

FACTORY AUTOMATION

Energy Saving Support Software EcoAdviser

Support tool for energy saving activities equipped with AI technology.





Mitsubishi Electric Corporation operates across a wide range of sectors, from home appliances and building systems to railway solutions, factory automation equipment, and satellites and leverages the synergy created by these diverse sectors to address various challenges and provide optimal solutions worldwide.

We, the Mitsubishi Electric Group, will continue to evolve in "carbon neutrality" and a "circular economy" by promoting innovation in products and services and providing integrated solutions through our business activities, all in order to realize a vibrant and sustainable society.

Under "Changes for the Better" which reflects the Mitsubishi Electric Group's commitment to "always strive to achieve something better", Mitsubishi Electric FA will expand the value of its products and services in the FA system business by advancing the provision and expansion of integrated solutions under the slogan "Automating the World" for an even better tomorrow. Through automation technology, we aim to contribute to innovation not only in the manufacturing industry but also across society as a whole.

We stand as your partner in shaping a smarter, more efficient, and more sustainable future.



The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

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Energy Saving Support Software

EcoAdviser

1
Concept

Equipped with the AI technology of Mitsubishi Electric “Maisart”, the system provides total support for energy saving activities from understanding the current condition, identification/factor diagnosis of energy-losses to effect verification of energy saving measures.

Understanding the current condition of energy usage
(page 6·7)

Identification of energy-losses
(page 8)

Effect verification of energy saving measures
(page 10)

Factor diagnosis of energy-losses
(page 9)



It is possible to grasp the current condition by creating graphs and reports for analysis based on accumulated collection data.

Function
limited edition



Energy saving data
analysis software

Model :

MES3-EAP1-DA

Key features

- Analysis graph creation
- Dashboard creation
- Report creation

In addition to simple visualization of accumulated collection data, it contributes to the realization of effective energy saving activities by AI function such as energy-losses identification and factor diagnosis.

AI diagnosis
edition



Energy saving data analysis
and diagnosis software

Model :

MES3-EAP1-AI

Key features

- Analysis graph creation
- Dashboard creation
- Report creation
- Energy-losses identification  Maisart
- Energy-losses factor diagnosis  Maisart
- Effect verification of energy saving measures

What is  **Maisart** ?

“Maisart” is a brand name of Mitsubishi Electric AI technology that stands for “Mitsubishi Electric’s AI creates the State-of-the-ART in technology” representing our wish to make things “Smart” with our unique AI technology.

1 Energy saving data analysis by utilizing various graphs

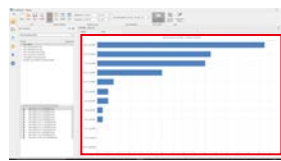
- Selectable from 7 types of graphs depending on analysis purpose

Understanding the present situation: Visualizing the energy consumption of each production process

As ordering display and percentage display are possible in addition to time series, the data can be utilized for priority ordering of energy saving.



(1) Pie chart

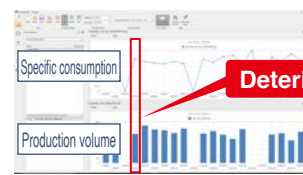


(2) Rank chart

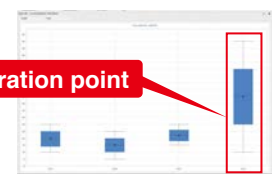
Ranking chart helps users to identify the bottleneck process.

Specific consumption management: Monitoring energy consumption in relation to production volume

By managing with energy specific consumption which a number of productions is taken into account, identify the equipment and hours that are hurting the productivity.



(3) Time series chart

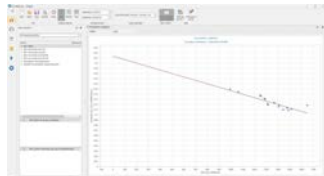


(4) Box plot

EcoAdviser helps users to identify the deterioration point of production efficiency. It assists users to find equipments or operation where KAIZEN is required.

Find out correlation

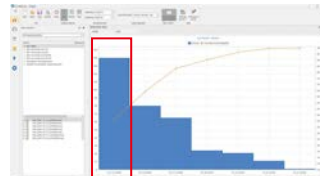
Understanding the present production efficiency by checking the correlation between production volume and energy consumption.



(5) Scatter plot

Check error records

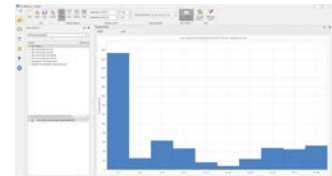
Understanding the error content to be dealt with.



(6) Pareto chart

Setting threshold and target

Determine the threshold or target value by understanding the distribution of collected data.

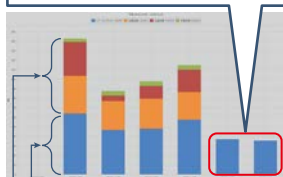


(7) Histogram

[Case study (1)] Energy-losses finding of air compressor

1. Verify the energy consumption of production equipment and air compressor per day.
2. Perform detail verification with the data by one hour graph.

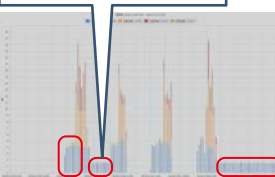
Found energy loss of air compressor during non-operation days.



Air compressor
Production equipment

Energy loss by early starting-up was generated.

Forgot to turn off after production end.



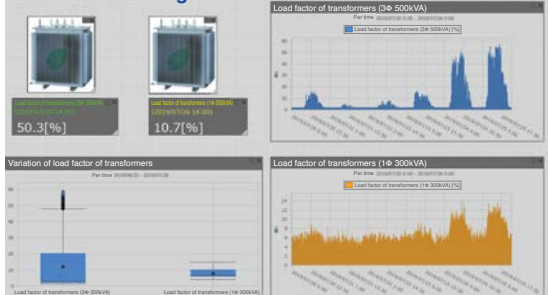
Operation loss was generated during non-operation days.

⇒ Conduct operation improvement of air compressor to reduce loss, and actualize energy saving!

[Case study (2)] Management of transformer load factor

Perform the load management of transformer to grasp the residual force of the transformer. Utilize for daily safety management.

Load factor management of transformers



⇒ Utilize for equipment installation plan in the future and amount selection when updating the transformer.

2 Remote monitoring by customizable dashboard.

- It is possible to paste the created graphs and results of energy-loss factor diagnosis (page 9) on the dashboard and save the data. Also, by setting a Web server on PC, it can be utilized as the visualization tool of the field.

Solutions

- To show the dashboard at the production site and office to improve the energy saving awareness of the employees.
- To monitor energy information and transformer load remotely to reduce the time to go to the site.

