

SCADA Software  
MC Works64

**e-Factory**

# MC Works<sup>64</sup>



**Next generation integrated  
monitoring solution for IoT**

-Plant-wide monitoring/  
integrated multiple sites monitoring-

# GLOBAL IMPACT OF MITSUBISHI ELECTRIC



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

## ***Changes for the Better***

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

Mitsubishi Electric is involved in many areas including the following

### **Energy and Electric Systems**

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

### **Electronic Devices**

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

### **Home Appliance**

Dependable consumer products like air conditioners and home entertainment systems.

### **Information and Communication Systems**

Commercial and consumer-centric equipment, products and systems.

### **Industrial Automation Systems**

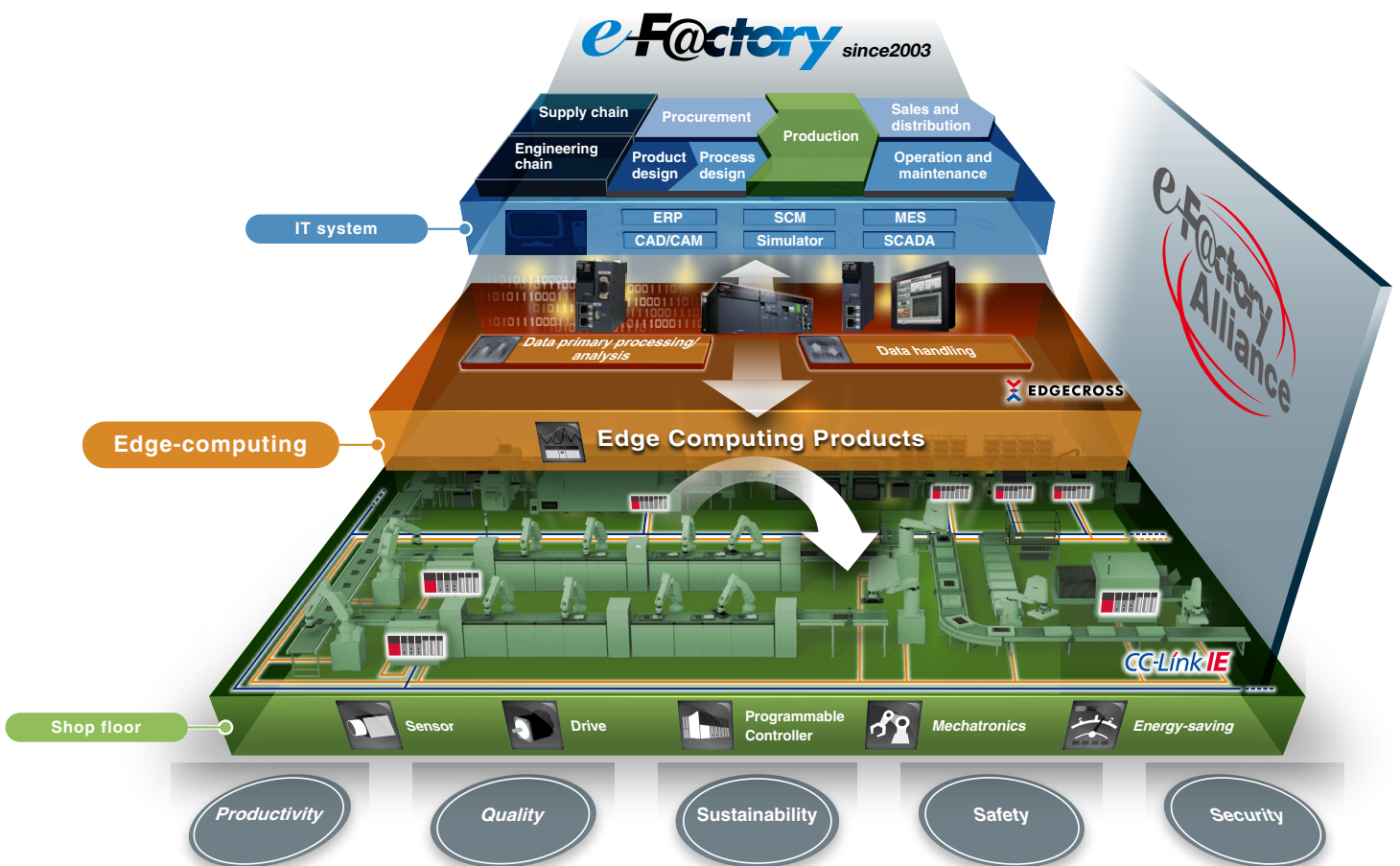
Maximizing productivity and efficiency with cutting-edge automation technology.



Mitsubishi Electric FA integrated solution



e-F@ctory is the Mitsubishi Electric solution for improving the performance of any manufacturing enterprise by enhancing productivity, and reducing the maintenance and operations costs together with seamless information flow throughout the plant.



# Issues in the manufacturing site

MC Works64 provides highly functional monitoring control system in response to various business needs at manufacturing, production process or the office.

MC Works64 proposes solutions to various issues concerning monitoring control.





# MC Works<sup>64</sup>

can solve these issues



Issue 6

Add remote monitoring function

Issues with  
system integrator



Issue 7

Reduce engineering time

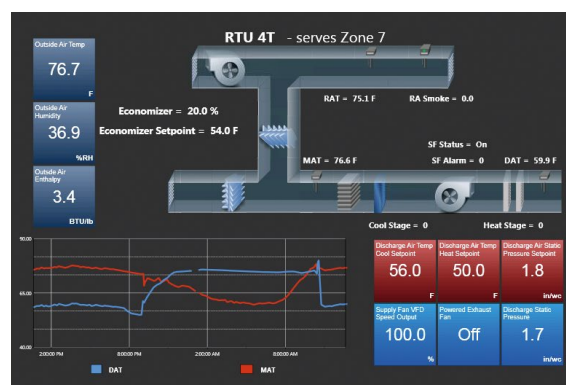


# Improve monitoring and operating efficiency

## Monitoring multiple screens simultaneously is troublesome

### ► 3D graphic screen requires only one screen for monitoring

- Depends on the facility configuration, multiple screens are necessary to show one facility. Operation of viewpoints shifting as well as zooming of the monitoring screen are enabled in the 3D screen. The status of devices can be quickly and correctly monitored and intuitive monitoring/control are realized with one screen.



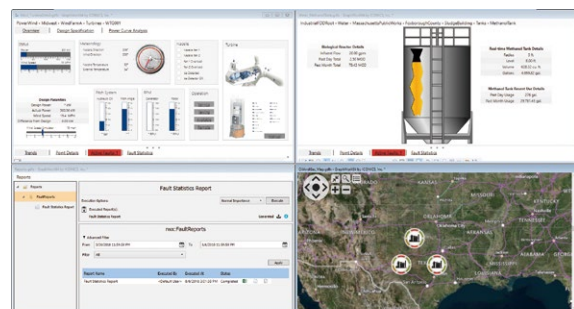
## Monitor multiple data and images simultaneously

### ► All necessary information can be checked with multi-monitor display and multi-view display function

- Many monitoring screen such as 3D graphic screen, map monitoring screen, alarm, and trend included in MC Works64 can be displayed at a time with multi-monitor display and multi-view display function.



Multi-monitor display



Multi-view display

## Function to notify alarm information immediately from anywhere

### ► Mail function and push notification immediately transmit information

- AlertWorX which is a standard function of MCWorks64 notifies alarm information by e-mail or SMS in response to any development.
- AlarmWorX64 Multimedia (MMX), which is an optional product, has a function to send alarm information at alarm detection to the customer's desktop computer, tablet computer, or mobile device by e-mail. Setting to categorize notifying parties into groups and add shift patterns is possible. For example, an operator group and engineering group could be created and assigned to different types of alarm.
- Push notification function has been newly added, offering customers with a prompt alarm notification at the shop floor or office.

#### Mail notification



#### Push notification





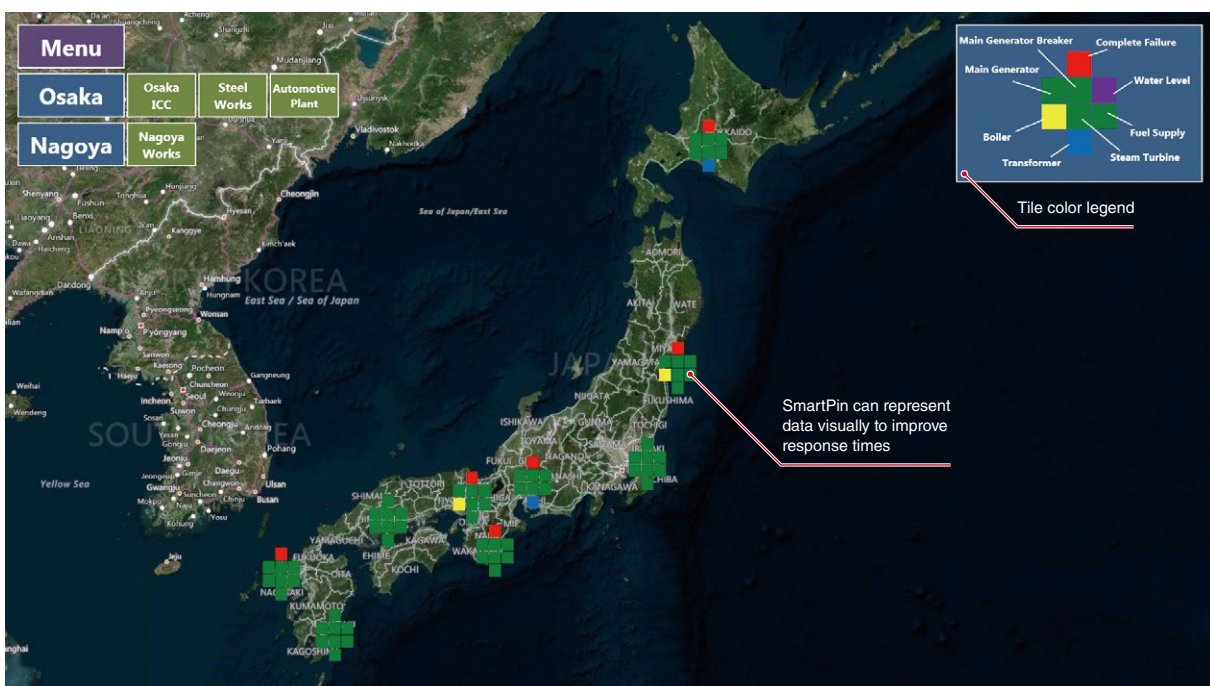


# Monitor multiple factories with wide-area monitoring system

## Easily check data of multiple factories

### ► Utilization of map data enables realistic wide-area monitoring

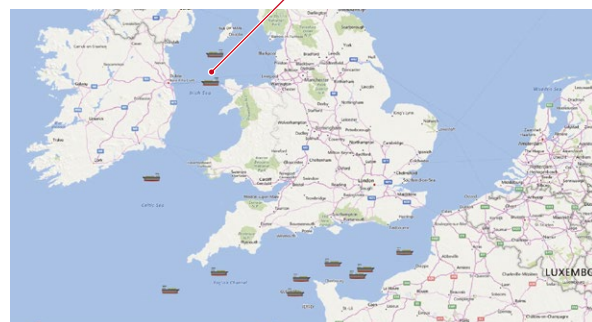
- Display manufacturing sites and factories all over the world on the map to monitor through coordination with general map data such as Google Maps and Bing Maps. Monitoring linked with GPS data is possible.
- SmartPin function enables detailed information and alarm status to be displayed.



Click pin to display detailed information



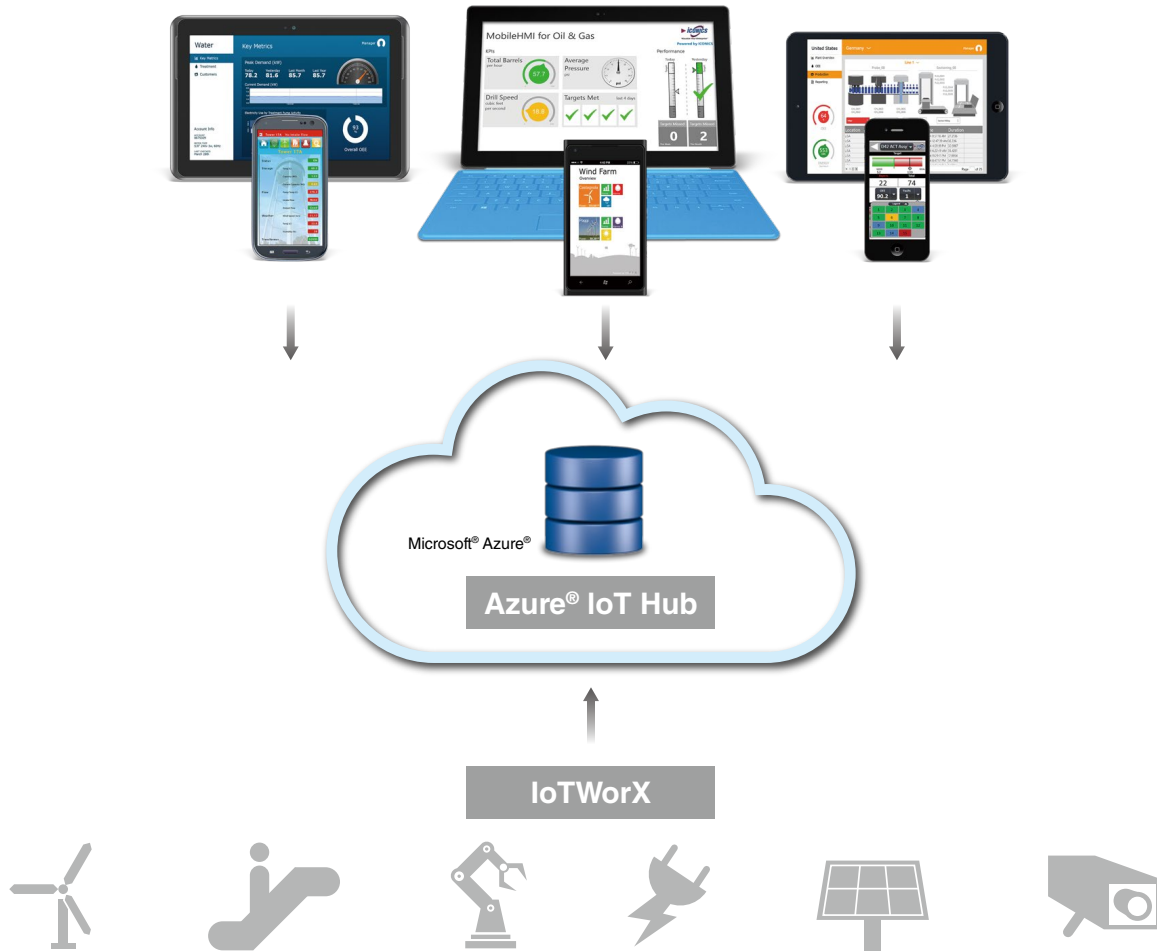
GPS data can be utilized



## Secure data communications with the cloud

### ► Protect important data through secure communications and in the cloud environment

- Integration with Microsoft® Azure® enables secure communications with the cloud via secure protocols using Azure® IoT Hub and IoTWorkX.
- A secure system for publishing data to the cloud from different site scan be configured without constructing VPN service environment.



