MITSUBISHI ELECTRIC

Edge Computing Software

iQ Edgecross

OPC UA Data Collector
User's Manual

-SW1DND-DCOPCUA-M
-SW1DND-DCOPCUA-MD
-SW1DNN-DCOPCUA-M

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the MELSEC iQ-R Module Configuration Manual.

In this manual, the safety precautions are classified into two levels: " ⚠ WARNING" and " ⚠ CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under " ⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

● To perform an operation, such as data change or operating status change, to running devices, such as a programmable controller, servo, robot, or server, from an industrial PC equipped with this product, configure an interlock circuit outside of the devices so that the entire system always operates to the safety side. Additionally, read this manual carefully and ensure the safety before operations. Especially, in the above mentioned operations that are performed from external devices through network, any problems on devices may not be dealt with promptly due to an abnormal data communication.

● Configure a safety circuit outside of an industrial PC equipped with this product so that the entire system operates to the safely side even when a fault occurs in the PC.
Failure to do so may result in an accident due to an incorrect output or malfunction.

[Design Precautions]

⚠CAUTION

● During application of each setting, do not perform the operation that forcibly turns the industrial PC equipped with this product OFF.
Otherwise, the data will be undefined and resetting and re-registering data will be required.
Additionally, doing so may cause the malfunction of this product.

[Security Precautions]

⚠️WARNING

● To maintain the security (confidentiality, integrity, and availability) of access target devices and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

CONDITIONS OF USE FOR THE PRODUCT

(1) This software shall be used under the following conditions;

　　i) that any failure occurred in this software, if any, shall not lead to any serious accident.

　　ii) that the backup and/or fail-safe functions are systematically performed outside the devices in the cases of any failure occurred in this software.

(2) 　Mitsubishi Electric assumes no responsibility and liability (including but not limited to, default liability, defect liability, quality assurance responsibility, tort liability, product liability) for the quality, performance, and safety of both this software and products using this software.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving this software and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INTRODUCTION

Thank you for purchasing OPC UA Data Collector.

This manual describes the specifications, procedures before operation, and troubleshooting of this product.

Before using this product, please read this manual and the relevant manuals carefully, and develop familiarity with the functions and performance of this product to handle correctly.

Please make sure that the end users read this manual.

Note that the menu names and operating procedures may differ depending on an operating system in use and its version.

When reading this manual, replace the names and procedures with the applicable ones as necessary.

CONTENTS

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
OPC UA Data Collector User's Manual [SH-081921ENG] (this manual)	Specifications, procedure before operation, and troubleshooting of OPC UA Data Collector	e-Manual PDF

> **Point**
>
> e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.
>
> e-Manual has the following features:
> • Required information can be cross-searched in multiple manuals.
> • Other manuals can be accessed from the links in the manual.
> • Hardware specifications of each part can be found from the product figures.
> • Pages that users often browse can be bookmarked.
> • Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Address space	Data that contains information of an access target device, a group, and a tag
Data model management	A function that abstracts devices, equipment, and lines in the production site and hierarchically manages them
Edge application	Software that performs various processing for data utilization in production sites using the functions provided by Edgecross in the edge computing area
Edge computing	An information processing method and area, for not only collecting and analyzing data in production sites in real-time, and feed backing the data, but summarizing the production site data and sharing information with IT systems efficiently with the hardware and software in production sites
Edgecross	A software platform that implements specifications and concepts for realizing manufacturing solutions by the FA-IT collaboration centering on the edge computing
Edgecross Basic Software	The name of the software product that implements the Edgecross function
Industrial PC	A PC specialized for industrial use with features such as high reliability, environmental resistance, and long-term supply
Location	A tag accessible from OPC UA Data Collector
Location parameter	A parameter for setting tags accessible from OPC UA Data Collector
Management Shell	The name of the Windows version product that implements the data model management function
Management Shell Explorer	Software that sets and references data models managed by Management Shell
Real-time data processing	A function that realizes the real-time diagnosis and feedback of the production site data
Real-time Flow Designer	The name of the software component that performs operation setting of Real-time Flow Manager
Real-time Flow Manager	The name of the Windows version software component that implements the real-time data processing
Tag	Information to access device data of the CPU module of the own station or a CPU module on a network from an OPC UA client application

1 OPC UA Data Collector

OPC UA Data Collector is a software component that performs the data collection, data reading, and data writing functions to a device connected to an OPC UA server.

Data in a device connected to an OPC UA server can be collected and updated by using OPC UA Data Collector in combination with Edgecross Basic Software.

For details on Edgecross Basic Software, refer to the following:

📖Edgecross Basic Software for Windows User's Manual

MEMO

2 SPECIFICATIONS

This chapter shows the functional and operational specifications of OPC UA Data Collector.

2.1 Functional Specifications

This section shows the functional specifications of OPC UA Data Collector.

Item		Specification
Access target device	Number of connectable devices	1 server per instance
	Connectable server	OPC UA server with all of the following OPC UA service sets • Discovery service set • SecureChannel service set • Session service set • View service set • Attribute service set • Subscription service set
Supported type by Data Collector		• Data collection function • Data reading function/Data writing function
Data collection function	Maximum number of collectible tags for one setting (one group)	256
	Collection interval	• 500 to 900 (ms) • 1 to 21600 (s)
	Input data type[1]	• BOOL (Bit value) • INT (Signed 16-bit integer value) • UINT (Unsigned 16-bit integer value) • DINT (Signed 32-bit integer value) • UDINT (Unsigned 32-bit integer value) • LINT (Signed 64-bit integer value) • ULINT (Unsigned 64-bit integer value) • REAL (32-bit real number value) • LREAL (64-bit real number value) • WSTRING (Unicode (UTF-16LE)) (16 characters)
Data reading function/Data writing function	Input and output data type[1]	• BOOL (Bit value) • INT (Signed 16-bit integer value) • UINT (Unsigned 16-bit integer value) • DINT (Signed 32-bit integer value) • UDINT (Unsigned 32-bit integer value) • LINT (Signed 64-bit integer value) • ULINT (Unsigned 64-bit integer value) • REAL (32-bit real number value) • LREAL (64-bit real number value) • WSTRING (Unicode (UTF-16LE)) (16 characters)

*1 For details on the data types, refer to the following:
🕮Edgecross Basic Software for Windows User's Manual

2.2 Operational Specifications

This section shows the operational specifications of OPC UA Data Collector.

