

General Specifications

NTPF100
Exaopc
OPC Interface Package

Exaopc

GS 36J02A10-01E

■ GENERAL

As data sharing between information systems increases, there is an increasing need to effectively access and use plant information to meet business needs in a timely manner. In the process industry, there are a variety of data sources in plant devices and databases in the control room. However, until now, it was not necessarily easy to access operation data on DCS from supervisory information systems.

To solve this problem, the Exaopc package provides an interface that is compliant with an OPC (OLE for Process Control) standard interface developed by the OPC Foundation. It also has Exaopc proprietary functions to act as a more advanced interface.

Exaopc is an OPC server running on Windows, which can be connected to a variety of PCSs (Process Control Systems) and provides an OPC client with process data via OPC interface. With the package, the OPC client can acquire and define process data from PCSs and receive alarm events.

This GS covers the specifications of the Exaopc OPC Interface Package.

■ FUNCTION SPECIFICATIONS

The Exaopc package provides the OPC specifications-compliant interface.

● Data Access (DA) Server

The DA Server reads and writes process data using item IDs as identifiers.

● Alarms & Events (A&E) Server

The A&E Server notifies alarms and events from plants that asynchronously occur. The following messages are sent to Yokogawa DCSes:

- System alarm messages
- Process alarm messages
- Mode/status change messages
- Sequence messages (*1)
- Operation guide messages (*1)
- Engineering maintenance messages (*2)
- Operation record messages (*2) (*3)
- Server internal errors

*1: Message character strings are not supported by CENTUM-XL and μ XL

*2: Not supported by μ XL

*3: Not supported by CENTUM-XL

● Historical Data Access (HDA) Server

Exaopc automatically saves instantaneous values acquired from the DA Server, to a historical database in the HDA Server. The OPC client can access historical data by connecting to the HDA Server.

● Batch Server [CS Batch 3000, CS Batch 1000] (Exaopc R3.01 or later)

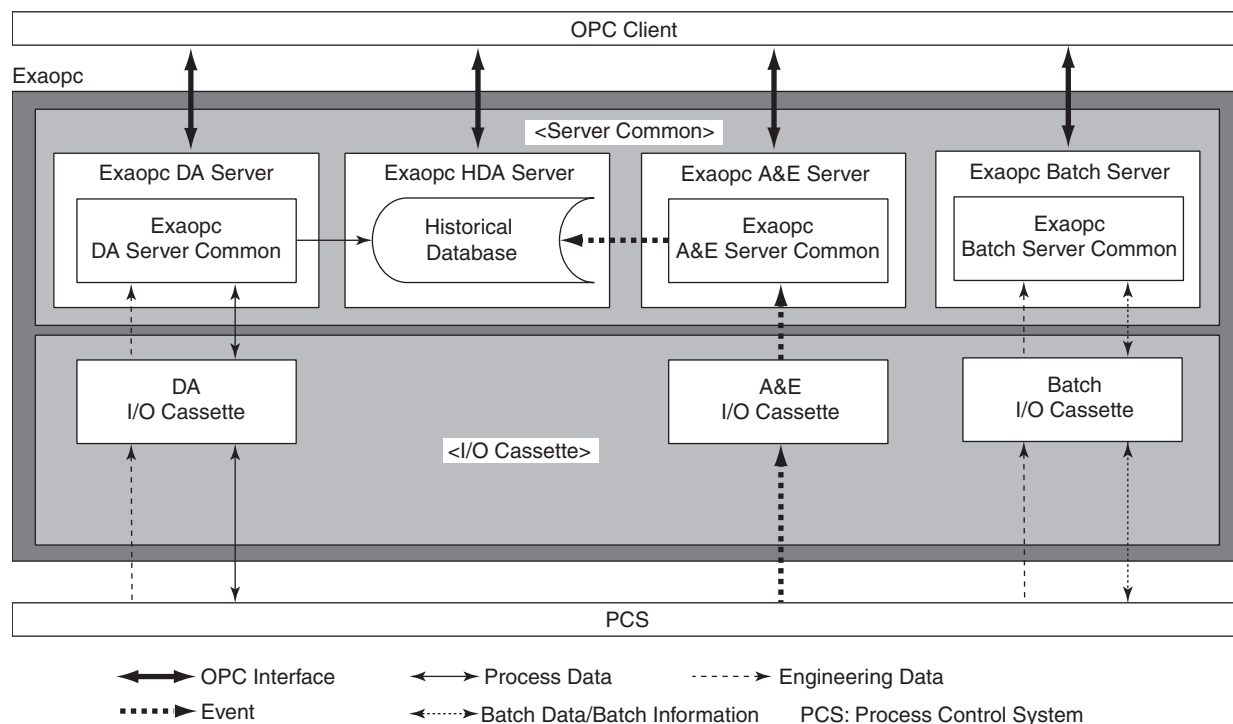
The Exaopc with Batch server (Exaopc/Batch) reads and writes the batch data and the batch related information of CS Batch 3000 and CS Batch 1000. The Exaopc/Batch can use features of DA, A&E, HDA servers.