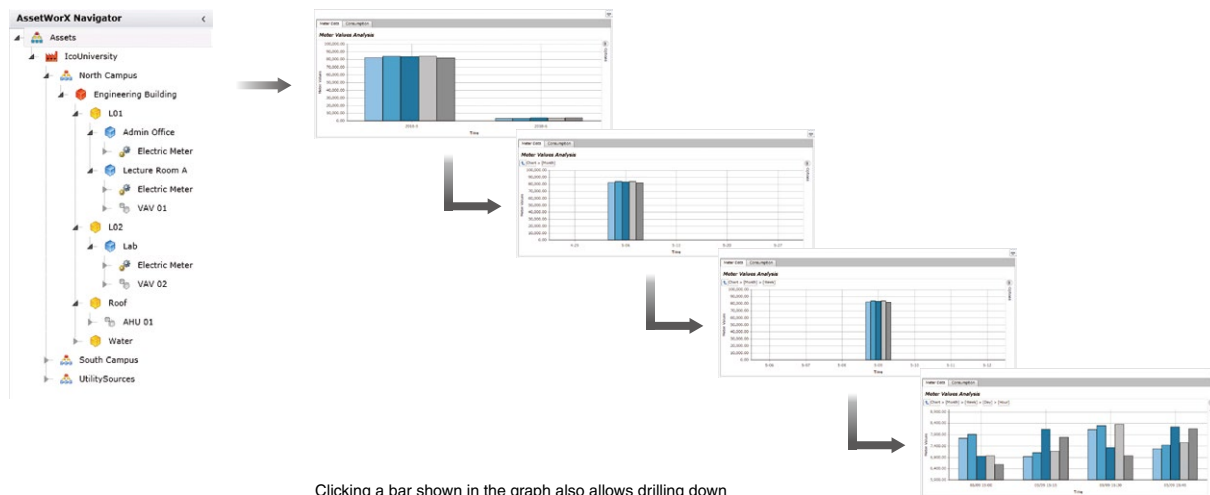
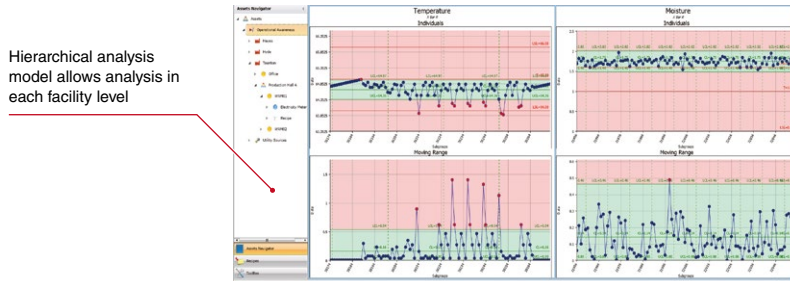


# Promote energy saving

## Efficiently monitor wasted energy consumption

### ► Visualize energy consumption and CO<sub>2</sub> emissions in the whole system or per device

- Causes of abnormal energy use can be located by visualizing electricity and gas consumption in the factory, leading to cost reduction.
- Drilling down the left side tree on the screen (from the left tree in the lower image) displays the energy consumption in the graph according to the selected area/facility.







# Improve operating ratio

## Reduce downtime of the production facility

### ▶ Prevent troubles leading to a long-term facility stop

- Filter a large amount of collected alarm information to display necessary information only. In addition, alarm analysis can be effectively done by combing alarm chart categorized according to conditions such as alarm names and priorities. Taking preventive measures to frequently occurring errors can improve facility efficiency and product quality.



Chart display function visualizes causes of alarms frequently occurring. Downtime can be reduced by taking preventive measures.

## Quickly recover production facility to reduce downtime

### ▶ User customizable fault rules for quick error cause detection

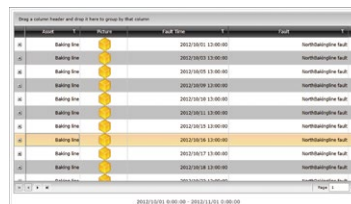
- By registering/accumulating trouble causes, fault causes when errors occur can be displayed in list form, helping a quick recovery of the facility.
- Facility failure can be prevented by analyzing fault causes and the number of faults to weigh the probabilities of failures.



Failure



When an error occurs, possible causes are ranked according to the conditions surrounding the error



Faults occurred are displayed in list form



Number of faults are displayed in graph form

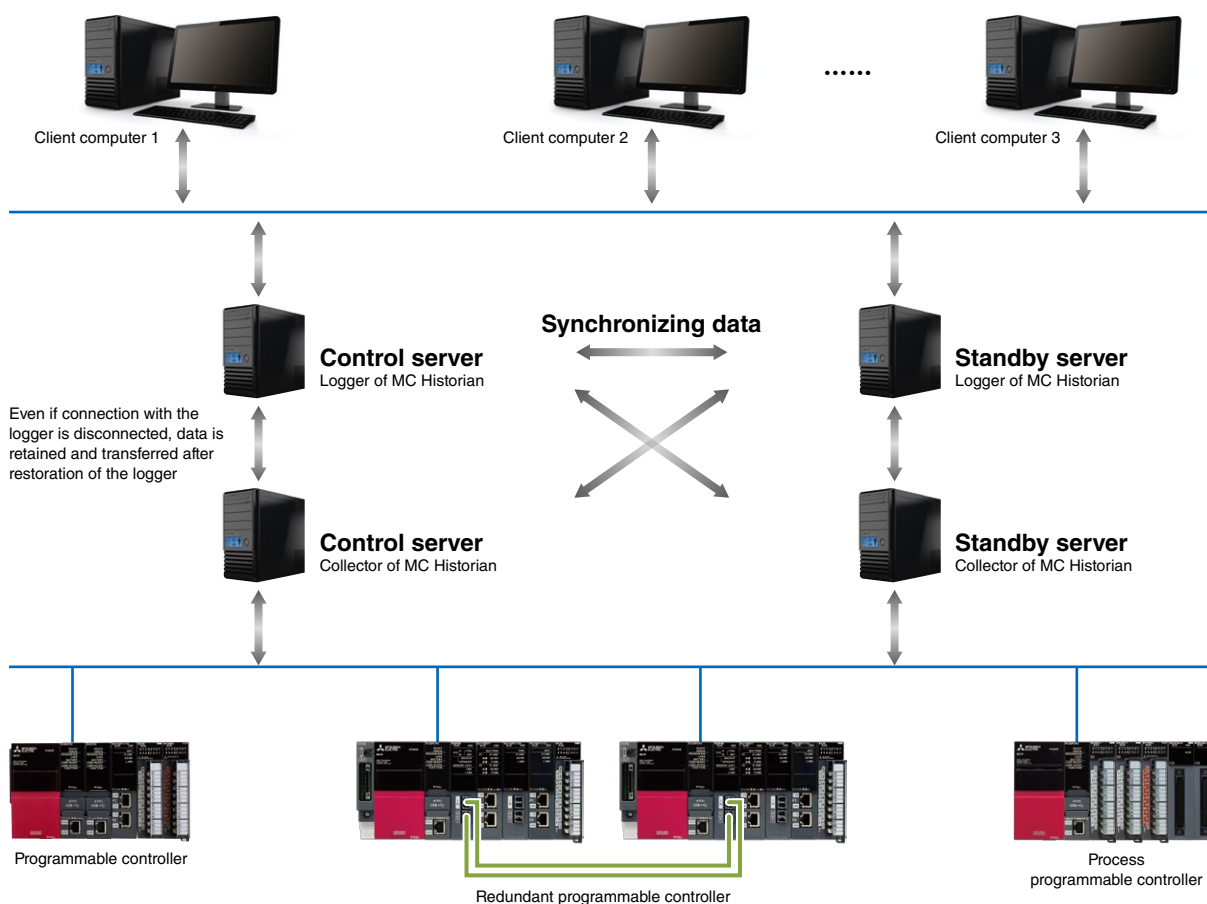


# Configure highly reliable system

## Configure high availability redundancy

### ► Redundant data collection servers (collector) and data storage servers (logger)

- A redundant system can be configured by having two servers and installing data collection (collector) and data storage (logger), which are two functions of the data collection server, on different computers. Even if the server for data storage (logger) went down, data can be stored in the data collection server (collector) for a certain period, enabling complete data collection.



## Collect a large volume of data for a long term

### ► MC Historian realizes a long-term logging of a large volume of data

- Highly reliable data logging function is necessary for data analysis. MC Historian uses dedicated binary files to save data. While performing high-speed and highly efficient data logging, auto archive function enables to store data for a long term and backup.



## Add remote monitoring function

### Monitor equipment and facility from a remote location

#### ► Monitor from a smart phone and tablet computer

- Access and monitor important data from anywhere on any device.
- MC Mobile is compatible with mobile terminals using Microsoft® (Windows Phone®, Surface®), Apple® (iPhone®, iPad®), Android™ (phone, tablet computer), or HTML5.



### Monitor from different clients, but increasing computers are troublesome

#### ► Installing software on client is unnecessary

- WebHMI uses the MC Works64 server as a web server, allowing access and monitor of important data on the web server from any web browser. Adding a client computer is easy just by simple operation as software installation is unnecessary. In addition, license is managed on the MC Works64 server, allowing version management on one computer.





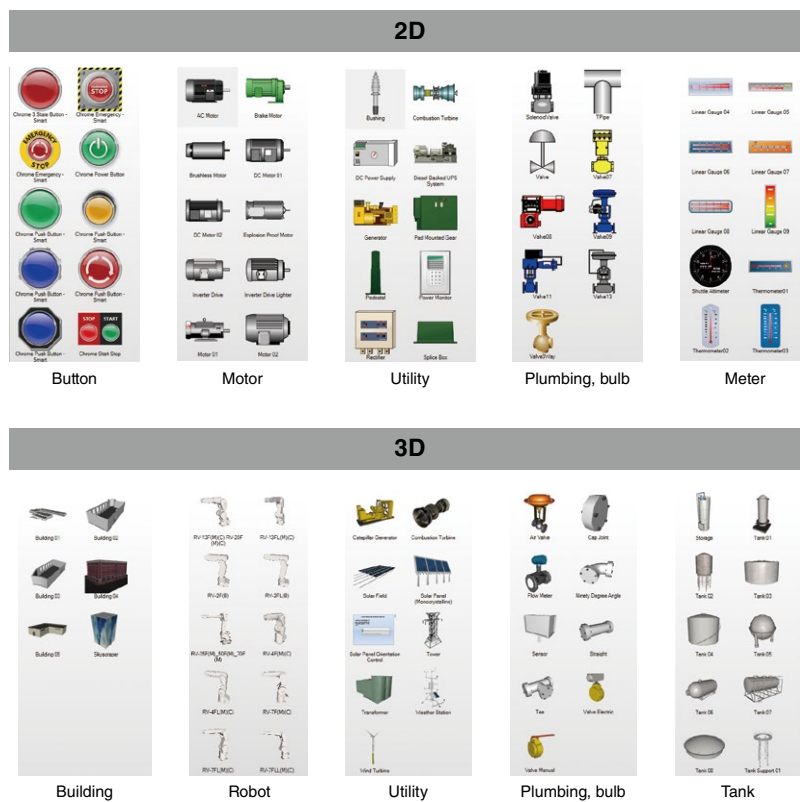


# Reduce engineering time

## Easily create high quality monitoring screen

### ► Variety of libraries help design screens

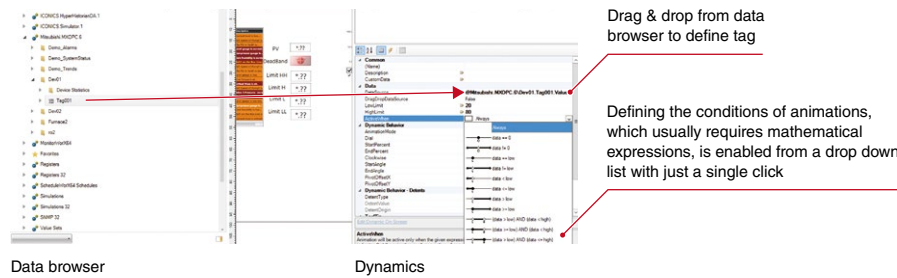
- Utilization of pre-registered symbols in libraries reduces symbol design time.
- Customized symbols can be registered in libraries for easier utilization.
- More than 1000 types of high-definition 2D and 3D symbols for variety of industries such as building management and food/drugs are registered in libraries.