Operating status

The status of OPC UA Data Collector varies for each access target and is determined according to the communication status with the targets.

The communication status with access targets can be checked in Edgecross Basic Software.

Status of OPC UA Data Collector	Description	Communication status with an access target
Data is being read from or written to an access target.	Data Collector and the access target are connected normally. (It will be in this state when the connection processing succeeds.)	Connected
Data is not being read from or written to an access target. (Reconnection is in progress.)	Data Collector and the access target are disconnected. (It will be in this state when the connection processing fails.)	Disconnected

Behavior when an error occurs

When OPC UA Data Collector detects an error, it behaves according to the error type as follows:

Error type	Status of OPC UA Data Collector	Behavior of OPC UA Data Collector
Data collector operation stop error	• Operations according to the specifications cannot be guaranteed due to a hard disk error in an industrial PC of the installation destination or a failure of resource securing. • An error cannot be corrected even by changing the network configuration due to an incorrect parameter setting (device type out of range, for example).	• Discards collected data when this error occurs during data collection. • Stops the data collection, data reading, or data writing function and reports this error to Edgecross Basic Software.
Data collector operation continuation error	• Operations such as a program execution or data communication cannot be continued due to temporary network failure. • An error may be corrected by changing the network configuration even though there is no communication due to a mismatch between the parameter settings and the network configuration.	• Discards collected data when this error occurs during data collection. • Continues the data collection, data reading, or data writing function even after reporting this error to Edgecross Basic Software.

> **Point**
>
> The error types reported to Edgecross Basic Software are as follows:
> • Data collector operation stop error: Moderate error
> • Data collector operation continuation error: Minor error

2.3 Accessible Devices

This section shows the connection destination devices accessible from OPC UA Data Collector.
• Industrial PC in which an OPC UA server is installed
• Devices with the OPC UA server functions equipped

Precautions

The connection procedure differs depending on a connection destination device.
Check the setting procedure of a connection destination device.

3 PROCEDURE BEFORE OPERATION

This chapter shows the procedure from start-up to operation of OPC UA Data Collector.

Operating procedure

1. Install OPC UA Data Collector in an industrial PC in which Edgecross Basic Software is installed.

For the installation procedure and the operating environment of OPC UA Data Collector, refer to the following:

📖OPC UA Data Collector Installation Instructions

2. Set the setting of an OPC UA server and wire and connect it to the industrial PC.

For the methods, refer to the manuals for the OPC UA server and the industrial PC used.

3. Set the parameters of OPC UA Data Collector.

☞ Page 17 PARAMETER SETTING

Precautions

When running Data Collector on an industrial PC where an antivirus software is installed, an exceeded collection cycle or data missing may occur due to an operation of the antivirus software. Exclude the following from the monitoring targets in the antivirus software settings. For the setting methods, refer to the manual for each antivirus software.

 • Data Collector installation destination folder
 • Following files and folders of Windows

Pagefile.sys

*.pst

%systemroot%\System32\Spool

%systemroot%\SoftwareDistribution\Datastore

%windir%\Security\Database

%allusersprofile%\NTUser.pol

%systemroot%\system32\GroupPolicy\Machine\registry.pol

%systemroot%\system32\GroupPolicy\User\registry.pol

MEMO

4 FUNCTIONS

This chapter shows the functions of OPC UA Data Collector.

4.1 Data Collection Function

This function sends a data reading request to an OPC UA server in the interval of the set collection cycle and collects data of data tags when receiving a response from the OPC UA server.

Data acquisition starts at the time when the set time has elapsed since the operating status of Edgecross Basic Software was turned to RUN. After that, data is read periodically at specific intervals. However, if data cannot be read at the data acquisition start, data will not be read periodically at specific intervals.

This function works at specific intervals without the effects of the time change of an industrial PC in which OPC UA Data Collector runs.

Collection processing time report

When an enabled data collection setting is included and the operating status of Edgecross Basic Software switches from RUN to STOP, the collection processing times (maximum and minimum collection processing times)[1] in the RUN state are reported to the software as events. However, when no data is collected while Edgecross Basic Software is in the RUN state, the maximum and minimum collection processing times are reported as '0.'

*1 The range of collection processing time is 0 to 4294967295 in microseconds. When an event is notified, the time unit is converted to milliseconds (three decimal places).

When an uncorresponding data type is set

When a data type set in the location parameter does not correspond to the one set in an OPC UA server, a collection error (data type mismatch) (error code: 2015H) is reported to Edgecross Basic Software.

Check the table below and set the data type corresponding to the one set in the OPC UA server.

OPC UA server	Location parameter
UA_BOOLEAN	BOOL
UA_String	WSTRING
UA_INT16	INT
UA_INT32	DINT
UA_INT64	LINT
UA_UINT16	UINT
UA_UINT32	UDINT
UA_UINT64	ULINT
UA_FLOAT	REAL
UA_DOUBLE	LREAL

Precautions

- An OPC UA server itself collects data periodically. Therefore, data may not be collected if the collection cycle of OPC UA Data Collector is longer than that of an OPC UA server. It is recommended to set the collection cycle of OPC UA Data Collector shorter than that of an OPC UA server.