Consult with Yokogawa to use this advanced feature.

● OPC Security Interface (Exaopc R2.10 or later)

Exaopc provides security function through OPC Security-compliant interface when OPC Client uses the features of DA, A&E, and Batch servers.

■ GENERAL CONFIGURATION



■ FEATURES

● Major Applications

Exaopc OPC Interface can be used in a wide variety of OPC client applications.

- Yokogawa packages, including Exapilot (Operation Efficiency Improvement Package)
- OPC standard compliant general-purpose applications
- User applications created by VB, VC++ or VC++ .NET

● Compliance with OPC Specifications

The Exaopc package supports OPC standard interface functions (DA/A&E/HDA, Batch, Security) specified by OPC Foundation, and many other optional functions such as browsing.

● Connectivity with Different PCs

The package can be connected to various Yokogawa DCSes (CENTUM CS 3000, CENTUM CS 1000, CENTUM CS, CENTUM-XL, μ XL), and other vendors' DCSes.

● I/O Cassette

The package consists of two layers: Server Common Part for user interfaces and common processing, and I/O Cassette Part for processing by the connected PCs. Connection with target systems can be implemented by the development of I/O Cassette, enhancing target systems and simplifying maintenance.

● Automatic Backup

The process data acquired by the DA server, are automatically saved as backup data. The OPC client does not have to request the server to save data. Users can access past acquired data.

● Equalization [CS 3000, CS 1000, CENTUM CS]

A list of tags in CENTUM can be equalized to Exaopc. When function blocks (tags) are added, deleted or changed in the FCS builder, and they are loaded, the change is notified the Exaopc on line. The package updates function block data based on the received data.

● Browsing [CS 3000, CS 1000, CENTUM CS]

Users can view the content of the OPC server from OPC client. The OPC client can access CENTUM tag list Exaopc acquired by Equalization functions.

● Security [CS 3000, CS 1000, CENTUM CS]

The package has a security (account, scope of monitoring, operation ID, operator console group, access level) dependent on the CENTUM. You can specify detailed security for the OPC client.

● Traffic Control

When accessing a large volume of data from the OPC client, the CENTUM CS system may have problems (load concentration on control stations and control buses, in particular). To prevent problems, access from the client is restricted to avoid to exceed the maximum accessible data.

● Expanded Test Functions [CS 3000, CS 1000] (Supported by Exaopc R1.10 or later)

By connecting to Expanded Test Functions on CS 3000/CS 1000, users can access the FCS simulator on a station with CS 3000/CS 1000 engineering functions. Therefore, users can perform engineering and test OPC clients without use of actual FCSS.

● Multiple Project Connection [CS 3000] (Supported by Exaopc R1.20 or later)

On Exaopc, users can use Multiple Project Connection functions for CS 3000, which enables integrated monitoring for multiple projects. This allows to handle data of CS 3000 projects, CS 1000 projects, or CS projects on Exaopc as well as the data of own project.

