FA Equipment for Beginners

(Data Logging)

This course is intended for first time users to grasp an overview and understanding of data logging.

L(NA)00274ENG

Introduction

Purpose of the Course

This course is intended for first time users to understand the basics of data logging.

Introduction Course Structure

The contents of this course are as follows.
We recommend that you start from Chapter 1.

Chapter 1 - What is data logging?

You will learn about data logging together with an application example and reasons why data logging is required.

Chapter 2 - Data logging function of Mitsubishi Electric products

You will learn about an overview of the data logging function (collecting data from multiple devices, transferring the collected data to a personal computer) and application examples of data logging files, which improve productivity.

Chapter 3 - How to use data logging

You will learn about the data logging settings, data to be collected, and data collection timing.

Chapter 4 - Products that support data logging

You will learn about the products that support data logging together with their performance and costs.

Final Test

Passing grade: 60% or higher.

Introduction

How to Use This e-Learning Tool

Go to the next page	>	Go to the next page.
Back to the previous page	<	Back to the previous page.
Move to the desired page	TOC	"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning	X	Exit the learning.

Cautions for Use

Safety precautions

When you learn based on using actual products, please carefully read the safety precautions in the corresponding manuals.

Chapter 1 What is data logging?

In this chapter, let's learn about an overview of data logging.

1.1 What is data logging?

Data logging is the process of collecting and recording data using devices such as programmable controllers.
Data refers to information processed by control devices such as programmable controllers.
Logging means recording.

In other words, data logging refers to collecting and recording information processed by control devices such as programmable controllers.
The recorded data can be transferred to a personal computer and used for various applications.

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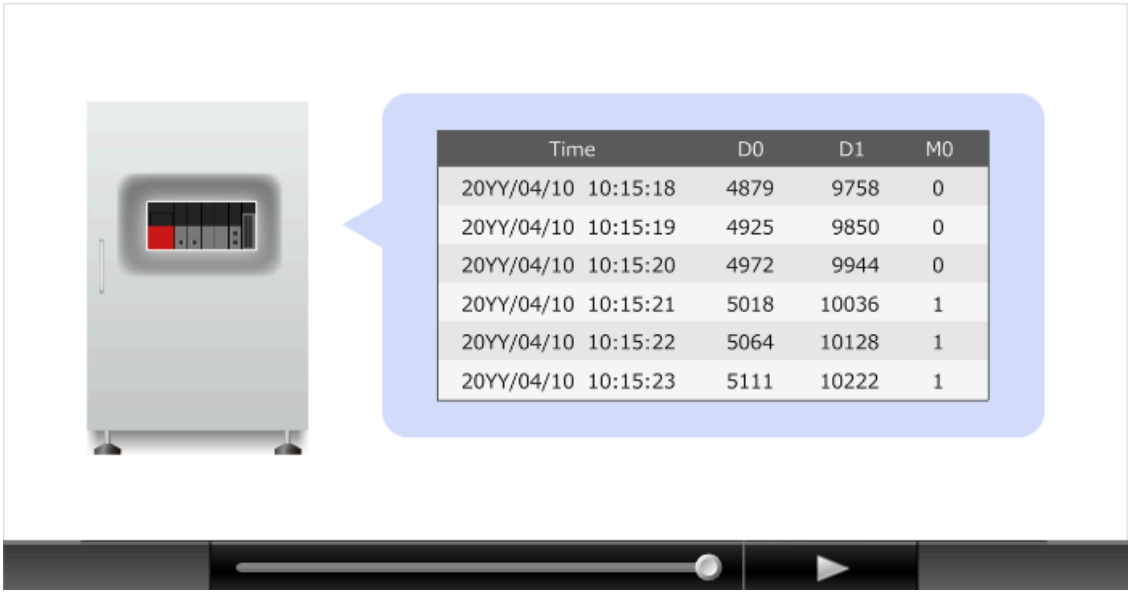
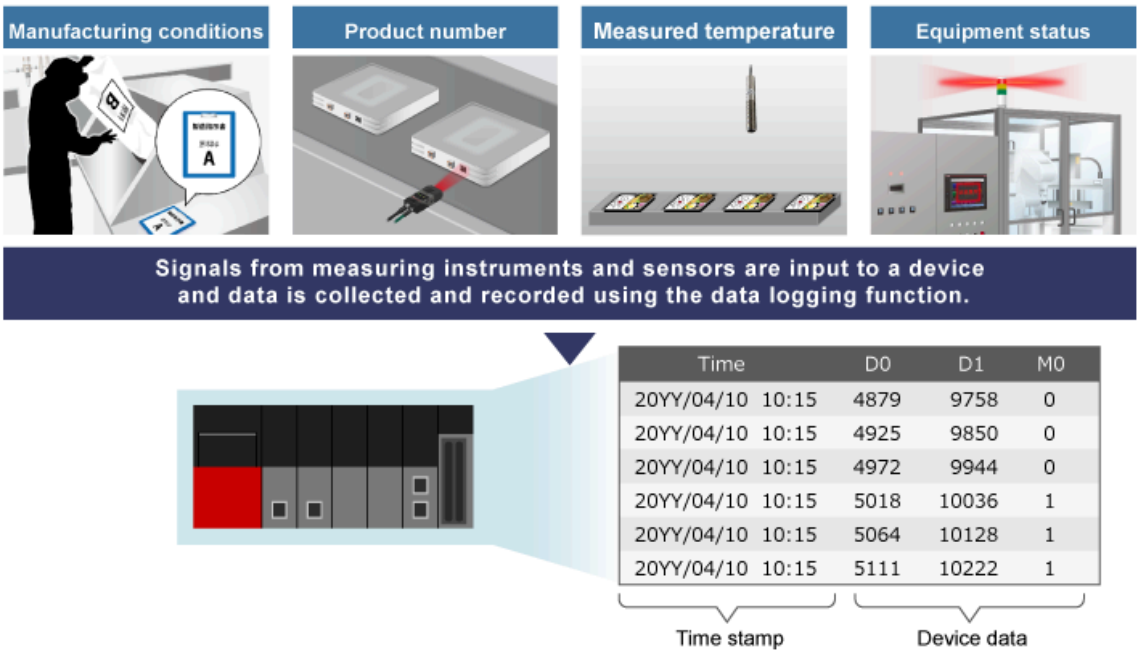