  In addition, the collection cycle of an OPC UA server depends on its performance. For details, refer to the manual for an OPC UA server used.
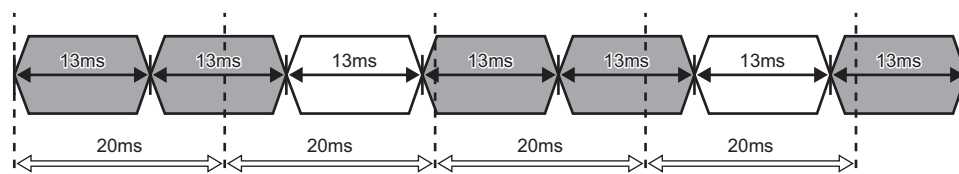
- ▨: Data is collected.
- ▱: Data is not collected.
- ◄─►: Collection cycle of an OPC UA server
- ⇔: Collection cycle of OPC UA Data Collector

- OPC UA Data Collector checks the connection status with an OPC UA server every collection cycle and attempts a re-connection if disconnected. If re-connection fails, it will be disconnected until the connection status check in the next collection timing.
- Character strings including surrogate pair characters cannot be read.
- When the same location is set for some data in one flow, values of the collected data may not match.

Ex.

- To match a data value collected by OPC UA Data Collector with the current value of an access target device, set both the polling cycle of an OPC UA server and collection cycle of OPC UA Data Collector shorter.

4.2   Data Reading Function

This function sends a data reading request to an OPC UA server according to a request from Edgecross Basic Software and reads data of data tags.

When an uncorresponding data type is set

When a data type set in the location parameter does not correspond to the one set in an OPC UA server, a reading error (data type mismatch) (error code: 200DH) is reported to Edgecross Basic Software.
Check the table below and set the data type corresponding to the one set in the OPC UA server.

OPC UA server	Location parameter
UA_BOOLEAN	BOOL
UA_String	WSTRING
UA_INT16	INT
UA_INT32	DINT
UA_INT64	LINT
UA_UINT16	UINT
UA_UINT32	UDINT
UA_UINT64	ULINT
UA_FLOAT	REAL
UA_DOUBLE	LREAL

4.3   Data Writing Function

This function sends a data writing request to an OPC UA server according to a request from Edgecross Basic Software and writes data to data tags.

Precautions

The operations when writing WSTRING type data are as follows:
- Character strings composed of only non-surrogate characters: Written as they are.
- Character strings including surrogate pair characters: Written but replaced with an undefined value.

5 PARAMETER SETTING

This chapter shows the parameters of OPC UA Data Collector that can be set in Edgecross Basic Software.

For the display of the setting screens for each parameter, refer to Edgecross Basic Software User's Manual.

📖Edgecross Basic Software for Windows User's Manual

Precautions

When the setting file of Edgecross Basic Software storing the access target device settings of OPC UA Data Collector is transferred to another industrial PC, the settings should be set again.

5.1　Communication Parameter

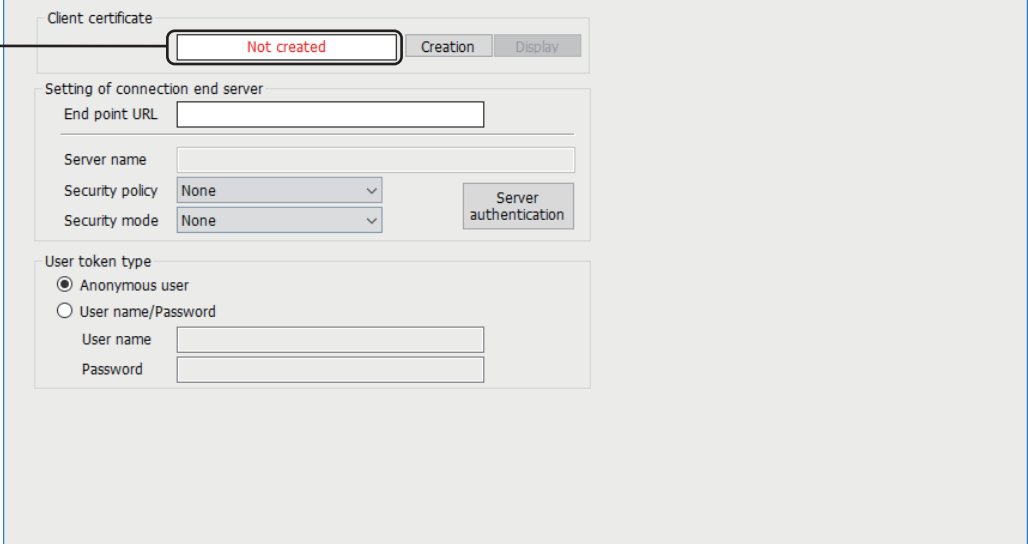This section shows the screens for configuring the connection between OPC UA Data Collector and an OPC UA server.

Window

- The "Target Device Setting" screen of Real-time Flow Designer
- The "Target Device Setting" screen of Management Shell Explorer

Displayed items

Item		Description
Client certificate	(1) Creation status display	The creation status of a client certificate is displayed.
	[Creation] button	Click this to display the "Creation of client certificate" screen. ☞ Page 21 Creating a client certificate
	[Display] button[*1]	Click this to display the contents of a client certificate. (☞ Page 20 Certificate screen)
Setting of connection end server	End point URL	Set the endpoint URL of a connection destination server (0 to 1024 characters).
	Server name	The connection destination server name is displayed.
	Security policy	Select a security policy. The security policy should be the same as that of a connection destination server.[*2] • None: No security • Basic128Rsa15: 128-bit encryption • Basic256: 256-bit encryption • Basic256Sha256: 256-bit encryption (using Sha256 algorithm)
	Security mode	Select a security mode. The security mode should be the same as that of a connection destination server.[*2] • None: No security • Sign: Data is signed. • Sign & Encrypt: Data is signed and encrypted.
	[Server authentication] button	Click this to connect to the set endpoint URL to update a server name. When clicking this button, communication with an OPC UA server is performed. When a client certificate has not been created yet, the "Creation of client certificate" screen appears. When the certificate of a connected server is not trusted, the "Authentication of server certificate" screen appears so check the contents and trust the certificate.

