
**User's
Manual**

**DXA410
DAQOPC
User's Manual**

Foreword

This manual explains the functions and operations of DAQOPC. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.

DAQOPC is an OPC server that provides OPC interface (Data Access interface). The OPC interface was designed by the OPC (OLE for Processing Control) Foundation. This manual describes the specifications of the Data Access interface and vendor-specific section. This manual is for those who understand the specifications of the OPC Foundation.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
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Revisions

1st Edition	November 2000
2nd Edition	September 2001
3rd Edition	May 2002
4th Edition	November 2002
5th Edition	December 2005

Checking the Contents of the Package

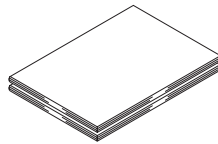
Unpack the box and check the contents before operating the software. If some items are missing or otherwise inconsistent with the contents description, please contact your dealer or nearest YOKOGAWA representative.

Model and Suffix Code

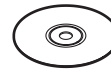
Model	Basic Suffix Code	Specification
DXA410		DAQOPC OPC Server
	-0	OS (Windows NT Workstation 4.0, NT Server 4.0, Windows 2000)
	1	Basic Version, Japanese
	2	Basic Version, English
	3	Advanced Version, Japanese
	4	Advanced Version, English

Package Contents

DXA410 DAQOPC
User's manual (this document) 1 pc.
DXA410 DAQOPC
Installation manual 1 pc.



CD-R 1 pc.
(in case)



Notes on Using This Product

Storing the CD-R

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Doing so can cause it to become unreadable.
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 - Store the CD-R in its original jewel case.
Do not leave the CD-R in the CD-ROM drive after use. It can become deformed or damaged unless it is kept in its case.
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Contents

1

Checking the Contents of the Package	ii
Notes on Using This Product	iii
CD-R Handling Guidelines	iv

2

Chapter 1 Overview

1.1 Functional Overview of DAQOPC	1-1
1.2 Overall Configuration and DAQOPC Interface	1-6
1.3 Server Function	1-7

3

Chapter 2 DAQOPC Operation

2.1 Flow of DAQOPC Operation	2-1
2.2 Starting the Configurator and Setting Parameters	2-2
2.3 Starting and Stopping DAQOPC	2-9
2.4 Setting Up the DAQOPC Client	2-10

Index

Chapter 3 DAQOPC DA Server Functions

3.1 Overview of the DAQOPC DA Server Function	3-1
Data Access Method via the OPC Interface	3-1
OPC Interface Compliance	3-1
3.2 OPC Interface Functions	3-2
3.2.1 A List of Interfaces	3-2
3.2.2 Process Data	3-7
3.2.3 ItemID	3-10
Defining the ItemID	3-10
A list of ItemIDs	3-10
Item IDs	3-12
Access path	3-17
Blob	3-17
3.2.4 Data acquisition operation	3-18
Limits of Data Acquisition Operation	3-18
Cached data update	3-18
Data change notification	3-19
3.2.5 Group Object Properties (IOPCGroupStateMgt)	3-19
3.2.6 Item Properties	3-20
3.2.7 Locale ID (LCID)	3-44
3.2.8 Structures Defined by the OPC	3-44
3.2.9 Support for OPC Optional Specifications	3-45
3.3 Error Codes	3-46

Index

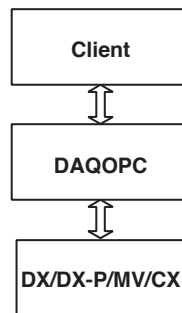
1.1 Functional Overview of DAQOPC

What Is an OPC Interface

By using the OPC interface provided by YOKOGAWA, the user is able to access various data on the DX/DX-P/MV/CX via the DAQOPC server using an OPC-compliant application that runs on a Windows machine. The user does not have to create a special application program.

The OPC interface is a standard interface that uses OLE (Object Linking and Embedding) for process control. It consists of a server that provides various data on the DX/DX-P/MV/CX and a general-purpose interface used to access the server.

OPC applies OLE, which is a standard method of communication between applications in the Windows environment, to process control. It allows the exchange of process data between multiple general-purpose Windows applications.



DAQOPC Functions

Functions Common to the Basic and Advanced Version

- Provides Data Access function (DA), the OPC interface.
DA function: Reading and writing of the current value of the process data that uses ItemID as the data identifier.
- Starts and stops the OPC server in sync with the start and shutdown of Windows.
- Supports the communication interfaces of the DX/DX-P/MV/CX which includes Ethernet, RS-232, and RS-422-A. The DX-P only supports the Ethernet interface.
- Allows a data update rate of up to 1 s. However, data update may not be possible at the specified rate depending on the communication conditions.
When retrieving data other than items PV, SP, OUT, ALARM1-4, COMMON.STATUS, and COMMON.PROP, the server issues a query command to the connected device. If the client requests the retrieval of these items to the server, the data retrieval takes time, and the load on the CPU on the server side PC increases.
- You can read measured values, computed values, control setting values (CX), alarm statuses, and other values as item IDs.
- Capable of reading and writing communication input data as an ItemID (administrator level only). However, for the DX-P, this is only for users using communication input data.
- Allows access using DX/DX-P/MV/CX administrator and user levels.
- By setting the communication status with the connected device to an ItemID, the client is able to instruct a recovery after a power failure.
- Retrieves span value, unit, tag, alarm type, and alarm setpoint as Property IDs of the ItemID.
- The DAQOPC OPC server supports the OPC Data Access Version 1.0A and 2.0.
- The DAQOPC OPC server supports the OPC DA Custom Interface.
- The DAQOPC OPC server supports the OPC DA Automation Interface.
- The DAQOPC OPC server supports the optional OPC DA browser function.
(Browser function is used by the OPC client to browse the contents of the OPC server.)
- The DAQOPC OPC server can connect up to 24 DX/DX-P/MV/CXs.

Advanced Version Functions

You can write the following items. However, control loop and control computation constant items can only be written on the CX. Also, some items are not supported by certain styles of CX.

Accessing the DX-P with the Advanced version is the same as that with the Basic version since the monitor function (port number 34261) is used.

* Supported by style 2 of the CX or later.

** Supported by style 3 of the CX or later. When PV/SP computation is ON, you cannot write the measured value 1 input bias, measured value 2 input bias, measured value 1 input filter, measured value 2 input filter, or remote input filter.

Alarm setpoint

Recording start/stop

Computation start/stop

Batch name (with the batch option only)

Lot number (with the batch option only)

Writing messages (with the batch option only)

Output value of internal loops (only internal loops)

Run/Stop of internal loops *

Control mode of internal loops *

Switching Remote/Local on internal loops *

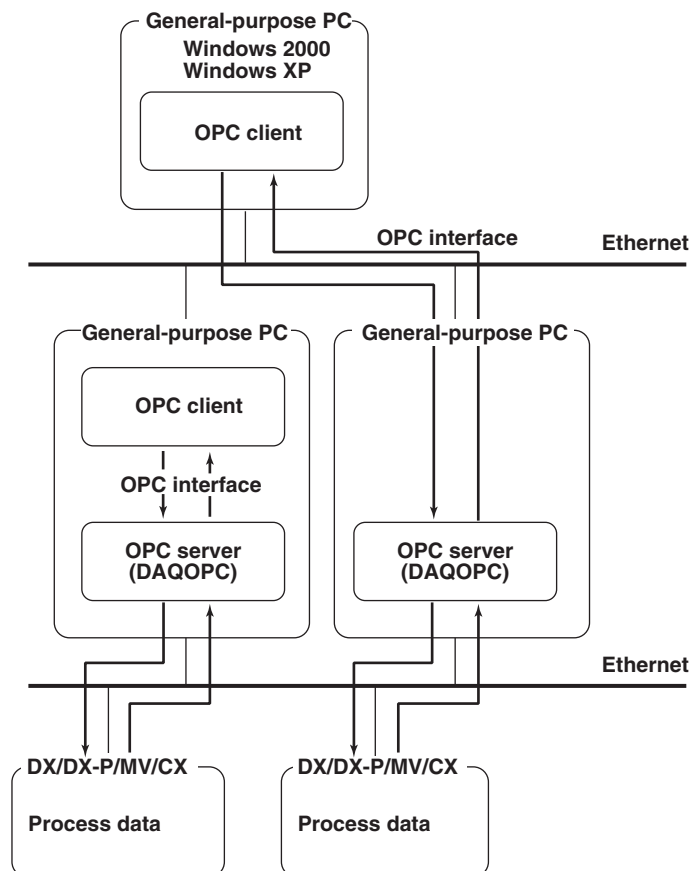
Current SPNo. of internal loops *

(See next page.)

SP settings for each PID of the of internal loops
 Alarm setpoint for each PID of the of internal loops
 Proportional band (P) settings for each PID of the of internal loops
 Integral time (I) settings for each PID of the of internal loops
 Derivative time (D) settings for each PID of the of internal loops
 Output high-limit for each PID of the of internal loops
 Output low-limit for each PID of the of internal loops
 Manual reset value for each PID of the of internal loops
 Preset output value for each PID of the of internal loops
 Control direction settings for each PID of the of internal loops
 ON/OFF control hysteresis setting for each PID of the of internal loops
 Measured value 1 input bias of the control loop **
 Measured value 2 input bias of the control loop **
 Remote input bias of the control loop **
 Measured value 1 input filter of the control loop **
 Measured value 2 input filter of the control loop **
 Remote input filter of the control loop **
 Control loop ratio setting **
 Control computation constants **

Where OPC Interface Fits

OPC client refers to the application that requests data using the OPC interface. OPC server refers to the application that provides the data.



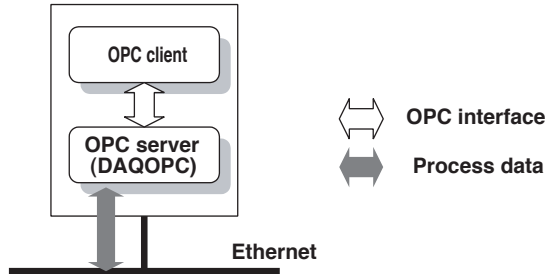
The OPC server and OPC client run on a general-purpose PC.

You can use a commercially sold OPC-compliant application or an OPC-compliant application that you've created using VC++ (Visual C++), VB (Visual Basic), or VBA (Visual Basic for Application) as an OPC client.

Server/Client Configuration

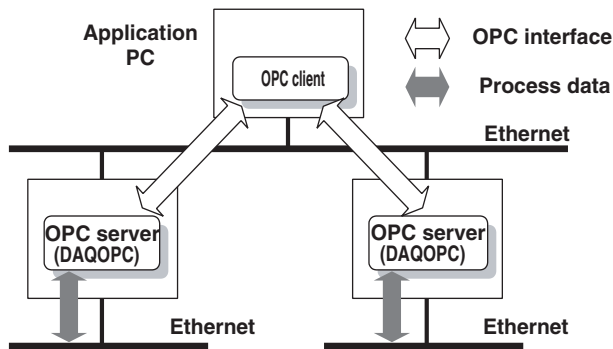
The DAQOPC user (OPC client) may exist on the same PC as the DAQOPC server or on a host computer (Windows machine).