1.2 Application example of data logging

Let's take a look at an example of data logging.

By inputting signals from measuring instruments and sensors installed in the customer's system to a device such as a programmable controller and executing data logging, data such as the manufacturing conditions, product numbers, measured temperatures, and equipment status can be collected and recorded with time stamps.

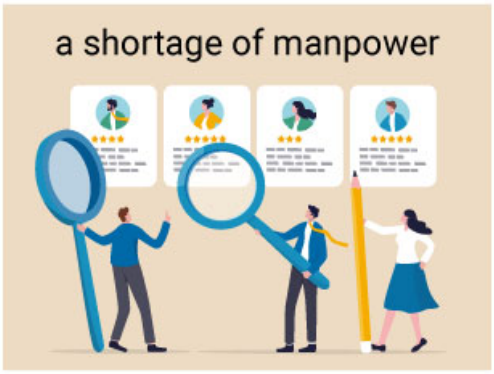


1.3 Why is data logging required?

Why is data logging required for customers?

In recent years, there has been a shortage of manpower due to a decline of the labor force, a reduction in working hours due to work style changes, and a rise in global technological competitiveness. Improving productivity is one of the most important issues for customers.

Data logging, which you will learn in this course, is a function that collects and records data at production sites.
By using data logging, various operations of customers can be streamlined, for example automating tasks performed by humans and using data to analyze problems that occur at production sites. As a result, productivity can be improved.



1.4 Issues that customers are facing

Customers may be facing the following issues at production sites.

• It takes time for operators to measure and record the data of the system and processed products.
• It takes time for operators to create reports (such as daily reports) because data required for reports have to be entered manually.
• It is expensive to introduce a traceability system.
• It takes time for operators to identify the cause of an error and restore the system from the error.

Data logging can be used to solve these customer's issues.

Recording data and creating reports

Traceability introduction cost

Identifying the cause of an error

Chapter 2 Data logging function of Mitsubishi Electric products

In Chapter 1, you have learned about an overview of data logging.

In this chapter, let's learn about the data logging function of Mitsubishi Electric products using the data logging function of the MELSEC iQ-R series CPU module as an example.

2.1 Function overview

Let's take a look at the data logging function of the MELSEC iQ-R series CPU module as an example.

The data logging function collects data at a specified interval or a desired timing and stores the collected data as a data file on the SD memory card or function memory.