## Easier animation setting

### ► Dynamic function enables dynamic animations

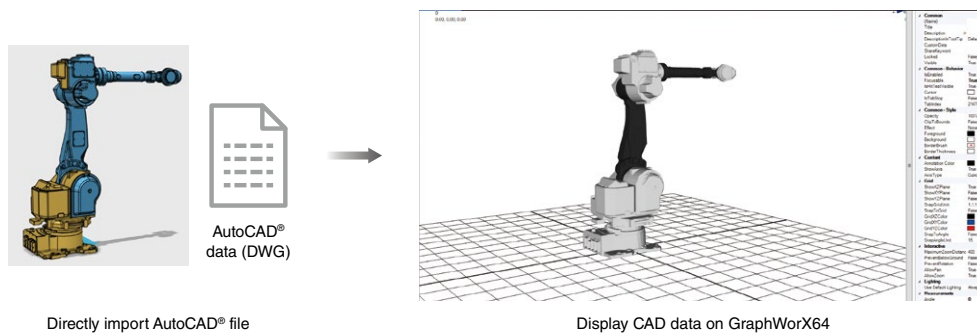
- MC Works64 includes a multitude of dynamic animations that can be applied to any object. Applying animation and defining tag can be done by easy operation.
- Various types of dynamics include pick action, size, location, and color.
- Tags can be registered to symbols to change color and display numerical value.



## Use CAD drawing for monitoring screen

### ► Existing CAD data such as AutoCAD<sup>®</sup> can be imported to create a screen

- Utilization of 2D and 3D image data reduces time for creating a graphic screen.

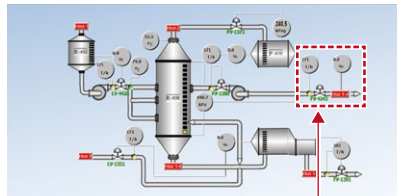
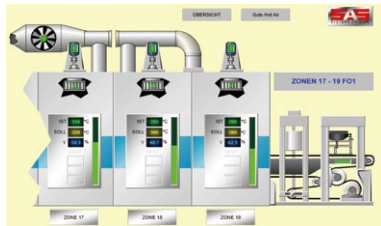


# Basic functions of MC Works64

Monitoring from the whole process system to devices with powerful functions

## GraphWorX64 Graphic monitoring function

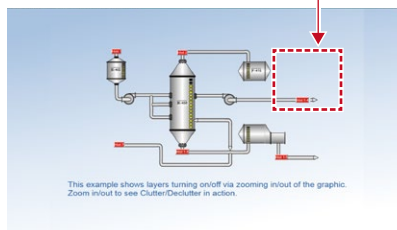
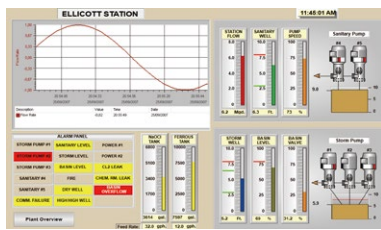
GraphWorX64 has extensive standard libraries. A wide variety of symbols are available (1461 symbols in 2D and 235 symbols in 3D), realizing a professional and user-friendly monitoring screen. Zoom in/zoom out to automatically show or hide objects, enabling efficient visualization of information.



This example shows layers turning on/off via zooming in/out of the graphic. Zoom in/out to see Clutter/Declutter in action.

Zoom in

Layers can be shown/hidden by zooming in or out of the screen.



Zoom out

This example shows layers turning on/off via zooming in/out of the graphic. Zoom in/out to see Clutter/Declutter in action.

By using the built-in 3D functionality, it is possible to create an immersive monitoring screen. With 3D, the user is able to change the screen's viewpoint freely, up to 360 degrees, allowing for intuitive monitoring. It is also possible to zoom into problematic areas when an alarm occurs, enabling the confirmation of alarms intuitively.



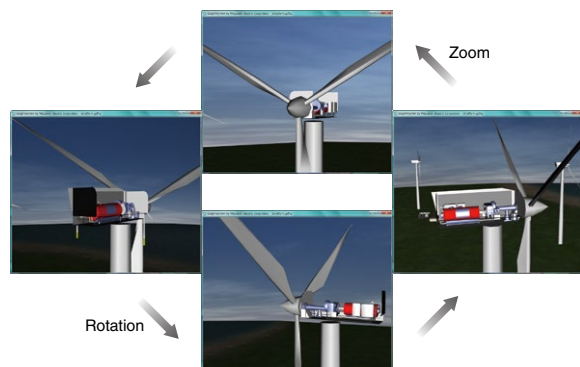
Continuously shift between different viewpoints



Zoom in on the location of an alarm



Pan

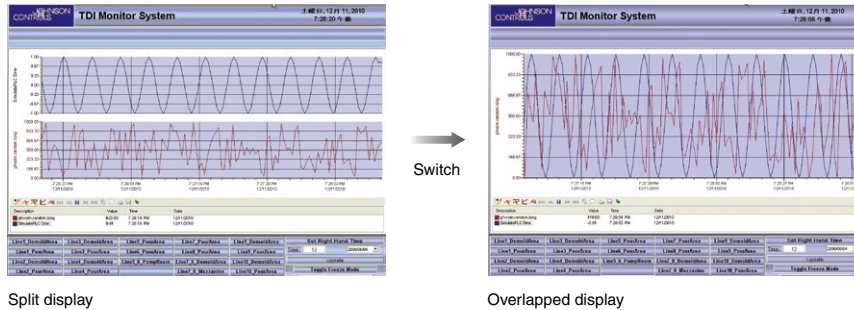


Rotation

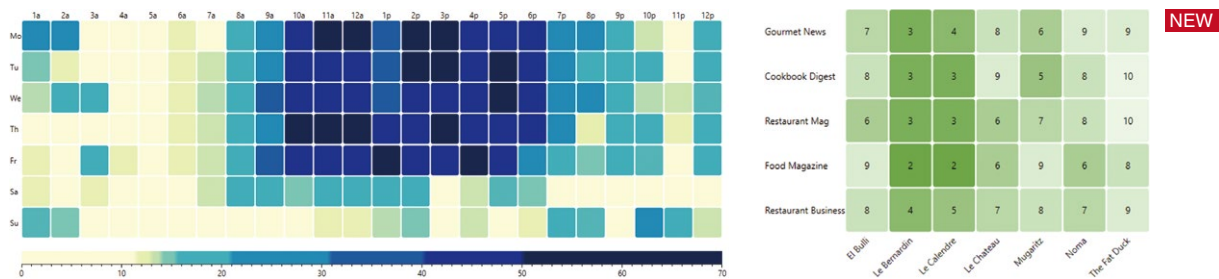
Zoom

## TrendWorX64 Trend display

Several trend graphs can be displayed simultaneously, providing quick understanding of the entire system operation state. In addition, operations such as pausing operation, exporting data, adding pens, and changing the scale are possible.



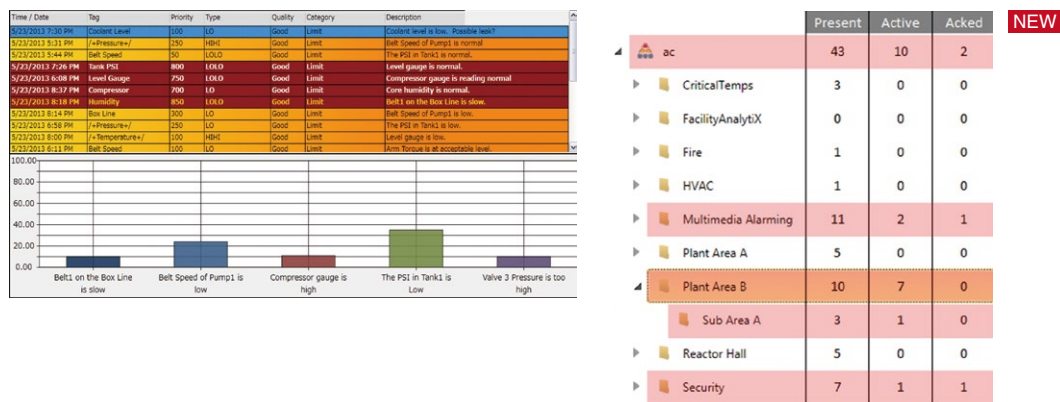
By using the new data diagram function, a data set can be color-coded as a heat map to make data easily visible, contributing to quick analysis.



Heat map: Days and times when alarms most frequently occur and such can be easily understood by colors that change based on threshold values.

## AlarmWorX64 Alarm & event

Monitor process status and notify alarms. Real-time or historical alarm is supported. In addition, combining with AssetWorX, number of alarms per production line/equipment and breakdown of alarm status can be easily checked.



AssetWorX: Display alarm information per equipment/production line on AssetWorX



## Camera control View IP camera stream

The camera control can be used with both GraphWorX64 and MC Mobile screens to stream data from an IP camera. RTSP and MJPEG protocols for streaming are supported. Equipment failure during production can be checked from the office instantaneously, allowing countermeasures to be taken for safe and reliable system operation.



## AssetWorX Asset management by hierarchical tree structure

AssetWorX is an asset management compliant with international standard ISA-95, which defines equipment hierarchy models for physical assets in manufacturing. Assigning a model to the tree according to the actual structure of the enterprise, company/process/factory/line etc. makes it easy to comprehend data at different levels. This can reduce the time taken for decision making and operating the system.

Icons representing each level make it easy to understand the structure of the tree

Name	Icon	Description	Nested
Enterprise	[Enterprise Icon]	Enterprise level	<input type="checkbox"/>
Site	[Site Icon]	Site level	<input type="checkbox"/>
Area	[Area Icon]	Area level	<input checked="" type="checkbox"/>
Process cell	[Process Cell Icon]	Process cell level	<input type="checkbox"/>
Unit	[Unit Icon]	Unit level	<input type="checkbox"/>
Equipment Module	[Equipment Module Icon]	Equipment module level	<input checked="" type="checkbox"/>
Control Module	[Control Module Icon]	Control module level	<input checked="" type="checkbox"/>

Asset	Active
Assets	45
Alarms	45
CriticalTemps	0
Fire	0
HVAC	0
Multimedia Alarming	18
Plant Area A	2
Plant Area B	5
Sub Area A	1
Reactor Hall	2
Security	5
Hazardous	0

Time	Area	Process	Value	Unit	Alarm	Severity	Message	Area
2018/06/06 15:57	Scale	700	LOLO	Good	Scale: Reading is low.	Plant Area B		
2018/06/06 15:57	Pump1	450	LOLO	Good	Pressure in pump1 is low.	Plant Area B		
2018/06/06 16:07	Coolant Level	600	LO	Good	Coolant level is low.	Plant Area B		
2018/06/06 15:57	Alkaline Level	800	LOLO	Good	Alkaline level in...	Plant Area B		
2018/06/06 16:09	Level Gauge	300	LO	Good	Level gauge is low.	Plant Area B		

AssetWorX further enhances visualization of the factory when combined with other functions such as AlarmWorX64 and TrendWorX64

## Universal Connectivity Open connectivity

MC Works64 supports several protocols using the MX OPC Server, allowing connection with various Mitsubishi Electric factory automation products. By using the OPC server manufactured by partner, Takebishi Corporation, other company's controllers can be connected.

### MX OPC UA server

Support OPC UA functionality.

- Monitor and operate equipment with OPC UA
- Support the auto-generation for the setting of OPC UA Server in MC AppBuilder

### MX OPC server

Communication software supporting MELSEC programmable controller.

### Supported products

Model	MX OPC UA server	MX OPC server
MELSEC iQ-R Series CPU	●	●
MELSEC iQ-R Series motion CPU	●	●
MELSEC iQ- F Series CPU	●	●
MELSEC- Q Series CPU	●	●
MELSEC- Q Series motion CPU	●	●
MELSEC- L Series CPU	●	●
MELSEC- F Series CPU	●	●
MELSEC- A Series CPU	-	-
Energy-saving Data Collection Server (EcoWebserver III)	-	●
Air-conditioning controller (G-150AD)	-	●

[Supported communication protocol] MODBUS<sup>®</sup>, DNP3<sup>\*1</sup>, IEC60870<sup>\*1</sup>

[Supported network] Serial, Ethernet, CC-Link IE Control Network, CC-Link IE Field Network, MELSECNET/H, MELSECNET/10, CC-Link

\*1. It is not supported by MX OPC UA Server.

### Support DNP3.0, IEC60870-5

MX OPC server supports DNP3.0 or IEC60870-5

- Monitor and operate equipment supporting DNP3.0 or IEC60870-5  
[Open communication protocol used for DNP3.0/power and water supply facility]  
[Open communication protocol used for IEC60870-5/power industry]

## Partner products

### Device explorer OPC server

Communication software supporting programmable controller CPU, C Controller, motion CPU, and GOT (HMI). Can access production information via various networks such as Ethernet and CC-Link.