To use these functions, the supervisory CS 3000 system requires a Multiple Project Connection Package. Function specifications, restrictions, and operation environment for these functions are the same as for CS 3000. See GS 33Q02S10-31E "LHS5450/LHS4450 Multiple Project Connection Package" for further information.

■ CONNECTED SYSTEMS

System	Connection Method	Communication Method
CENTUM CS 3000	Directly connected to VF701 Control Bus Interface Card	Vnet
CENTUM CS 1000		
CENTUM CS		
CENTUM-XL (*1)	Via ECGW3 Gateway (*2)	Ethernet
μXL (*1)	Via MOPS Gateway (*2)	Ethernet
DCS from other vendors	Depends on each specifications (*3)	Ethernet

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*1: The sales of this product is already terminated.

*2: It is recommended that the system connects with V net via a bus converter.

*3: Please contact us.

■ SYSTEM CONFIGURATION

● Server/Client Composition

The following two client/server configurations can be used:

- The OPC client exists on a PC with Exaopc installed.
- The OPC client exists on a supervisory computer (Windows NT machine).

● Multiple Clients

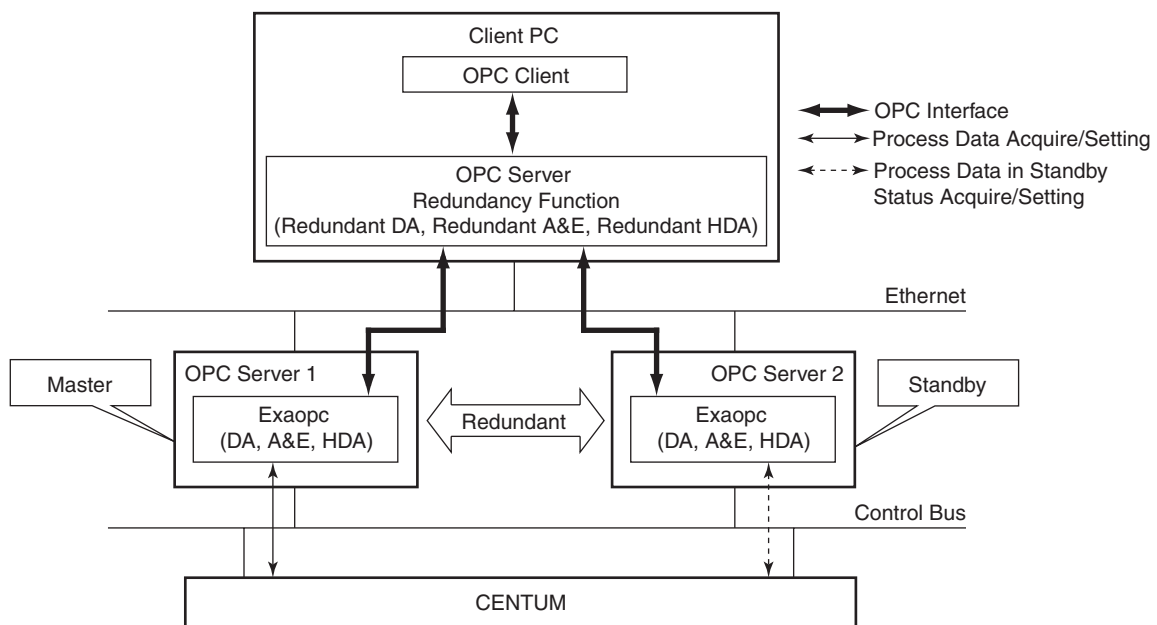
Users can access one Exaopc from multiple OPC clients.

● Multiple Servers

Users can access multiple Exaopc from one OPC client.

● Duplicated OPC Server Configuration (Exaopc R3.01 or later)

Exaopc for OPC Server redundancy (Exaopc-RD) supports the duplicated OPC server configuration. This allows monitoring two OPC servers and automatically switching the connection to OPC client when one of the servers is temporarily unavailable. Consult with Yokogawa to use this advanced feature.