Item	Description
User token type	Select a user token type (user recognition method).
	• Anonymous user: Select this to connect without specifying a user name and a password.
	• User name/Password: Select this to connect with specifying a user name (0 to 1024 characters) and a password (0 to 1024 characters).

*1 It cannot be clicked when a client certificate has not been created.

*2 Depending on the connection destination server, it may be possible to connect with multiple security policies and security modes. Check the specifications of the server.

Precautions

When editing an access target device setting already set in Real-time Flow Designer or Management Shell Explorer, it may take time to display the screen due to a cause such as a network failure because communication with an OPC UA server is performed.

Certificate screen

The following shows the configuration of the "Certificate" screen. By clicking the [Install Certificate] button, a certificate is installed in Windows. [*1]

  *1   It does not affect the operation of Management Shell.
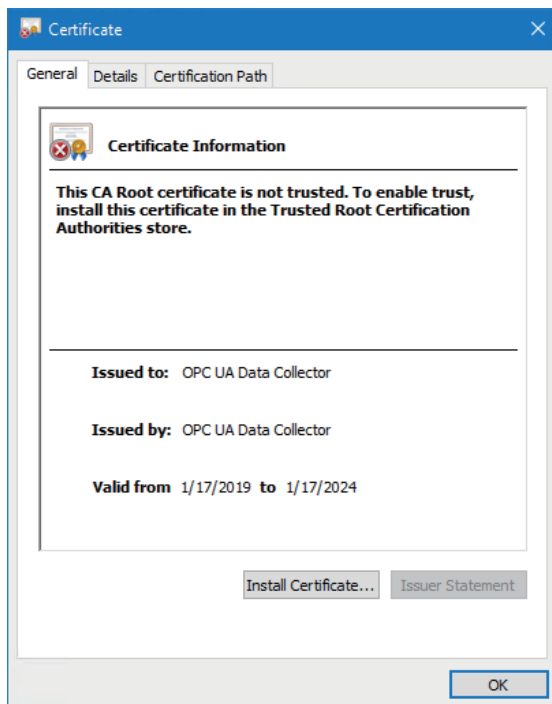
Creating a client certificate

The following shows the screen for creating a client certificate for connecting to an OPC UA server.
This screen appears if a client certificate has not been created yet when setting the communication parameters of OPC UA Data Collector.
It also appears when a client certificate expires.

Window

Displayed items

Item	Description
Application name	An application name (OPC UA client name) is displayed.
Organization name	Set an organization name (0 to 256 characters).
Unit of organization	Set the unit of an organization (0 to 256 characters).
Region name	Set the name of a region (0 to 128 characters).
Prefecture/State name	Set a prefecture or state (0 to 128 characters).
Country	Enter the abbreviation for a country name (0 to 2 characters).
Domain	Set a domain (0 to 16 characters). Default: The machine name of an industrial PC in which OPC UA Data Collector is installed is displayed.
Application URI	The application URI is displayed. Format: urn:[host name]:[company name]:[product name]
Expiration date	Select the expiration date of a client certificate. When using an expired client certificate, the access to an OPC UA server is denied and communication is not established.
Strength of RSA key	Select the strength of the RSA key. By selecting bigger bit, the communication security will also be higher.
Signature algorithm	Select a signature algorithm. When selecting "Sha256," the security of a digital signature will be stronger than when selecting "Sha1."

Precautions

- Depending on the setting of the OPC UA server of a connection target, it is required to trust the created client certificate by the server. For the method, refer to the manual for an OPC UA server used.
- Do not re-create a client certificate until the certificate date is expired. If it is necessary to re-create a client certificate, delete the client certificate and the private key file stored in the following locations manually.
  Client certificate: (Folder in which Edgecross Basic Software is installed)\DataCollector\000002_OPCUA DataCollector_0100\SWnDN-DCOPCUA\PKI\certs\client.der
  Private key file: (Folder in which Edgecross Basic Software is installed)\DataCollector\000002_OPCUA DataCollector_0100\SWnDN-DCOPCUA\PKI\private\client.pem
- The server certificate (server name[thumb print of server certificate].der) is stored in the following location.
  (Folder in which Edgecross Basic Software is installed)\DataCollector\000002_OPCUA DataCollector_0100\SWnDN-DCOPCUA\PKI\trusted

5.2 Collection Parameter

This section shows the screen for configuring the setting on data collection for OPC UA Data Collector.

Window

- The [Collection Option] tab in the "Data Collection Setting" screen of Real-time Flow Designer

```
Collection Data   Collection Option

Collection parameter settings
Please set the collection parameter.

Collection Interval   5 ⇕ 00   msec  ∨   (500 - 900)
```
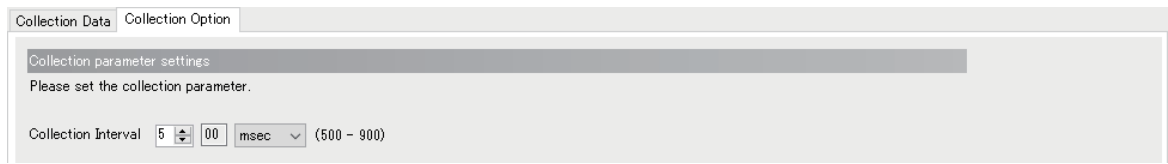
Displayed items

Item	Description
Collection Interval	Set an interval and the unit for collecting data.

5.3 Location Parameter

This section shows the screens for configuring the setting on target tags for OPC UA Data Collector.

Real-time Flow Designer

Data collection function

Window

The [Collection Data] tab in the "Data Collection Setting" screen of Real-time Flow Designer

Displayed items

Item	Description
Data Name	Set a data name (up to 32 characters).
Constant	Select the checkbox to add a constant value or fixed character string to collection data.
Location (top)	Set an access target tag.
Location (end)	The content set for "Location (top)" is displayed.
Data Type	The data type set for a tag is automatically set. Do not change the setting.
Length	When selecting "WSTRING" for "Data Type," the number of characters set for a tag is displayed.
Setting Value	Set a constant value or fixed character string to add to collection data.