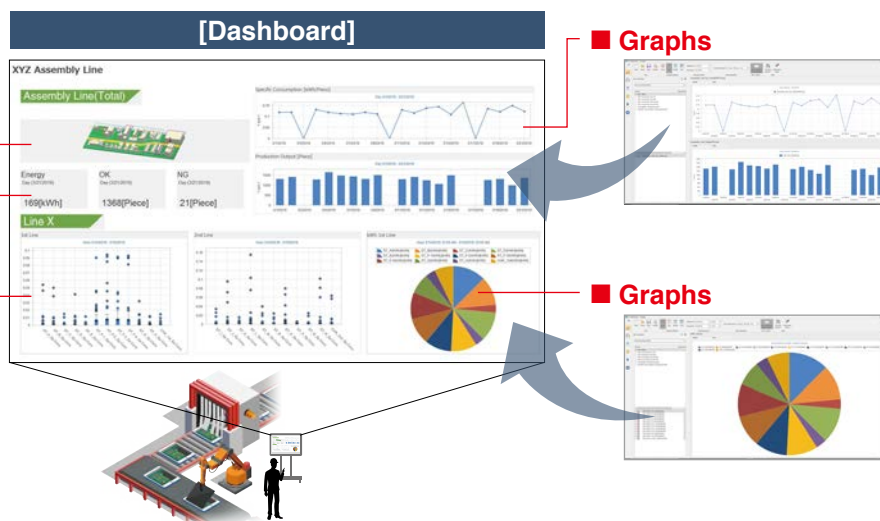
Easy to customize

■ Image data

■ Number panel

■ Graphs

[Dashboard]



■ Graphs

■ Graphs

[Dashboard creation example]

For building and office

Suitable for increasing energy saving awareness of employees!



List of dashboard contents

- Image of the building
- Target energy consumption (Rate conversion)
- Current electricity rate
- Power usage ratio for each floor
- Electricity rate ranking per 1 m²
- Power usage ratio for each load
- Power usage trend graph for each load

For factory

Remote monitoring of usage condition of utility equipment. Remote monitoring is possible with teleworking.



List of dashboard contents

- Image of the factory
- Total energy usage (k ℓ conversion)
- Power usage ratio for each building
- Electricity fee ranking per transformer
- Air usage condition
- Transformer load factor

*Above dashboard is not included the software, and it is necessary to be created by customers.

*The data update cycle of a dashboard is one hour.

3 Automatic identification of energy-losses generated in production equipment (AI diagnosis edition only)

- By using Mitsubishi Electric's original five points energy saving methodology, the EcoAdviser can quantitatively identify and indicate daily energy-losses.

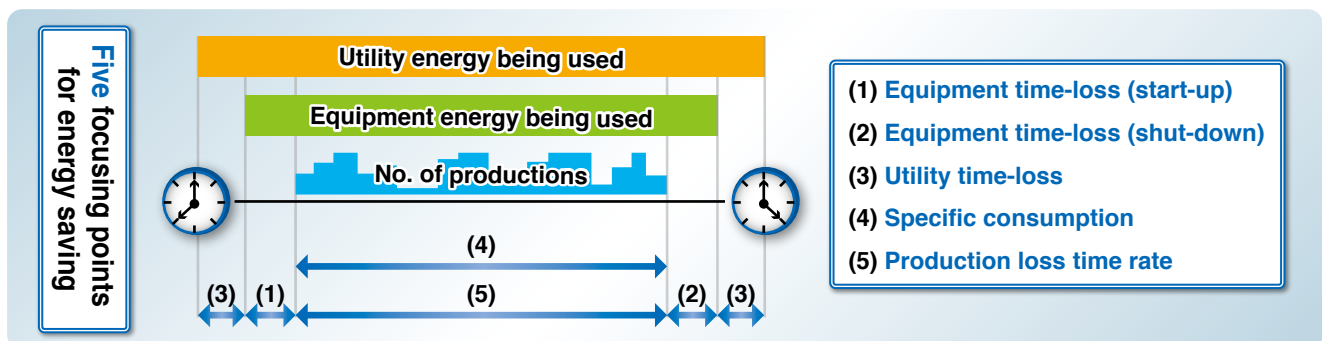
Solutions

- To quantitatively understand where energy-losses are generated.
- To grasp the energy-losses caused by too early starting-up of the equipment and forgetting to turn it off.
- To automatically calculate the energy specific consumption and production operating rate of the equipment.

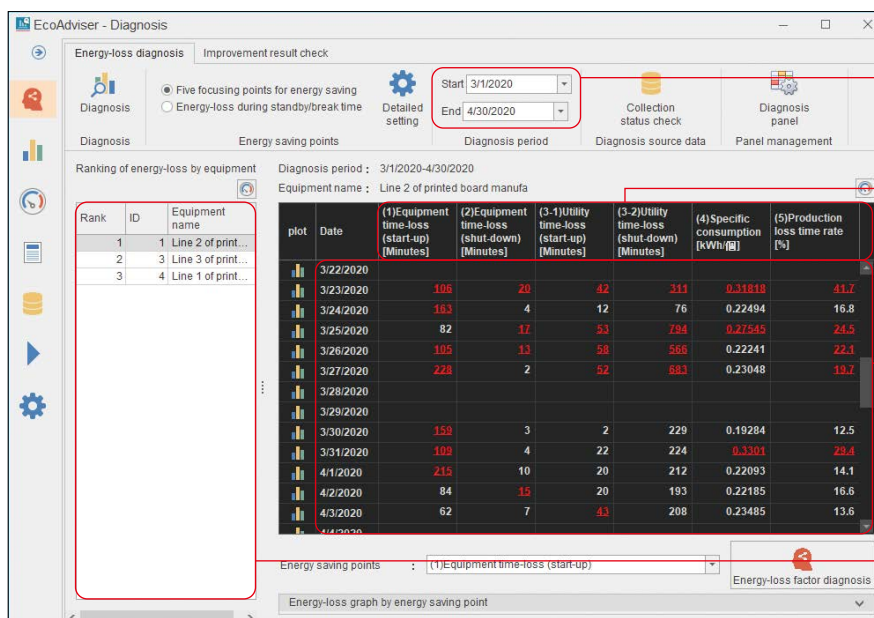
What are the “Five focusing points for energy saving” of Mitsubishi Electric’s knowhow?

