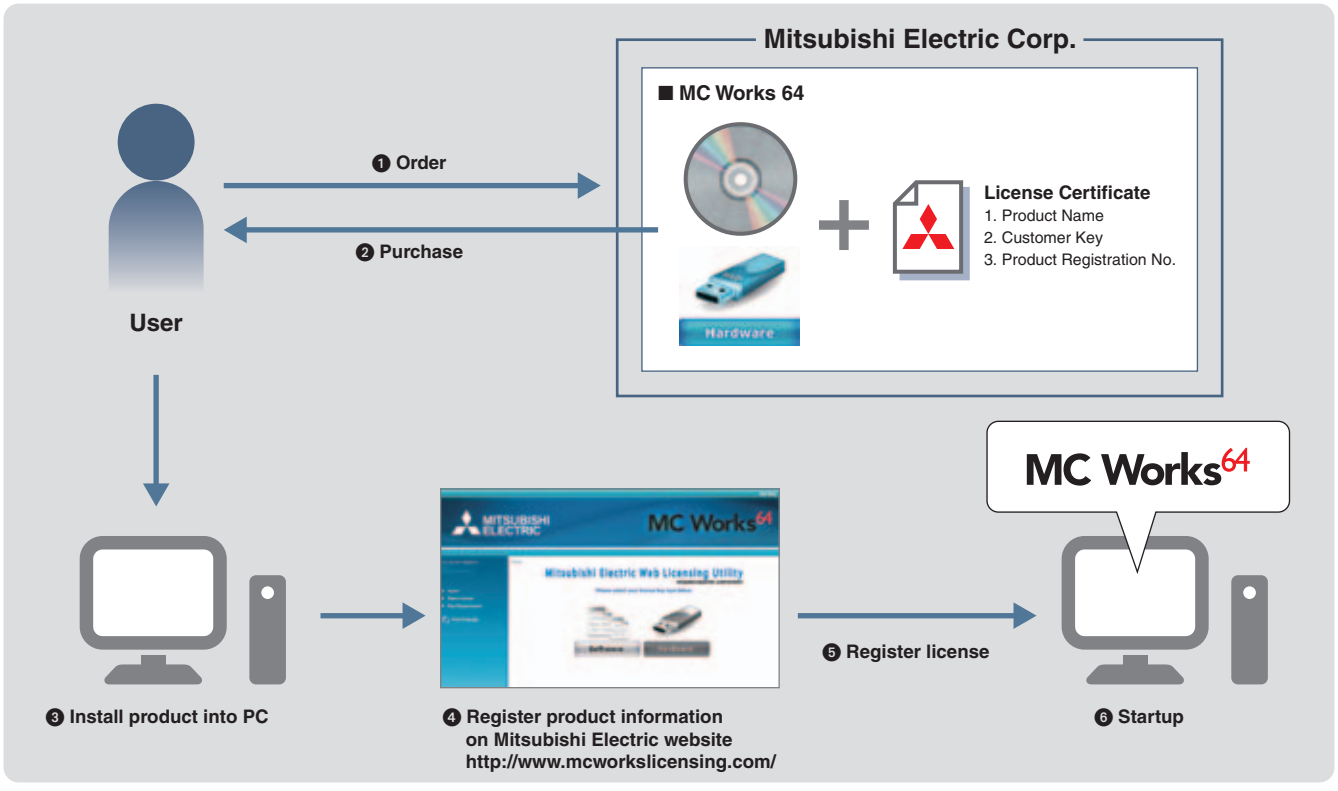
■ Flow to implementing MC Works64

Registration of license (Software key)



* Refer to the manual enclosed with the product for details.

Registration of license (Hardware key)



* Refer to the manual enclosed with the product for details.

DeviceXPlorer OPC Server – TAKEBISHI CORPORATION

DeviceXPlorer is communication software which supports MELSEC-Q series, C Controller, Motion Controller and Graphic Operational Terminal (GOT).
By using DeviceXPlorer, you will access to production data in MELSEC through Ethernet, CC-Link and various MELSEC network.

Region

TAKEBISHI

Takebishi is electric engineering company and supplies manufacturing services by hardware and software technology such as MES, monitoring and controllig.
Since the appearance of MELSEC, we have engineering experience over about 20years, and develops the software product with MELSEC and high affinity corresponding to EZSocket.

Area covered

Asia, Europe, North America, South and Central America, Africa

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Machinery and Electric Machine Division, Engineering Dept.
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E-mail : fa-support@takebishi.co.jp
URL : http://www.faweb.net/us/

MEMO

Extensive global support coverage providing expert

Global FA centers

"Mitsubishi Electric Global FA centers" have been established in various countries around the world to cover the Americas, Europe, and Asia. FA centers help to ensure compliance with the certifications and regulations of different regions, initiate product development in response to local demands, and provide full-time, professional customer service.