When the OPC client exists on the same PC as the DAQOPC server



- Application size: Mid-size
- Performance: Faster than when the OPC client exists on a host computer, because a local OPC server is used.

When the OPC client exists on a host computer



- Application size: Mid- to large-size
- Performance: The performance degrades slightly (20% to 30%) per server when compared to when the OPC client exists on the same PC as the DAQOPC server. This is because the DCOM (Distributed Component Object Model) is used to connect between the client and server.

Hardware Requirements

The following hardware is required for DAQOPC to operate properly.

- PC model: IBM PC/AT compatible (that can run Windows 2000 or Windows NT)
- CPU: Pentium 300 MHz or later (Windows 2000)
Pentium 800 MHz or later (Windows XP)
- Main memory: 256 MB or more
- Free disk space: 1 GB or more.
- Communication device: RS-232 port supported by the OS.
Ethernet NIC (not required if the OPC client and the DAQOPC server exist on the same PC, and the RS-232/RS-422-A interface is used to retrieve data from the DX/MV/CX.)
- Peripheral devices: Mouse supported by the OS.

Software Requirements

The following software is required for DAQOPC to operate properly.

- OS: Windows 2000 or Windows XP Professional.
The language version of the package (DAQOPC) must be the same (both Japanese or both English) as that of the operating system (Windows 2000 or Windows XP.)
- Service pack: Windows 2000 SP 3, 4.
Windows XP Professional SP1, 2

Miscellaneous

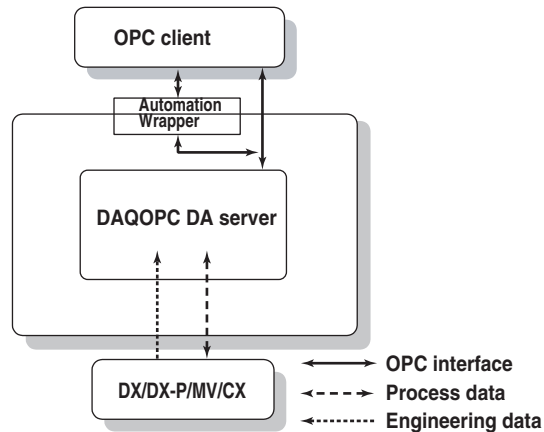
If the communication interface with the DAQSTATION is RS-422-A, an RS-232/RS-422-A converter is required.

1.2 Overall Configuration and DAQOPC Interface

This section will describe the overall construction of DAQOPC and an overview of DAQOPC functions.

Overall Construction of DAQOPC

The overall construction of DAQOPC is shown below. DAQOPC OPC server consists of a server that provides the interface specifications of the OPC DA.



Role of each function

An overview of the interface that DAQOPC supports is indicated.

Process Data		OPC Specification
Current value data	Read/write*	Complies with DA2.0

* With the Advanced version, you can save the items shown on page 1-2.

Engineering Data		OPC Specification
Tag information	Load	Complies with DA2.0
Tag list	Load	Complies with DA2.0

1.3 Server Function

A list of DAQOPC server functions is shown below.

Function Name	Description
OPC DA custom interface	Functions that complies with the custom interface of the OPC specification.
OPC DA automation interface	Functions that complies with the automation interface of the OPC specification.

DA Server

Application capacity

The application capacity of the DAQOPC DA server is shown below.

Item	Application Capacity
Maximum number of clients	100 clients
Maximum number of group objects	1,000 groups
Maximum number of registered ItemIDs	10,000/group
Maximum number of cache update ItemIDs	100,000
Cache update rate (UpdateRate)	1,000 to 3,600,000 ms (1 s to 1 h)

Server name (ProgID)

Server name is as follows:

Server Name: **Yokogawa.ExaopcDADAQOPC1**

Note

You can also check the server name (ProgID) in the Version Information dialog box of the DAQOPC configuration window.

OPC Custom Interface and OPC Automation Interface

The OPC specification defines two types of interfaces: OPC custom interface and OPC automation interface. Both of these interfaces have approximately the same data access functions, but they are designed for different client programs.

The DAQOPC OPC server implements both interfaces and supports both types of client programs.

	Custom Interface	Automation Interface
Application	For dedicated applications such as SCADA/MES/analysis software programs	For easy access from script languages
Number of client languages	VC++	Visual Basic
Performance	Good	Poor

The OPC custom interface uses the basic OLE/COM functions directly and operates at a high speed.

In contrast, the OPC automation interface complies with the OLE automation interface that allows access from Visual Basic. The process that facilitates the access from script languages leads to an overhead, and, therefore, the performance is slightly lower than the OPC custom interface.

VB and VC++ versions

If you are creating an application program (OPC client), use the following versions of VB and VC++.

Version	DAQOPC and User Application on the Same PC	DAQOPC and User Application on Different PCs.
DAQOPC R3.01	VB6.0, VC++6.0 (SP5)	VB5.0/6.0, VC++5.0/6.0

If you are creating a program using VB, select the Yokogawa Exaopc Data Access Automation Server check box by choosing Project > References.

2.1 Flow of DAQOPC Operation

This section will describe the operations of DAQOPC. For the access method from the OPC client software, see chapter 3, “DAQOPC DA Server Function.”

DAQOPC refers to the setup file at startup and logs onto the DX/DX-P/MV/CX. The DAQOPC configuration window provides easy-to-use user interface (like a typical Windows application) for displaying and setting the communication parameters of the DX/DX-P/MV/CX from which DAQOPC is to retrieve data. In addition, the DAQOPC configuration window shows information that is required for the client to connect to DAQOPC (ProgID).

Flow of Operation

The general flow of operation is as follows:

1. Determine the method of connection with the DAQSTATION from which to retrieve the data using the Configurator.
2. Start DAQOPC.
3. Set up the client software if the client is on a different PC.

Changing the Parameter during DAQOPC Operation

You can change system parameters on the DAQOPC configuration window even when DAQOPC is in operation. However, the specified parameters take effect the next time DAQOPC is started.

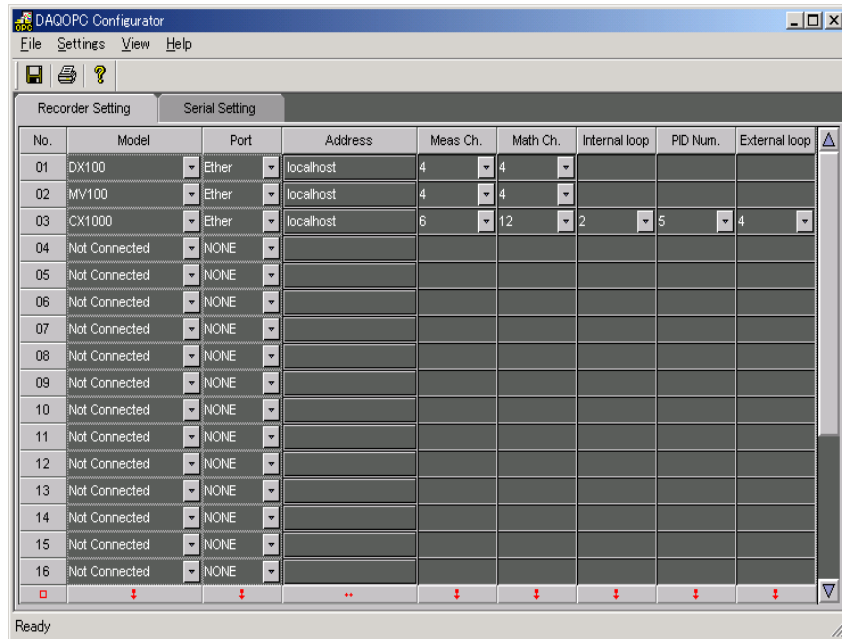
2.2 Starting the Configurator and Setting Parameters

Configurator

Configurator is used to set the communication conditions between DAQOPC and the DAQSTATION from which to retrieve the data.

Starting the Configurator

Choose **Start > Programs > DAQOPC > DAQOPC Configurator**. The window that appears when the program is started is shown below.



A List of Menu Commands

The functions of menu commands are indicated below.

File > Revert

Reloads the setup file without saving the information that you are currently editing.

File > Save

Saves the information that you are currently editing to the setup file.

File > Print

Prints the recorder settings and serial settings that you are currently editing.

File > Print Preview

Prints the preview of the recorder settings and serial settings that you are currently editing.

File > Printer Setup

Sets the printer.

File > Exit

Exits the Configurator.

Settings > Working Condition

Displays the Working Condition dialog box.

Settings > Ethernet Setting

Displays the Ethernet Setting dialog box.

View > Recorder Setting

Switches to the Recorder Setting tab.

View > Serial Setting

Switches to the Serial Setting tab.

View > Toolbar

Shows or hides the toolbar.

View > Status Bar

Shows or hides the status bar.

Help > About

Displays the Version Information dialog box.

Working Condition Dialog Box

Set the following items on the Working Condition dialog box.

The screenshot shows the 'Working Condition' dialog box with the following settings:

- Time stamp:** Use time of hardware, Use time of PC, Execute by demo mode
- How to treat special data:**
 - +over data:** Define value: 0, Use lower span, Use upper span
 - over data:** Define value: 0, Use lower span, Use upper span
- Skip data value:** 0
- Error data value:** 0
- Unstable data value:** 0
- How to treat data at communication error:** Define value: 0, Use previous value

- **Time Stamp**

Select whether to use the time of the connected recorder or the time of the PC in which DAQOPC is installed for the time stamp that is added when the data is retrieved.

Note

If daylight savings time is engaged on the main DX/DX-P/MV/CX and the time changes from summer to winter, loaded data will not be correctly updated on other connected units if they are not synched to the main device. Therefore you should select Use time of PC in such cases.

- **Execute by simulation mode**

If you select this check box, DAQOPC does not perform communications with the DX/DX-P/MV/CX and operates as a simulator.

- **How to treat special data**

Assigns values to special data that is retrieved from the DX/DX-P/MV/CX. For values over or under the range, you can specify a particular value or assign upper and lower limits of the span. You can also assign values for skip, error, and unstable data value. You can assign a value between -100000000 and 1000000000. A decimal point is added to the appropriate position to the value that is actually retrieved.

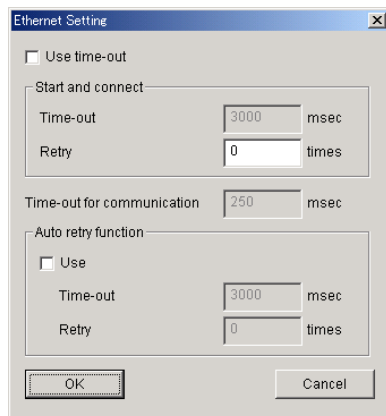
In addition, you can assign a value when a nonexistent channel is specified as an item. The selectable range is -100000000 to 1000000000.

- **How to treat data at communication error**

Specify the handling of the value when an error occurs while data is being retrieved. If the previous value is used, the value before the communication error is retrieved. If you are specifying a particular value, it is handled in the same fashion as "How to treat special values." If a communication error occurs when DAQOPC initially connects to the DX/DX-P/MV/CX, the value is always set to 0.

Setting of Ethernet Setting Dialog Box

Set the following items on the Ethernet Setting dialog box.