[Compatible models]

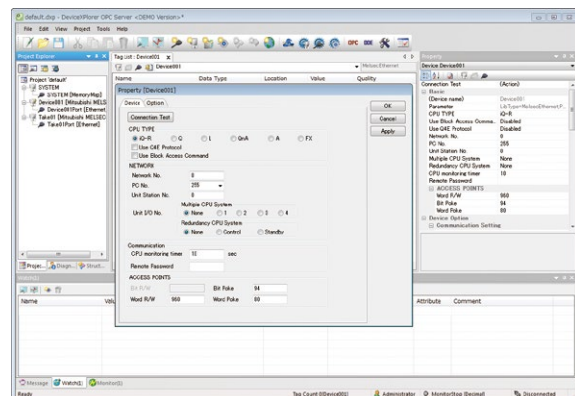
MELSEC iQ-R/iQ-F/Q/L/QnA/A/F Series, GOT (HMI) 2000 Series, CNC numerical controller M700V/ M70V Series, energy saving data collection server EcoServer III, energy saving demand monitoring server E-Energy, energy measuring module EcoMonitorLight, smart meter M5CM-RAL/RL type

[Supported network]

Ethernet, serial, CC-Link, CC-Link IE, MELSECNET/H

[Area supported]

Japan, China, Asia (except Japan and China), Europe, North America, Middle America, Africa

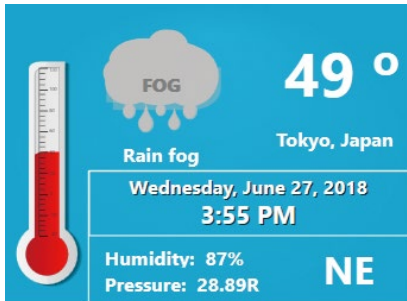


### Takebishi Corporation

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TEL: +81-75-325-2171 E-mail: fa-support@takebishi.co.jp  
URL: <http://www.faweb.net/>

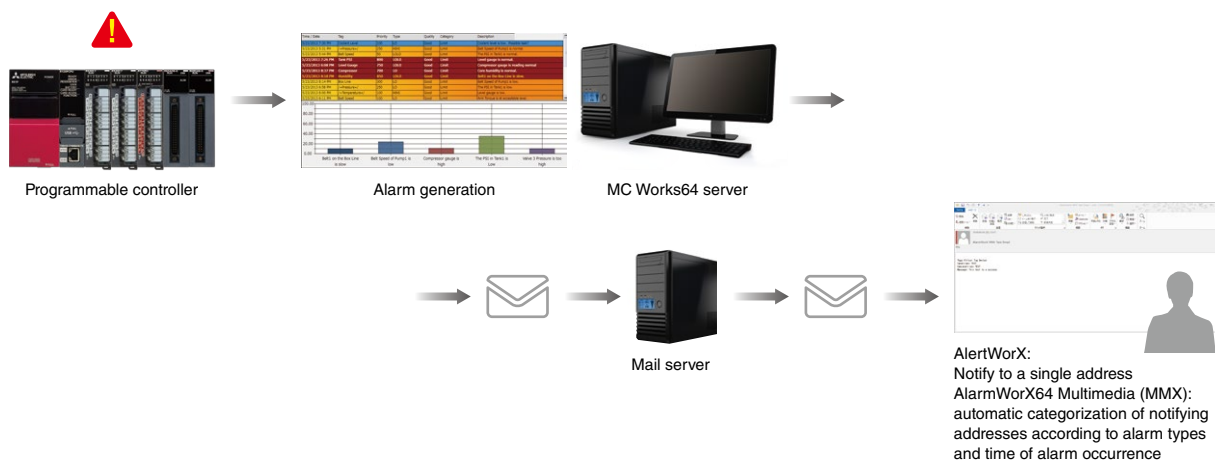
## Open protocol Can access data from anywhere

MC Works64 supports various communications such as OPC DA/AE/HDA/UA, BACnet® (compliant with ANSI/ASHRAE Standard 135-2008), and databases. Different systems in multiple sites and different types of devices can be easily connected. MC Works64 Web Services can obtain weather data utilizing Web Services supporting SOAP or REST on the Internet.



## AlarmWorX64 Multimedia (MMX) Message notification Option

Send notifications containing real-time alarm information by email or SMS. Messages can include: alarm occurrence date, alarm type, and alarm name. AlertWorX, a standard function of MC Works64, has simple settings to send alarm notifications to a single address. Using AlarmWorX64 Multimedia (MMX) enables more advanced settings, such as categorizing notification addresses into groups and adding shift patterns. For example, an operator group and engineering group could be created and assigned to different types of alarm. The target addresses can also be switched automatically according to the current shift pattern.

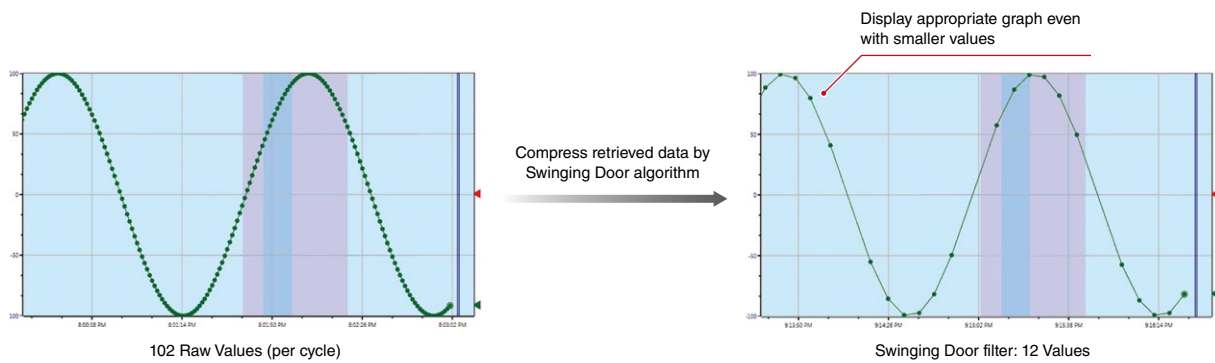


# Integration of IoT in the factory

MC Works64 supports Azure<sup>®</sup> IoT Hub, allowing easier integration of IoT environment in the factory

## MC Historian High-speed/highly reliable data collection Option

High performance and highly reliable data logger can collect 100,000 points/s\*<sup>1</sup> (standard trend collection performance of MC Works64 is 20,000 points/s\*<sup>1</sup>). Computing results can be logged using a calculating formula. Log capacity reduction using high-pressure function (Swinging Door algorithm) enables a long-term logging. MC Historian stores data in the original database not in SQL Server<sup>®</sup>. A simplified version of MC Historian called MC Historian Express is available in both MC Works64 and MC Mobile packages.



\*1. Depends on the system configuration.

### Comparison of product package functions

Function/specifications	MC Historian SD/R (option package)	MC Historian Express (MC Works64 standard package)
High speed logging	●	●
Calculation logging	●	-
High pressure function	●	-
Saving files in HDD* <sup>2</sup>	●	●
Redundant	●* <sup>3</sup>	-
Distributed processing	●* <sup>3</sup>	-
Maximum number of tags	-	5000* <sup>4</sup>
Tag counting method	Counted as MC Historian tag	Counted as MC Works64 tag

\*2. While MC Works64 saves logs in Microsoft<sup>®</sup> SQL Server<sup>®</sup> Express with 10GB limit, MC Historian saves logs directly in HDD enabling a long-term data storage and large amounts of data logging.

\*3. Supported by MC Historian R only.

\*4. Use MC Works64 tag.

\*5. MC Historian has two different redundant patterns.

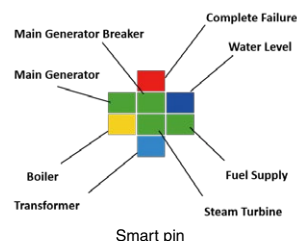
\*6. Retains data for a certain period of time when communications with the data storage are interrupted, then transfers log data to the data storage after communication recovery.

### Comparison of redundant functions

Function/specifications	Redundancy with MC Works64 server license (two licenses) including MC Historian R	Redundancy with MC Works64 server license (two licenses)
Redundant monitoring system (screen)	●	●
Redundant event/alarm	●	●
Redundant logging	●* <sup>5</sup>	-
Automatic server switching (manual switching is enabled)	●	●
Play back function* <sup>6</sup>	●	-

## EarthWorX Wide-area monitoring

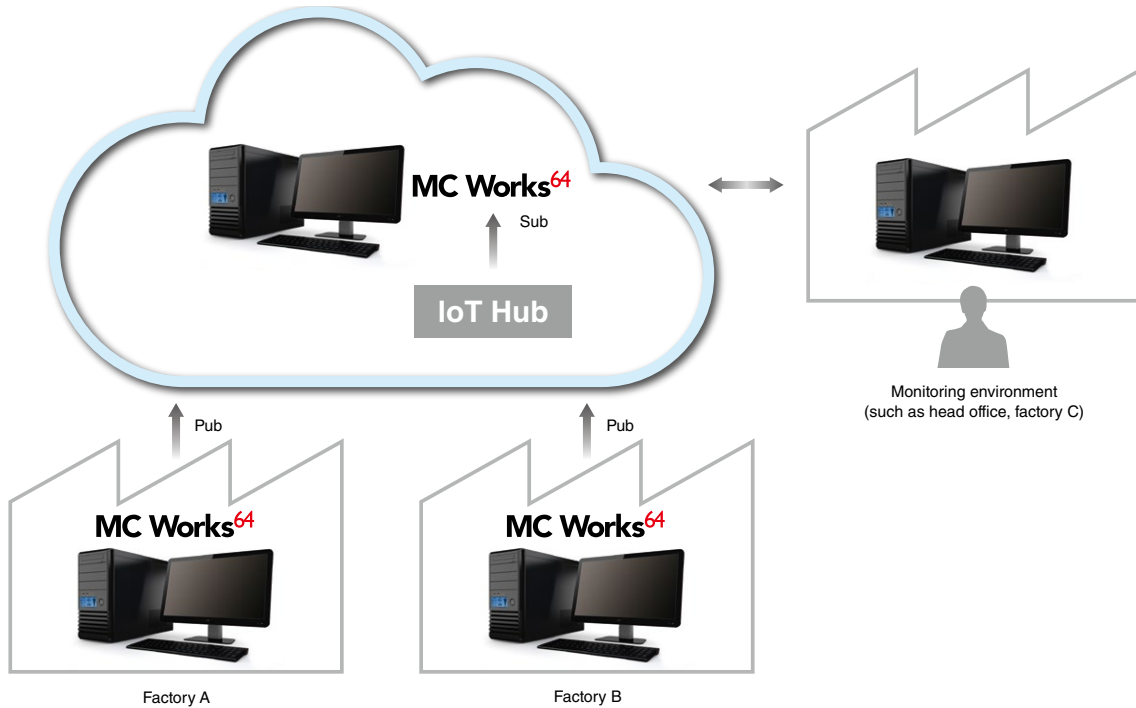
3D geographical information can be downloaded from the Internet and shown on the screen via EarthWorX. In addition, by assigning each tile of a smart pin with the status of a production line or piece of equipment, then arranging the smart pins on the map, the asset state can be easily visible.





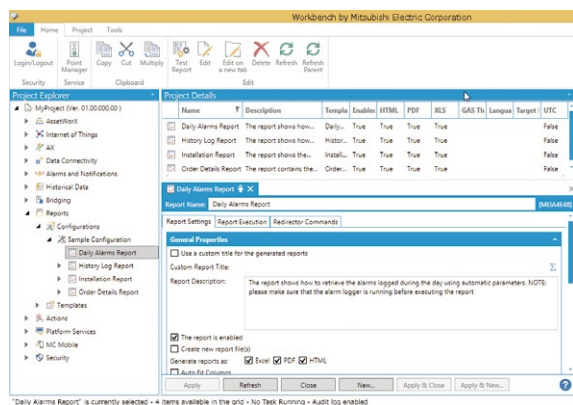
## IoTWorX IoT communication function for Cloud NEW

IoTWorX communicates with Microsoft® Azure® general service: IoT Hub, allowing configuring IoT environment easily.



## ReportWorX64 Report output function Option

Various types of reports including: daily, weekly, monthly, and yearly reports can be created using OPC or BACnet® real-time data, or from various databases (TrendWorX64, AlarmWorX64, MC Historian). This software can create report templates using Microsoft® Excel®, and output them in Excel®, HTML, or PDF format. MC Works64 includes the simplified version of ReportWorX Express\*1, however, use of ReportWorX64 is recommended.



ReportWorX64 and ReportWorX Express are compatible with the 32-bit version and 64-bit version of Microsoft® Excel® 2010 or later.

The differences of ReportWorX64 and ReportWorX Express are given below.