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Tel: +886-2-2299-2499 / Fax: +886-2-2299-2509
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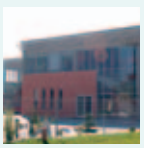

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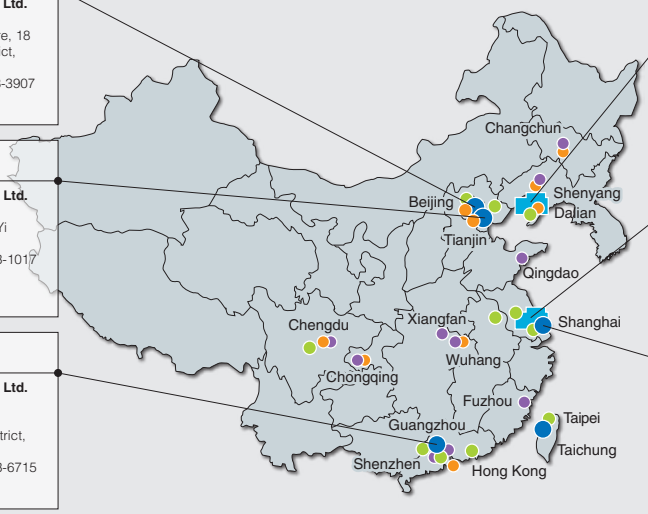
Area covered: China

China (including Hong Kong area)



Local factory in China

Mitsubishi Electric Dalian Industrial Products Co., Ltd.

Local factory in China

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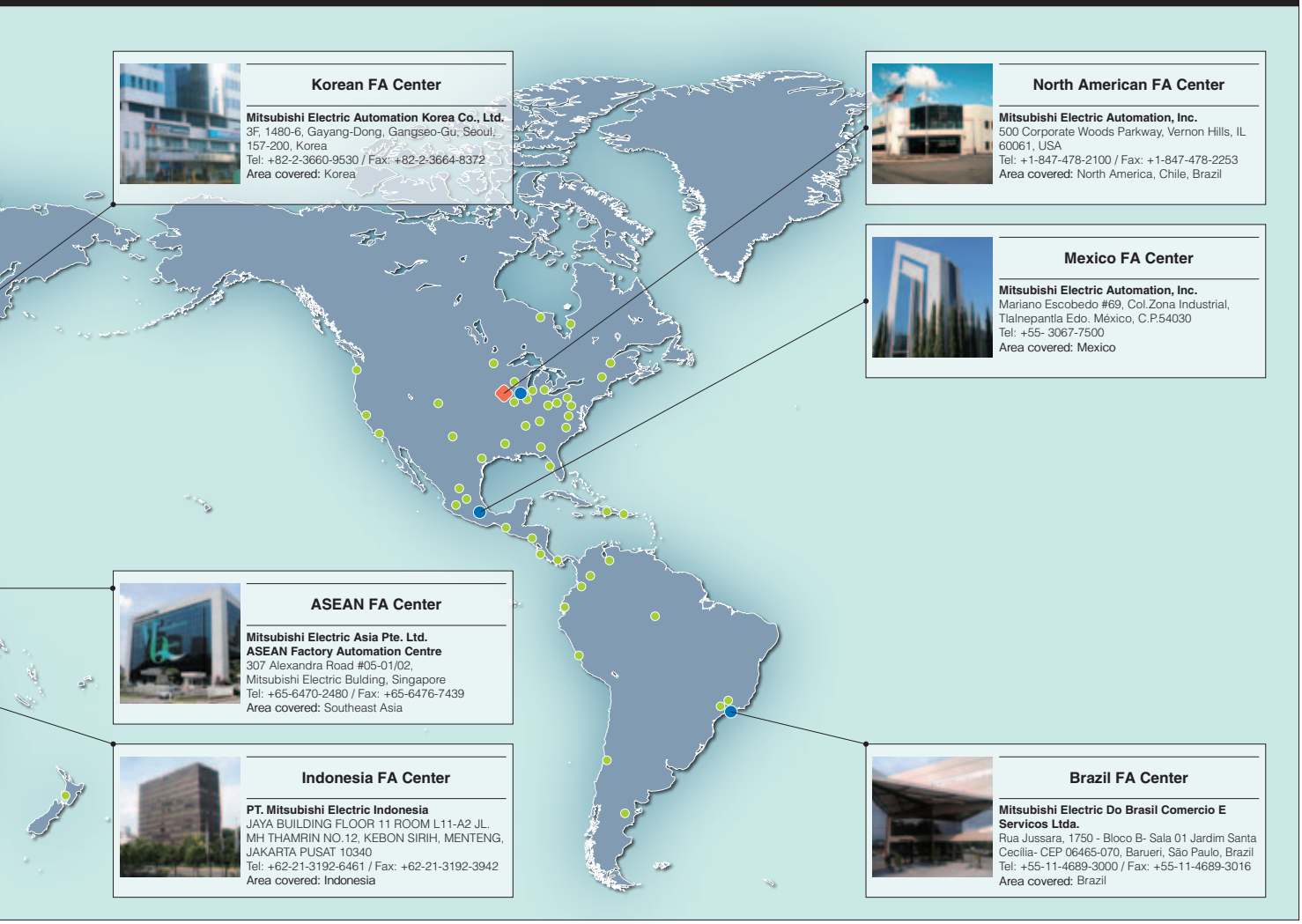
Tel: 86-21-2322-3030 / Fax: 86-21-2322-3000
Area covered: China

help whenever needed.