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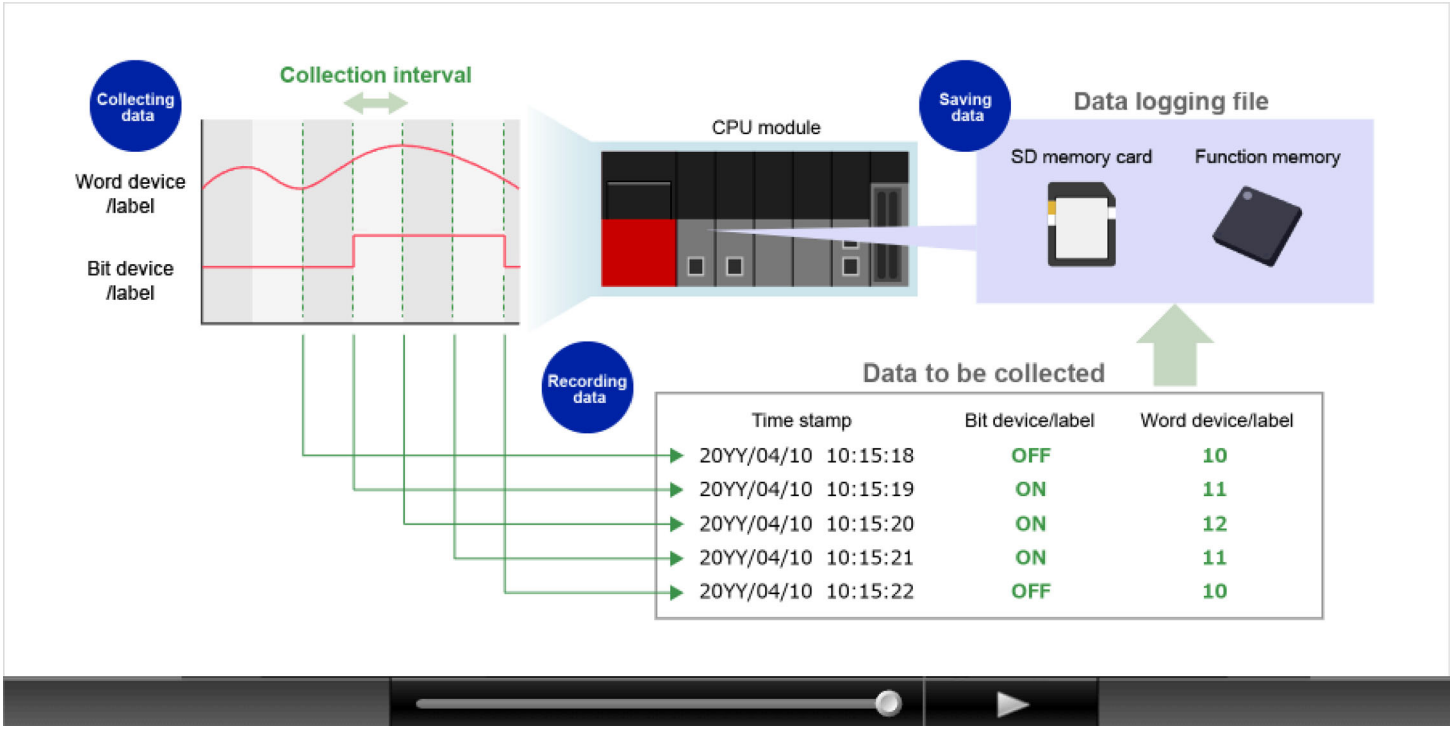
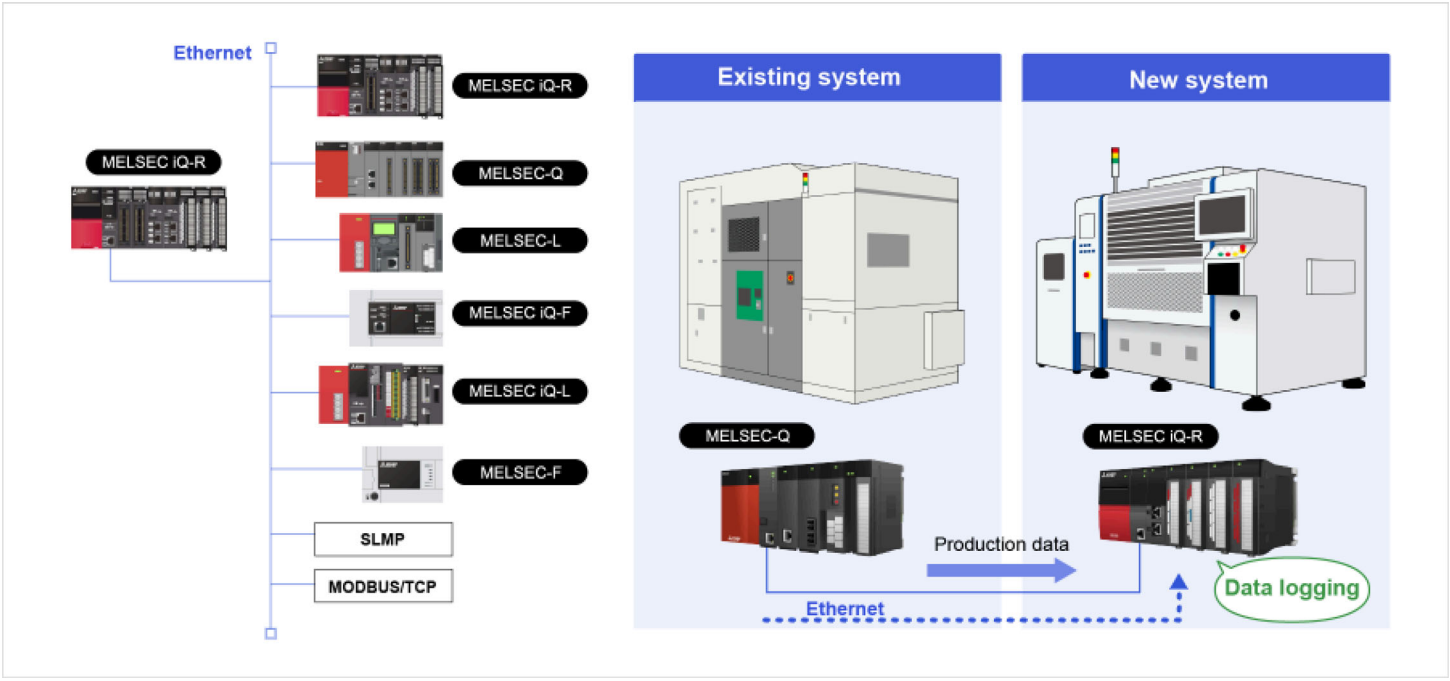