- (1) **Equipment time-loss (start-up)** Time-loss between production equipment start-up and production start
- (2) **Equipment time-loss (shut-down)** Time-loss between production end and production equipment shut-down
- (3) **Utility* time-loss**
 - **Utility time-loss (start-up)** Time-loss between utility start-up and production equipment start-up
 - **Utility time-loss (shut-down)** Time-loss between production equipment shut-down and utility shut-down
- (4) **Specific consumption** Specific consumption between production start and production end
- (5) **Production loss time rate** Non-productive time ratio from production start to production end

*Ancillary equipment operated in conjunction with main production equipment (Example: Exhaust fan, Mist collector, Air compressor, etc.)



[Energy-loss diagnosis screen]



■ Diagnosis period

Select a diagnosis period to identify energy-losses.

■ Five focusing points for energy saving

Daily energy-losses are displayed for each of significant five focusing points for energy saving.

■ Energy-losses identification screen

Daily energy-loss time (Unit: minutes), specific consumption, and production loss time rate are displayed together, and days when energy-losses are larger than usual are highlighted.

■ Ranking display

Automatically display in order of energy-loss amount with ranking style.

4 Energy-losses factor diagnosis (AI diagnosis edition only)



- Items that have a correlation as the generation factor of energy-losses are shown as a ranking, and they are presented along with the expected improvement effects.

Solutions

- To find a trend that energy-losses are generated and come up with measures.
- To specify time, day of the week, and production items related to energy-losses.
- To determine the priority of energy saving measures.

What is "Energy-losses factor diagnosis"?

It indicates the significant items related to date when energy-losses are higher than usual.



Diagnosis results

- ▶ Example "Thursday"
- ▶ Start-up was 4 AM
- ▶ The day's number of productions is 250

Based on the diagnosis results, fact verification is performed, and specific measures can be taken.

Measures based on diagnosis results

"Thursday" ⇒ Review the start-up/shut-down time of the equipment.

"4 AM" ⇒ Call attention to reduce unnecessary early morning start-up.

"250 pieces" ⇒ Since energy-losses are large on the date with a few number of productions, review the production plan.

[Energy-loss factor diagnosis result screen]

Energy-loss factor diagnosis				
Diagnosis period: 3/1/2020 - 4/30/2020				
Equipment name: Line 2 of printed board manufa				
Energy saving points: (1)Equipment time-loss (start-up)				
Rank	Energy-loss factor (type)	Energy-loss factor (detail)	Expected improved result(\$/Year)	Does this information help you?
1	Manufacturing starting time	9[Time]	75	☐ Yes ☐ No
2	Production volume	330~410	123	☐ Yes ☐ No
3	Day of the week	Thursday	142	☐ Yes ☐ No
4	Production volume (the previ...	220~440	85	☐ Yes ☐ No
5	Equipment start-up time	4[Time]	62	☐ Yes ☐ No

■ Energy-losses factor diagnosis

AI is used to automatically judge the factors that have a significant correlation with energy-losses, and they are displayed in the ranking style. (Day of the week, starting-up time, production volume, etc.)

■ Evaluation of diagnosis results

Reflect the user evaluation on the diagnosis results afterwards. The items that Yes is selected are likely to be displayed on the top range.

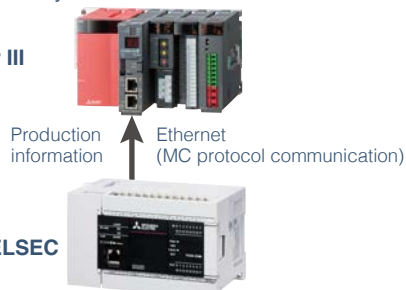
■ Expected improvement result

Automatically calculate the expected improvement result and show the result by amount.

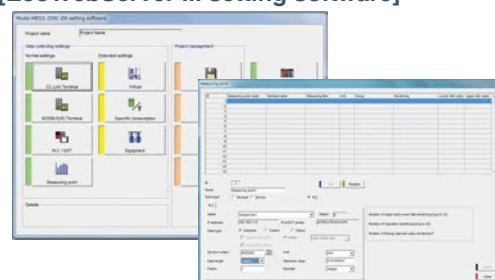
<For customers who do not conduct production information collection>

The production information in the Programmable Controllers MELSEC can be transferred to EcoAdviser (AI Diagnostic version). Alternatively, data can be imported into EcoWebServer III using the EcoWebServer III configuration software and then collected by EcoAdviser.

EcoWebServer III



[EcoWebServer III setting software]



For details, please refer to the EcoWebServer III operation manual (Settings Edition).

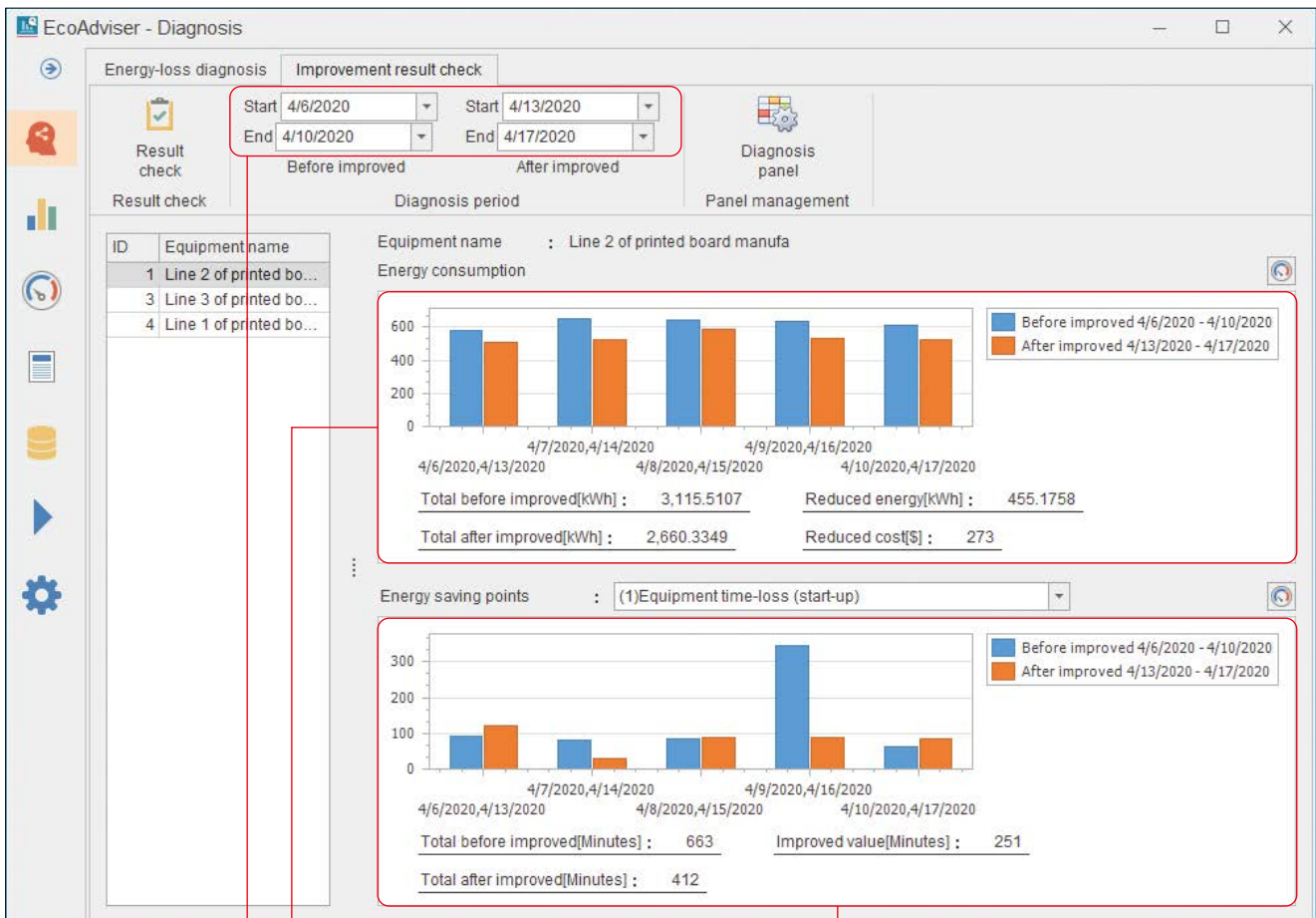
5 Effect verification of energy saving measures (AI diagnosis edition only)