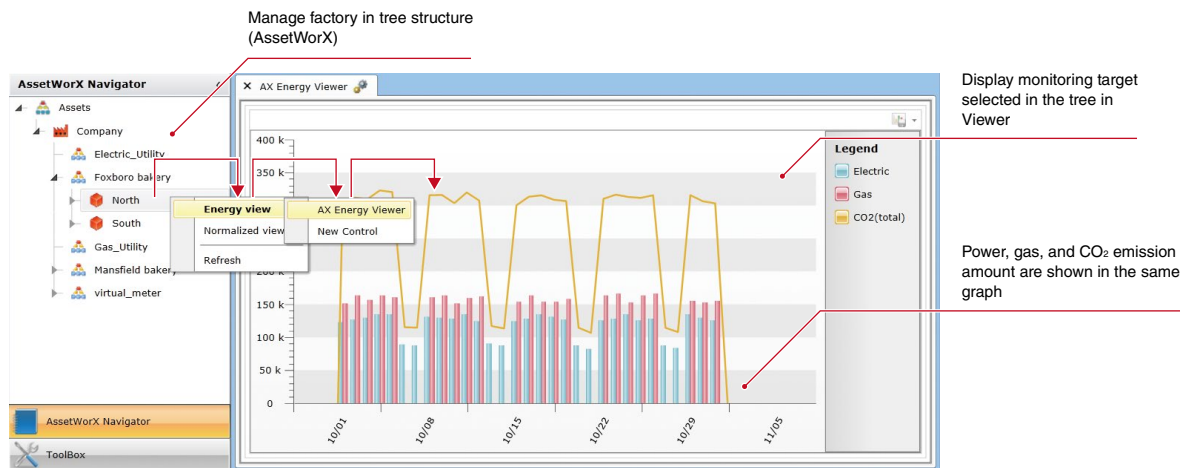
ReportWorX64: A variety of reports can be created from the database, and automatically saved. ReportWorX Express: Reports are created manually by selecting a random range (period) and the data in Excel®.

# Visualize energy consumption in the factory

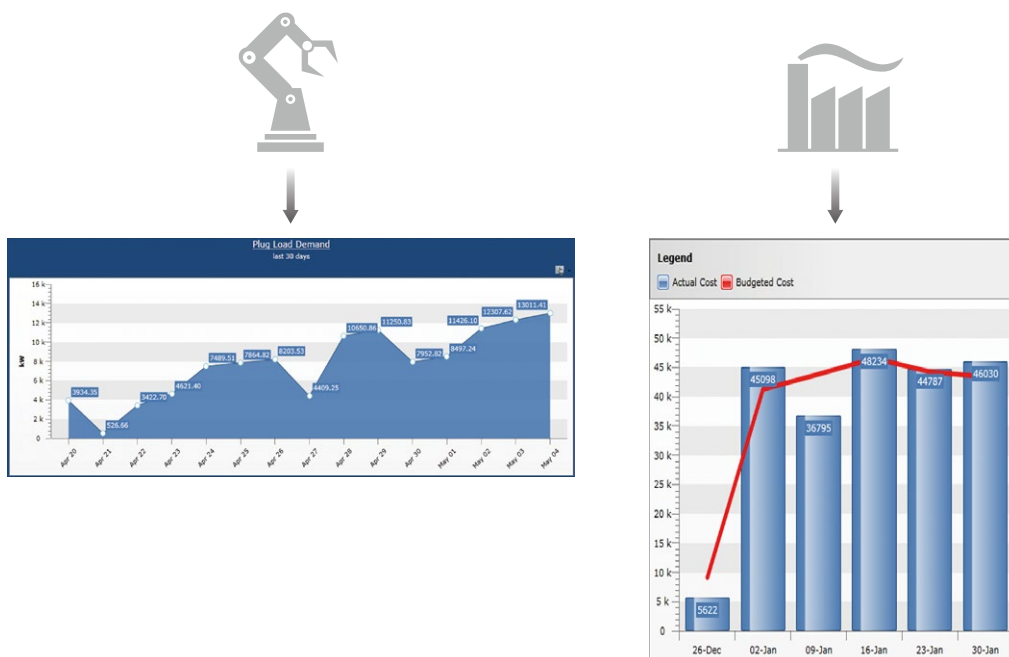
Visualize energy consumption in the factory, contributing to optimization

## AX Energy Visualization and analysis of energy consumption Option

AX Energy realizes data collection and visualization of energy consumption such as power and gas. In addition, specific CO<sub>2</sub> consumption and such can be easily calculated with standard function, contributing to consumption energy analysis and improvement. With its interconnectivity with AssetWorX, energy consumption per level of the factory is easily understood.



Monitoring target level (factory, production line, facility level) and period (year, month, week, day) can be freely switched to display. The hierarchical structure of this asset complies with ISA-95 standard.



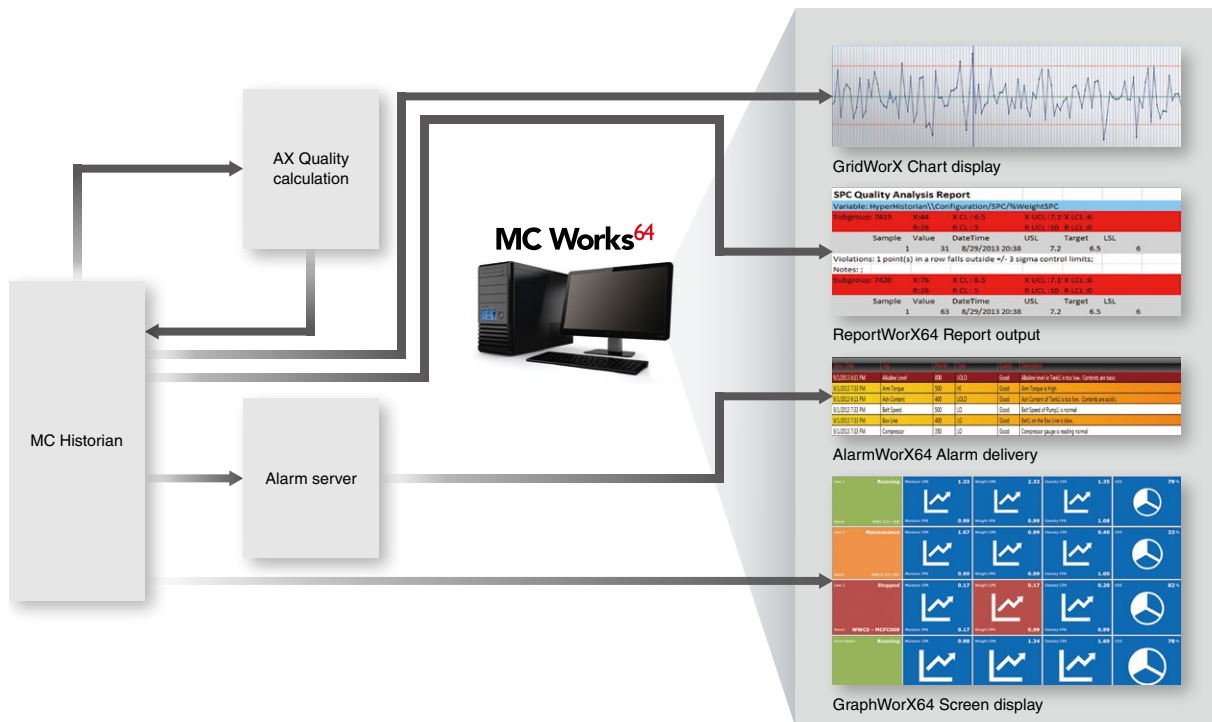
## AX Quality Quality control Option

SPC quality analysis solution performs quality control of the production line using the management chart. Product quality can be improved by monitoring and analyzing process trends.



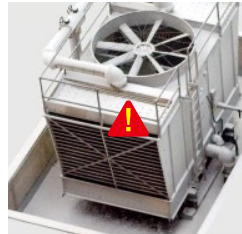
- \*1. USL: upper specification limit
- \*2. USL: lower specification limit

AX Quality interconnects SPC data accumulated in MC Historian with various MC Works64 functions such as ReportWorX64 and GraphWorX64. MC Mobile is also supported; a manager can remotely perform quality control of the process using a tablet computer or a smart phone.



## AX Facility Faults analysis Option

AX Facility enables faster troubleshooting based on registered and accumulated error causes at the time of equipment failure.



MC Works<sup>64</sup>



- Register fault cause
- Accumulate data at failures



Conditions (state) at failures are ranked according to equipment and system



Faults occurred are displayed in list form



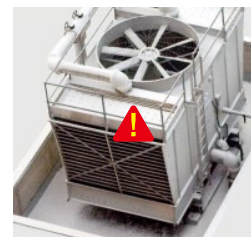
Number of faults are displayed in graph form

MC Works<sup>64</sup>



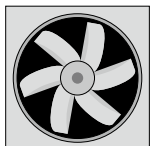
Investigate root causes of air conditioning system failure in order of priority from the accumulated data, enabling efficient troubleshooting

Determines the priority of equipment to be investigated based on ranked fault causes



Stopped air conditioning system

Priority 1: Fan



Priority 1-1: Clogged air inlet

Priority 2: Motor



Priority 2-1: Break operation faulty  
Priority 2-2: Overcurrent

Priority 3: Inverter



Priority 3-1: Network communication failure  
Priorities 3-2: 24 V DC power failure



# SCADA in your palm

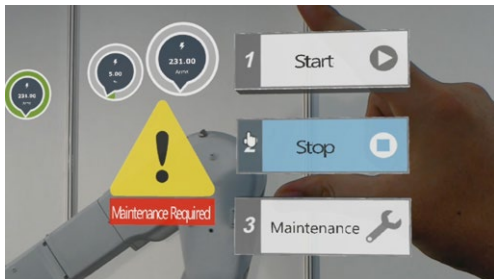
Easily access SCADA from smart devices

## MC Mobile Mobile monitoring Option

MC Mobile is a mobile application that enables monitoring with any mobile device. Personnel can access and monitor important data from anywhere on any device. MC Mobile is compatible with mobile terminals using Microsoft® (Windows Phone®, Surface®), Apple® (iPhone®, iPad®), Android™ (phone, tablet computer), or HTML5.



MC Mobile now supports the latest in Augmented Reality technology. The Microsoft® HoloLens is a wearable device that displays monitoring screens in an augmented space, enabling intuitive operation via a user's real-world field of vision.

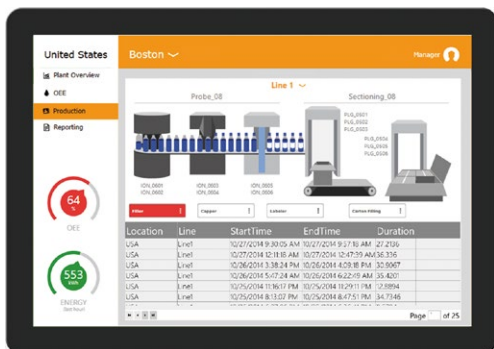


AR (Augmented Reality)

**NEW**

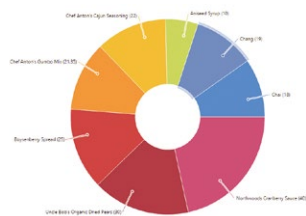


In addition, MC Mobile now supports Control of AX Facility, GridWorX, and ScheduleWorX64. Many functions are now available on MC mobile, thereby increasing usability and visibility.



## KPIWorX Performance indicator display Option

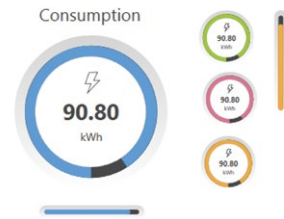
KPIWorX is an application for configuring self-service dashboards. An original dashboard can be created by arranging widgets (device symbols, alarms, trends etc.) on the screen as desired during monitoring, supporting intuitive operation by displaying KPI\*<sup>1</sup> and OEE\*<sup>2</sup> information on a smart phone or tablet computer. Widgets such as the following charts and graphs related to business intelligence (BI) useful for management decision making are now available, helping to configure a visually rich screen with improved visibility.



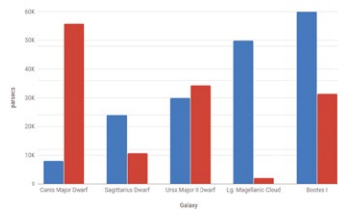
Doughnut chart



Tree map



Variety of symbols



Categorical chart

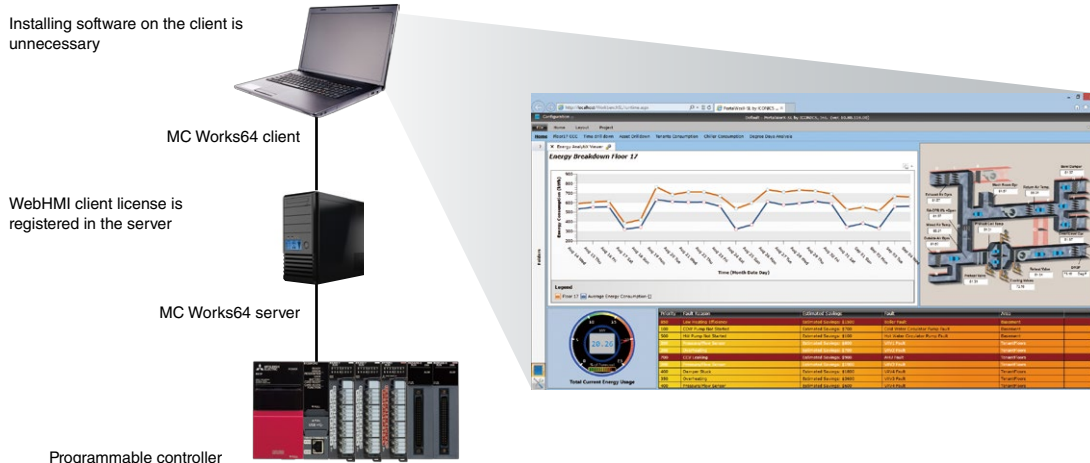
Office	Bads Count	Goods Count	Total Count	Developer Count	Bads per Devel	Goods per Devel
IT	317	76	394	2	158.50	38.00
CZ	688	131	832	13	52.92	10.08
US	425	138	568	9	47.22	15.33
NO	12	2	14	2	6.00	1.00

Table

\*1. KPI: Key Performance Indicator  
\*2. OEE: Overall Equipment Effectiveness

## WebHMI Web monitoring Option

WebHMI uses the MC Works64 server as a web server, enabling monitoring and project editing from the web client (a computer for MC Works64 client). This allows operators to use most of MC Works64 functions from different web browsers. WebHMI can be used without installing software on client computers; setup of client computers is easy.