2.2 Collecting data from multiple devices

The MELSEC iQ-R series CPU module can collect and record data from multiple existing devices by using the simple CPU communication function and the data logging function together.

The simple CPU communication function, which is a built-in function of the CPU module, allows data communications between devices connected over Ethernet.
Since data can be sent/received to/from programmable controllers of different series (for example MELSEC-Q series) and non-Mitsubishi devices, data can be collected from multiple devices to the MELSEC iQ-R series CPU module.
The MELSEC iQ-R series CPU module can collect data without changing the existing system configuration by using the simple CPU communication function and can record the collected data by using the data logging function.

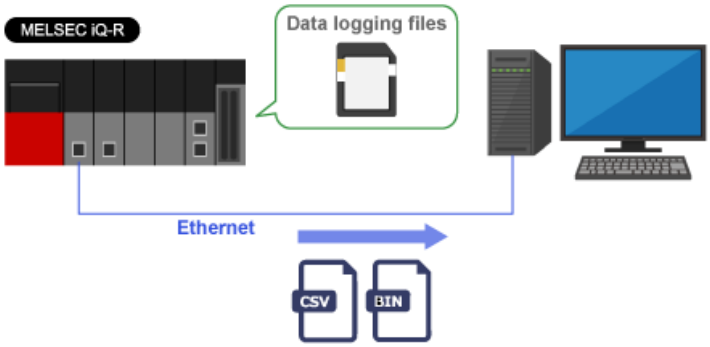


2.3 Transferring the collected data to a personal computer

The collected data (data logging files) can be transferred easily from the CPU module to a personal computer.

Data collected by data logging is saved in a data logging file in CSV, binary, or Unicode text format. Then, the file is stored in the SD memory card or function memory.

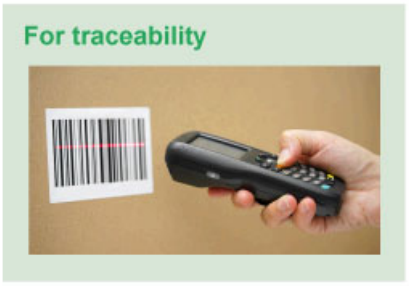
Data logging files can be transferred to a personal computer at a desired timing by using the data logging file transfer function. Data logging files can be acquired smoothly. You do not have to go to the production site to insert or remove the SD memory card.

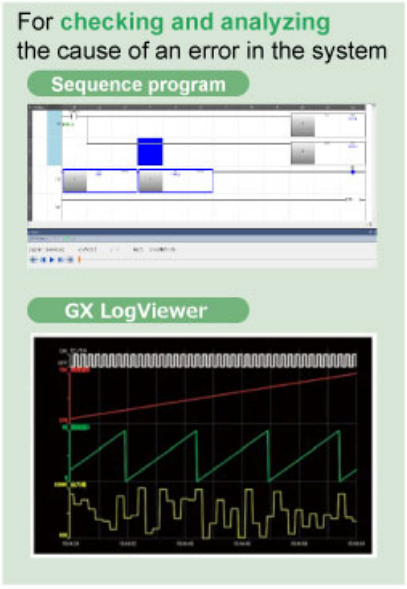


2.4 Application examples of data logging files

Data logging files transferred to a personal computer can be used for various applications:

- for customer-created reports
- for traceability (tracking)
- for analyzing the cause of an error in the system and checking the system status