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Figure: Configuration Example for Duplicated OPC Server

● CS3000/1000, CS System Configuration

- The Exaopc is directly connected to control buses via the VF701 Control Bus Interface Card, and it communicates with control stations and reads/writes tag data and receives process messages.
- The Exaopc as well as HIS/ICS automatically equalizes engineering data from the ENG/EWS Engineering Station of the CENTUM system.
- Multiple Exaopc can be connected in one system. They are counted as equivalent stations as one HIS/ICS on the system. The total number of HIS/ICS stations and Exaopc-installed PCs must not exceed the maximum number of HIS/ICS stations.
- Please set a system configuration in consideration of CPU loads of the control stations and bus loads of the control buses (V net/VL net).
- When connecting Exaopc Batch Server to CS 3000 system that has CS 3000 with Batch optional software packages, use the same configuration for connecting with regular CS 3000 system. As for CS 1000 with Batch function, use the configuration for connecting with regular CS 1000 system.

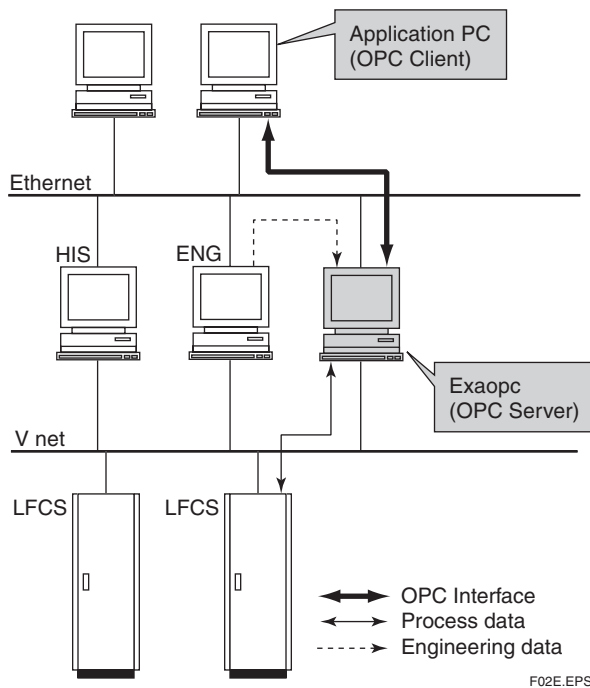


Figure: Configuration Example for CS 3000

● CENTUM-XL, μ XL System Configuration (Supported by Exaopc R1.10 or later)

- Exaopc reads/writes tag data or receives messages of the control station through its gateway station (ECGW3/MOPS).
 - Multiple Exaopc can be connected in a system, and up to two Exaopc can be connected per gateway.
 - Make sure that the gateway specifications such as application capacity or data throughput are met in fixing system configuration.
 - Up to 8 Exaopc packages for CENTUM-XL/ μ XL can be installed on a PC.
- Multiple software licenses are required for each installed Exaopc.
- For the system configuration to connect with CENTUM-XL or μ XL, Vnet configuration via a bus converter is recommendable than this gateway station configuration on throughput, functionality and other points.