■Location setting

For OPC UA Data Collector, locations can be set in the "Location Setting" screen.

Data writing function

Window

The [Instruction Target data] tab in the "Instruction Feedback Setting" screen of Real-time Flow Designer

Displayed items

Item	Description
Data Name	Set a data name (up to 32 characters).
Location (top)	Set an access target tag.
Location (end)	The same content as "Location (top)" is displayed.
Data Type	The data type set for a tag is automatically set. Do not change the setting.
Length	When selecting "WSTRING" for "Data Type," the number of characters set for a tag is displayed.
Setting Value	Set a value to substitute for an access target location.

■Location setting

For OPC UA Data Collector, locations can be set in the "Location Setting" screen.

☞ Page 27 Location setting

Management Shell

Window

The "Add External Data Tag Resource" or "Edit External Data Tag Resource" screen of Management Shell Explorer

```
Add External Data Tag Resource                                    X

Data Tag Resource Name    [                                    ]

Resource Display Name     [                                    ]

Target Device             [ Dev004                          v ]

Location                  [                              ]  [ Setting ]

Data Type                 [ BOOL                          v ]

Number of Characters      [                         ]

                                          [  OK  ]  [ Cancel ]
```

Displayed items

Item	Description
Data Tag Resource Name	Set the name of an external data tag resource (up to 32 characters).
Resource Display Name	Set the display name of an external data tag resource (up to 64 characters).
Target Device	Select an access target device for an external data tag resource.
Location	Set an access target tag.
Data Type	The data type set for a tag is automatically set. Do not change the setting.
Number of Characters	When selecting "WSTRING" for "Data Type," the number of characters set for a tag is displayed.

Location setting

For OPC UA Data Collector, locations can be set in the "Location Setting" screen.

Location setting

The following shows the screen for selecting a layer in the tree view to select an access target tag in the displayed tag list.

Window

■Real-time Flow Designer

- Data collection function: Click the [...] button in the [Collection Data] tab in the "Data Collection Setting" screen of Real-time Flow Designer.
- Data writing function: Click the [...] button in the [Instruction Target data] tab in the "Instruction Feedback Setting" screen of Real-time Flow Designer.

■Management Shell

Click the [Setting] button in the "Add External Data Tag Resource" or "Edit External Data Tag Resource" screen of Management Shell Explorer.
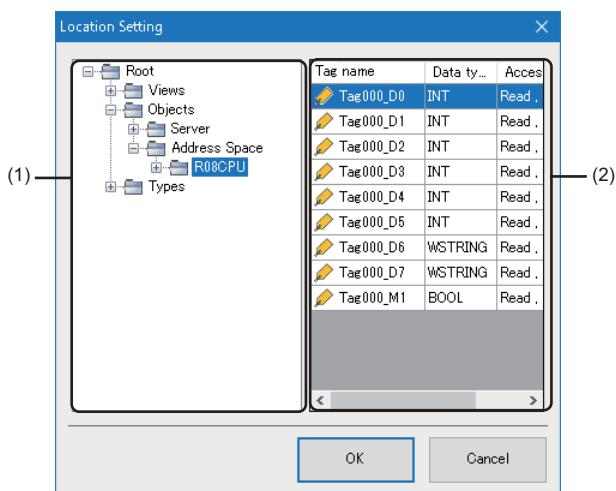
Displayed items

Item		Description
(1) Tree view		Address space information and each definition are displayed in a tree.
(2) Tag list	Tag name	Select access target data. Tags in an item selected in the tree view are displayed.
	Data type[1]	The data type of a tag is displayed. "---" is displayed for the data types that are the array type or not supported by OPC UA Data Collector.
	Access direction	The access direction is displayed.

*1   The string type defined on the OPC UA server side is converted into WSTRING (UTF-16LE).

Precautions

When editing an access target device setting already set in Real-time Flow Designer or Management Shell Explorer, it may take time to display the screen due to a cause such as a network failure because communication with an OPC UA server is performed.

6 **TROUBLESHOOTING**

This chapter explains the errors which may occur when using OPC UA Data Collector and the troubleshooting.

6.1 **Checking Method for Error Descriptions**

The following are the methods for checking error descriptions.

Checking method	Details
Real-time Flow Designer	Error codes can be checked in the "Real-time Flow Manager Diagnostics" screen of Real-time Flow Designer. For details, refer to the following: 📖Edgecross Basic Software for Windows User's Manual
Management Shell Explorer	Error codes can be checked in the "Error Information List" screen of Management Shell Explorer. For details, refer to the following: 📖Edgecross Basic Software for Windows User's Manual

> *Point*
>
> When an error occurs due to a location parameter setting, the location causing the error can be confirmed in the detailed information for the error code[*1].

*1 If the number of characters of the location is 67 or more, it will be displayed as follows. (A surrogate pair character is counted as two characters.)
(The first 30 characters)...(the last 36 characters)

Error type

There are two types of errors for OPC UA Data Collector: moderate error and minor error.

6.2 Troubleshooting by Symptom

If a function of OPC UA Data Collector does not perform properly, check the applicable items in the following and troubleshoot the error.

Troubleshooting on the OPC UA Data Collector startup

Symptom	Check point	Corrective action
Data Collector is not recognized at the Edgecross Basic Software start.	Does a signed-in user who started Edgecross Basic Software have the access right to a folder in which OPC UA Data Collector is stored?	• Sign in as a user with the access right to the folder in which OPC UA Data Collector is stored, and start Edgecross Basic Software. • Grant the user access to the folder in which OPC UA Data Collector is stored.