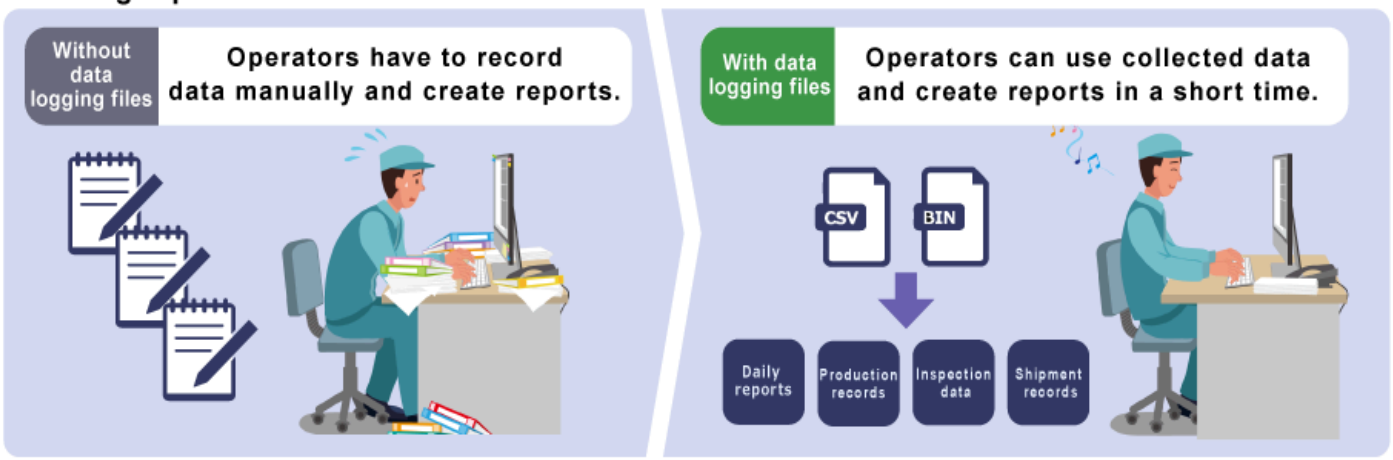




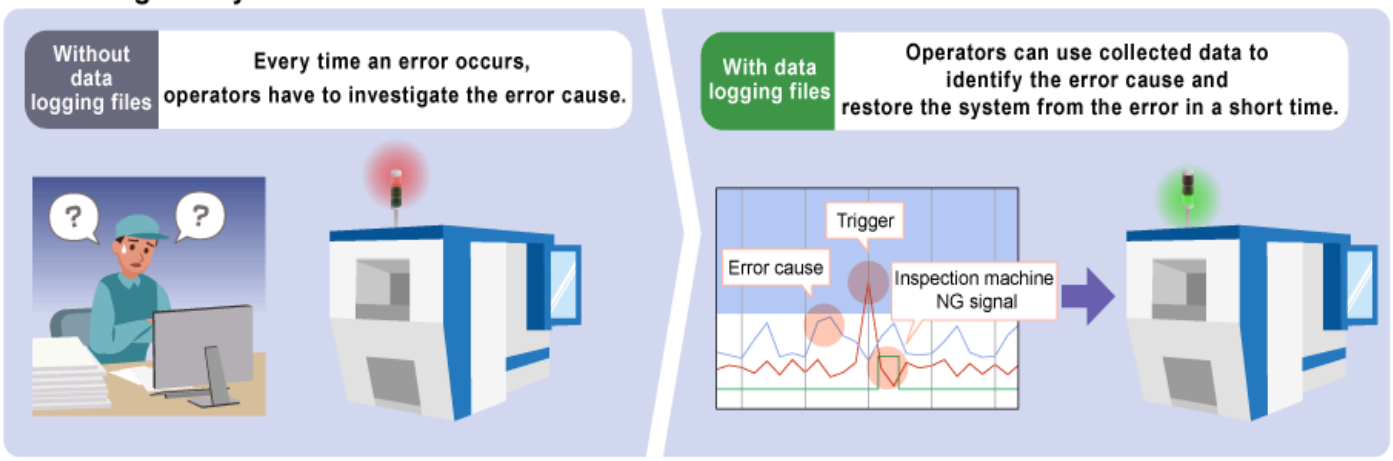
2.5 Improving productivity

Use of data logging files improves productivity at production sites. For example, operators can use the collected data to create reports instead of recording the data manually. Operators can also use the collected data to identify the error cause and restore the system from the error.