- Just by selecting a period before and after improvement, the power usage amount, electricity rate, and energy-losses before and after improvement can be easily verified.

Solutions

- To reduce the time to summary the data in order to understand the effects of the energy saving measures implemented.
- To conduct verification and review of energy saving measures, and achieve continuous activities.
- To report the results of energy saving activity with quantitative data.

[Effect verification screen before and after taking energy saving measures]



■ Improvement effect of energy consumption and reduction price amount

Comparison based on energy consumption and price is possible.

■ Diagnosis period

Effect verification is possible just by selecting the period before and after improvement.

■ Improvement effects in the energy saving perspectives

Able to compare energy-losses of the selected energy saving points.

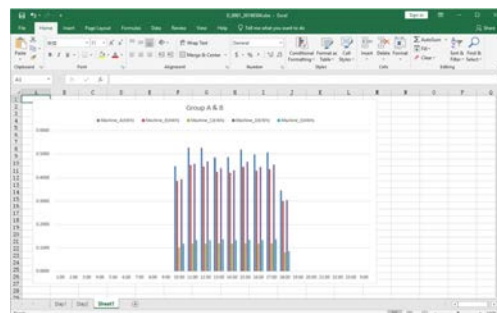
6 Creation of reports (daily, monthly and annual)

- Able to create daily, monthly, and annual reports based on the data collected from EcoWebServer III.

[Monthly output example]

Assembly Line 1st											
Date	Total Energy (kWh)	Machine_A1 (kWh)	Machine_A2 (kWh)	Machine_A3 (kWh)	Machine_A4 (kWh)	Machine_A5 (kWh)	Machine_A6 (kWh)	Machine_A7 (kWh)	Machine_A8 (kWh)	Machine_A9 (kWh)	Machine_A10 (kWh)
1	1.704	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Month Total	10.704	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Average	0.357	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

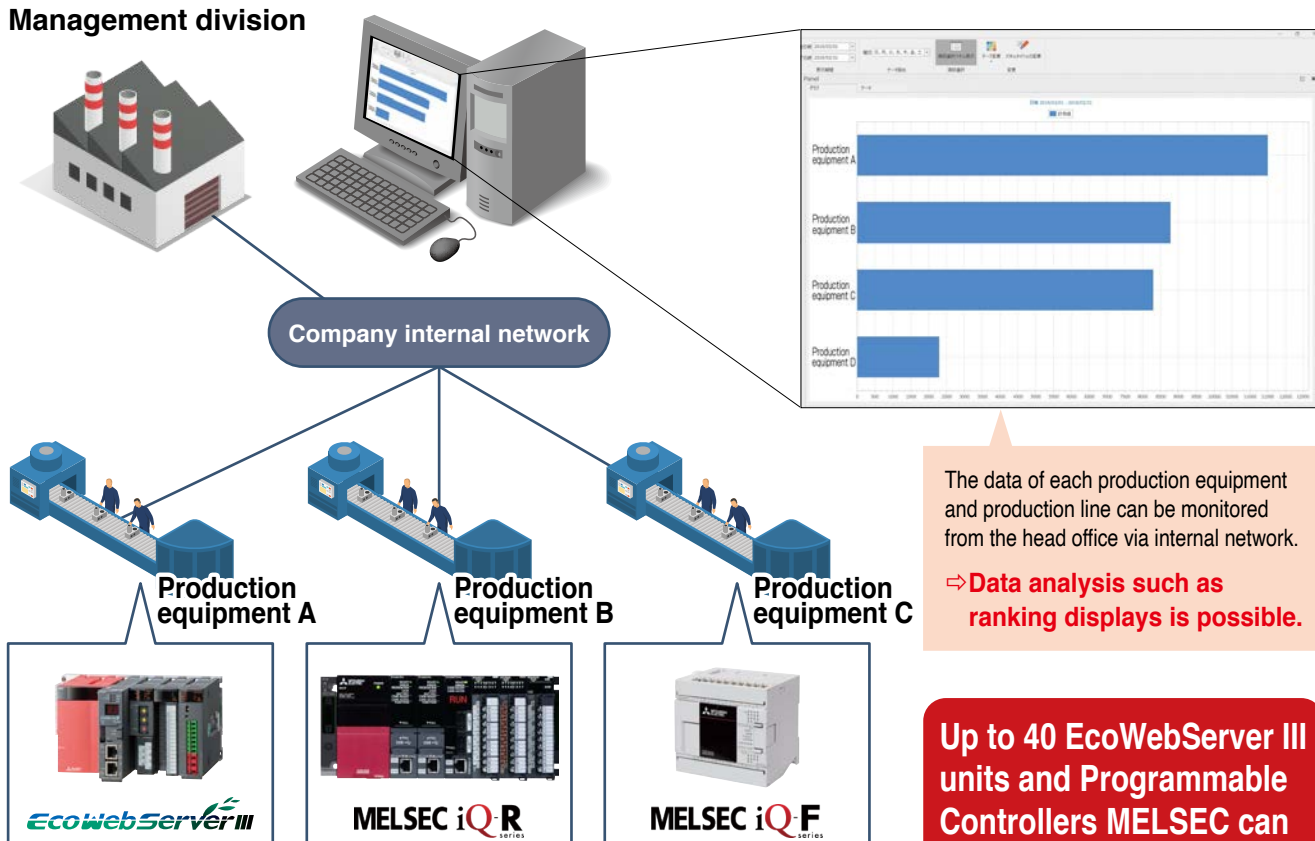
By setting, a **sign field** can be added, and a report can be customized by creating a format.
(For detail, refer to the manual)



7 EcoAdviser enables centralized management (graphs and reports), comparison, and analysis of data for each production equipment and production line within the factory.