# Configure robust applications

## Security functions essential for growing needs

### Security functions

Security can be setup easily with MC Works64's application action check boxes. Read/write access can be set according to groups or users based on: screen, symbol, or application similarly to Windows®.

Display registered users and groups

Set accessible applications according to a group or user

Check boxes to authorize read or write

Login permission setting is set just by clicking on the following time sheet and checked visually. For example, when performing system maintenance, setting the accessible time to Works64 in the time sheet allows access authorization setting of unauthorized persons easily and quickly.

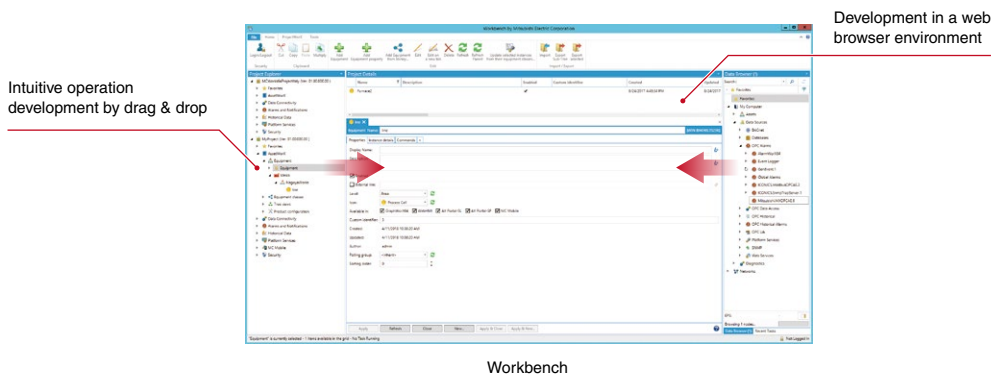
Access authorization can be easily set by dragging the time sheet

# Increase development efficiency

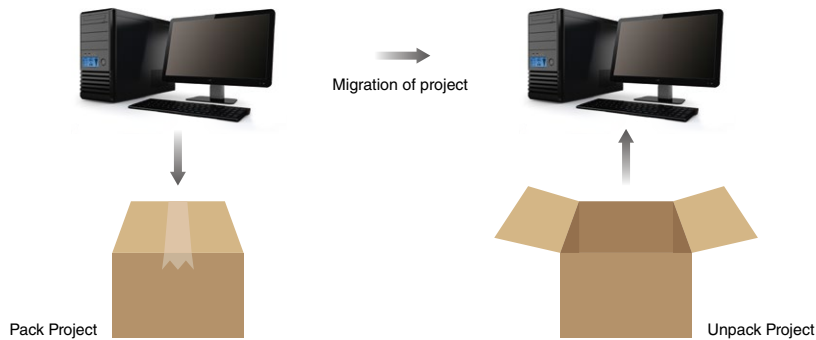
Reduce wasted time and cost

## Workbench Project management tool

Workbench is a project management tool for all MC Works64 related products. Various tools such as GraphWorX64 and AlarmWorX64, which are applications of the MC Works64 suit, can be managed in the centralized environment. Workbench is featuring a project tree display and drag-and-drop operations, allowing construction of visual and intuitive applications. Setting data of each tool can be output in Excel®, CSV, XML format that is editable with familiar Windows® applications. Edited data can be imported and the changed settings can be reflected to each tool. By supporting both local computer and remote computer access, Workbench provides a highly flexible screen development environment.



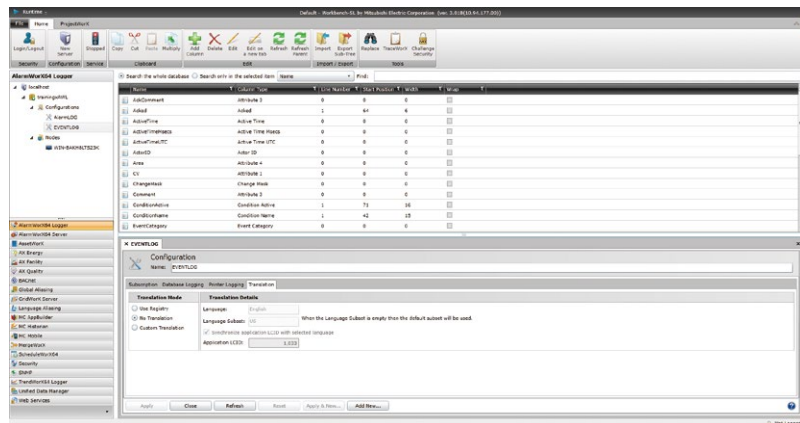
Pack and Go function of Workbench executes migration of projects between computers. Setting of whole project (not per file), restoration per database unit, encryption, and password-protected file creation are supported.





## MC AppBuilder Design support tool

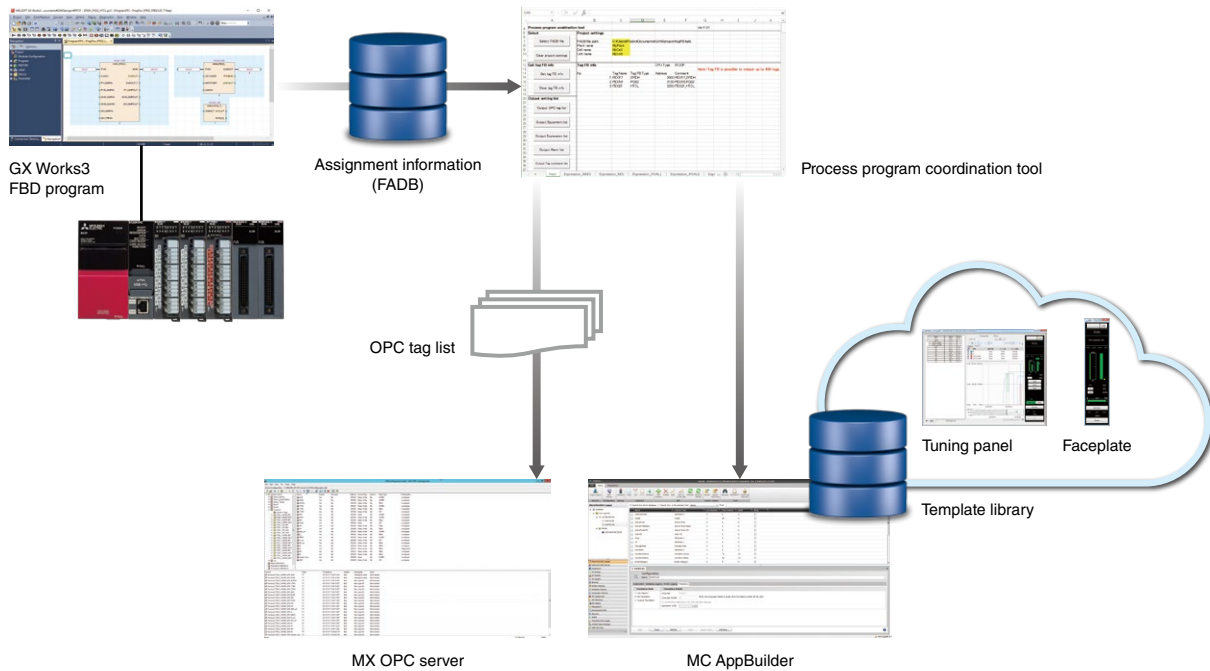
MC AppBuilder is an engineering support tool that enables easier construction of the plant system where MC Works64 and MELSEC programmable controllers are used. MC AppBuilder is bundled with MC Works64 as standard. MC AppBuilder can be started from Workbench-SL. In addition, design contents sharable according to device types are managed as a template\*1 in the library. Assigning templates corresponding to devices in the system tree at designing reduces engineering time. Templates provided by manufacturers as well as customized templates can be registered and utilized.



\*1. Templates include graphic part information such as symbols and faceplates, control program information such as function blocks, and various interface information (alarm, trend setting).

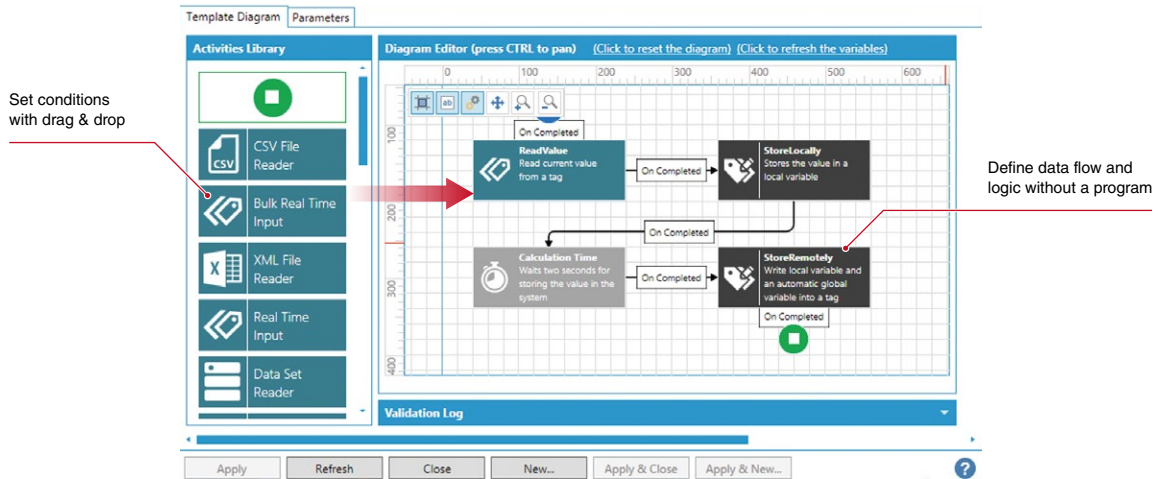
## Process program coordination function

MC AppBuilder generates faceplate templates and device/tag assignment information for the OPC server in coordination with GX Works3 and PX Developer, contributing to engineering time reduction.



## BridgeWorX64 Data handling Option NEW

Data, files, and web services can be handled by connecting to a variety of data source, such as OPC and SQL, MES and ERP, and using a graphical process design tool called transaction flow diagram. Large volumes of data such as logging from database to database can be handled also.

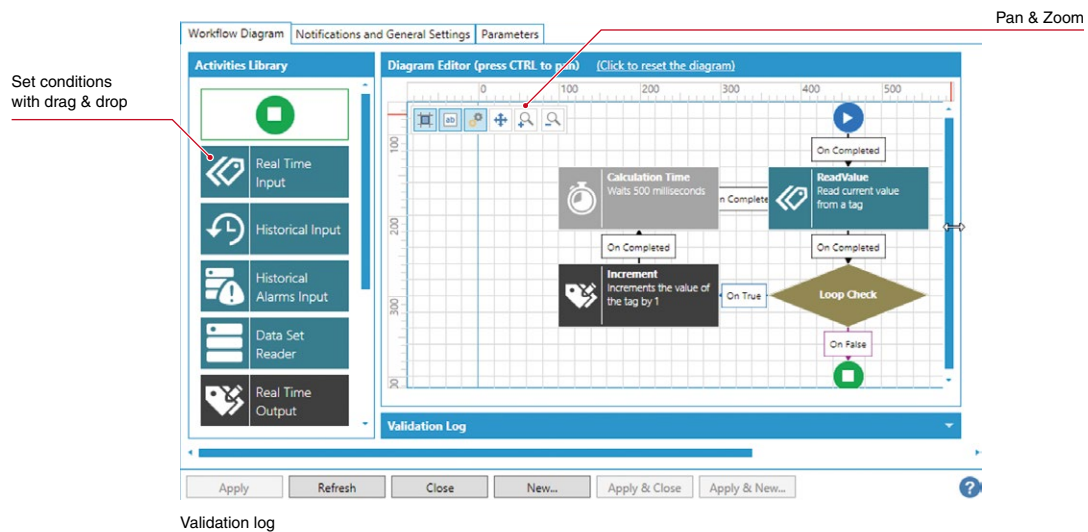


## Workflow Script processing using flowchart NEW

By using Workflow, data that was previously processed with scripts can now be executed with graphical process flows similar to SFC. Processes such as data recording, alarm notification, and report outputs can be executed with the defined process flows.



For example, Workflow is extremely effective in the following situation.  
Archive the table if Historian is running in the middle of the night and no users are logged in.



### [Differences between BridgeWorX64 and Workflow]

The main difference is that BridgeWorX can handle large volumes of data, such as when reading the database or logging into the database. On the other hand, Workflow can successively execute relatively light processes (output to the DA Tag, etc.) according to the set scan rate.

# Respond to the increasing needs of the industry

MC Works64 complies with global standards

## Regulatory compliance (ISA18.2) NEW

AlarmWorX64 provides functions to comply with ANSI/ISA18.2 a US alarm management standard. MC Works64 helps promote global compatibility of customer's systems through compliance with internationally mainstream alarm system.