Creating reports



Restoring the system from an error



Chapter 3 How to use data logging

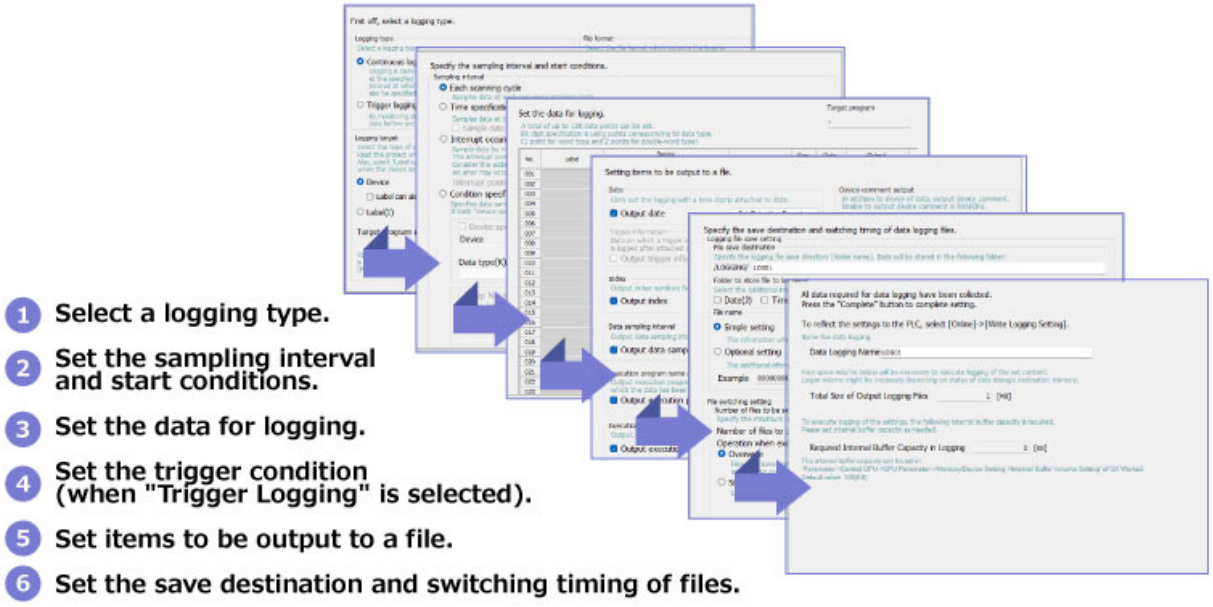
In Chapter 2, you have learned about the data logging function of Mitsubishi Electric products.
In this chapter, let's learn how to use data logging using the data logging function of the MELSEC iQ-R series CPU module as an example.

3.1 Data logging settings

Let's take a look at the data logging settings of the MELSEC iQ-R series CPU module as an example.

Data logging settings can be configured easily with CPU Module Logging Configuration Tool*1.
No program is required. All you have to do is just set items on each wizard window.

*1: The tool can be downloaded free of charge from the Mitsubishi Electric website.



1. Select a logging type.
2. Set the sampling interval and start conditions.
3. Set the data for logging.
4. Set the trigger condition (when "Trigger Logging" is selected).
5. Set items to be output to a file.
6. Set the save destination and switching timing of files.

3.2 Data to be collected

When the data logging function of the MELSEC iQ-R series CPU module is used, the following data can be collected.

The data that can be collected by the data logging function of the MELSEC iQ-R series CPU module are information processed by the CPU module.
Data of the following devices and labels can be collected: bit devices, word devices, double-word devices, global labels, and local labels.

Data that can be collected by the data logging function of the MELSEC iQ-R series CPU module

Bit device	X, DX, DY, M, L, F, SM, V, B, SB, T (contact), T (coil), ST (contact), ST (coil), C (coil), LT (contact), LT (coil), LST (coil), LC (contact), LC (coil), FX, FY, Jn\X, Jn\Y, Jn\SB, Jn\B, BLn\S
Word device	T (current value), ST (current value), C (current value), D, SD, W, SW, RD, R, ZR, Z, FD, Un\G, Jn\W, Jn\SW, U3En\G, U3En\HG
Double-word device	LT (current value), LST (current value), LC (current value), LZ
Global label	Bit, word (signed), double word (signed), word (unsigned), double word (unsigned), single-precision real number, double-precision real number, time, number of characters, timer type, retentive timer type, counter type, long timer type, long retentive timer type, long counter type
Local label	

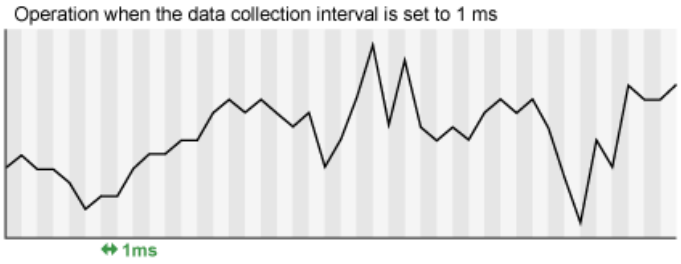
3.3 Data collection timing

When the data logging function of the MELSEC iQ-R series CPU module is used, the data collection timing can be specified.

To specify the data collection timing that meets your application, select the logging type, continuous logging or trigger logging.

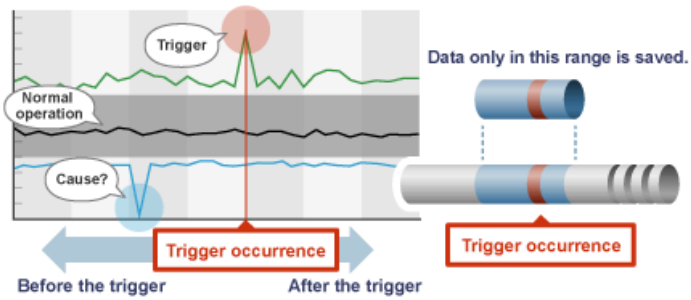
Logging type	Data collection method	Application
Continuous logging	Continuously collects specified data at a specified interval or timing.	Use this method to continuously record the specified data for a certain period of time and check the recorded data at a desired timing.
Trigger logging	Collects specified data at a specified interval or timing and extracts the specified number of data records before and after the trigger condition is met.	Use this method to check the specified data before and after the trigger. The logging data before and after an error can be checked by setting a device where the error has occurred as a trigger.