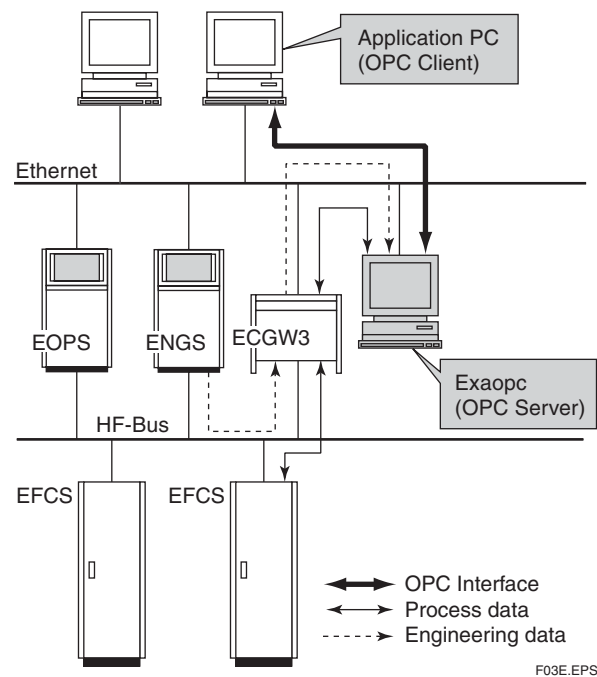


Figure: Configuration Example for CENTUM-XL

■ APPLICATION CAPACITY

OPC Server function	Item	Application capacity
DA Server	A number of clients (A number of server objects)	100 clients
	A number of groups (A number of group objects)	1000 groups
	A number of Item IDs	10000 item IDs/group 100000 item IDs/all groups
	Cache update period (Data gathering period)	1 to 3600 sec
	Max. throughput of data access (*1)	2000 item IDs/sec (CS 3000, CS 1000, and CENTUM CS) 200 item IDs/sec (CENTUM-XL) 100 item IDs/sec (μXL)
A&E Server	A number of clients (A number of server objects)	100 clients
	Max. number of event-registered objects (Max. number of event subscription objects)	1000 objects
HDA Server	A number of clients (A number of server objects)	100 clients
	A number of browser (A number of browser objects)	100 browser/server object 10000 browser/all server objects
	A number of item IDs	100000 item IDs/server object
	Max. historical data save period	Not restricted (Depends on disk capacity, its area is defined with a Record parameter)
Batch Server	A number of clients (A number of server objects)	100 clients
	A number of groups (A number of group objects)	1000 groups
	A number of item IDs	10000 item IDs/group 100000 item IDs/all groups

*1: It depends on the conditions of the project and the application.

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■ OPERATING ENVIRONMENT

● Hardware

Machine: IBM PC/AT-compatible (DOS/V) (Multiple-processor configuration is not supported)

CPU: Intel Pentium 800MHz or above (Windows XP, Windows Server 2003)
Intel Pentium 300MHz or above (Windows 2000)

Main memory: 256MB or more

Disk capacity: 4GB or more (1GB or more free space)

Communication device:

Ethernet-ready network card

To connect to CS 3000/1000/CS with Vnet configuration

NTP/VF701 Control Bus Interface Card

The 5 V PCI specifications apply to VF701 style S2. (The PCI power supply of the PC must support 5 V DC specifications.)

The 5 V PCI, 3.3 V PCI or 3.3 V PCI-X specifications apply to VF701 style S3 which is supported by Exaopc R3.10 or later.

NTP/YCB141 V net Cable (10Base-2 cable)

NTP/YCB147 Control Bus Adapter

NTP/YCB149 Control Bus Converter Unit

NTP/YCB146 T-type Connector of Control Bus

NTP/YCB148 Control Bus Terminator

To connect to CS 3000 with Vnet/IP configuration (CS 3000 R3.05 or later, and Exaopc R3.10 or later)

NTP/VI701 Vnet/IP Interface Card

● Software

The following lists the software requirements as to the Exaopc revision numbers.

Exaopc release number	OS	Windows Service Pack
R1.01, R1.10, R1.20	Windows NT Workstation or Windows NT Server 4.0	4, 5, 6a
R2.01, R2.02, R2.10	Windows NT Workstation or Windows NT Server 4.0	4, 5, 6a
	Windows 2000 Professional or Windows 2000 Server	1, 2, 3
R3.01	Windows 2000 Professional or Windows 2000 Server	1, 2, 3, 4
	Windows XP Professional	1
R3.10 (the latest)	Windows 2000 Professional or Windows 2000 Server	1, 2, 3, 4
	Windows XP Professional	1, 2
	Windows Server 2003	—

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The Exaopc Package and the Operating system (Windows) must share the same language environment.