- **Use Time-out**
Select this check box when setting a timeout.
- **Start and Connect**
Set the timeout time and the retry count for establishing connection at the startup of the server. These values also apply to the reestablishment of the connection when 2 is written to Common.Status. You can set 1 ms to 60000 ms for Time-out. You can set 0 to 10 times for Retry. When connection is established, retry is stopped before the specified count is reached. If Retry is set to 0 and the connection fails, the communication fails and the connection is not retried.
- **Time-out for communication**
Select this check box to set the timeout for the communication error when retrieving data or requesting write operation after connection. You can set 1 ms to 60000 ms for Time-out.
- **Auto retry function**
Select this check box to reestablish the connection when retrieving the next data or requesting the next data write operation when communication failed or communication error occurred. The settings for Time-out and Retry are the same as those for Start and Connect.

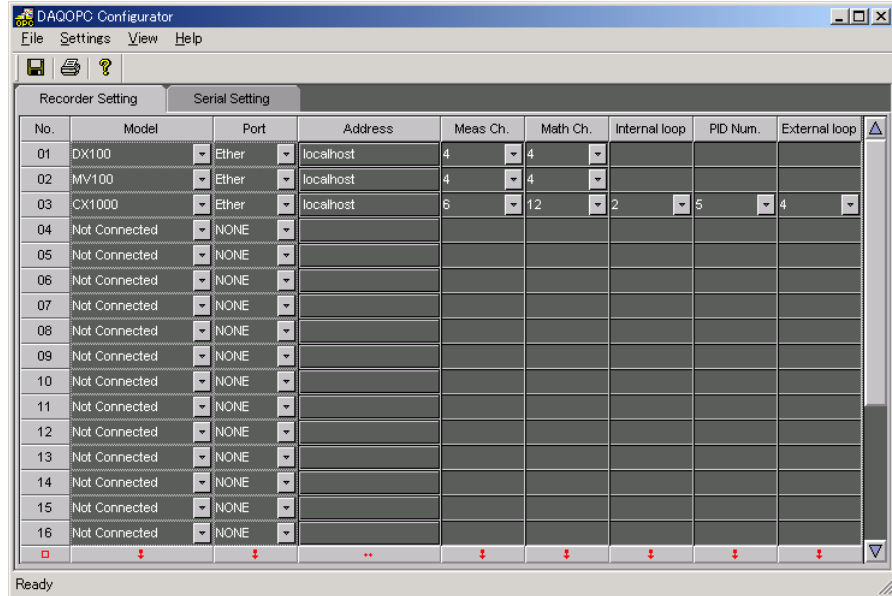
Note

With the DX-P if the password is incorrect, neither automatic recovery nor manual recovery through writing to the item STATUS is allowed. Please make note of this. Also, it is recommended that the password expiration period for users connected to the DX-P be set to when the DX-P main unit is turned OFF.

2.2 Starting the Configurator and Setting Parameters

Configuring the Recorder

The Recorder Setting tab page is shown below.



The following items are specified on the Recorder Setting tab page.

Make sure to set the Model, Port, and Address when connecting to the DX/DX-P/MV/CX.

- Model: Select the type of DX/DX-P/MV/CX to be connected.
- Port: Select the port to be connected. For COM, only the ports that are valid in the serial settings are displayed.
- Address: Only the COM ports that are set to Ethernet or RS-422-A are valid. (Note: The DX-P can only select Ethernet.)
- Meas. Ch: Select the number of measurement channels of the DX/DX-P/MV/CX to be connected.
- Math Ch: Select the number of computation channels of the DX/DX-P/MV/CX to be connected.
- Int. Loop: Select the number of internal loop of the CX to be connected.
- PID NO: Select the number of PID of the CX to be connected.
- Ext. Loop: Select the number of external loop of the CX to be connected.

Note

The values of measurement channels, computation channels, internal loops, PID group numbers, and external loops are retrieved from the DX/DX-P/MV/CX when connecting to it, so there is no need to enter those values. However, in simulation mode, DAQOPC operates according to the values set here, since it does not communicate with the DX/DX-P/MV/CX.

When the port is an Ethernet port

Click the address to display the following dialog box.



Specify the following parameters.

- IP Address or Host name: Enter the IP address or host name that is assigned to the DX/DX-P/MV/CX that is to be connected.
- Login name: Specify the login name.
- User ID: Specify the user ID. (DX-P only)
- Password: Specify the password.
- Login level: Specify the level for the specified login name. (Other than DX-P)

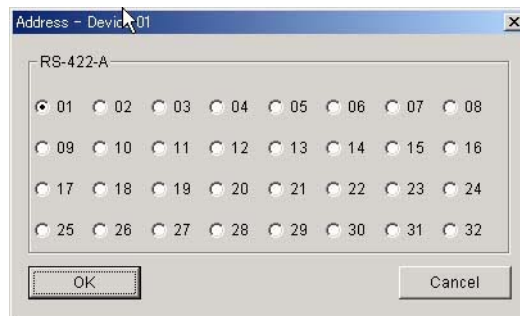
If the parameters are not correct, connection to the DX/DX-P/MV /CX fails.

Note

- With the CX and DX, if the login level is user, communication input data cannot be specified as an DAQOPC item ID.
- With the DX-P, the monitor function is used (port number: 34261) Therefore, the write function cannot be used. However, communication input data can be written if using a user specified as “users using communication input data” on the DX-P side.
- With the DX-P if the password is incorrect, neither automatic recovery nor manual recovery through writing to the item STATUS is allowed. Please make note of this. Also, it is recommended that the password expiration period for users connected to the DX-P be set to when the DX-P main unit is turned OFF.

When the port is COM

Click the address to display the following dialog box.



Set the RS-422-A address.

Serial Setting Tab Page

The following items are specified on the Serial Setting tab page.

Recorder Setting		Serial Setting		
Port No.	Type	Baud Rate	Parity Bit	Stop Bit
<input checked="" type="checkbox"/> COM1	RS-422-A	9600 bps	ODD	1
<input type="checkbox"/> COM2	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM3	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM4	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM5	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM6	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM7	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM8	RS-422-A	9600 bps	NONE	1
<input type="checkbox"/> COM9	RS-422-A	9600 bps	NONE	1

- Port No.: Select the check box corresponding to the port to be used.
- Type: Set the type of port to be used.
- Baud Rate: Select the baud rate for the port to be used.
- Parity Bit: Set the parity for the port to be used.
- Stop Bit: Select the stop bit for the port to be used.

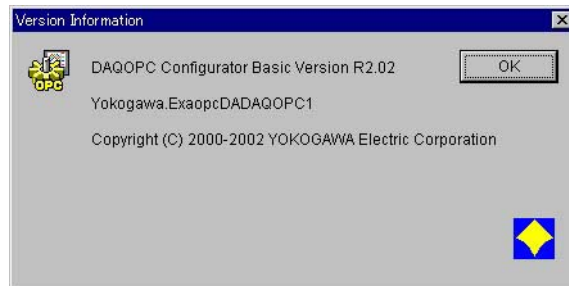
2.2 Starting the Configurator and Setting Parameters

Version Information Dialog Box

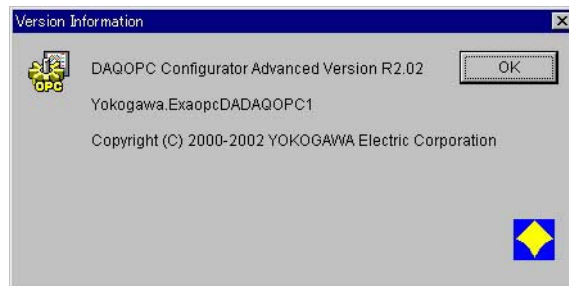
The Version Information dialog box shows the following information.

- Version information
- ProgID
- Serial number

Basic Version



Advanced Version



2.3 Starting and Stopping DAQOPC

Starting DAQOPC

The DA server process automatically starts as a background process when the Windows system is started. At this point, DAQOPC starts communications with the DAQSTATION according to the communication conditions that were specified using the Configurator.

Stopping DAQOPC

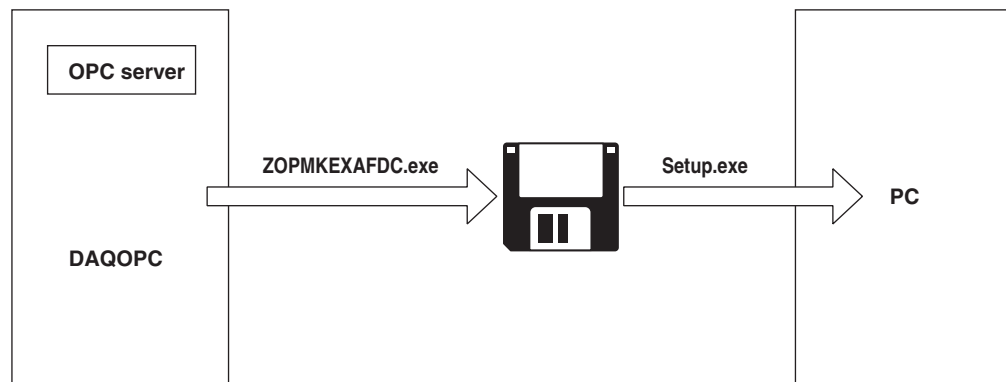
The DA server process automatically stops when the Windows system is shut down.

2.4 Setting Up the DAQOPC Client

If you are using DAQOPC remotely from a PC that is connected to the network, you must setup the DAQOPC client.

If you have not set up the DAQOPC client, follow the procedure below to set up the software.

1. Insert a formatted floppy disk into the floppy drive of the PC (PC server) in which you have installed DAQOPC.
2. On the server PC, run ZOPMKEXAFDC.exe in the Program folder in the installation folder of the DAQOPC using a program such as Windows Explorer.
3. A dialog box appears when an OPC client setup disk is created.
Click **OK** in the dialog box.
4. Log on to the PC (PC client) in which to setup the OPC client using a user name belonging to the Administrator group.
5. Insert the setup floppy disk that you have just created into the floppy drive of the client PC.
6. Run Setup.exe on the setup floppy disk. The OPC client is set up.



Access Method from the Client Software

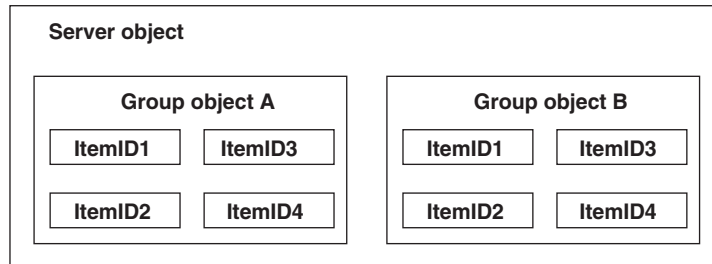
The ProgID used in accessing DAQOPC from the client software is as follows:

Yokogawa.ExaopcDADAQOPC1

3.1 Overview of the DAQOPC DA Server Function

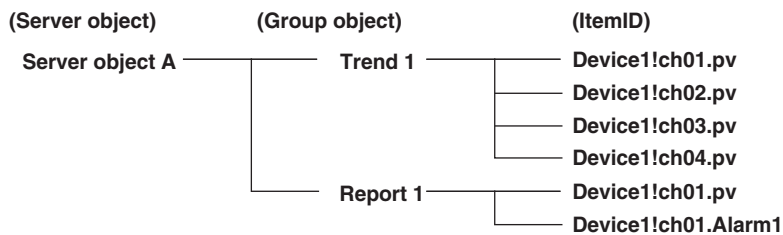
Data Access Method via the OPC Interface

Through the OPC Interface, the OPC client creates a group object in the server object and registers the process data to be accessed as an ItemID in the group object. ItemIDs are registered in the form “tag, tag item.” Using this scheme, you can specify the data acquisition rate for each group object. You can also register the same ItemID in different group objects according to your application.