Continuous logging



After the start of data logging, data is collected at a specified interval and saved in data logging files until data logging is stopped.

Trigger logging



After the start of data logging, the specified number of data records before and after the trigger is extracted and saved in a data logging file.

Chapter 4 Products that support data logging

In Chapter 3, you have learned how to use data logging using the data logging function of the MELSEC iQ-R series CPU module as an example.
In this chapter, let's take a look at Mitsubishi Electric products that support data logging.

4.1 Products that support data logging

The following Mitsubishi Electric products support data logging.

Data logging function of the MELSEC iQ-R/MELSEC-Q/MELSEC iQ-F series CPU module

The data logging function, which is a built-in function of the CPU module, stores the data specified with the dedicated configuration tool in the SD memory card inserted to the CPU module. You can use this function effectively for data analysis and traceability at the start-up of a system.

MELSEC-Q/MELSEC iQ-R series high speed data logger module

High-speed, easy, and low-cost data logging can be performed with an unconventional accuracy.
The report function automatically generates Excel® files without a program. This will help you to create daily reports and graphs.

GOT2000 series logging function and network drive function

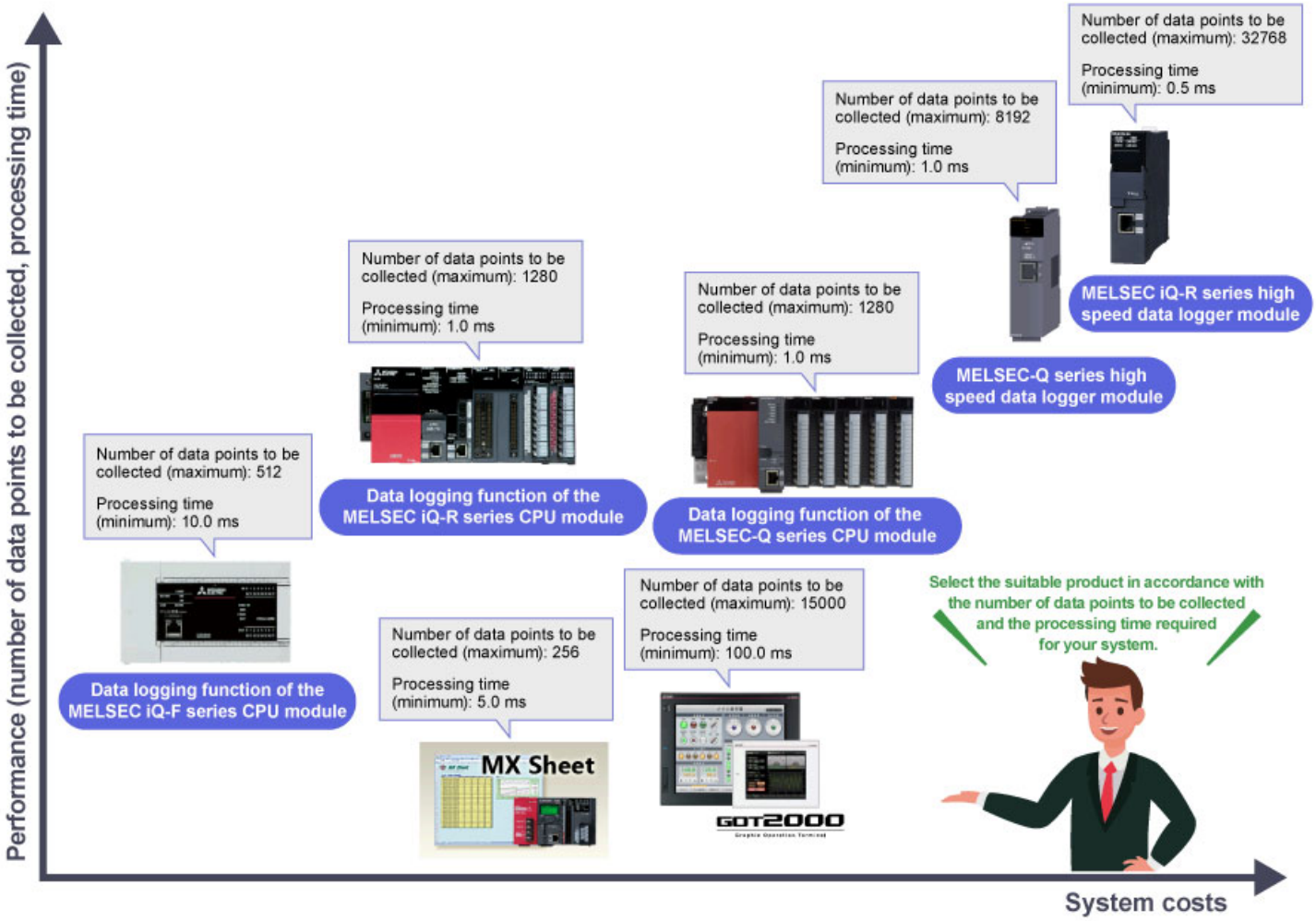
Data of programmable controllers and temperature controllers can be logged in to the GOT and displayed in graphs or lists.
Using the network drive function, you can directly save GOT files to the shared folder on the file server.