Troubleshooting on data collection

Symptom	Check point	Corrective action
Unable to connect to an OPC UA server.	Is the client certificate trusted on the OPC UA server side?	Trust the client certificate on the OPC UA server side. For the method, refer to the manual for the OPC UA server used.
	Is an unauthorized anonymous user trying to connect to a server?	Allow the anonymous user access on the OPC UA server side.
	Is a user name or password correct?	Check the user name and password.
	Is the setting file of Edgecross Basic Software transferred to another industrial PC?	Set the access target device again.
Unable to change the OPC UA server setting.	Is there any process using Data Collector, and is an OPC UA server connected to?	Terminate the process using Data Collector and disconnect from the OPC UA server.

Troubleshooting on communication parameters

Symptom	Check point	Corrective action
It takes time to complete the following operations for the access target device setting. Or, a message appears indicating that the setting contents must be reviewed. • Displaying the "Target Device Setting" screen • Clicking the [Server authentication] button • Clicking the [OK] button	Is the host name included in the endpoint URL set in the "Target Device Setting" screen?	Change the host name to the IP address linked to the host name. (Example) opc:tcp://ServerPC:4810 → opc:tcp://192.168.3.10:4810
	Is the IP address included in the endpoint URL set in the "Target Device Setting" screen?	Set the IP address in the server certificate. For the setting method, refer to the manual for an OPC UA server used.

Troubleshooting on location parameters

Symptom	Check point	Corrective action
It takes time to complete the following operation for the location setting. Or, a message appears indicating that the setting contents must be reviewed. • Displaying the "Location Setting" screen	Is the host name included in the endpoint URL set in the "Target Device Setting" screen?	Change the host name to the IP address linked to the host name. (Example) opc:tcp://ServerPC:4810 → opc:tcp://192.168.3.10:4810
	Is the IP address included in the endpoint URL set in the "Target Device Setting" screen?	Set the IP address in the server certificate. For the setting method, refer to the manual for an OPC UA server used.

Troubleshooting on Edgecross Basic Software

Symptom	Check point	Corrective action
An error caused by this product has been detected in Edgecross Basic Software.	Has a data collector startup error been detected in Edgecross Basic Software?	Reinstall this product since the file may have been moved or deleted.

Troubleshooting on screens

Symptom	Check point	Corrective action
Contents in the screen are not displayed properly.	Is a value other than 100% set for "Change the size of text, apps, and other items" in Windows?	• Change the value to 100% for "Change the size of text, apps, and other items." • For Windows 10 (version 1703 or later) or later[1], the display of a screen can be enlarged with high DPI scaling by using a Windows function.[2] ❶ Select 'ProcessDesigner.exe'[3], then select [Properties] on the right-click menu. ❷ Select the checkbox of "Override high DPI scaling behavior. Scaling performed by:" in the [Compatibility] tab, then select "System" from the pull-down list. ❸ Click the [OK] button.

[1] The Windows version can be checked by the following procedure:
  ❶ Enter "winver" in the search box of Windows, and select it from the menu.
  ❷ Check the version in the displayed screen.
[2] The display will be blurred by enlarging.
  The following lists the setting values for "Change the size of text, apps, and other items" and the recommended display resolution for each setting value in Windows 10 or later.
  Setting value: 100%, display resolution: 1024 × 768 dots or more
  Setting value: 125%, display resolution: 1900 × 1200 dots or more
  Setting value: 150%, display resolution: 1900 × 1200 dots or more
  Setting value: 175%, display resolution: 2880 × 1620 dots or more
  Setting value: 200%, display resolution: 2880 × 1620 dots or more
  Setting value: 225%, display resolution: 3840 × 2160 dots or more
  Setting value: 250%, display resolution: 3840 × 2160 dots or more
[3] 'ProcessDesigner.exe' is stored in the folder in which Edgecross Basic Software is installed.
  The following is an example of a storage location.
  (Example) When starting the operating system on the C drive and setting the installation destination folder as the default
  C:\Edgecross\Edgecross Basic Software\Real-timeFlowDesigner\ProcessDesigner.exe

6.3 Error Code List

This section shows the codes for errors that occur in OPC UA Data Collector.

Error code	Error name	Error description	Corrective action
2001H	Data Collection Setting Error	The Data Collection setting is incorrect.	Please review and correct the Data Collection setting.
2002H	OPC UA server connection error (Connection failure)	Failed to connect to the OPC UA server.	• Please check that the OPC UA server has started. • Please review and correct the path to the device on which the OPC UA server operates. • Please check if the end point URL of the OPC UA server is correct. ■If the load on the network is high, please reduce the load. • Reduction of access frequency to the OPC UA server, amount of communication data. • Separation of communication path of this product and communication path of other software. • Reduction of communication to be simultaneously executed for one Target Device. ■If the load on the OPC UA server is high, please reduce the load. • Reduction of the number of clients to be connected to the OPC UA server. • Closing applications running on the OPC UA server.
2003H	OPC UA server connection error (Session establishment failure)	Failed to establish the session.	• Please check that the security policy and security mode are matched with those of the server. • Please check that the user name and password are correctly set. • For an anonymous user, please check that the access from an anonymous user is allowed on the server. • Please check that the client certificate is trusted by the server. • Please check that the number of available simultaneous connected clients is not exceeded. If the number of available simultaneous connected clients is exceeded, please reduce the number of clients. ■If an IP address is included in the endpoint URL in the Target Device setting • Please check if the IP address is set in the server certificate. ■If the load on the OPC UA server is high, please reduce the load. • Closing applications running on the OPC UA server.
2004H	Certificate reading error	Failed to read a certificate.	• Please check if a client certificate exists. • Please check that the client certificate is not expired. • Please check that the time of the industrial PC running this product does not exceed the validity period of the client certificate.
2005H	Reading error (OPC UA server connection failure)	Failed to read the data because the connection with the OPC UA server was lost.	• Please check that the OPC UA server has started. • Please review and correct the path to the device on which the OPC UA server operates. ■If the load on the network is high, please reduce the load. • Reduction of access frequency to the OPC UA server, amount of communication data. • Separation of communication path of this product and communication path of other software. • Reduction of communication to be simultaneously executed for one Target Device. ■If the load on the OPC UA server is high, please reduce the load. • Reduction of the number of clients to be connected to the OPC UA server. • Closing applications running on the OPC UA server.