In the example below, two group objects, Trend 1 and Report 1, are created in the server object A. Device1!ch01.PV through ch04.PV are registered as ItemIDs in the Trend 1 group object. Device1!ch01.PV and Device1!ch01.Alarm1 are registered as ItemIDs in the Report 1 group object.

Trend 1 and Report 1 are accessed as independent group objects. In addition, the value of Device1!ch01.PV exists in Trend 1 and Report 1 in this example.



OPC Interface Compliance

The DAQOPC is an OPC server that provides the interface complying with the following OPC DA Specification Version 2.0 and Version 1.0A.

- OPC DA Custom Interface
- OPC DA Automation Interface

It supports all the standard functions that are defined in these OPC Specifications.

In addition, those items that are defined as options (browse function of items) are also supported.

Note

For details on the OPC Custom Interface and OPC Automation Interface, see the corresponding sections in section 1.3, “Server Functions.”

3.2 OPC Interface Functions

The DAQOPC supports the standard interface of OPC Version 2.0. It also supports a portion of the interface that is defined to be options. For clients that use the older version of the OPC interface, functions that were supported in OPC Version 1.0A are also supported.

This section will mainly focus on the vendor-specific option interface of the DAQOPC. For details on the OPC Interface, see the specifications that are released by the OPC Foundation.

3.2.1 A List of Interfaces

A list of interfaces that are supported is indicated for the OPC Custom Interface and OPC Automation Interface.

Custom Interface

The table below indicates whether or not the DAQOPC supports various interfaces of the Custom Interface.

Object	Interface Name	Description	Support
OPCServer	IOPCServer	A standard interface of the OPC DA server Adds and Deletes group objects	Yes
	IOPCCommon	OPC common interface Sets the locale and retrieves error strings	Yes
	IConnectionPointContainer	OPC common interface Interface for asynchronous communication used to notify the client that the server is going to shut down	Yes
	IOPCItemProperties	Interface Retrieves the properties of the ItemID	Yes
	IOPCBrowseServerAddressSpace(optional)	Browses the ItemIDs in the OPC DA server	Yes
	IOPCServerPublicGroups (optional)	Connects to the public group; deletes the public group	No
	IPersistFile (optional)	Loads and saves configuration information	No
OPCGroup	IOPCGroupStateMgt	Manages the group object	Yes
	IOPCItemMgt	Manages the ItemIDs	Yes
	IOPCSyncIO	Performs synchronous write and read operations	Yes
	IOPCAsyncIO2	Performs asynchronous write and read operations	Yes
	IConnectionPointContainer	Interface for creating connections for asynchronous read and write operations	Yes
	IOPCPublicGroupStateMgt (optional)	Convert a private group to a public group	No
	IOPCAsyncIO (old)	Performs asynchronous write and read operations (old interface for compatibility)	Yes
	IDataObject (old)	Performs connection and disconnection to the asynchronous I/O (old interface for compatibility)	Yes
EnumOPCItemAttributes	IEnumOPCItemAttributes	Retrieves a list of ItemIDs that are registered in the group object	Yes

Yes: Supported, No: Not supported

Automation Interface

The DAQOPC only supports the automation interfaces that correspond to the custom interfaces that are supported. The table below shows whether or not the interface is supported. (Since those that are not supported may result in error, error handling for Visual Basic must be provided.)

Object	Type	Name	Description	Support
OPCServer	Properties	StartTime	Time when the server was started	Yes
		CurrentTime	Current time	Yes
		LastUpdateTime	Time that was notified last	Yes
		MajorVersion	Major version	Yes
		MinorVersion	Minor version	Yes
		BuildNumber	Build number	Yes
		VendorInfo	Vendor information	Yes
		ServerState	Server state	Yes
		LocaleID	Locale ID	Yes
		Bandwidth	Bandwidth	Yes
		OPCGroups	Collection of group objects	Yes
		PublicGroupNames	Public group name	No
		ServerName	Server name	Yes
		ServerNode	Node name	Yes
		ClientName	Client name	Yes
	Methods	GetOPCServers	Gets a list of server names	Yes
		Connect	Established connection	Yes
		DisConnect	Releases connection	Yes
		CreateBrowser	Creates a browser object	Yes
		GetErrorString	Gets the error string	Yes
		QueryAvailableLocaleIDs	Gets a list of supported locale IDs	Yes
		QueryAvailableProperties	Gets a list of properties	Yes
		GetItemProperties	Gets properties	Yes
LookupItemIDs	Converts the ItemID of properties	No		
Events	ServerShutDown	Shutdown event	Yes	

Yes: Supported, No: Not supported

3.2 OPC Interface Functions

Object	Type	Name	Description	Support
OPCBrowser	Properties	Organization	Hierarchical type	Yes
		Filter	Filter specification	Yes
		DataType	Data type	Yes
		AccessRights	Access rights	Yes
		CurrentPosition	Current position	Yes
		Count	Number of collections	Yes
	Methods	Item	Gets the object	Yes
		ShowBranches	Gets a list of current positions	Yes
		ShowLeafs	Gets a list of current positions	Yes
		MoveUp	Moves the hierarchy	Yes
		MoveToRoot	Moves the hierarchy	Yes
		MoveDown	Moves the hierarchy	Yes
		MoveTo	Gets the absolute position	Yes
		GetItemID	Gets the ItemID	Yes
GetAccessPaths	Gets access paths	Yes		
OPCGroups	Properties	DefaultGroupsActive	Default active property	Yes
		DefaultGroupUpdateRate	Default cache update	Yes
		DefaultGroupDeadband	Default deadband	Yes
		DefaultGroupLocaleID	Default locale ID	Yes
		DefaultGroupTimeBias	Default time bias	Yes
		Count	Number of collections	Yes
	Methods	Item	Gets the group object	Yes
		Add	Adds a group	Yes
		GetOPCGroup	Gets the group object	Yes
		Remove	Deletes the group	Yes
		RemoveAll	Deletes all groups	Yes
		ConnectPublicGroup	Gets the public group	No
		RemovePublicGroup	Deletes the public group	No

Yes: Supported, No: Not supported

Object	Type	Name	Description	Support
OPCGroup	Properties	Name	Group name	Yes
		IsPublic	Public property (always FALSE)	No
		IsActive	Active property	Yes
		IsSubscribed	Asynchronous property	Yes
		ClientHandle	Client handle	Yes
		ServerHandle	Server handle	Yes
		LocaleID	Locale ID	Yes
		TimeBias	Time bias	Yes
		DeadBand	Deadband	Yes
		UpdateRate	Cache update rate	Yes
		OPCItems	Item collection	Yes
	Methods	SyncRead	Performs a synchronous read	Yes
		SyncWrite	Performs a synchronous write	Yes
		AsyncRead	Performs an asynchronous read	Yes
		AsyncWrite	Performs an asynchronous write	Yes
		AsyncRefresh	Refreshes	Yes
		AsyncCancel	Cancels asynchronous request	Yes
	Events	DataChange	Change notification	Yes
		AsyncReadComplete	Asynchronous read response	Yes
		AsyncWriteComplete	Asynchronous write response	Yes
AsyncCancelComplete		Cancel response	Yes	

Yes: Supported, No: Not supported

3.2 OPC Interface Functions

Object	Type	Name	Description	Support
OPCItems	Properties	Parent	Parent group object	Yes
		DefaultRequestedDataType	Default requested data type	Yes
		DefaultAccessPath	Default access path	No
		DefaultActive	Default active property	Yes
		Count	Number of collections	Yes
	Methods	Item	Gets the item object	Yes
		GetOPCItem	Gets the item object	Yes
		Remove	Removes the item object	Yes
		Validate	Checks the item	Yes
		SetActive	Sets the active property	Yes
		SetClientHandles	Sets the client handle	Yes
		SetDataTypes	Sets the data type	Yes
		AddItem	Adds an item	Yes
		AddItems	Adds multiple items	Yes
OPCItem	Properties	Parent	Parent group object	Yes
		ClientHandle	Client handle	Yes
		ServerHandle	Server handle	Yes
		AccessPath	Access path	No
		AccessRights	Access rights	Yes
		ItemID	ItemID	Yes
		IsActive	Active property	Yes
		RequestedDataType	Requested data type	Yes
		Value	Data value	Yes
		Quality	Quality flag	Yes
		TimeStamp	Time stamp	Yes
		CanonicalDataType	Data type assigned by the server	Yes
		EUType	Engineering unit type	No
	EUInfo	Engineering unit information	No	
	Methods	Read	Performs a synchronous read	Yes
Write		Performs a synchronous write	Yes	

Yes: Supported, No: Not supported

3.2.2 Process Data

The process data of the OPC specification consists of the following three elements.

- Value
- Quality Flag
- Time Stamp

Value

OPC uses a data type called VARIANT.

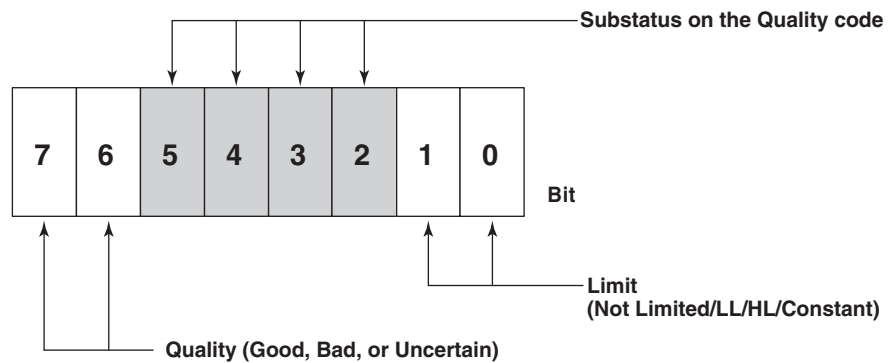
Quality Flag

This flag indicates whether the Value was retrieved correctly. Notifies the reason if erroneous.

The quality flag of DAQOPC follows the system of the OPC specifications. The quality flag system of the OPC specifications consists of the following three contents.

- Quality (Good, Bad, or Uncertain)
- Substatus (details dependent on the Quality)
- Limit (additional information for the substatus)

The quality flag is expressed using the following 8 bits.



DAQOPC sets these three types of information as a quality flag.

3.2 OPC Interface Functions

Quality and Substatus

The Substatus of the Quality code contains information that can be expressed using 4 bits for each Quality (Good, Bad, and Uncertain). The Substatus codes are defined by the OPC specifications. DAQOPC uses these codes to add details. The table below shows the information that the OPC specifications define.