- Able to monitor energy usage conditions of each production equipment and production line by utilizing VPN communication, etc.

Management division



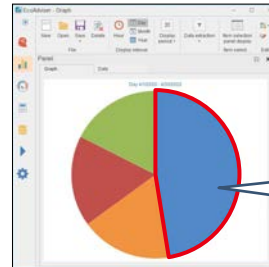
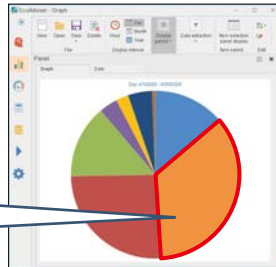
*Collection of data log files from Programmable Controllers MELSEC is supported only by the AI Diagnostic version. The Function-Limited version supports registration of up to 20 units.

Energy saving example of PCB manufacturing line using EcoAdviser

Understanding the current condition

- (1) Specification of the Equipment that requires energy saving measures by utilizing the energy saving data analysis function.

Specify "PCB mounting line" from various lines in the floor.



It was found that "Reflow furnace" in the PCB mounting line is using the most energy.

Identification of energy-losses

- (2) Identification of energy-losses by the energy-losses identification function.

plot	Date	(1)Equipment time-loss (start-up) (Minutes)	(2)Equipment time-loss (shut-down) (Minutes)	(3-1)Utility time-loss (start-up) (Minutes)	(3-2)Utility time-loss (shut-down) (Minutes)	(4)Specific consumption (kWh/個)	(5)Production loss time rate [%]
	3/22/2020	106	20	42	311	0.31818	41.2
	3/23/2020	183	4	12	76	0.22494	16.8
	3/24/2020	82	17	53	784	0.27545	24.5
	3/26/2020	195	13	58	568	0.22241	22.3
	3/27/2020	228	2	52	683	0.23048	19.7
	3/28/2020						
	3/29/2020	158	3	2	229	0.19284	12.5
	3/30/2020	109	4	22	224	0.3301	29.4
	4/1/2020	215	10	20	212	0.22093	14.1
	4/2/2020	84	15	20	193	0.22185	16.6

It was found that significant energy-losses are generated in "Loss at starting-up of the reflow furnace", "Loss at shutting-down of ancillary equipment", and "Operation time loss of the reflow furnace".

Factor diagnosis

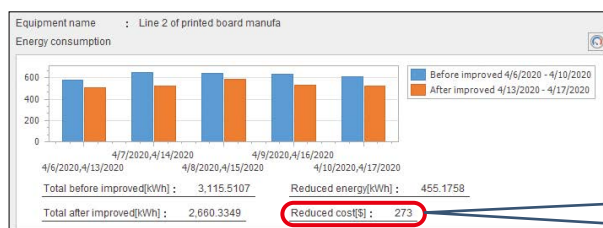
- (3) Factor diagnosis of energy-losses of the reflow furnace.

Rank	Energy-loss factor (type)	Energy-loss factor (detail)	Expected improved result(\$/Year)	Does this information help you ?
1	Equipment shut-down time	22(Time)		
2	Day of the week	Thursday	560	☐ Yes ☐ No
3	Utility shut-down time	4(Time)		
4	Production volume (the previ...	650~(個)	688	☐ Yes ☐ No
5	Production volume	330~410(個)	110	☐ Yes ☐ No

Though the reflow furnace is turned OFF at 22:00, it was found that the ancillary equipment still continues to operate. When the actual condition is verified, it was found that ancillary equipment is always operating during weekday. → The ancillary equipment is turned OFF in conjunction with the reflow furnace.

Effect verification

- (4) Effect verification before and after taking the measure



When measures are taken for above and other energy-loss items, actualized the energy saving effect for approx. 2,000 USD per reflow furnace in a year. In addition, 90%* of work hour for data analysis and cause determination were reduced. *According to our reasearch

Specifications of EcoAdviser

★: Function available only for MES3-EAP1-AI

Item	Specifications	
	MES3-EAP1-DA	MES3-EAP1-AI
Measuring point settings	Register collection source	Register a collection source and its measuring points.
	Collection source	EcoWebServer III, Edgecross
	Number of collection sources *1	Max. 20 units
	Number of measuring points	Max. 5680 points
	EcoWebServer III	Max. 255 points per unit
	EcoWebServer III with demand monitoring function	Demand period (15 minutes): Max. 284 points per unit Demand period (30 minutes): Max. 282 points per unit Demand period (60 minutes): Max. 280 points per unit
	Edgecross	Max. 256 points per unit Data type: BOOL, INT, UINT, DINT, UDINT, REAL, LREAL
	★Programmable controller	—
	Register manual input measuring point	Registers measurement points for measurement/metering values confirmed visually, such as offline meters
	Number of registrations	Max. 256 points
Measuring point settings	Register product type time period measuring point	Register a measuring point to extract data of one product from multiple types of products.
	Number of registrations	Max. 256 points
	Measuring value measuring point	Select from collection source measuring points or manual input measuring points.
	Time period measuring point	Time period type
	Time period type	0 to 65535
	Calculation measuring point for diagnosis setting	Register a measuring point to calculate measuring points with each other.
	Number of registrations	Max. 256 points
	Available measuring points	Select from collection source measuring points, manual input measuring points, or product type time period measuring points. • Max. 200 points can be registered per calculation formula. • Max. 4000 letters can be used per calculation formula.
	Register specific consumption measuring point	Register a measuring point to calculate specific consumption.
	Number of registrations	Max. 256 points
Graph function	Energy measuring point	Select from collection source measuring points, manual input measuring points, product type time period measuring points, or calculation measuring points.
	Production volume measuring point	
	Measuring point group	Folder tree: Max. 4 hierarchy levels Number of groups: Max. 256 groups Number of registrations: Max. 256 points per group (Max. 7000 measuring points for total groups)
	Analysis method (Graph type)	Select from time series chart, box plot, pie chart, scatter plot, histogram, or pareto chart.
	Display interval	Select from hourly, daily, monthly, or yearly. *For the box plot analysis method, this is set to hourly.
	Number of saves	Max. 300 panels