(English version or Japanese version)

OPC Server Redundancy function runs on Windows 2000 (Exaopc R3.01, R3.10) or Windows Server 2003 (Exaopc R3.10).

The most recent Service Pack in the “Windows Service Pack” column is recommended to use for each Exaopc release number.

Only the latest version of Exaopc can be purchased.

Software compatibility

Software compatibility of Exaopc and CENTUM

Exaopc	CENTUM CS			CENTUM CS 3000/CS 1000							
	R2.08 or earlier	R2.09	R2.1x (*2)	R2.06	R2.10	R2.2x (*3)	R3.01	R3.02	R3.03	R3.04	R3.05
R1.01 (Windows NT)	—	✓	✓	✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R1.10 (Windows NT)	—	—	✓	—	✓✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R1.20 (Windows NT)	—	✓	✓	—	✓	✓✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R2.01 (Windows NT)	—	✓	✓	—	✓	✓✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R2.01 (Windows 2000)	—	✓	✓	—	✓	✓	✓✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R2.02, R2.10 (Windows NT)	—	✓	✓	—	✓	✓✓	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)	✓ (*1)
R2.02, R2.10 (Windows 2000)	—	✓	✓	—	✓	✓	✓	✓✓	✓ (*1)	✓ (*1)	✓ (*1)
R3.01 (Windows XP/2000)	—	—	✓	—	✓	✓	✓✓	✓✓	✓✓	✓ (*1)	✓ (*1)
R3.10 (Windows XP/2003/2000)	—	—	✓	—	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓

✓✓ : Compatible. Expanded Test Functions of Exaopc is available only this combination.

✓ : Compatible. However, Expanded Test Functions of Exaopc is not available.

— : Contact Yokogawa, for the details of compatibility.

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*1: In this combination since the Exaopc is older than CENTUM CS 3000/CS 1000, the Exaopc does not fully support newly added functions of CENTUM CS 3000/CS 1000 R3.01 or later.

*2: CENTUM CS R2.1x includes R2.10, R2.11, R2.12, R2.13, and R2.14.

*3: CENTUM CS 3000/CS 1000 R2.2x includes R2.20, R2.21, R2.22 and R2.23.

Revision Compatibility of Exaopc Batch Server and CS Batch 3000/CS Batch 1000

Exaopc/Batch	CS Batch 3000/CS Batch 1000							
	R2.06	R2.10	R2.2x (*1)	R3.01	R3.02	R3.03	R3.04	R3.05
R3.01	NC	NC	NC	NC	NC	✓	✓	—
R3.10	NC	NC	NC	NC	NC	—	—	✓

✓ : Compatible NC: Not compatible — : Contact Yokogawa, for the details of compatibility.

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*1: CS Batch 3000/CS Batch 1000 with Batch Function R2.2x includes R2.20, R2.21, R2.22 and R2.23
Exaopc Batch Server does not support Multiple Project Connection function.

Optional software

To connect to the μ XL system, the following optional software are required:

MAPF-S221 Ethernet Communication Package for EN83

MAPF-S311 Ethernet Computer Communication Package for EN83

Version of Visual Basic and Visual C++

The following version of Visual Basic and Visual C++ is prerequisite to develop and execute a client application.

Exaopc	Exaopc and user AP are on the same PC	Exaopc and user AP are on different PCs
R1.01 (Windows NT)	VB 5.0, VC++5.0 (SP4) (*1)	VB 5.0/6.0, VC++5.0/6.0
R1.10 (Windows NT)	VB 6.0, VC++6.0 (SP3) (*1)	
R1.20 (Windows NT)		
R2.01 (Windows NT)		
R2.01 (Windows 2000)		
R2.02, R2.10 (Windows NT)	VB 6.0, VC++6.0 (SP3) (*1)	
R2.02, R2.10 (Windows 2000)	VB 6.0, VC++6.0 (SP5) (*1)	
R3.01 (Windows XP/2000)	VB 6.0, VC++6.0 (SP5) (*1)	
R3.10 (Windows XP/2003/2000)	VB 6.0, VC++6.0 (SP5) (*1) VC++ .NET	VB 5.0/6.0, VC++5.0/6.0 VC++ .NET

*1: Verify in user application program, if any other versions are used.