Code	Substatus for Each Data Quality Code		
	Good(3)	Bad(0)	Uncertain(1)
0	Non-specific	Non-specific	Non-specific
1	N/A	Configuration Error	Last Usable Value
2	Local Override	Not Connected	N/A
3		Device Failure	Sensor Not Accurate
4		Sensor Failure	EngineeringUnitsExceeded
5		Last Known Value	Sub-Normal
6		Comm Failure	
7		Out of Service	
8			
9			
10			
11			
12			
13			
14			
15			

Limit

Limit is yet another Quality code information that is added to the combination of Quality and Substatus.

Code	Description
0	Not Limited
1	Low Limited
2	High Limited
3	Constant

Data and Quality code

The data from the DX/DX-P/MV/CX is converted to the following Quality codes.

Data status	Quality	Substatus	Limit
Normal value	Good	Non-specific	Not Limited
Positive overrange value	Good	Non-specific	High Limited
Negative overrange value	Good	Non-specific	Low Limited
Skip or computation Off	Bad	Out of Service	Not Limited
Error value	Bad	Sensor Failure	Not Limited
Unstable data value	Bad	Out of Service	Not Limited
Communication error	Bad	Comm Failure	Not Limited

Phenomenon	Quality	Substatus	Limit
The specified tag does not exist when re-reading the attribute information or the tag never existed	Bad	Configuration Error	Not Limited

By assigning values other than normal values using the Configurator, you can check the data from the DX/DX-P/MV/CX even without the Quality code.

Time Stamp

Retrieves either the time of the DX/DX-P/DX-P/MV/CX or the time of the PC. Using the Configurator, you can change the destination from which to retrieve the time.

Selection on the Configurator	Description
Time of the device (DX/MV/CX)	Retrieves the time of the device *
Time of the PC	Retrieves the time of the PC in which the server for retrieving the data is installed in UTC †

* Several commands are issued when data is retrieved. The time of the data registered in the group corresponds to the time of the device that is retrieved by the first command issued. Therefore, the time of the device may not be applied correctly depending on the item.

† Several commands are issued when data is retrieved. The time of the PC corresponds to the time when all the items registered in the group are retrieved.

3.2 OPC Interface Functions

3.2.3 ItemID

An arbitrary string used to identify items. It is generally called tags.

Defining the ItemID

DAQOPC defines ItemIDs as follows:

Device!tag number.data item

Example: DEVICE1!CH001.PV

The "DEVICE" section is fixed. In the number section that follows, specify the device position that you assigned using the Configurator.

A list of ItemIDs

On DAQOPC, the following items can be accessed using ItemIDs.

ItemID	Description	Canonical data type	Access Rights	Notes
DEVICExx!CHxxx.PV	Measured value or computed result	VT_R8	Read Only	Measurement and computation channels only
DEVICExx!CHxxx.ALARMx	Alarm status of the specified channel	VT_I2	Read Only	Measurement and computation channels only
DEVICExx!CHxxx.ATx	Alarm type of the specified channel	VT_I2	Read Only	Measurement and computation channels only
DEVICExx!CHxxx.ASPx	Alarm setpoint of the specified channel	VT_R8	Read/Write ²	Measurement and computation channels only
DEVICExx!Loopx.PV	PV of the specified loop	VT_R8	Read Only	CX control loops only
DEVICExx!Loopx.SP	SP of the specified loop	VT_R8	Read Only	CX control loops only
DEVICExx!Loopx.OUT	OUT of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.ALARMx	Alarm status of the specified loop	VT_I2	Read Only	CX control loops only
DEVICExx!Loopx.ATx	Alarm type of the specified loop	VT_I2	Read Only	CX control loops only
DEVICExx!Loopx.RUN ¹	Run/Stop switching of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.MODE ¹	Control mode switching of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.REMLOC ¹	Remote/Local switching of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.SPNO ¹	Current SP number of the specified loop and switching of the number	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.PIDNO ¹	Current PID number of the specified loop	VT_I2	Read Only	CX control loops only
DEVICExx!Loopx.PID-SP	SP of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-ASPx	Alarm setpoint of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-P	Proportional band of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-I	Integral time of the specified PID of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-D	Derivative time of the specified PID of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-OH	Output high-limit of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-OL	Output low-limit of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only

1,2 With the Advanced version, data can only be written to the DX/MV/CX if a user with Administrator privileges is logged on. Data cannot be written to the DX/MV/CX with the Basic version.

ItemID	Description	Canonical data type	Access Rights	Notes
DEVICExx!Loopx.PID-MR	Manual reset value of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-PO	Preset output value of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-DR	Control direction setting of the specified PID of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!Loopx.PID-H	Hysteresis setting of the ON/OFF control of the specified PID of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!LoopZ.BS1	Measured value 1 input bias of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!LoopZ.BS2	Measured value 2 input bias of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!LoopZ.RBS	Remote input bias of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!LoopZ.FL1	Measured value 1 Input filter of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!LoopZ.FL2	Measured value 1 Input filter of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!LoopZ.RFL	Remote input filter of the specified loop	VT_I2	Read/Write ²	CX control loops only
DEVICExx!LoopZ.RT	Ratio setting of the specified loop	VT_R8	Read/Write ²	CX control loops only
DEVICExx!EXTxx.PV	PV of the specified external loop	VT_R8	Read Only	CX external loops only
DEVICExx!EXTxx.SP	SP of the specified external loop	VT_R8	Read Only	CX external loops only
DEVICExx!EXTxx.OUT	OUT of the specified external loop	VT_R8	Read Only	CX external loops only
DEVICExx!EXTxx.Alarmx	Alarm status of the specified external loop	VT-I2	Read Only	CX external loops only
DEVICExx!CHcxx.INPUT	Value of the communication input data	VT_R8	Read/Write ³	Communication input data only
DEVICExx!Wbb.VALUE	Control computation constants	VT-R8	Read/Write ²	CX only
DEVICExx!COMMON.STATUS	Device status	VT_I2	Read/Write	
DEVICExx!COMMON.PROP	Property read status	VT_I2	Read/Write	
DEVICExx!COMMON.Record	Device sampling status		Read/Write ²	
DEVICExx!COMMON.Math ⁴	Device computation status		Read/Write ²	
DEVICExx!Batch.Name ⁵	Device batch name		Read/Write ²	
DEVICExx!Batch.LotNo. ⁵	Device lot number		Read/Write ²	
DEVICExx!Message!Direct.	Device message writing		Read/Write ²	Other than DX-P

1 Applies only to CX Style2 or later

2 With the Advanced version, data can only be written to the DX/MV/CX if a user with Administrator privileges is logged on. Data cannot be written to the DX/MV/CX with the Basic version.

3 With the Basic and Advanced versions, data can only be written to the DX/MV/CX if a user with Administrator-level privileges is logged on. With the DX-P, writing is only possible when logged on as a user specified as a "user using communication input data."

4 Valid with the MATH option.

5 Valid with the DX-P or DX/CX batch option.

XX: The device position set using the Configurator.

YYY: Measurement and computation channel numbers. 001 to 060.

a: Alarm number. 1 to 4.

bb: Control computation constant number. 1 to 36.

Item IDs

When reading

- If nonexistent channels or loop PID numbers are specified in the items, the value is 0.
- Except for item PV, SP, or OUT, the previous value is held if a communication error occurs.

When Writing

- No check is performed on the server side to determine whether or not the value to write is within the allowed range.

- **Item name PV**

Specifiable tag: Measurement, computation, control loop, external loop
The communication error values, +OVER values, -OVER values, skip values, error values, and unstable data values are set to the values specified in the Configurator. If control mode is OFF on the CX, or for analog retransmission, it is set to the skip value.

- **Item name ALARM**

Specifiable tag: Measurement, computation channels, control loops, and external loops

Item names are ALARM1, ALARM2, ALARM3, and ALARM4.

The alarm value is 0 if there is no alarm occurring. Otherwise the value is set according to the list below.

Alarm type

- | | |
|--|---|
| 0: Alarm OFF | 22: PV low-limit alarm |
| 1: Upper limit alarm | 23: Deviation high-limit alarm |
| 2: Lower limit alarm | 24: Deviation low-limit alarm |
| 3: Difference upper limit alarm | 25: Deviation high & low limit alarm |
| 4: Difference lower limit alarm | 26: Deviation within high & low limit alarm |
| 5: Upper limit on rate-of-change alarm | 27: SP high-limit alarm |
| 6: Lower limit on rate-of-change alarm | 28: SP low-limit alarm |
| 7: Delay upper limit alarm | 29: Output high-limit alarm |
| 8: Delay lower limit alarm | 30: Output low limit alarm |
| 21: PV high-limit alarm | 31: Other alarms |

For skip channels or channels with MATH turned OFF, or when control mode is OFF or the analog retransmission loop is specified, the value is 0 when alarms are turned OFF.

- **Item name AT**

Specifiable tag: Measurement, computation channels, and control loops

Item names are AT1, AT2, AT3, and AT4.

Same as "Item name ALARM."

For skip channels or channels with MATH turned OFF, or when control mode is OFF or the analog retransmission loop is specified, the value is 0 when alarms are turned OFF.

- **Item name ASP**

Specifiable tag: Measurement and computation channels

Item names are ASP1, ASP2, ASP3, and ASP4.

For skip channels or channels with MATH turned OFF, or when control mode is OFF or the analog retransmission loop is specified, the value is 0 when alarms are turned OFF.

- **Item name SP (CX only)**

Specifiable tag: Control loops and external loops

The communication error values, +OVER values, -OVER values, skip values, error values, and unstable data values are set to the values specified in the Configurator. If control mode is OFF on the CX, or for analog retransmission, it is set to the skip value.

- **Item name OUT (CX only)**
 Specifiable tag: Control loops and external loops
 The communication error values, +OVER values, -OVER values, skip values, error values, and unstable data values are set to the values specified in the Configurator. If control mode is OFF on the CX, it is set to the skip value.
 Data can only be written with a CX Style2 or later.
- **Item name RUN (CX of style number S2 or later only)**
 Specifiable tag: Control loops
 Stop: 1
 Run: 2
 If control mode is OFF or if the analog retransmission loop is specified, the value is 0.
- **Item name MODE (CX of style number S2 or later only)**
 Specifiable tag: Control loops
 Auto: 1
 Manual: 2
 Cascade: 3
 If control mode is OFF or if the analog retransmission loop is specified, the value is 0.
- **Item name REMLOC (CX of style number S2 or later only)**
 Specifiable tag: Control loops
 Local: 1
 Remote: 2
 If control mode is OFF or if the analog retransmission loops or loops on which remote input selection is turned OFF are specified, the value is 0.
- **Item name SPNO (CX of style number S2 or later only)**
 Specifiable tag: Control loops
 If control mode is OFF or if the analog retransmission loop is specified, the value is 0.
- **Item name PIDNO (CX of style number S2 or later only)**
 Specifiable tag: Control loops
 If control mode is OFF or if the analog retransmission loop is specified, the value is 0.
- **Item name BS1 (CX of style number S3 or later only)**
 Specifiable tag: Control loops
 The value is 0 if the measured value 1 input bias cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the measured value 1 input bias setting is OFF.
 If the measured value 1 input bias is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.
- **Item name BS2 (CX of style number S3 or later only)**
 Specifiable tag: Control loops
 The value is 0 if the measured value 2 input bias cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the measured value 2 input bias setting is OFF.
 If the measured value 2 input bias is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.