Item	Specifications	
	MES3-EAP1-DA / MES3-EAP1-AI	
Dashboard function	Dashboard creation	Create a dashboard with graph and measuring point data panels arranged.
	Sheet setting	Max. 10 sheets per dashboard
	Available panels	Graph panel (created with graph function) ★Diagnosis panel (graph/table of diagnosis result) Numeric panel (collected measuring point data) Image panel (image file)
	Number of saves	Max. 5 files
	Display mode	Display the created dashboard on EcoAdviser.
	Auto-update	Set the automatic update of graphs and measuring point data.
	Auto-update timing	1-hour cycle (after automatic collection)
	Tab display	Set the display of the tab for sheet switching.
	Auto-switch	Set the automatic switching of the sheet at regular intervals.
	Auto-switch interval	10/20/30/60/120/180/300 (sec.)
Report function	HTML output	Output the created dashboard to the HTML file.
	Automatic HTML output function	Set the automatic output to the HTML file at the time of change of dashboard settings or update of displayed data.
	Output timing	1-hour cycle (after automatic collection)
	Saving destination	Set the saving destination of HTML files to be output.
	Format	Set the report format.
	Number of saved report settings	Max. 24 report settings (In one setting, output items of daily, monthly, and annual report are saved.)
	Daily report	Max. 320 items, 16 items per sheet × 20 sheets
	Monthly report	Max. 320 items, 16 items per sheet × 20 sheets
	Annual report	Max. 320 items, 16 items per sheet × 20 sheets
	Output item	Select from measuring points, manual input measuring points, product type time period measuring points, calculation measuring points, or specific consumption measuring points.
Report creation	Daily report	Create the daily report of a specified day and save it in the Excel format.
	Monthly report	Create the monthly report of a specified month and save it in the Excel format.
	Annual report	Create the annual report of a specified year and save it in the Excel format.
	Automatic report output settings	Set the automatic output of reports.
	Automatic output time	Set the time of automatic output of reports.
Report creation	Saving destination	Set the destination path of daily report files. Set the destination path of monthly report files. Set the destination path of annual report files.

*1: When the collection source is Edgecross, the number of registrations depends on the flow number of data logging of Edgecross.

For more information about the data logging flow, refer to the Edgecross Basic Software for Windows User's Manual.

Each Mitsubishi PLCs log file is counted as one data source file.

*2: For the diagnosis panel, the panels to display the energy-loss factor diagnosis results can be placed up to 100 panels/whole dashboard.

★: Function available only for MES3-EAP1-AI

Item		Specifications
		MES3-EAP1-DA / MES3-EAP1-AI
Data collection function	File collection settings	Collect the logging files stored in the collection sources.
	Collection source	EcoWebServer III
		Zoom (1 min.) data file, Demand (daily) data file *3
		Edgecross
		Historical data file
	★Programmable controller	Programmable controller data log file
	Collection settings	Set the data collection for each file type.
	Automatic collection timing	EcoWebServer III: Collection time specified by the user Edgecross: Collection period specified by the user ★Programmable controller: Collection period specified by the user
	Collection period	Set the collection period on daily/monthly/annual basis.
	Retention period	Set the retention period for each file type.
	15/30/60-minute basis data	2 to 10 years *Default: 10 years
	Daily basis data	
	Monthly basis data	
	Annual basis data	
	★Diagnosis data	
	★Diagnosis source data	62 days
	File deletion timing	Sequentially delete the logging files after the retention period expires.
Data input function	Data input	Input 15-min/30-min/60-min/24-hour basis data of each measuring point for a user-specified period. Max. 256 measuring points can be selected simultaneously. Specified period: Max. 31 days
	Export	Output 15-min/30-min/60-min/24-hour basis data of each measuring point for a user-specified period to the Excel file.
	Import	Input 15-min/30-min/60-min/24-hour basis data of each measuring point based on the imported Excel file.
Calculation function	Available measuring points	Select from product type time period measuring points, calculation measuring points, or specific consumption measuring points. *Max. 256 measuring points can be selected at one time.
	Automatic calculation	Automatically calculate measuring point data.
	Available measuring points	Select from product type time period measuring points, calculation measuring points, or specific consumption measuring points.
	Calculation timing	At the execution of automatic collection

*3: When the collection source is EcoWebServer III with demand monitoring function, demand (daily) data files can be collected.

*4: If the number of decimal places in electric energy data is insufficient and energy loss cannot be calculated accurately, data must be collected with higher resolution (e.g., detailed electric energy).

Item		Specifications
		MES3-EAP1-DA / MES3-EAP1-AI
Data output function	Data output	Output the collected measuring point data, which is saved in the file.
	Auto output settings for data file	Set the automatic output of data files.
	Output group setting	Max. 30 groups
	Output destination setting	Set the destination path.
	Output measuring points	Select from measuring points, manual input measuring points, product type time period measuring points, calculation measuring points, or specific consumption measuring points.
	Output timing	After automatic collection
Maintenance function	Backup	Back up the setting values and data to the folder
	Restore	Restore the setting values and data backed up from the specified folder
★Diagnosis settings	Equipment setting	Register the equipment information for energy-loss diagnosis
	Number of registrations	Max. 50
	Energy-loss factor setting	Set the energy-loss factor for equipment
	Number of registrations	Max. 20 points per equipment
	Calculation measuring point for diagnosis setting	Set the calculation measuring point for energy-loss diagnosis.
	Number of registrations	Max. 150 points
	Available measuring points	Select from measuring points. *Demand measuring points are excluded.
	Electricity rate setting	Set the currency unit and electricity rate per 1 kWh to convert energy consumption into the amount for diagnosis.
	Evaluation reset	Reset the evaluation for energy-loss factor
	Energy-loss diagnosis	Diagnose the following two items for equipment.
★Diagnosis function	Energy-loss extraction *4	- Extracts energy loss for each piece of equipment based on the five key energy-saving viewpoints and standby/break-time energy loss, and displays results in descending order of energy loss - Displays time-series graphs of daily energy measurement points, utility measurement points, and production volume measurement points Displayable period: Up to 366 days prior to the current PC time within the diagnosis period
	Energy-loss factor diagnosis	Diagnoses energy-loss factors for selected equipment and five key energy-saving viewpoints using default and user-added energy-loss factors
	Improvement result check	Compare the data of two periods to check the effect of energy saving improvement activities.
	Automatic diagnosis	Execute automatic diagnosis of energy-loss and its factor.
	Diagnosis panel	Save the graph or table of energy-loss extraction or energy-loss factor diagnosis result.
	Number of saves	Max. 50 panels

PC operating environment

The following table shows the operating environment of the PC where EcoAdviser is to be installed.