Description	NewState
Ash Content of Tank1 is...	SUP
Arm Torque is at...	SHE
Alkaline level in Tank1 is...	OOS

**Acknowledge & Operation of Alarms and Events**

Type: All Items      Operation: Acknowledge

What: Operation Clear, LatchAck Off, LatchUnack Off, Shelve On, Shelve Off, OutofService On, OutofService Off, Suppress On, Suppress Off, Report Progress, Acknowledge

Filter: Severity between: 0 and: 1,000

Field: AckRequired with value:

Comment:

Key Pad    Ok    Cancel

## Regulatory compliance (FDA 21 CFR Part 11)

Food and drug manufacturers and developers need to implement controls to comply with Part 11 according to each device and manufacturing system. MC Works64 provides necessary functions to help comply with the regulation.

Operation check function

Time / Date	Tag	Priority	Type	Quality	Description
3/26/2011 1:24 PM		500		Good	Service started
3/26/2011 1:24 PM	TwxLog64	500		Good	Started Logging
3/26/2011 1:24 PM	TwxLog64	400		Good	Loaded configuration: Configuration (1)
3/26/2011 1:24 PM		500		Good	Service stopped
3/26/2011 1:23 PM	TwxLog64	500		Good	Stopped Logging
3/26/2011 1:23 PM	FrameWorX Server	600		Good	User "admin" logged in
3/26/2011 1:22 PM	AWXL0g32	500		Good	License Enabled
3/26/2011 1:22 PM	AWXL0g32	500		Good	ICONICS AlarmWorX64 Logger Started.
3/26/2011 1:22 PM	AlarmWorX64	500		Good	AlarmWorX64 Viewer is correctly connected to the subscription ©Mi:Con

Audit trail function

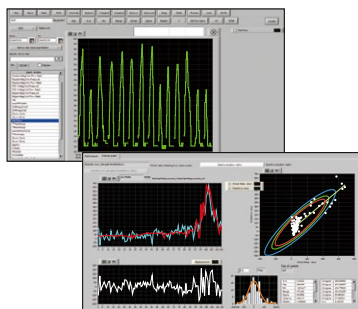
## MC Works<sup>64</sup> Edge-computing edition NEW

Model with optimized functions for edge computing, supporting MELIPC MI5000 and MI2000. Utilizing Edgecross, operation status can be checked and diagnosis results can be displayed.



### Coordination with other Edge applications

Utilization of analysis results of data collected through Edgecross and corrective procedures accumulated by users when an error occurs will minimize the facility downtime at the time of preventive maintenance and facility error.



#### Real-time data analyzer

One software enables real-time diagnosis and offline analysis of production data



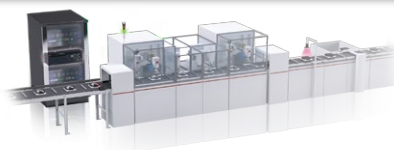
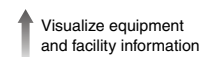
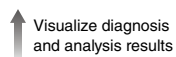
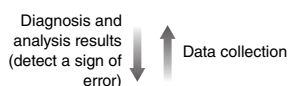
#### MC Works<sup>64</sup> Edge-computing edition

Visualize facility and equipment in which a sign of fault is developing, enabling preventive maintenance before an event occurs



#### MC Works<sup>64</sup> Edge-computing edition

Visualize operating status of equipment and facility Edgecross delivers and KPI information



### Product configuration table<sup>\*1</sup>

Product	Model	Version
MC Works <sup>64</sup> Edge Computing Edition	SW4DND-MCWEG-MT 75/150/500/1500/5K	Development version
MC Works <sup>64</sup> Edge Computing Edition CL	SW4DND-MCWEGCL-MK1	Client version
MC Works <sup>64</sup> Edge Computing Edition AS	SW4DND-MCWEGAS-MT5	Asset license
MC Works <sup>64</sup> Edge Computing Edition TG	SW4DND-MCWEG-MT 500/1500	Additional tag license

<sup>\*1</sup>. This product needs to be installed on MELIPC. Software operating environment is the same as use for MELIPC MI5000 and MI2000. For more information, please refer to "Industrial Computer MELIPC Series" catalog (L(NA)08578)

# Operating environment

## System requirements

Item	MC Works64	MC Historian	MC Mobile	AX Energy AX Facility AX Quality
Series	PC/AT-compatible computer			
CPU	Dual/Multi Core 64-bit processor 2 GHz or higher recommended			
Memory	8 GB (16 GB or larger recommended)			
Hard disk drive (for installation)	Free space of 10 GB or larger	Free space of 160 GB or larger	Free space of 10 GB or larger	Free space of 50 GB or larger
Virtual memory (for operation)	512 MB or larger			
Disk drive	DVD-ROM drive			
OS*1	64-bit Windows® OS			
Display	Resolution: 1024 × 768 pixels or more			
Database*1	Microsoft® SQL Server®			
.NET Framework	4.6.2			
Web server*2	Microsoft® Internet Information Services (IIS) 7.0 or later			
Web browser*1*2	HTML-compatible browser (Internet Explorer® etc.)			
Other requirements	-			
PLC Engineering Software*3	GX Works2 (1.545T or later) GX Works3 (1.045X or later)	-	-	-

\*1. For details of the compatibility with specific versions, see the table below.

\*2. Necessary to view browser screens.

\*3. Necessary for automatically generating programmable controller projects with MC AppBuilder.

## OS compatibility

OS*4*5*6	MC Works64*6	MC Historian	MC Mobile	AX Energy AX Facility AX Quality
Windows® 10*7	●	●	-	-
Windows® 8, 8.1*8	●	●	-	-
Windows® 7*9	●	●	-	-
Windows® 7 SP1*9	●	●	-	-
Windows Server® 2016	●	●	●	●
Windows Server® 2012 R2	●	●	●	●
Windows Server® 2012	●*10	●	●	●
Windows Server® 2008 R2 SP1	●*10	●	-	●
Windows Server® 2008 R2	-	-	-	-

\*4. All operating systems are 64-bit versions.

\*5. With a client computer for Web browser monitoring, the software can be used with either 32-bit or 64-bit version of Windows® OS (Professional, Enterprise, and Ultimate editions).

\*6. Operation with an Embedded system is not guaranteed.

\*7. Windows®10 Home, Mobile, Mobile Enterprise, Education, IoT Core, and IoT Enterprise are excluded. Operation on Professional and Enterprise is guaranteed.

\*8. Operation with Windows®8, 8.1 Professional, and Enterprise is guaranteed.

\*9. For Windows®7, only Professional, Enterprise, and Ultimate Editions are supported.

\*10. Operation of MC AppBuilder is not guaranteed with the Windows Server® operating system.

## Database compatibility (data storage)

Database	MC Works64 MC Alarm64 MMX LT	MC Historian	MC Mobile	AX Energy*11	AX Facility AX Quality
SQL Azure®	●	●	●	-	-
SQL Server® 2016 (including Express)	●	●	●	●	●
SQL Server® 2014 (including Express)	●	●	●	●	●
SQL Server® 2012 (including Express)	●	●	●	●	●
SQL Server® 2008 R2 (including Express) SP1	●	●	●	●	●

\*11. When using SQL Server® Express (free edition), a capacity of one DB is limited to 10 GB.

## Web browser compatibility (screen display)

Web browser	WebHMI screen	WebHMI screen (Silverlight®)	MC Mobile screen (HTML5)
Microsoft® Edge	-	-	●
Internet Explorer® 8-11	●	●	●
Firefox® 3-4	-	●	●
Safari®	-	-	●
Google Chrome™	-	-	●

## MX OPC Server

Item	Specifications
Number of connected programmable controllers	10 units
Number of tags*12	100,000 tags

\*12. 10,000 points of OPC tag data can be collected from one programmable controller.



# Product List

## MC Works64 server license

Product name	Model	Number of tags	Outline
MC Works64 DV	SW4DND-MCWDTV-MT	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	License required to perform engineering such as monitor screen design and alarm/trend setting with MC Works64. This license can also be used as an operation version for operating, etc. When using redundant servers, each server will require a license, so two of these licenses will be required. One client license is included.
MC Works64 RT	SW4DND-MCWRT-MT	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k	License required for operating a monitoring system, such as operating. Engineering operations, such as monitor screen design and alarm/trend setting, are not possible with this license. Two licenses are required for redundancy. One client license is included.

## MC Works64 client license (WebHMI<sup>1</sup> license)

Product name	Model	Number of clients	Outline
MC Works64 CL DV	SW4DND-MCWCLDV-MK	1, 5, 25	This license is required to access the MC Works64 server from the client computer, to perform engineering such as monitor screen design or alarm/trend setting. Operation such as monitor operation can also be performed.
MC Works64 CL RT	SW4DND-MCWCLRT-MK	1, 5, 25	This license is required to access the MC Works64 server from the client computer, and perform operation such as monitor operations.
MC Works64 CL R	SW4DND-MCWCLR-MK	1, 5, 25	This license is required to access the MC Works64 server from the client computer, and perform operation such as monitor operations. This license is also required for client computer redundancy.

<sup>1</sup>. WebHMI reads and displays MC Works64 server information with a Web browser.

## High-function data collection license

Product name	Model	Number of tags	Outline
MC Historian SD	SW4DND-MCHSD-MT	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k, 500k, 1M	This license is for the high-function logging package MC Historian that supports calculation of collected data, data compression, and is capable of high-speed logging in ms units. Data is saved in an original binary format, so a commercial database is not required. Data can be saved for a long time using the archive function. Tags independent from the MC Works64 server license are counted.
MC Historian R	SW4DND-MCHR-MT	75, 150, 500, 1500, 5k, 15k, 50k, 100k, 250k, 500k, 1M	This license is required for MC Historian redundancy. Two MC Historian SD licenses are included. Tags independent from the MC Works64 server license are counted.

## Report license

Product name	Model	Number of simultaneous report (Excel® file) outputs	Outline
MC Report <sup>*2</sup>	SW4DND-MCRSV-MT	Number of simultaneous report outputs: 1, 5, 25, 100 files	This is the optional license for the MC Works64 server, and is required when outputting Microsoft® Excel® base reports. The MC Works64 server has a similar function, but this option has a higher functionality than MC Report. When using redundant MC Works64 servers, each server will require a license, so two of these licenses will be required.

<sup>\*2</sup>. The MC Report function is called as ReportWorX64 in MC Works64.

## Energy-saving, maintenance package license

Product name	Model	Number of assets	Outline
AX Energy SV	SW4DND-AXESV-M	5	This package is capable of highly efficient energy monitoring using functions specialized for energy conservation. Refer to the Product Selection Guide for details on the functions and information on calculating the number of assets. The MC Works64 server license must be prepared separately.
AX Facility SV	SW4DND-AXFSV-M	5	This package supports system downtime and maintenance cost reduction through trouble detection, fault analysis, and preventive maintenance. Refer to the Product Selection Guide for details on the functions and information on calculating the number of assets. The MC Works64 server license must be prepared separately.
AX Energy AS	SW4DND-AXEAS-MT	1, 100, 500	This is the license for adding AX Energy assets.
AX Facility AS	SW4DND-AXFAS-MT	1, 100, 500, 1500, 5k, 10k	This is the license for adding AX Facility assets.

## Quality control package license

Product name	Model	Number of tags	Outline
AX Quality SV	SW4DND-AXQSV-M	-	This quality control package uses highly specialized quality statistics management, such as variation control and histogram displays. The MC Works64 server license and MC Historian license are required.

## Mobile monitoring license

Product name	Model	Number of clients	Outline
MC Mobile CL	SW4DND-MCMCL-MK	1, 5, 25, 100, 500	This license is for the MC Mobile additional client.

## Alarm mail notification function package license

Product name	Model	Outline
MC Alarm64 MMX LT*1	SW4DND-MCAMMLT-M	This license is required to notify events such as alarms using E-mail or SMS. The MC Works64 standard server has a similar function, but MC Alarm64 MMX LT is an option with higher functionality. When using redundant servers, each server will require a license, so two of these licenses will be required.

\*1. The MC Alarm64 MMX LT function is called AlarmWorX64 Multimedia in MC Works64.

## Data handling package license

Product name	Model	Number of transactions	Outline
MC Bridge <sup>2</sup>	SW4DND-MCBSV-MT	1, 5, 25, 100	This package follows graphically set processes to read and transfer large volumes of data stored in various places.

\*2. The MC Bridge function is called as BridgeWorX64 in MC Works64.

## USB hardware key

Product name	Model	Outline
MC Works USB hardware key	NZ2HK-IPS	Various MC Works64 licenses can be registered on a USB hardware key. When updating the server computer, the licenses can be transferred just by exchanging the USB hardware key. Refer to the Product Selection Guide for details. Please check the operating environment on page 34 before purchasing.

## Function list

Product name	Function					
	Workbench [Development environment]	MC AppBuilder [Design support tool]	GraphWorX64 [Graphic screen display]	AlarmWorX64 [Alarm display]	TrendWorX64 [Trend display]	GridWorX [Database access]
MC Works64 DV	●	●	●	●	●	●
MC Works64 RT	-	-	●	●	●	●
MC Historian SD	●	●	-	-	●	-

Product name	Function					
	EarthWorX [Wide-area monitoring screen]	MC Historian Express*3 [Simplified data logging]	ReportWorX Express [Simplified report tool]	WebHMI [Web publishing]	AssetWorX [Asset management]	ScheduleWorX64 [Scheduling]
MC Works64 DV	●	●*4	●	●	●	●
MC Works64 RT	●	●*4	●	●	●	●
MC Historian SD	-	-	-	●	●	●

Product name	Function				
	Workflow [Flow chart processing]	AlertWorX [Mail notification]	IoTWorX [Communication function for IoT]	BACnet® [BACnet® connection]	SNMP [SNMP connection]
MC Works64 DV	●	●	●	●	●
MC Works64 RT	●	●	●	●	●
MC Historian SD	●	-	-	●	●

\*3. For functional differences of MC Historian Express and MC Historian (option package), please refer to page 21.