3.2 OPC Interface Functions

- **Item name RBS (CX of style number S3 or later only)**
Specifiable tag: Control loops
The value is 0 if the remote input bias cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the remote input bias setting is OFF.
If the remote input bias is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.
- **Item name FL1 (CX of style number S3 or later only)**
Specifiable tag: Control loops
The value is 0 if the measured value 1 input filter cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the measured value 1 input filter setting is OFF.
If the measured value 1 input filter is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.
- **Item name FL2 (CX of style number S3 or later only)**
Specifiable tag: Control loops
The value is 0 if the measured value 2 input filter cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the measured value 2 input filter setting is OFF.
If the measured value 2 input filter is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.
- **Item name RFL (CX of style number S3 or later only)**
Specifiable tag: Control loops
The value is 0 if the remote input filter cannot be set, or if control mode is OFF or analog retransmission loops are specified, or if the remote input filter setting is OFF.
If the remote input filter is OFF when writing and a value other than 0 is input, it automatically turns ON. However, even if 0 is entered, you cannot turn it OFF.
- **Item name RT (CX of style number S3 or later only)**
Specifiable tag: Control loops
If the ratio setting cannot be set, or control mode is OFF or if the analog retransmission loop is specified, the value is 0.
When the ratio setting is OFF, when writing a value other than 1, it automatically turns ON. You cannot set it to OFF.

Note

For the number of digits to the right of the RT decimal point, the number when reading RT from the instrument is applied. This number of digits is also used when writing. Therefore, remember that the number of digits cannot be changed when writing. Furthermore, when you switch from OFF to ON, the decimal places is set to 0.

- **Item name PIDxSP (CX only)**
Specifiable tag: Control loop PID
If control mode is OFF or if the analog retransmission loops are specified, the value is 0.
- **Item name PIDxASP (CX only)**
Specifiable tag: Control loop PID
Item names are ASP1, ASP2, ASP3, and ASP4.
If control mode is OFF or if the analog retransmission loops or loops on which alarms are turned OFF are specified, the value is 0.

- **Item name PIDxP (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops on which proportional band cannot be set are specified, the value is 0.
- **Item name PIDxI (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops on which integral time cannot be set are specified, the value is 0.
- **Item name PIDxD (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops on which differential time cannot be set are specified, the value is 0.
- **Item name PIDxOH (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops whose output upper limit cannot be set are specified, the value is 0.
- **Item name PIDxOL (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops whose output lower limit cannot be set are specified, the value is 0.
- **Item name PIDxMR (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops whose manual reset cannot be set are specified, the value is 0.
- **Item name PIDxPO (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops whose preset output cannot be set are specified, the value is 0.
- **Item name PIDxDR (CX only)**
 Specifiable tag: Control loop PID

Reverse:	1
Direct:	2

 If control mode is OFF or if the analog retransmission loops are specified, the value is 0.
- **Item name PIDxH (CX only)**
 Specifiable tag: Control loop PID
 If control mode is OFF or if the analog retransmission loops or loops whose relay hysteresis cannot be set are specified, the value is 0.

3.2 OPC Interface Functions

- **Item name INPUT**

Specifiable tag: Communication input data

Note

When writing, the real number writing value is converted to “%4E” format and sent. Therefore, please note that there are times when the write value is not sent as-is.

- **Item name Value (CX of style number S3 or later only)**

Specifiable tag: Control computation constant

Note

When writing, the real number writing value is converted to “%4E” format and sent. Therefore, please note that there are times when the write value is not sent as-is.

- **Item name STATUS**

Specifiable tag: COMMON

Indicates the status of the specified device (see below).

Operating normally.	0
The specified device does not exist.	1
Failed to allocate memory area.	2
Failed to open communications.	3
Communication error.	4

When the status is 3 and 4, and 0 is written, the DAQOPC server attempts to recover the communication of the specified device.

Writing 0 when the status is 0, 1, or 2 is void.

Note

- **Item name PROP**

Specifiable tag: COMMON

Indicates the property read status of the specified device (see below).

The properties of the specified device have not been read.	0
The properties of the specified device have been read.	1
Performs a read operation to the specified device.	2

When 2 is written, the properties are retrieved from the specified device. Normally, the properties are read when the DAQOPC is started. When a retrieve request for a property value is not received, the server returns this value. In addition, the server uses the decimal position information of the measured and computed values that are retrieved at the start of DAQOPC. Therefore, if you change the range, the number of loops, the PID number, and other settings on the specified device, make sure to execute a reread.

- **Item name Record**

Specifiable tag: COMMON

The sampling status is shown as follows.

During sampling or sampling start	2
Sampling stopping or sampling stopped	1

In the case of a communication error, the value prior to occurrence of the error is held.

- **Item name Math**

Specifiable tag: COMMON

The computation status is shown as follows.

When nonexistent	0
Computation stopped or computation stopping	1
Computation executing or computation start	2
Computation reset	3

In the case of a communication error, the value prior to occurrence of the error is held.

- **Item name Name**

Specifiable tag: COMMON

Displays the batch name. Up to thirty-two characters can be used on the DX-P, or up to sixteen on the CX/DX.

In the case of a communication error, the value prior to occurrence of the error is held.

No check is performed on the server side to determine whether or not the input value is allowed.

- **Item name LotNo.**

Specifiable tag: COMMON

Displays the lot number.

In the case of a communication error, the value prior to occurrence of the error is held.

No check is performed on the server side to determine whether or not the input value is allowed.

- **Item name Direct**

Specifiable tag: MESSAGE

Executes writing of the message set on the main unit. Enter a message number.

Set to 0 when Read.

Access path

OPC defines access path for distinguishing the COM (Component Object Model) ports, but the DAQOPC DA Server does not use it.

Blob

OPC defines a parameter called Blob to increase the efficiency of ItemID searches, but the DAQOPC DA Server does not use it.

3.2.4 Data acquisition operation

DAQOPC supports the following OPC specified data reference interfaces.

- IOPCSyncIO
- IOPCASyncIO2
- IOPASyncIO(Old)

Regarding the data acquisition functions used by these interfaces, the DA server operation is described in depth in the OPC specifications. The data acquisition operation of the DAQOPC basically complies with the OPC specifications. The flow chart below outlines the operation of DAQOPC.

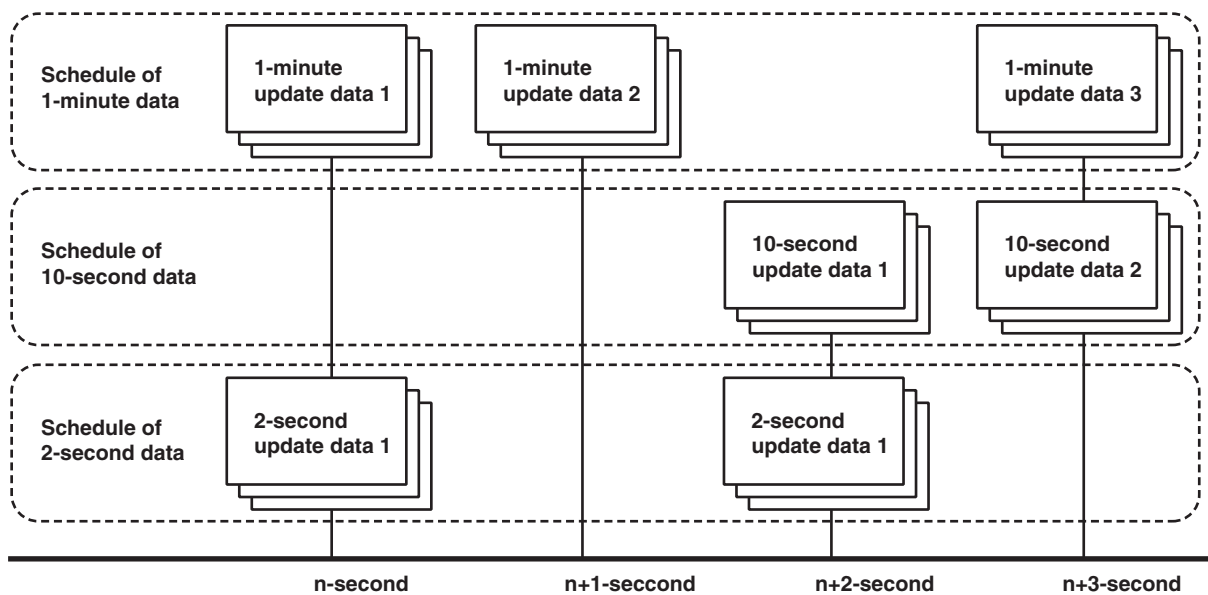
Limits of Data Acquisition Operation

The data acquisition operation complies with the OPC specifications. However, if the acquisition request from the client software exceeds the specifications of the maximum number of data points of DAQOPC, the process is temporarily suspended. Therefore, the desired response will not be obtained.

Cached data update

The cached data is scheduled in units of the update rate as follows:

1. The cached data is divided into update rate communication units (the maximum number of data points that can be transferred each time: 10000).
2. If the data and the update rate are the same, it is scheduled once to avoid duplication.
3. Each communication unit is scheduled as follows:
 - Each communication unit maintains its update rate.
 - Scheduling is dispersed so that duplication of communication units within the same second with the same update rate is avoided as much as possible up to a range of one minute.
 - Scheduling is performed so that duplication within the same second with communication units of other update rates is minimized.
 - The communication unit of each update rate is scheduled with the start point at each 0 s of the system time. If multiple communication units of the same update rate exist, they are scheduled in order every 1 s with the update rate as the maximum width.



Data change notification

DAQOPC rules regarding the data change check for the data change notification are given below.

- For data of which the type is VT_R8 (measured and computed values (PV)), if the ratio of the difference between the current cached data and the new value is greater than the deadband, cached data is updated.
- For data of which the type is VT_I2 (alarm status (ALARMx), device status (STATUS), and property read status (PROP)), if there is a difference between the current cached data and the new value, cached data is updated.

3.2.5 Group Object Properties (IOPCGroupStateMgt)

“Groups” are provided as means by which the OPC client can efficiently access the process data via the DA server. The OPC client is able to register arbitrary number of items in a group, and, in general, this group is handled as a unit for process data access. The handling of group object properties that are vendor-specific is indicated below.

Group name

For the DAQOPC DA Server, if no name is specified when creating a group object, a group object with the following name is created.

Name of the created group: **CSGroup1, CSGroup2, ..., CSGroupN**
where **N** is an integer string.

3.2.6 Item Properties

Item properties are property values that can be retrieved by specifying the ItemID and property ID. The following types of data can be acquired.