Item	Specifications
OS	Microsoft Windows 10 Pro / Enterprise / IoT Enterprise (64-bit) Microsoft Windows 11 Pro / Enterprise (64-bit)
Language	Japanese, English, Simplified Chinese
CPU	Intel® Core™ i5-8500 (recommended)
Memory	8 GB or more
Hard disk	50 GB or more *1
LAN	10/100/1000BASE-T × 1
USB connector (Type A)	1 connector (for connecting the hardware key)
CD drive	1 drive (for installing EcoAdviser)
Spreadsheet *2	Microsoft Excel 2021 (64-bit) Microsoft Excel 2024 (64-bit)
Display resolution	1024×768 pixels or more
Input device	Mouse and keyboard

*1: If you set the storage period of each data and the registration number of each measuring point to the maximum, this capacity will be necessary.

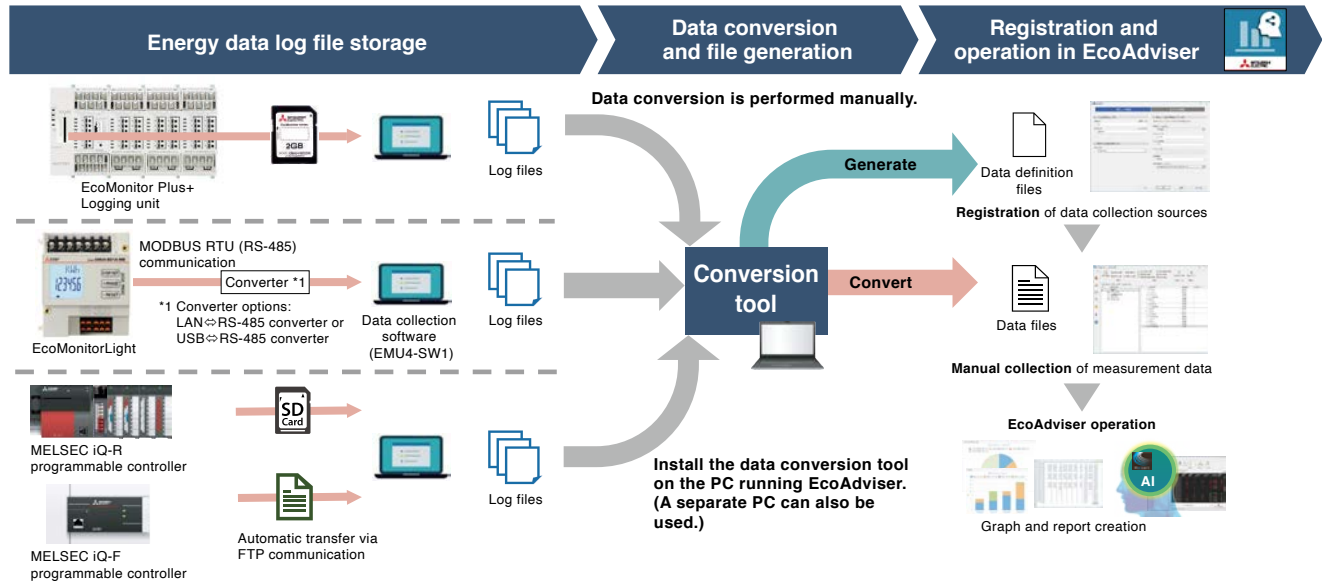
*2: You cannot use Excel software that has been purchased from the Microsoft Store. Use the desktop version of Excel.

Trademarks

- Microsoft, Windows, and Excel are registered trademarks of Microsoft Corporation in the United States and other countries.
- Ethernet is a trademark of FUJIFILM Business Innovation Corp.
- Edgecross is a registered trademark of General Incorporated Association Edgecross Consortium.
- QR Code is a registered trademark of DENSO WAVE INCORPORATED.
- MODBUS is a registered trademark of Schneider Electric USA Inc.
- EcoAdviser, EcoWebServer and Maisart are registered trademarks of Mitsubishi Electric Corporation.
- Other company and product names herein are trademarks or registered trademarks of their respective owners.

EcoAdviser File Conversion Tool Overview

This tool converts log files from EcoMonitor Light / EcoMonitor Plus logging units, MODBUS-compatible data collection software, and MELSEC programmable controllers into formats that can be collected by EcoAdviser. Converted files can be manually collected into EcoAdviser to enable graph creation, report creation, and AI diagnosis functions.



Because this file conversion tool uses **manual operation**, it is not recommended for use in dashboard displays that require automatic updates. If automatic data updates are required, please consider building a system using an energy-saving data collection server, Edgecross, or Mitsubishi PLCs.

EcoAdviser's AI diagnosis function analyzes energy usage and production volumes in 1-minute cycles, so 1-minute logging data is required.

Supported models/log files

	Model	Logging cycle	EcoAdviser support (●: Supported, —: Not supported)	
			Graph/ report creation	AI diagnosis
EcoMonitor-related	Logging unit	1 min	—	●
		15 min/30 min/1 hr	● *1	—
	Data collection software	1 min	● *2	●
		1 hr	●	—
Programmable controller-related	MELSEC iQ-R Series MELSEC iQ-F Series MELSEC-L Series MELSEC-Q Series	1 min or less	● *2	● *3
		More than 1 min	● *2	—

This tool and a GENESIS64 version of the file conversion tool is also available and can be downloaded free of charge from the Mitsubishi Electric Factory Automation website (QR code on the right).



- *1 EcoAdviser data cycle settings and logging cycles must match.
- *2 EcoAdviser extracts and collects data according to EcoAdviser data cycle settings.
- *3 EcoAdviser extracts and collects data in 1-minute cycles.

Warranty Information

Before use, please review the following warranty terms for the product.

If you have any questions or in the event of a failure, please contact the dealer where the product was purchased, Mitsubishi Electric System & Service, or your nearest Mitsubishi Electric branch office.

■Free-of-charge Warranty Period and Coverage

If a failure or defect attributable to Mitsubishi Electric (collectively hereinafter referred to as "failure") occurs in the product during the free-of-charge warranty period, we will repair the product free of charge through the dealer where the product was purchased or a Mitsubishi Electric service company.