Error code	Error name	Error description	Corrective action
2006H	Writing error (OPC UA server connection failure)	Failed to write the data because the connection with the OPC UA server was lost.	• Please check that the OPC UA server has started. • Please review and correct the path to the device on which the OPC UA server operates. ■If the load on the network is high, please reduce the load. • Reduction of access frequency to the OPC UA server, amount of communication data. • Separation of communication path of this product and communication path of other software. • Reduction of communication to be simultaneously executed for one Target Device. ■If the load on the OPC UA server is high, please reduce the load. • Reduction of the number of clients to be connected to the OPC UA server. • Closing applications running on the OPC UA server.
2007H	Data Collector internal error	An unexpected error occurred inside this product.	• If Real-time Flow Manager is used, please write the Real-time Flow Manager parameter again. • Please check that no other error occurs. • Please restart the Industrial PC running this product. • Please reinstall this product. • If the same error occurs, please consult your local Mitsubishi representative.
2008H	Target Device setting error	The Target Device setting information does not exist.	Please set the Target Device setting of the basic software again.
2009H	Reading error (Access to a non-existent tag)	Failed to read the data because reading was performed on a tag which did not exist in the OPC UA server.	Please review the location setting or OPC UA server setting so that the tag of the location setting exists in the OPC UA server.
200AH	Writing error (Access to a non-existent tag)	Failed to write the data because writing was performed on a tag which did not exist in the OPC UA server.	Please review the location setting or OPC UA server setting so that the tag of the location setting exists in the OPC UA server.
200BH	Reading error (Incorrect access direction)	Failed to read the data because reading was performed on a tag which was set to unreadable in the OPC UA server.	Please review the location setting or OPC UA server setting so that the access direction of the tag of the location setting becomes read or read/write.
200CH	Writing error (Incorrect access direction)	Failed to write the data because writing was performed on a tag which was set to unwritable in the OPC UA server.	Please review the location setting or OPC UA server setting so that the access direction of the tag of the location setting becomes write or read/write.
200DH	Reading error (Data type mismatch)	The settings for the data types of the tag of the location setting and OPC UA server are different.	Please review the location setting or OPC UA server setting so that the data types of the tag of the location setting and OPC UA server match.
200EH	Writing error (Data type mismatch)	The settings for the data types of the tag of the location setting and OPC UA server are different.	Please review the location setting or OPC UA server setting so that the data types of the tag of the location setting and OPC UA server match.
200FH	Reading error (Error detected in the OPC UA server)	Failed to read the data because an error was detected in the OPC UA server.	• Please check the measures with the error code displayed on the status code in the user's manual of the OPC UA server and perform them. • If the above actions do not solve the problem, please contact the manufacturer of the OPC UA server.
2010H	Writing error (Error detected in the OPC UA server)	Failed to write the data because an error was detected in the OPC UA server.	• Please check the measures with the error code displayed on the status code in the user's manual of the OPC UA server and perform them. • If the above actions do not solve the problem, please contact the manufacturer of the OPC UA server.

Error code	Error name	Error description	Corrective action
2011H	Target OPC UA server communication timeout error	The communication with the target OPC UA server has timed out.	• Please check that the OPC UA server has started. • Please review and correct the path to the device on which the OPC UA server operates. ■If the load on the network is high, please reduce the load. • Reduction of access frequency to the OPC UA server, amount of communication data. • Separation of communication path of this product and communication path of other software. • Reduction of communication to be simultaneously executed for one Target Device. ■If the load on the OPC UA server is high, please reduce the load. • Reduction of the number of clients to be connected to the OPC UA server. • Closing applications running on the OPC UA server. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2012H	Collection error (OPC UA server connection failure)	Failed to collect the data because the connection with the OPC UA server was lost.	• Please check that the OPC UA server has started. • Please review and correct the path to the device on which the OPC UA server operates. ■If the load on the network is high, please reduce the load. • Reduction of access frequency to the OPC UA server, amount of communication data. • Separation of communication path of this product and communication path of other software. • Reduction of communication to be simultaneously executed for one Target Device. ■If the load on the OPC UA server is high, please reduce the load. • Reduction of the number of clients to be connected to the OPC UA server. • Closing applications running on the OPC UA server. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2013H	Collection error (Access to a non-existent tag)	Failed to collect the data because collection was performed on a tag which did not exist in the OPC UA server.	• Please review the location setting or OPC UA server setting so that the tag of the location setting exists in the OPC UA server. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2014H	Collection error (Incorrect access direction)	Failed to collect the data because collection was performed on a tag which was set to unreadable in the OPC UA server.	• Please review the location setting or OPC UA server setting so that the access direction of the tag of the location setting becomes read or read/write. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2015H	Collection error (Data type mismatch)	The settings for the data types of the tag of the location setting and OPC UA server are different.	• Please review the location setting or OPC UA server setting so that the data types of the tag of the location setting and OPC UA server match. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2016H	Collection error (Error detected in the OPC UA server)	Failed to collect the data because an error was detected in the OPC UA server.	• Please check the measures with the error code displayed on the status code in the user's manual of the OPC UA server and perform them. • If the above actions do not solve the problem, please contact the manufacturer of the OPC UA server. ■In the case using Real-time Flow Manager • Please execute STOP operation with Real-time Flow Designer, then execute RUN operation again.
2017H	Certificate time invalid error	Server certificate or client certificate has expired or is not yet valid.	Please make sure that the system time on the server and client sides are the same and re-create the certificate.

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6.4 Event Code List

This section shows the codes for events that occur in OPC UA Data Collector.