- **Specifying the data item PV (measurement channel, computation channel, internal loop (CX), and external loop (CX))**

ItemID is specified as follows:

Device name!measurement, computation channel, internal loop, or external loop.PV

Example: DEVICE1!CH001.PV
 DEVICE1!Loop1.PV
 DEVICE1!Ext1.PV

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items.
5	VT_I4	“Item Access Rights” Access level of item. 1: Read only
6	VT_R4	“Server Scan Rate” Allows retrieval of the DX/DX-P/MV/CX scan or control rate (control loop) in the ms order. Example “250”
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the DX/DX-P/MV/CX Space for skipped channels and loops that are turned OFF. Example “°C”
101	VT_BSTR	“Item Description” Allows retrieval of the tag strings specified on the DX/DX-P/MV/CX. Example “Furnace 1”
102	VT_R8	“High EU” Allows retrieval of the upper limit of the span or scale that is specified on the DX/DX-P/MV/CX. 0 for skipped channels and loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows retrieval of the lower limit of the span or scale that is specified on the DX/DX-P/MV/CX. 0 for skipped channels and loops that are turned OFF. Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows retrieval of the number of digits to the right of the decimal point when displaying measured values and computed values on the DX/DX-P/MV/CX (The number of digits to the right of the decimal point of the PV range for internal loop control with PV switching of the CX). 0 for skipped channels and loops that are turned OFF. Example “2”

- **Specifying the data item AT**

ItemID is specified as follows:

Device name!measurement, computation channel, or internal loop.AT1 to AT4

Example: DEVICE1!CH01.AT1
 DEVICE1!Loop1.AT1

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. 1: Read only

- **Specifying the data item ASP**

ItemID is specified as follows:

Device name!measurement, computation channel, or Loopx.PID-ASP1 to ASP4

Example: DEVICE1!CH002.ASP1
 DEVICE1!Loop3.PID2-ASP1

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only
100	VT_BSTR	Advanced version: 3 = read/write enabled “EU Unit” Allows retrieval of the engineering unit specified on the DX/DX-P/MV/CX. Space for skipped channels and loops that are turned OFF. Example “°C”
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. 0 for skipped channels, loops that are turned OFF, and alarms that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. 0 for skipped channels, loops that are turned OFF, and alarms that are turned OFF. Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows retrieval of the number of digits to the right of the decimal point when displaying alarm setpoint on the DX/DX-P/MV/CX. If skip channels/OFF loops or control loops are set to alarm OFF, the value is 0. Example “2”

3.2 OPC Interface Functions

- **Specifying the data item SP (CX)**

ItemID is specified as follows:

Device name\internal loop, PID-SP, or external loop

Example: DEVICE1!Loop2.SP
 DEVICE1!Loop2.PID2-SP
 DEVICE1!Ext2.SP

For Internal/External Loops

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. 1: Read only
6	VT_R4	“Server Scan Rate” Allows retrieval of the CX control interval in the ms order. Example “250”
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Space for loops that are turned OFF . Example “°C”
101	VT_BSTR	“Item Description” Allows retrieval of the tag strings specified on the CX. Example “Furnace 1”
102	VT_R8	“High EU” Allows retrieval of the SP high-limit specified on the CX. 0 for loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows retrieval of the SP low-limit specified on the CX. 0 for loops that are turned OFF. Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows retrieval of the number of digits to the right of the decimal point when displaying values on the CX. (The number of digits to the right of the decimal point of the PV range for internal loop control with PV switching of the CX) 0 for non-existing loops and loops that are turned OFF. Example “2”

For PID

Property ID	VARIANT type	Description
1	VARTYPE	<p>“Item Canonical Data Type”</p> <p>Allows retrieval of VARIANT data type of items</p> <p>VT_R8(5)</p>
5	VT_I4	<p>“Item Access Rights”</p> <p>Access level of item</p> <p>Basic version: 1 = read only</p>
100	VT_BSTR	<p>Advanced version: 3 = read/write enabled</p> <p>“EU Unit”</p> <p>Allows retrieval of the engineering unit specified on the CX</p> <p>Space for loops that are turned OFF</p> <p>Example “C”</p>
102	VT_R8	<p>“High EU”</p> <p>Allows retrieval of the SP high-limit specified on the CX</p> <p>0 for loops that are turned OFF</p> <p>Example “2.0000”</p>
103	VT_R8	<p>“Low EU”</p> <p>Allows retrieval of the SP low-limit specified on the CX</p> <p>0 for loops that are turned OFF</p> <p>Example “-2.0000”</p>
6006	VT_I2	<p>“Decimal Point”</p> <p>Allows retrieval of the number of digits to the right of the decimal point when displaying values on the CX</p> <p>0 for loops that are turned OFF</p> <p>Example “2”</p>

3.2 OPC Interface Functions

- **Specifying the data item OUT (CX)**

ItemID is specified as follows:

Device name\internal loop or external loop.OUT

Example: DEVICE1!Loop2.OUT
 DEVICE1!Ext02.OUT

For Internal Loops

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item Basic version: 1 = read only Advanced version: 3 = read/write enabled
6	VT_R4	“Server Scan Rate” Allows retrieval of the CX control interval in the ms order Example “250”
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX Space for loops that are turned OFF Example “%”
101	VT_BSTR	“Item Description” Allows retrieval of the tag strings specified on the CX Example “Furnace 1”
102	VT_R8	“High EU” Allows the retrieval of the upper limit of the span 0 for loops that are turned OFF Example “105.0”
103	VT_R8	“Low EU” Allows the retrieval of the low limit of the span 0 for loops that are turned OFF Example “-5.0”
6006	VT_I2	“Decimal Point” Allows retrieval of the number of digits to the right of the decimal point when displaying values on the CX 0 for loops that are turned OFF Example “1”

For External Loops

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. 1: Read only.
6	VT_R4	“Server Scan Rate” Allows retrieval of the CX control interval in the ms order. Example “250”
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Space for loops that are turned OFF. Example “%”
101	VT_BSTR	“Item Description” Allows retrieval of the tag strings specified on the CX. Example “Furnace 1”
102	VT_R8	“High EU” Allows the retrieval of the upper limit of the span. 0 for loops that are turned OFF. Example “105”
103	VT_R8	“Low EU” Allows the retrieval of the low limit of the span. 0 for loops that are turned OFF. Example “-5”
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. 0 for loops that are turned OFF. Example “1”

- **Specifying the data item RUN (CX)**

ItemID is specified as follows:

Device name!internal loop.RUN

Example: DEVICE1!Loop2.RUN

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

3.2 OPC Interface Functions

- **Specifying the data item MODE (CX)**

ItemID is specified as follows:

Device name\internal loop.MODE

Example: DEVICE1!Loop2.MODE

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item REMLOC (CX)**

ItemID is specified as follows:

Device name\internal loop.REMLOC

Example: DEVICE1!Loop2.REMLOC

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item SPNO (CX)**

ItemID is specified as follows:

Device name\internal loop.SPNO

Example: DEVICE1!Loop2.SPNO

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items.
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item PIDNO (CX)**

ItemID is specified as follows:

Device name!internal loop.PIDNO

Example: DEVICE1!Loop2.PIDNO

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. 1: Read only.

- **Specifying the data item PIDx.P (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop.P

Example: DEVICE1!Loop2.PID3.P

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “%” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “999.9” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “0.1” Fixed
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. “1” Fixed

3.2 OPC Interface Functions

- **Specifying the data item PIDx-I (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-I

Example: DEVICE1!Loop2.PID3-I

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “S” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “6000” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “0” Fixed

- **Specifying the data item PIDx-D (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-D

Example: DEVICE1!Loop2.PID3-D

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “S” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “6000” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “0” Fixed

- **Specifying the data item PIDx-OH (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-OH

Example: DEVICE1!Loop2.PID3-OH

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “%” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “105.0” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-5.0” Fixed
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. “1” Fixed

- **Specifying the data item PIDx-OL (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-OL

Example: DEVICE1!Loop2.PID3-OL

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “%” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “105.0” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-5.0” Fixed
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. “1” Fixed

3.2 OPC Interface Functions

- **Specifying the data item PIDx-MR (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-MR

Example: DEVICE1!Loop2.PID3-MR

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “%” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “105.0” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-5.0” Fixed
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. “1” Fixed

- **Specifying the data item PIDx-PO (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-PO

Example: DEVICE1!Loop2.PID3-PO

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “%” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “105.0” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-5.0” Fixed
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. “1” Fixed

- **Specifying the data item PIDx-DR (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-DR

Example: DEVICE1!Loop2.PID3-DR

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item PIDx-H (CX)**

ItemID is specified as follows:

Device name!PID of the internal loop-H

Example: DEVICE1!Loop2.PID3-H

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
6	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Space for loops that are turned OFF. Example “°C”
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range (value of EUS100.0%). 0 for loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range (value of EUS0.0%). 0 for loops that are turned OFF. Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. 0 for loops that are turned OFF. Example “2”

3.2 OPC Interface Functions

- **Specifying the data item BS1 (CX)**

ItemID is specified as follows:

Device position\control loops.BS1

Example: DEVICE1!Loop2.BS1

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
6	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Space for loops that are turned OFF. Example “°C”
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range (value of EUS100.0%). 0 for loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range (value of EUS-100.0%). 0 for loops that are turned OFF. Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. 0 for loops that are turned OFF.

- **Specifying the data item BS2 (CX)**

ItemID is specified as follows:

Device position!control loops.BS2

Example: DEVICE01!LoopZ.BS2

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
6	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Example “°C”
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range (value of EUS100.0%). 0 for loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range (value of EUS-100.0%). Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values.

3.2 OPC Interface Functions

- **Specifying the data item RBS (CX)**

ItemID is specified as follows:

Device position!control loops

Example: DEVICE01!LoopZ.RBS

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. Space for loops that are turned OFF. Example “°C”
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range (value of EUS100.0%). 0 for loops that are turned OFF. Example “2.0000”
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range (value of EUS-100.0%). Example “-2.0000”
6006	VT_I2	“Decimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values.

- **Specifying the data item FL1 (CX)**

ItemID is specified as follows:

Device position!control loops.FL1

Example: DEVICE01!LoopZ.FL1

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “S” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “120” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-1” Fixed

- **Specifying the data item FL1 (CX)**

ItemID is specified as follows:

Device name!control loop PID-H

Example: DEVICE1!Loop2.PID3-H

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “S” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “120” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-1” Fixed

3.2 OPC Interface Functions

- **Specifying the data item RFL (CX)**

ItemID is specified as follows:
 Device position!control loops.RFL
 Example: DEVICE01!LoopZ.RFL

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_BSTR	“EU Unit” Allows retrieval of the engineering unit specified on the CX. “S” Fixed
102	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “120” Fixed
103	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “-1” Fixed

- **Specifying the data item RT (CX)**

ItemID is specified as follows:
 Device position!control loops.RT
 Example: DEVICE01!LoopZ.RT

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
100	VT_R8	“High EU” Allows the retrieval of the upper limit within the selectable range. “30000” Fixed
102	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range. “0.0001” Fixed
103	VT_R8	“LDecimal Point” Allows the retrieval of the number of digits to the right of the decimal point when displaying values. Note: If the ratio setting is OFF, the value is 0. Also, the number of digits after the decimal point is the value held when communication starts or when property information is acquired through PROP. Therefore, after communication starts, if you change number of digits after the decimal point on the instrument side, a reload is executed through item PROP. Example “2”

- **Specifying the data item INPUT (Communication Input Data)**

ItemID is specified as follows:

Device name!communication input data.INPUT

Example: DEVICE1!CHC01.INPUT

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5	VT_I4	“Item Access Rights” Access level of item. Communication input data
102	VT_R8	3: Read and write. “High EU” Allows the retrieval of the upper limit that can
103	VT_R8	be input. “Low EU” Allows the retrieval of the lower limit that can
		be input.