FA center | FA center satellite (China) | Mechatronics service center (China) | Sales and Service office | Factory location | Development center



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PT. Mitsubishi Electric Indonesia
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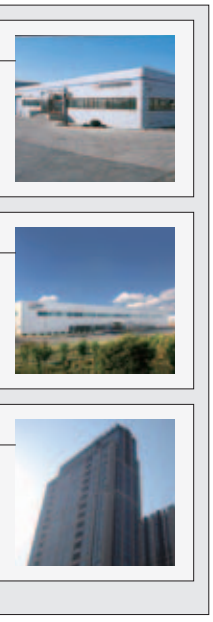
Tel: +55-11-4689-3000 / Fax: +55-11-4689-3016
Area covered: Brazil



Complying with international quality assurance standards.

All of Mitsubishi Electric's FA component products have acquired the international quality assurance "ISO9001" and environment management system standard "ISO14001" certification. Mitsubishi Electric's products also comply with various safety standards, including UL standards.
*For jointly developed and partner products, guaranteed quality standards may differ. Please refer to the product manuals for details.

Safety Standards

CE	CE : Council Directive of the European Communities
c UL us	UL : Underwriters Laboratories Listing

■ Related product catalogs

iQ Platform
Programmable Controllers
MELSEC-Q series [QnU]
L(NA)08101E

Programmable Controllers
MELSEC-L series
L(NA)08159E

PROGRAMMABLE LOGIC CONTROLLERS
MELSEC FX
HIME-B215

Mitsubishi Programmable Controllers
MELSEC Process control/
Redundant system
L(NA)08030E

Programmable Controllers
Real Time Operating System C Controller
L(NA)08165E

Safety Programmable Controller/
Safety Controller/Safety Relay Module
MELSEC Safety
L(NA)08192E

Programmable Logic Controller
MELSEC-Q Series
Energy Measuring Module/
Insulation Monitoring Module
Y-0725

Mitsubishi Graphic Operation Terminal
GOT1000
L(NA)08054

Mitsubishi iQ Platform Compatible
GOT1000 Screen Design Software
MELSOFT GT Works3

Mitsubishi Electric SSCNET III/H compatible
Motion Controller
Q173DSCPU/Q172DSCPU
Simple Motion Module
QD77MS16/QD77MS4/QD77MS2
L(NA)03062

SERVO AMPLIFIERS & MOTORS
L(NA)03058

INVERTER FAMILY
L(NA)06036

Mitsubishi Electric
Energy-saving Data Collection Server
EcoWebServerⅢ
Y-0715

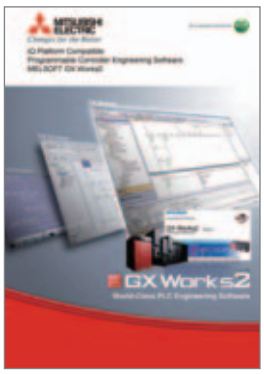
Air Circuit Breakers
Y-0622

MITSUBISHI Energy Measuring Unit
Y-0645

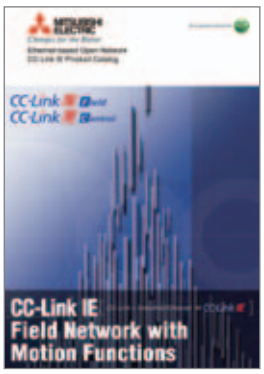
Molded Case Circuit Breakers
Earth Leakage Circuit Breakers
Y-0720

MITSUBISHI ELECTRONIC
MULTI-MEASURING INSTRUMENT
ME96NSR
Y-0686

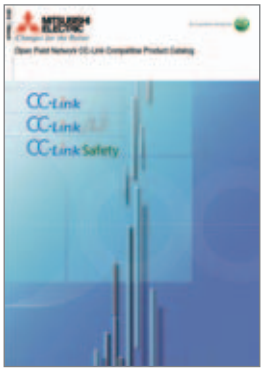
Mitsubishi iQ Platform Compatible
FA Integrated Engineering Software
MELSOFT iQ Works
L(NA)08232ENG



iQ Platform Compatible
Programmable Controller Engineering Software
MELSOFT GX Works2
L(NA)08122E



Ethernet-based Open Network
CC-Link IE Product Catalog
L(NA)08111E



Open Field Network CC-Link Compatible
Product Catalog
L(NA)08038E

MEMO

iQ MELViz PlantSuite

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)

Mitsubishi Electric
Control and Monitoring System for Social Infrastructure
MELViz iQ PlantSuite

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