MX Component and MX Sheet

These are software to be installed on a personal computer. MX Component enables data communications with programmable controllers and MX Sheet enables data logging only using Excel sheets.

4.2 Comparison between performance and system costs

The following chart shows the comparison between performance of data logging and system costs of all the Mitsubishi Electric products that support data logging.
Select the suitable product in accordance with the number of data points to be collected and the processing time required for your system.



When the number of data points to be collected is set to the maximum points, data logging cannot be performed with the minimum processing time. For the correlation between the number of data points to be collected and the processing time, refer to the manual for the product used.

Test | Final Test

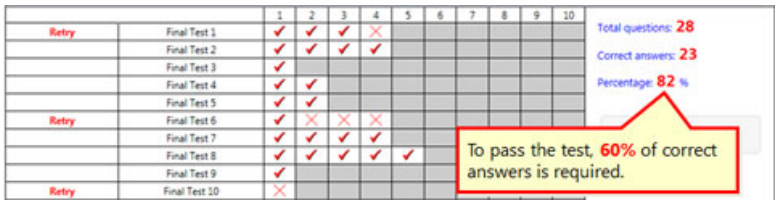
Now that you have completed all of the lessons of the **FA Equipment for Beginners (Data Logging)** course, you are ready to take the final test. If you are unclear on any of the topics covered, please take this opportunity to review those topics.

There are a total of 5 questions (14 items) in this Final Test.

You can take the final test as many times as you like.

Score results

The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.



Test **Final Test 1**

The following statements describe an overview of data logging. Fill in the blanks with appropriate terms.

Data logging is the process of **(Q1)** using devices such as programmable controllers.
Data refers to **(Q2)** processed by control devices such as programmable controllers.
Logging means **(Q3)** .

The recorded data can be transferred to a personal computer and used for various applications.

Q1	collecting and recording data
Q2	information
Q3	recording

Test **Final Test 2**

The following statements describe the application example of data logging. Fill in the blanks with appropriate terms.

By inputting signals from measuring instruments and sensors installed in the customer's system to a device such as a programmable controller and executing data logging, data such as the **(Q1)** can be collected and recorded with **(Q2)** .

By using data logging, various operations of customers can be streamlined, for example automating tasks performed by humans and using data to analyze problems that occur at production sites.

Q1 manufacturing conditions, production numbers, measured temperatures, and equipment status

Q2 time stamps

Q3 productivity

Test **Final Test 3**

The following statements describe the data logging function of a programmable controller. Fill in the blanks with appropriate terms.

The data logging function of the MELSEC iQ-R series CPU module collects specified data at a specified interval or a desired timing, and stores the collected data as a data file in **(Q1)** format.

Data files are stored in the **(Q2)**

Q1	CSV, binary, or Unicode text
Q2	SD memory card or function memory
Q3	multiple existing devices
Q4	personal computer

Test **Final Test 4**

The following statements describe how to use data logging. Fill in the blanks with appropriate terms.

The data logging settings can be configured easily with **(Q1)** .
No program is required. All you have to do is just set items on each wizard window.

The data that can be collected by the data logging function are information processed by the CPU module.
Data of the following devices and labels can be collected: **(Q2)** , double-word devices, global labels, and local labels

Q1	CPU Module Logging Configuration Tool
Q2	bit devices, word devices
Q3	data collection timing

Test **Final Test 5**

Select one Mitsubishi Electric product that does not support data logging.

Q1

- MELSEC iQ-R/MELSEC-Q/MELSEC iQ-F series CPU module
- MELSEC iQ-R/MELSEC-Q series high speed data logger module
- GOT2000 series
- GOT1000 series
- MX Sheet

Test **Test Score**

You have completed the Final Test. You results area as follows.
To end the Final Test, proceed to the next page

		1	2	3	4	5	6	7	8	9	10
	Final Test 1	✓	✓	✓							
	Final Test 2	✓	✓	✓							
	Final Test 3	✓	✓	✓	✓						
	Final Test 4	✓	✓	✓							
	Final Test 5	✓									

Total questions: **14**

Correct answers: **14**

Percentage: **100** %

Clear

You have completed the (Data Logging) course.

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review

Close