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When OPC client program that accesses Exaopc DA/A&E/HDA Server is configured with the VB application, it is recommended to use the Exaopc Client Library of Yokogawa System Engineering Corporation (model: NTPT900) for VB programmer.

The Library provides OPC connection functionality with the ActiveX component.

The recent versions for Exaopc R3.10 or later will support VB.NET development environment.

When OPC client program accesses Exaopc A&E server R3.10 or later using NTPT900, use the new version of NTPT900 supporting Exaopc R3.10 for revision compatibility.

Visit the web site of OPC Foundation at <http://www.opcfoundation.org/> for OPC interfaces.

● Installation of Multiple Exaopc

Multiple Exaopc of only CENTUM-XL cassette and μ XL cassette can be installed to one PC for Exaopc.

Type of cassette	CS cassette (*1)	XL/ μ XL cassette
CS cassette (*1)	✓✓	✓✓
XL/ μ XL cassette	✓✓	✓ (*2)

✓ : Can install multiple Exaopc

✓✓ : Can install only one Exaopc

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*1: CS cassette includes CS 3000 cassette, CS 1000 cassette, and CNETUM CS cassette.

*2: The mix of CENTUM-XL and μ XL cassette is possible. Can install up to 8 cassettes.

● Compatibility of PC Extended slot, Vet Interface card (VF701) and Exaopc revision number [CS 3000, CS 1000, CENTUM CS]

The VF701 style S3 supports PCI extended slots such as the PCI-X slot, which requires Exaopc R3.10 or later. The table below shows the compatibility of the PC extended slots, the VF701 styles, and the Exaopc revisions.

Compatibility of PC Extended slot, VF701 and Exaopc revision number

PC Extended slot		VF701 style S2 (PCI for 5 V)		VF701 style S3 (PCI for 5 V, 3.3 V)	
		Exaopc R3.01.50 or earlier	Exaopc R3.10 or later	Exaopc R3.01.50 or earlier	Exaopc R3.10 or later
PCI R2.X	5 V, 32 bit	✓	✓	✓	✓
	3.3 V, 32 bit	—	—	—	✓
PCI-X	3.3 V, 64 bit	—	—	—	✓ (*1)

✓ : Available — : Not available

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*1: The transfer rate of both style S2 and style S3 are 32 bit at 33 MHz.

● Revision Compatibility of Server and Client setup

The following table describes the revision compatibility between Exaopc (OPC server) and Client setup (Environmental setup for OPC clients). Please take notice of accessing multiple, different revision of Exaopc from an OPC client.

Exaopc Revision (OPC Server)	Exaopc Client setup Revision (OPC client) (*1)							
	R1.01	R1.10	R1.20	R2.01 (Windows NT/2000)	R2.02 (Windows NT/2000)	R2.10 (Windows NT/2000)	R3.01 (Windows XP/2000)	R3.10 (Windows XP/2003/2000)
R1.01 (Windows NT)	✓	NC	NC	NC	NC	NC	NC	NC
R1.10 (Windows NT)	NC	✓	✓	✓	✓	✓	✓	✓
R1.20 (Windows NT)	NC	✓ (*2)	✓	✓	✓	✓	✓	✓
R2.01 (Windows NT/2000)	NC	✓ (*2)	✓ (*2)	✓	✓	✓	✓	✓
R2.02 (Windows NT/2000)	NC	✓ (*2)	✓ (*2)	✓ (*2)	✓	✓	✓	✓
R2.10 (Windows NT/2000)	NC	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓	✓	✓
R3.01 (Windows XP/2000)	NC	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓	✓
R3.10 (Windows XP/2003/2000)	NC	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓ (*2)	✓

✓ : Compatible NC: Not compatible. Some functions are invalid. Upgrade Exaopc or OPC client.

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*1: The revision number of Client setup is actually the revision of Exaopc that client setup is done via floppy disk or network.