\*4. Up to 5000 Tags are supported.

For customers upgrading from SW3 to SW4, it is important to note that all licenses on a system must be upgraded simultaneously. In the case of a redundant system, both systems will need to be upgraded.

## Flow of selection

1

### Confirm the operating environment

---

**System requirements** ..... Refer to the system requirements on page 34 for details.

**OS compatibility** ..... Refer to OS compatibility on page 34 for details.

**Database compatibility** ..... Refer to OS compatibility on page 34 for details.

2

### Select the MC Works64 standard server license

---

Question

**Will you perform engineering such as screen design?** YES → DV (Development) version?  
No → RT (Runtime) version?

3

### Select the number of tag points (select the scale according to the number of programmable controller device points)

---

Field information is linked to tags from the programmable controller devices, and is then monitored and controlled on the MC Works64 screen. Calculate the scale based on the number of points.

4

### Select OPC server depending on connection with MELSEC controller or third-party company controller

---

Question

**Is device connected with MC Works64 a MELSEC device?**

YES → Server license with MX OPC server (Mitsubishi Electric OPC server)

No → Server license without MX OPC server +

Takebishi Corporation OPC server (DeviceXPlorer OPC Server)

5

### Select the number of clients

---

Select the number of clients according to the number of simultaneous operators.

6

### Select the operation package

---

Refer to the product list on page 35 for details.

7

### Select whether to use hardware key for license

---

Refer to License registration on page 38 for details. For assistance in detailed selections, please contact your local Mitsubishi Electric sales office or representative.

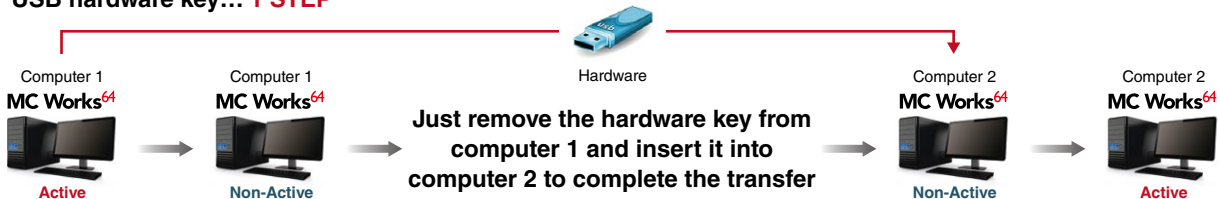
# License registration

## Merits of USB hardware key Hardware key simplifies the license transfer process

### Software license... 4 STEPS

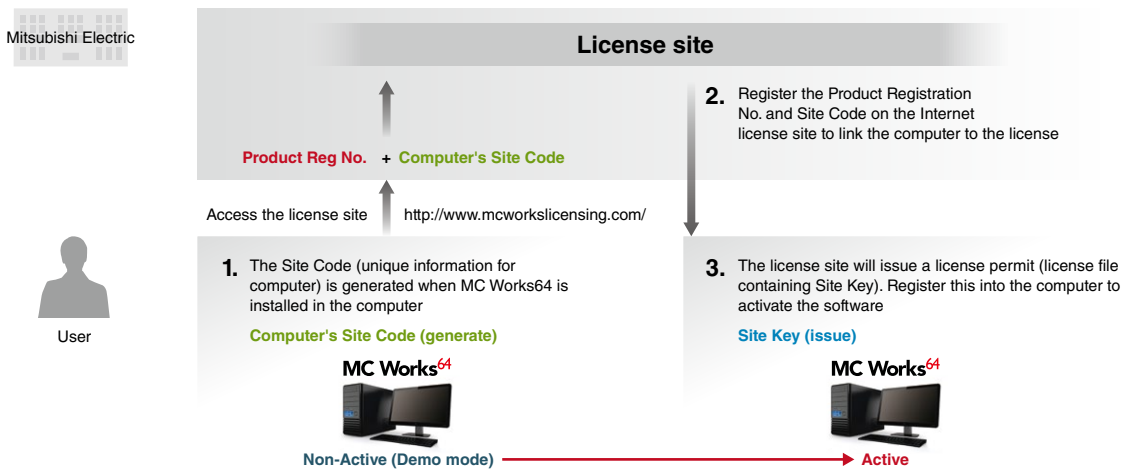


### USB hardware key... 1 STEP

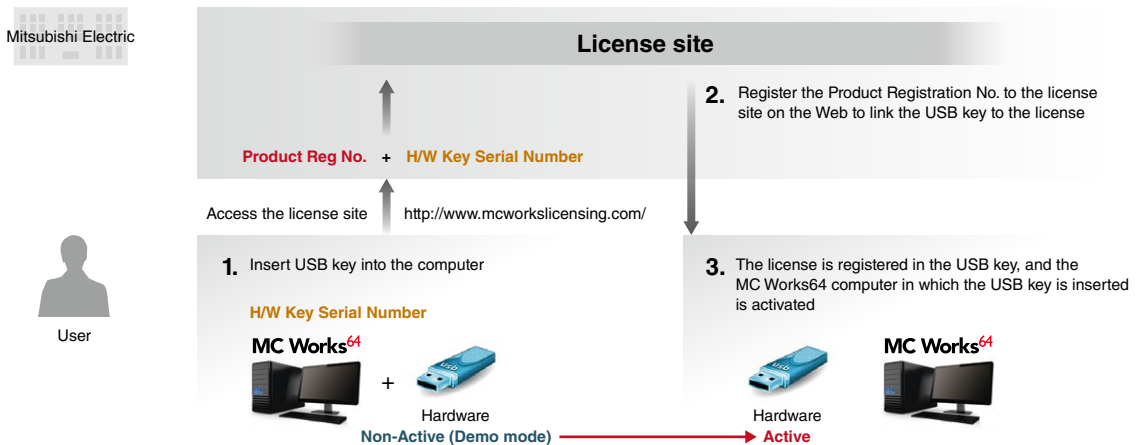


## How to register

### Software license



### USB hardware key



\*1. The license must be registered when the product is purchased. The license does not need to be registered when using in the demo mode (trial version).

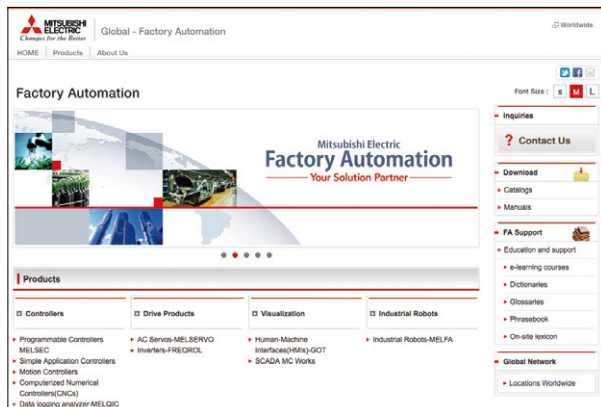
# Factory Automation Global website

Mitsubishi Electric Factory Automation provides a mix of services to support its customers worldwide. A consolidated global website is the main portal, offering a selection of support tools and a window to its local Mitsubishi Electric sales and support network.

## ■ From here you can find:

- Overview of available factory automation products
- Library of downloadable literature
- Support tools such as online e-learning courses, terminology dictionary, etc.
- Global sales and service network portal
- Latest news related to Mitsubishi Electric factory automation

**Mitsubishi Electric Factory Automation  
Global website:  
[www.MitsubishiElectric.com/fa](http://www.MitsubishiElectric.com/fa)**



## Online e-learning

An extensive library of e-learning courses covering the factory automation product range has been prepared. Courses from beginner to advanced levels of difficulty are available in various languages.



### ■ Beginner level

Designed for newcomers to Mitsubishi Electric Factory Automation products gaining a background of the fundamentals and an overview of various products related to the course.

### ■ Basic to Advanced levels

These courses are designed to provide education at all levels. Various different features are explained with application examples providing an easy and informative resource for in-house company training.



# Innovative next-generation, e-Manual

The e-Manual viewer is a next-generation digital manual offered by Mitsubishi Electric that consolidates all manuals into an easy-to-use package with various useful features integrated into the viewer. The e-Manual is modeled around a centralized database allowing multiple manuals to be cross-searched at once, further reducing the time for reading individual product manuals when setting up a control system.



## Key features include

- One-stop database containing all required manuals, with local file cache
- Included with GX Works3 engineering software
- Also available in tablet version
- Easily download manuals all at once
- Automatic update of manual versions
- Search information across multiple manuals
- Visual navigation from hardware diagram showing various specifications
- Customizable by adding user notes and bookmarks
- Directly port sample programs within manuals to GX Works3

## MITSUBISHI ELECTRIC FA e-Manual (tablet version)



The e-Manual application is available on iOS and Android™ tablets. e-Manual files are provided as in-app downloads.



**iOS**  
Version 8.1 or later

Download on the  
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**Android™**  
Version 4.3/4.4/5.0

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## Supported versions

OS	OS version	Model
iOS	iOS 8.1 or later	Apple iPad 2, iPad (3rd generation), iPad (4th generation), iPad Air, iPad Air 2, iPad mini, iPad mini 2, iPad mini 3, iPad mini 4, iPad Pro (12.9 inch), iPad Pro (9.7 inch)
Android™	Android™ 4.3/4.4/5.0	ASUS Nexus7™ (2013)*1

\*1. When using a tablet not listed above, 7-inch (resolution of 1920 x 1200 dots (WUXGA)) or better is recommended.

# Extensive global support coverage providing expert help whenever needed

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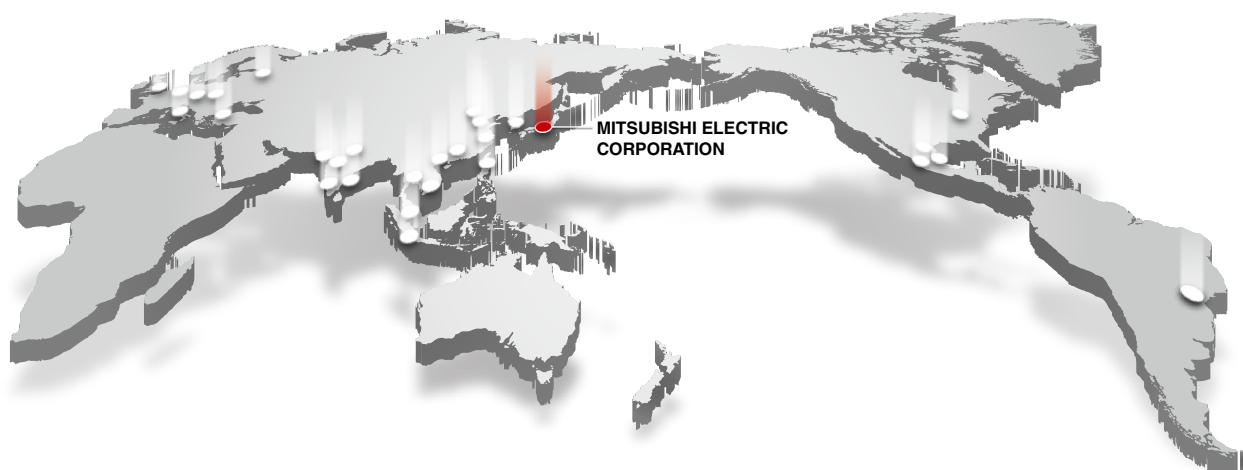
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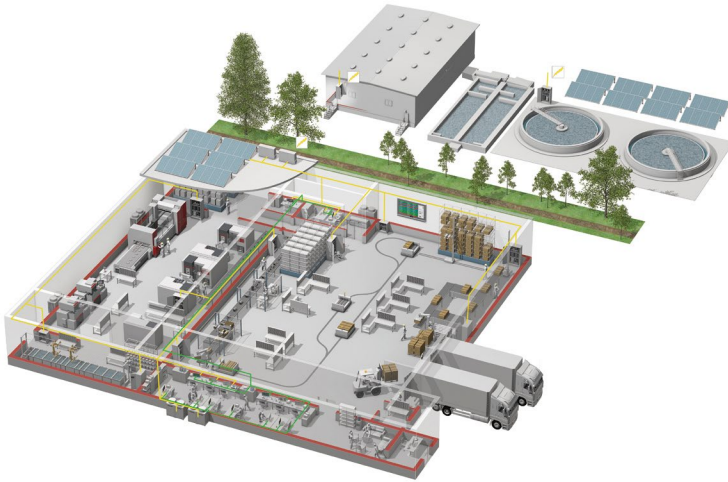
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Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

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Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

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As one of the world's leading companies with a global turnover of over 4 trillion Yen (over \$40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.



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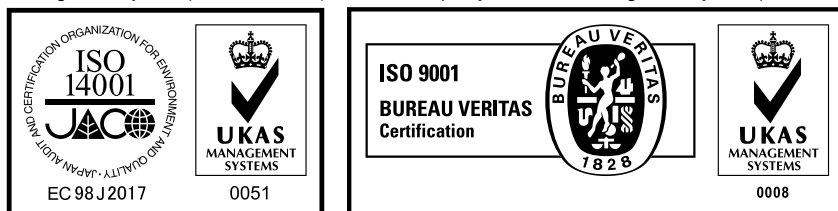


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\* Not all products are available in all countries.

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