- **Specifying the data item Value**

ItemID is specified as follows:

Device name!W αα.Value

Example: DEVICE1!Wαα.Value

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE	“Data Type” Allows retrieval of VARIANT data type of items. VT_R8(5)
5 OPC_PROP_RIGHTS	VT_I4	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
102 OPC_PROP_HIEU	VT_R8	“Hight EU” Allows the retrieval of the upper limit within the selectable range (9.9999E29). “9.9999E29” Fixed
103 OPC_PROP_LOEU	VT_R8	“Low EU” Allows the retrieval of the lower limit within the selectable range (–9.9999E29). “–9.9999E29” Fixed

- **Specifying the data item STATUS (COMMON)**

ItemID is specified as follows:

Device name!COMMON.STATUS

Example: DEVICE1!COMMON.STATUS

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. 3: Read and write.

3.2 OPC Interface Functions

- **Specifying the data item PROP (COMMON)**

ItemID is specified as follows:

Device name!COMMON.PROP

Example: DEVICE1!COMMON.PROP

Property ID	VARIANT type	Description
1	VARTYPE	“Item Canonical Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5	VT_I4	“Item Access Rights” Access level of item. 3: Read and write.

- **Specifying the data item Record (COMMON)**

ItemID is specified as follows:

Device name!COMMON.Record

Example: DEVICE1!COMMON.Record

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE(2)	“Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5 OPC_PROP_RIGHTS	VT_I4(3)	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item Math (COMMON)**

ItemID is specified as follows:

Device name!COMMON.Math

Example: DEVICE1!COMMON.Math

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE(2)	“Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5 OPC_PROP_RIGHTS	VT_I4(3)	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item Name**

ItemID is specified as follows:

Device name!Batch.Name

Example: DEVICE1!Batch.Name

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE(2)	“Data Type” Allows retrieval of VARIANT data type of items. VT_BSTR(8)
5 OPC_PROP_RIGHTS	VT_I4(3)	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

- **Specifying the data item Lot.No**

ItemID is specified as follows:

Device name!Batch.LotNo

Example: DEVICE1!Batch.LotNo

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE(2)	“Data Type” Allows retrieval of VARIANT data type of items. VT_I4(3)
5 OPC_PROP_RIGHTS	VT_I4(3)	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled
102 OPC_PROP_HIEU	VT_R8(5)	“Hight EU” Allows the retrieval of the upper limit within the selectable range. DX/CX: “9999” Fixed DX-P: “99999999” Fixed
103 OPC_PROP_LOEU	VT_R8(5)	“Low EU” Allows the retrieval of the lower limit within the selectable range. “0” Fixed

- **Specifying the data item Direct**

ItemID is specified as follows:

Device name!Batch.Direct

Example: DEVICE1!Batch.Direct

Property ID	VARIANT type	Description
1 OPC_PROP_CDT	VARTYPE(2)	“Data Type” Allows retrieval of VARIANT data type of items. VT_I2(2)
5 OPC_PROP_RIGHTS	VT_I4(3)	“Item Access Rights” Access level of item. Basic version: 1 = read only Advanced version: 3 = read/write enabled

3.2 OPC Interface Functions

- **Specifying the tag number (measurement channel)**

ItemID is specified as follows:

Device name!measurement channel

Example: DEVICE1!CH001

Cannot be registered in a group.

Property ID	VARIANT type	Description
101	VT_BSTR	<p>“Item Description”</p> <p>Allows retrieval of the tag strings specified on the DX/DX-PMV/CX.</p> <p>Example “Furnace 1”</p>
6003	VT_BSTR	<p>“Input Range”</p> <p>Allows the retrieval of range strings of measurement channels.</p> <p>Example “TC, TypeK”</p>

- **Specifying the tag number (computation channel)**

ItemID is specified as follows:

Device name!computation channel

Example: DEVICE1!CH031

Cannot be registered in a group.

Property ID	VARIANT type	Description
101	VT_BSTR	<p>“Item Description”</p> <p>Allows retrieval of the tag strings specified on the DX/DX-P/MV/CX.</p> <p>Example “Furnace 1”</p>

- **Specifying the tag number (communication input data)**

There are no item properties that can be retrieved.

Cannot be registered in a group.

- **Specifying the tag number (Control computation constant)**

There are no item properties that can be retrieved.

Cannot be registered in a group.

- **Specifying the tag number (COMMON)**

There are no item properties that can be retrieved.

Cannot be registered in a group.

- **Specifying the tag number (Batch)**

There are no item properties that can be retrieved.

Only existing devices can be registered to groups.

- **Specifying the tag number (Message)**

There are no item properties that can be retrieved.

Only existing devices can be registered to groups.

- **Specifying the loop number**

ItemID is specified as follows:

Device name!loop number

Example: DEVICE1!Loop2

Cannot be registered in a group.

Property ID	VARIANT type	Description
101	VT_BSTR	<p>“Item Description”</p> <p>Allows the retrieval of the tags and tag comment strings specified on the CX.</p> <p>The format is “tag, tag comment” (up to 17 characters).</p> <p>Example “Furnace 1, Loop 1”</p>

- **Specifying the external loop**

ItemID is specified as follows:

Device name!external loop

Example: DEVICE1!EXT02

Cannot be registered in a group.

Property ID	VARIANT type	Description
101	VT_BSTR	<p>“Item Description”</p> <p>Allows the retrieval of the tags and tag comment strings specified on the CX.</p> <p>The format is “tag, tag comment” (up to 17 characters).</p> <p>Space for loops that are turned OFF.</p> <p>Example “Funace 1”</p>
6001	VT_BSTR	<p>“Model”</p> <p>Allows the retrieval of the model of the external loop</p> <p>“?????” for non-existing loops.</p> <p>Space for loops that are turned OFF.</p> <p>Example “Utxxx”</p>

- **Specifying the device**

ItemID is specified as follows:

Device name

Example: DEVICE1

Cannot be registered in a group.

Property ID	VARIANT type	Description
6001	VT_BSTR	<p>“Model”</p> <p>Allows the retrieval of the DX/DX-P/MV/CX model on the DX/DX-P/MV/CX.</p> <p>Example “DX120”</p>
6002	VT_I2	<p>“Login Level”</p> <p>Allows the retrieval of the login level to the DX/DX-P/MV/CX.</p> <p>1: Administrator level</p> <p>2: User level</p>

3.2.7 Locale ID (LCID)

The locale ID (LCID) is a language identifier that is used when the OPC server returns values as strings. It is used in alarms, status, and other parameters that include engineering units.

In general, the DAQOPC ignores the locale ID.

The unit and tag strings of the DX/DX-P/MV/CX are passed without any modification.

For error strings (**IOPCServer::GetErrorString**, **IOPCCommon::GetErrorString**), the DAQOPC Server only supports the locale or the Windows system. However, all error strings that are defined by the OPC are returned in English (Windows system errors are returned in the local language).

3.2.8 Structures Defined by the OPC

The DAQOPC handles the vendor-specific section of the structures that are defined by the OPC specifications as follows:

Item property structure (OPCITEMATTRIBUTES)

- Engineering Unit

The engineering unit is the range information of the item ID.

Server status structure (OPCSERVERSTATUS)

- Bandwidth

On the DAQOPC, the bandwidth is set to the number of ItemIDs that are registered in the cache update.

- VendorInfo

“Yokogawa Electric Corporation” is set on the DAQOPC server.

3.2.9 Support for OPC Optional Specifications

The OPC optional functions that DAQOPC supports are described below.

Browsing (retrieves a list of ItemIDs in the server)

- **Hierarchy**

IOPCBrowseServerAddressSpace is an interface used to retrieve a list of tags. There are two methods available for viewing the server-side list, FLAT or HIERARCHICAL. For the DAQOPC, use the HIERARCHICAL method specifying the device name, tag number, and data item in that order.

- **ItemID retrieval through GetItemID**

The following string is returned for GetItemID.

- When a device name is specified
Device name
Example: Device1
(Cannot be used in IOPCItemMgt::AddItems)
- When a tag number is specified
Device name!tag number
Example: Device1!ch01
(Cannot be used in IOPCItemMgt::AddItems)
- When a data item is specified
Device!tag number.data item
Example: Device1!ch01.PV
(Can be used in IOPCItemMgt::AddItems)

Note

The DAQOPC browse information shown is that from the connected devices. Browse information is automatically obtained at the timing at which the connection to the device could be made successfully (including communications recovery time).

- **BrowseOPCItemIDs filter**

If you specify OPC_FLAT for the filter type, the operation is the same as when both OPC_BRANCH and OPC_LEAF are specified. Sorting is not performed on the list, and there is no limit in the number of data points that can be entered in the list. Therefore, the larger the number of tag numbers, more memory space is consumed. In such case, you can use the following types of filters to suppress the amount of memory that is consumed at any given time.

[szFilterCriteria]:	DAQOPC ignores this parameter.
[dwAccessRightsFilter]:	DAQOPC supports this parameter.

- **BrowseAccessPaths**

Since AccessPaths is not used, this is not supported.

3.3 Error Codes

The error codes that DAQOPC specifies are shown below.

Number	Message	Description
0xC0049001	"Fail to allocate memory."	Failed to allocate memory area.
0xC0049002	"Fail to read configuration file."	Failed to load the communication setup file.
0xC0049003	"Selected device doesn't exist."	A nonexistent device is specified by the Configurator.
0xC0049004	"Fail to open device."	Failed communications at startup.
0xC0049005	"Communication error."	A communication error occurred.
0xC0049006	"Irrelevant value."	Invalid value was input for communication input data.
0xC0049007	"Fail to get time stamp from PC."	Failed to get the time stamp from the PC.
0xC0049008	"Selected item doesn't exist."	Non-existent item is being specified.

Index

A

Access path 3-17
Automation Interface 3-3

B

Blob 3-17
Browsing 3-45

C

Cached data update 3-18
Custom Interface 3-2

D

DA Server 1-7
DAQOPC configuration window 2-1
Data Access Method via the OPC Interface 3-1
Data acquisition operation 3-18
Data change notification 3-19
Defining the ItemID 3-10

E

Error Codes 3-46

F

Flow of DAQOPC Operation 2-1

G

Group name 3-19
Group Object Properties 3-19

H

Hardware Requirements 1-5
Hierarchy 3-45

I

Item Properties 3-20
Item Properties (IOPCItemProperties) 3-20
Item property structure 3-44
ItemID 3-10

L

Locale ID 3-44

M

Model ii

O

OPC Automation Interface 1-8
OPC Custom Interface 1-8
OPC interface 1-1
OPC Interface Compliance 3-1
OPC Interface Functions 3-2
Overall Construction of DAQOPC 1-6

P

Process Data 3-7

Q

Quality Flag 3-7

S

Server Function 1-7
Server status structure 3-44
Server/Client Configuration 1-4
Setting Up the DAQOPC Client 2-10
Software Requirements 1-5
Starting and Stopping DAQOPC 2-9
Suffix Code ii

T

Time Stamp 3-7, 3-9

V

Value 3-7

W

What Is an OPC Interface 1-1