*2: This revision number of Client setup does not support the interface that the later version of Exaopc supports. Upgrade OPC client to support the interface.

■ SUPPORTED OPC SPECIFICATIONS

The Exaopc package provides the OPC client with an interface with the following specifications:
Exaopc has passed the OPC DA2 Compliance Test.

● DA Server

- OPC Data Access Custom Interface Specification Version 2.05a
- OPC Data Access Automation Specification Version 2.0
- OPC Security Custom Interface Specification Version 1.0

● A&E Server

- OPC Alarms and Events Version 1.10 (Exaopc R3.10) (*1)
- OPC Alarms and Events Automation Specification Version 1.0 (draft)
- OPC Security Custom Interface Specification Version 1.0

*1: OPC Alarms and Events Version 1.0 had been supported by Exaopc R3.01.50 or earlier.
The specification range of the "severity" for the SetFilter method is changed from "0 to 1000" (A&E1.0) to "1 to 1000" (A&E1.10).
When "severity=0 value" is set for the SetFilter method to Exaopc A&E1.10 OPC server, an error code will be returned by Exaopc because it is out of range.
Be sure to use A&E version compatible with both Exaopc and an OPC client accordingly.

● HDA Server

- OPC Historical Data Access Custom Interface Version 1.1
- OPC Historical Data Access Automation Interface Version 1.0 (draft)

● Batch Server

- OPC Batch Custom Interface Specification Version 1.0
- OPC Batch Automation Specification Version 1.0
- OPC Security Custom Interface Specification Version 1.0

■ ANNUAL MAINTENANCE AGREEMENT

Annual maintenance agreement is required from the first year. The agreement extends for a year from the delivery and must be renovated once a year. Services by the agreement covers providing remedies for troubles and providing updated package.

■ MODEL AND SUFFIX CODE

		Description
Model	NTPF100	Exaopc OPC Interface Package
Suffix Codes	-S	Basic Software License (with media)
	1	For CENTUM CS 3000 (DA, A&E, HDA Server Functions)
	2	For CENTUM CS 1000 (DA, A&E, HDA Server Functions)
	3	For CENTUM CS (DA, A&E, HDA Server Functions)
	4	For CENTUM-XL (DA, A&E, HDA Server Functions)
	5	For μ XL (DA, A&E, HDA Server Functions)
	A	For general-purpose system (*1)
	B	For CENTUM CS Batch 3000 (DA, A&E, HDA, Batch Server Functions; Exaopc/Batch) (*1)
	C	For CENTUM CS Batch 1000 (DA, A&E, HDA, Batch Server Functions; Exaopc/Batch) (*1)
	X	For OPC Server Redundancy (Exaopc-RD) (*1)
Option Codes	1	English version
	/Y-QTM	For Yokogawa OPC Clients : Exaquantum
	/Y-PLT	For Yokogawa OPC Clients : Exapilot
	/Y-SMC	For Yokogawa OPC Clients : Exasmoc
	/Y-RQE	For Yokogawa OPC Clients : Exarqe
	/Y-OMS	For Yokogawa OPC Clients : Exaoms
	/Y-CTM	For Yokogawa OPC Clients : CENTUM Optional-Software
	/Y-CLB	For Yokogawa OPC Clients : Exaopc Client Library (for VB programming)
	/Y-TRF	For Yokogawa OPC Clients : TriFellows
	/Y-OTH	For Yokogawa OPC Clients : Other products

*1: Consult with Yokogawa to use this Suffix Code.

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■ ORDERING INSTRUCTION

Specify model and suffix codes.

■ TRADEMARK

- Exaopc, Exapilot, Exaquantum, Exasmoc or Exarqe are registered trademarks of Yokogawa Electric Corporation.
- CENTUM is a registered trademark of Yokogawa Electric Corporation.
- Windows, ActiveX, Visual Basic, Visual C++ are registered trademarks of Microsoft Corporation.
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- Pentium is a registered trademark of Intel Corporation.
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