However, if on-site repair is required either domestically or overseas, the actual costs required for dispatching a technician will be charged.

[Free-of-charge Warranty Period]

If a defect relating to quality is found within one year from the date of purchase of this product or within 18 months from the date of manufacture, whichever occurs first, and the cause of the defect is attributable to Mitsubishi Electric, the product will be replaced with a substitute free of charge. However, even within the one-year period, repairs will be provided on a chargeable basis in the following cases.

- Failures caused by incorrect operation
- Failures caused by improper use

In addition, any product for which longer than one year has elapsed from the date of purchase will be subject to chargeable repair.

[Free-of-charge Warranty Coverage]

- (1) As a general rule, initial failure diagnosis shall be performed by the customer.

However, at the customer's request, Mitsubishi Electric or its service network may perform this work on a chargeable basis.

In such cases, if the cause of the failure is attributable to Mitsubishi Electric, the service will be provided free of charge.

- (2) Warranty coverage is limited to cases where the product is used under normal conditions in accordance with the conditions and precautions described in the instruction manual, caution labels affixed to the product, and related documentation, including the state of use, usage procedures, and operating environment.
- (3) Even within the free-of-charge warranty period, repairs shall be provided on a chargeable basis in the following cases.
- (a) Failures caused by improper storage or handling, carelessness, or negligence by the customer, as well as failures attributable to the customer's hardware or to design-related factors such as component selection.
 - (b) Failures attributable to modifications or alterations made to the product by the customer without Mitsubishi Electric's prior consent.
 - (c) Failures that could reasonably have been avoided if the customer's equipment into which the product was incorporated had been equipped with safety devices required by applicable laws and regulations governing the customer's equipment, or with functions or structures generally deemed necessary according to industry practice.
 - (d) Failures that could reasonably have been prevented if maintenance described in the instruction manual or related documentation had been properly performed.
 - (e) Failures caused by external factors due to force majeure, such as fire or abnormal voltage, or by natural disasters including earthquakes, lightning, windstorms, floods, or other similar events.
 - (f) Failures attributable to causes that could not have been foreseen based on the level of scientific or technical knowledge available at the time of shipment by Mitsubishi Electric.
 - (g) Any other failures for which Mitsubishi Electric is not responsible, or failures acknowledged by the customer to be outside Mitsubishi Electric's responsibility.

■Warranty Disclaimer for Opportunity Loss, Secondary Loss, and Similar Losses

Mitsubishi Electric shall not be responsible for the following, whether the failure occurs within or outside the free-of-charge warranty period.

- (1) Damages arising from causes not attributable to Mitsubishi Electric.
- (2) Loss of opportunity or loss of profits incurred by the customer as a result of a failure of Mitsubishi Electric products.
- (3) Damages arising from special circumstances, secondary damages, accident compensation, or damage to property other than Mitsubishi Electric products, regardless of whether such damages were foreseeable by Mitsubishi Electric.
- (4) Compensation for indirectly incurred costs, including costs related to replacement work performed by the customer, on-site attendance required in connection with such replacement, readjustment of on-site machinery or equipment, commissioning and trial operation, and other related work.

■Application of the Product

- (1) As a condition of use of this product, it is required that the product be used only in applications in which, even in the event of a failure or malfunction, no serious accident would occur, and that, in the event of a failure or malfunction, backup or fail-safe functions are implemented systemically outside the product.
- (2) This product is designed and manufactured as a general-purpose product intended for use in general industrial applications. Accordingly, this product is not intended for use in the following special-purpose equipment or systems.
 - (a) Applications for nuclear power plants or other power generation facilities of electric power companies, or other applications that may have a significant impact on the public.
 - (b) Applications for railway companies, government agencies, or similar entities that require Mitsubishi Electric to establish a special quality assurance system.
 - (c) Applications for which a significant impact on life, the human body, or property may be anticipated, such as aerospace, medical equipment, railways, combustion or fuel devices, ride-on mobile equipment, manned transport equipment, amusement equipment, safety machinery, servers, and air-conditioning equipment for server cooling.

If the product is used in any of the above applications, Mitsubishi Electric shall not assume any responsibility whatsoever for the quality, performance, or safety of the product as described in this instruction manual (including, but not limited to, liability for breach of contract, liability for defects, quality warranty liability, tort liability, and product liability). However, even for the above applications, depending on the specific conditions, such as limiting the intended use, ensuring that backup or fail-safe functions are provided on the equipment side, and not requiring special quality beyond general specifications, Mitsubishi Electric may, at its discretion, determine that application of this product is acceptable. Please consult us for details.

■Miscellaneous

Please note that any damages arising from the unauthorized reproduction or duplication of all or part of this document without Mitsubishi Electric's permission are not covered.

While every effort has been made to ensure that the information contained in this document incorporates the latest revisions to software and hardware, unavoidable discrepancies may occur.

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Creating Solutions Together.



Industrial Computer



Controllers



Computerized Numerical Controllers



Drive Products



Human Machine Interfaces



Robots



Low-voltage Power Distribution Products



Medium-voltage Power Distribution Products



Energy Saving Supporting Devices



Processing Machines: EDM, Lasers



Engineering and Solution Software

Mitsubishi Electric's FA division provides robust support for our customers' manufacturing needs. We offer a vast array of FA products, including industry-leading PLCs, control devices, drive devices, energy efficiency support equipment, power distribution control equipment, and industrial mechatronics. Our presence on every type of production floor enables us to assist in labor-saving initiatives and quality improvements, helping customers achieve sustainable manufacturing. We also address challenges such as decarbonization and labor shortages through the utilization of automation technology.

Additionally, by leveraging synergies among FA technologies, manufacturing expertise, and digital innovations, we aim to streamline the construction of systems for data collection, accumulation, and analysis. This contributes to reducing manufacturing and quality losses.

We enable flexible manufacturing processes that respect legacy systems while embracing innovations to drive optimization. As your solution partner, Mitsubishi Electric FA delivers high-performance, high-quality products that enhance your competitiveness.

Let's automate the world together!

Note: not all products are available in all countries

Precautions Before Use

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

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

- Of this product, export (or service trade) permission under this law is required for exports that fall under the safety and trade control related cargo (or service) specified in the Foreign Exchange and Foreign Trade Control Law.



Mitsubishi Electric's e-F@ctory concept utilizes both FA and IT technologies, to reduce the total cost of development, production and maintenance, with the aim of achieving manufacturing that is a "step ahead of the times". It is supported by the e-F@ctory Alliance Partners covering software, devices, and system integration, creating the optimal e-F@ctory architecture to meet the end users needs and investment plans.



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