Event code	Event status	Event name	Event description
9000H	Information	Collection processing time	Measurement of collection processing time has been completed.

APPENDIX

Appendix 1 Processing Performance and Processing Time

This section shows the processing performance and processing time of OPC UA Data Collector.

Measurement conditions 1

Industrial PC

Item		Description
CPU		Intel® Atom™ E3845 1.91 GHz 64-bit architecture
RAM		8 GB
OS (64-bit version)		Windows® 10 Pro
Ethernet network I/F	Interface	100BASE-TX
	Communication method	Half duplex
	Communication speed	100BASE-TX: 100 Mbps
	Number of cascade connections	100 Mbps: 1

Parameter of Data Collector

Parameter type	Setting item	Setting content
Collection parameter	Collection interval	500 (ms)

Parameters of an OPC UA server

Item	Setting content
Collection cycle	500 (ms)
Number of collectible tags	512

Access target server

Item	Description
In the same industrial PC	OPC UA server
Outside	MELSEC iQ-R OPC UA server module

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Measurement conditions 2

Industrial PC

Item		Description
CPU		Intel® Atom™ E3826 1.46 GHz (Dual Core)
RAM		4 GB
OS (64-bit version)		Windows® 10 Pro (64bit)
Ethernet network I/F	Interface	100BASE-TX
	Communication method	Full duplex
	Communication speed	100 Mbps (100BASE-TX)
	Number of cascade connections	100 Mbps: 1

Parameter of Data Collector

Parameter type	Setting item	Setting content
Collection parameter	Collection interval	500 (ms)

Parameters of an OPC UA server

Item	Setting content
Collection cycle	500 (ms)
Number of collectible tags	512

Access target server

Item	Description
In the same industrial PC	OPC UA server
Outside	MELSEC iQ-R OPC UA server module

Processing performance

The following table shows the processing performance capable of collecting all data in a specified cycle per collection processing time (single collection cycle).

Measurement conditions 1

Number of collection node points	Performance value (ms)		CPU usage rate (%)	
	OPC UA server in the same industrial PC	Outside of OPC UA server	Minimum value	Maximum value
256	2.8	2.9	0	3
512	3.0	3.0	0	3
1024	4.0	4.4	0	3
2048	6.0	4.6	0	3

Measurement conditions 2

Number of collection node points	Performance value (ms)		CPU usage rate (%)	
	OPC UA server in the same industrial PC	Outside of OPC UA server	Minimum value	Maximum value
256	2.51	6.89	0	6
512	6.2	4.92	0	6
1024	6.36	8.98	0	7
2048	6.81	5.59	0	7

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Appendix 3 Supported Edgecross Basic Software Version

The following table shows the version of Edgecross Basic Software supported by OPC UA Data Collector.

OPC UA Data Collector version[*1]	Data collector version[*2]	Data collector specifications version[*2]	Edgecross Basic Software version[*2]
1.00A	1	1.00	1.00 or later
1.01B	2		1.10 or later
1.02C	3		
1.03D	4		
1.04E	5		
1.05F or later	6		

*1 Can be checked in the screen displayed by selecting [Windows System] ⇨ [Control Panel] ⇨ [Programs] ⇨ [Programs and Features] from Windows Start.
*2 For the checking method, refer to the following:
📖 Edgecross Basic Software for Windows User's Manual

Restrictions when using in Management Shell

The following shows restrictions for using OPC UA Data Collector in Management Shell.

Import and export

Each version has restrictions as shown below for importing or exporting a setting file.

○: Without restrictions, △: With restrictions, ×: Not available

OPC UA Data Collector version	Importing a setting file in the same industrial PC as the one which exported the file	Importing a setting file in a different industrial PC from the one which exported the file
1.00A	×	×
1.01B or later	○	△[*1]

*1 An error occurs in starting Management Shell since a target device setting where OPC UA Data Collector is set is not available. In this case, set the target device setting again in the "Target Device Setting" screen, and the error will be removed.

Data model import and data model export

Each version has restrictions as shown below for importing and exporting a data model.

○: Without restrictions, △: With restrictions, ×: Not available

OPC UA Data Collector version	Importing a data model in the same industrial PC as the one which exported the model	Importing a data model in a different industrial PC from the one which exported the model
1.02C or earlier	×	×
1.03D or later	○	△[*1]

*1 An error occurs in starting Management Shell since a target device setting where OPC UA Data Collector is set is not available. In this case, set the target device setting again in the "Target Device Setting" screen, and the error will be removed.

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Appendix 4 Added and Changed Functions

This section shows the added and changed functions of OPC UA Data Collector.

Added/changed contents	Version	Reference
Management Shell added in Edgecross Basic Software Ver.1.10 is supported.	1.01B	—
Windows 11, Windows Server® 2019, and Windows Server 2016 are supported.	1.04E	▢OPC UA Data Collector Installation Instructions

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REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
May 2018	SH(NA)-081921ENG-A	First edition
May 2018	SH(NA)-081921ENG-B	Partial correction
September 2018	SH(NA)-081921ENG-C	■Added or modified part Section 6.4
March 2019	SH(NA)-081921ENG-D	■Added or modified parts Chapter 3, Section 4.1, Section 4.3, Section 5.1, Section 5.2, Section 5.3, Section 6.3, Appendix 3, Appendix 4
June 2019	SH(NA)-081921ENG-E	Partial correction
December 2019	SH(NA)-081921ENG-F	■Added or modified parts Section 4.1, Section 4.2, Section 6.1, Appendix 3
May 2021	SH(NA)-081921ENG-G	■Added or modified part Appendix 3
January 2022	SH(NA)-081921ENG-H	■Added or modified parts TERMS, Section 5.3, Appendix 2
June 2023	SH(NA)-081921ENG-I	■Added or modified parts Section 6.2, Appendix 4
September 2023	SH(NA)-081921ENG-J	■Added or modified parts Section 2.1, Section 6.2, Section 6.3, Appendix 2, Appendix 3

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